

# 2022–23 Bulletin

School of Medicine



Washington University in St. Louis



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## About This Bulletin

The graduate and professional *Bulletins* are the catalogs of programs, degree requirements, courses that may be offered and course descriptions, pertinent university policies and faculty of the following schools of Washington University in St. Louis: Architecture & Urban Design; Art; Arts & Sciences; Business; Engineering; Law; Medicine; and Social Work & Public Health.

The *University College Bulletin* is the catalog of University College, the professional and continuing education division at Washington University in St. Louis. The catalog includes programs, degree requirements, course descriptions and pertinent university policies for students earning a degree through University College.

The 2022-23 *Bulletin* is entirely online but may be downloaded in PDF format for printing. Individual pages as well as information from individual tabs may be downloaded in PDF format using the PDF icon in the top right corner of each page. To download the full PDF, please choose from the following:

- Architecture & Urban Design Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Grad\\_Arch.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Grad_Arch.pdf))
- Art Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Grad\\_Art.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Grad_Art.pdf))
- Arts & Sciences Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Grad\\_Arts\\_Sciences.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Grad_Arts_Sciences.pdf))
- Business Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Grad\\_Business.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Grad_Business.pdf))
- Engineering Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Grad\\_Engineering.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Grad_Engineering.pdf))
- Law Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Law.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Law.pdf))
- Medicine Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Medicine.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Medicine.pdf))
- Social Work & Public Health Bulletin (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_Brown.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_Brown.pdf))
- University College Bulletin (undergraduate & graduate) (PDF) ([http://bulletin.wustl.edu/grad/Bulletin\\_2022-23\\_UCollege.pdf](http://bulletin.wustl.edu/grad/Bulletin_2022-23_UCollege.pdf))

The degree requirements and policies listed in the 2022-23 *Bulletin* apply to students entering Washington University during the 2022-23 academic year. For more information, please visit the Catalog Editions (p. 10) page.

Every effort is made to ensure that the information, applicable key policies and other materials presented in the *Bulletin* are accurate and correct as of the date of publication (July 1, 2022). To view a list of changes that have taken place after that date, visit the Program & Policy Updates page (<http://bulletin.wustl.edu/about/updates/>).

[bulletin.wustl.edu/about/updates/](http://bulletin.wustl.edu/about/updates/)). Please note that the *Bulletin* highlights key university policies applicable to its students. Not all applicable university and departmental policies are included here.

Washington University reserves the right to make changes at any time without prior notice to the *Bulletin* and to university policies. Therefore, the electronic version of the *Bulletin* as published online is considered the official, governing document, and it may change from time to time without notice.

The next edition of the *Bulletin* will be published on July 5, 2023. In the interim, semester course offerings will be found in Washington University's Course Listings (<https://courses.wustl.edu/Semester/Listing.aspx>); these are usually available at the end of September for the upcoming spring semester, in early February for the upcoming summer semester, and in late February for the upcoming fall semester. Midyear changes to current courses (titles, descriptions, and credit units) are not reflected in this *Bulletin* and will only appear in the Course Listings. For more information about determining the appropriate edition of the Bulletin to consult, please visit the Catalog Editions page (p. 10) in the About This Bulletin section (<http://bulletin.wustl.edu/about/>).

For the most current information about registration and available courses, visit WebSTAC (<https://acadinfo.wustl.edu>) and Course Listings (<https://courses.wustl.edu/Semester/Listing.aspx>), respectively. Please email the Bulletin editor, Jennifer Gann, ([jennifer.gann@wustl.edu](mailto:jennifer.gann@wustl.edu)) with any questions concerning the *Bulletin*.

## Bulletin Policies

### Changes to the Bulletin

Every effort is made to ensure that the information, policies and other materials presented in the *Bulletin* are accurate and correct as of the date of publication. For more information about the content review process for the Bulletin, please visit the Catalog Editions page (p. 10).

The *Bulletin* for the upcoming academic year is published annually on July 1, and certain post-publication changes may be made until October 1. To view a list of changes that have taken place after the July 1 publication date, please visit the Program & Policy Updates page (<http://bulletin.wustl.edu/about/updates/>).

Washington University reserves the right to make changes at any time without prior notice. Therefore, the electronic version of the *Bulletin* and the policies set forth therein may change from time to time without notice. The governing document at any given time is the then-current version of the *Bulletin*, as published online, and then-currently applicable policies and information are those contained in that *Bulletin*.

## Discontinued Programs

Periodically, Washington University schools will change their program offerings. If a program is no longer accepting applicants, we will note this in the *Bulletin*, and soon after the program will be removed from the *Bulletin*. Students who are actively enrolled in these programs will be held to the requirements and policies published in the *Bulletin* from their year of matriculation. If a student has not been continuously enrolled in such a program and now wishes to inquire whether a discontinued program can still be completed, they should contact the relevant department or school to determine whether this opportunity is available.

## Year of Matriculation

Students who attend Washington University are held to the policies in place as published in the *Bulletin* during their year of matriculation. For more information, please visit the Catalog Editions page (p. 10).

## Course Numbering

Courses at Washington University are coded by department and include a three- or four-digit number that generally means the following, although students should check with the school or department offering the courses to be certain:

- 100 to 199 are primarily for first-year students;
- 200 to 299 are primarily for sophomores;
- 300 to 399 are primarily for juniors;
- 400 to 499 are primarily for juniors and seniors, although certain courses may carry graduate credit; and
- 500 and above are offered to graduate students and to juniors and seniors who have met all stated requirements. (If there are no stated requirements, juniors and seniors should obtain permission of the instructor.)

*For example:* Course L07 105 is an introductory course offered by the Department of Chemistry (L07).

The presence of a course in this *Bulletin* signifies that it is part of the curriculum currently offered and may be scheduled for registration. Enrollment requirements are determined by term.

## Curriculum Designators

The designators shown below are used in Washington University's course descriptions and listed here alphabetically by code. The primary fields covered in each section are also listed.

## A (Architecture)

Code	Name
A46 ARCH	Architecture
A48 LAND	Landscape Architecture
A49 MUD	Urban Design
AS1 MedSoc	Medicine and Society
AS2 PCS	Process Control Systems
AS3 UMSLEN	UMSL Joint Engineering Program

## B (Business)

Code	Name
B50 ACCT	Accounting
B51 ADMN	Administration
B52 FIN	Finance
B53 MGT	Management
B54 MEC	Managerial Economics
B55 MKT	Marketing
B56 OB	Organizational Behavior
B57 SCOT	Supply Chain, Operations, and Technology
B59 DAT	Data Analytics
B60 ACCT	Graduate Accounting
B62 FIN	Graduate Finance
B63 MGT	Graduate Management
B64 MEC	Graduate Managerial Economics
B65 MKT	Graduate Marketing
B66 OB	Graduate Organizational Behavior
B67 SCOT	Graduate Supply Chain, Operations, and Technology
B69 DAT	Graduate Data Analytics
B90 BEE	Brookings Executive Education
B99 INTL	International Studies

## E (Engineering)

Code	Name
E35 ESE	Electrical & Systems Engineering
E37 MEMS	Mechanical Engineering & Materials Science
E44 EECE	Energy, Environmental & Chemical Engineering
E60 Engr	General Engineering
E62 BME	Biomedical Engineering
E81 CSE	Computer Science & Engineering



## F (Art)

Code	Name
F00 Art	Art
F10 ART	Art (Core and Major Studio Courses)
F20 ART	Art (Elective Studio Courses)

## I (Interdisciplinary Programs)

Code	Name
I02 MAIR	Military Aerospace Science
I25 MILS	Military Science
I50 INTER	Interdisciplinary Studies
I52 IMSE	Institute of Materials Science & Engineering
I53 DCDS	Division of Computational and Data Sciences
I60	Beyond Boundaries
BEYOND	

## L (Arts & Sciences)

Code	Name
L01 Art-Arch	Art History and Archaeology
L03 East Asia	East Asian Studies
L04 Chinese	Chinese
L05 Japan	Japanese
L07 Chem	Chemistry
L08 Classics	Classics
L09 Greek	Greek
L10 Latin	Latin
L11 Econ	Economics
L12 Educ	Education
L13 Writing	Writing
L14 E Lit	English Literature
L15 Drama	Drama
L16 Comp Lit	Comparative Literature
L18 URST	Urban Studies
L19 EPSc	Earth and Planetary Sciences
L21 German	Germanic Languages and Literatures
L22 History	History
L23 Re St	Religious Studies
L24 Math	Mathematics and Statistics
L27 Music	Music
L28 P.E.	Physical Education
L29 Dance	Dance

L30 Phil	Philosophy
L31 Physics	Physics
L32 Pol Sci	Political Science
L33 Psych	Psychological & Brain Sciences
L34 French	French
L36 Ital	Italian
L37 Portug	Portuguese
L38 Span	Spanish
L39 Russ	Russian
L40 SOC	Sociology
L41 Biol	Biology and Biomedical Sciences
L43 GeSt	General Studies
L44 Ling	Linguistics
L45 LatAm	Latin American Studies
L46 AAS	Asian American Studies
L48 Anthro	Anthropology
L49 Arab	Arabic
L50 Pol Econ	Political Economics
L51 Korean	Korean
L52 ARC	Archaeology
L53 Film	Film and Media Studies
L56 CFH	Center for the Humanities
L57 RelPol	Center on Religion and Politics
L59 CWP	College Writing Program
L61 FYP	First-Year Programs
L62 Praxis	Praxis
L63 IPMS	Movement Science
L64 PNP	Philosophy-Neuroscience-Psychology
L66 ChSt	Children's Studies
L73 Hindi	Hindi
L74 HBRW	Hebrew
L75 JIMES	Jewish, Islamic, and Middle Eastern Studies
L77 WGSS	Women, Gender, and Sexuality Studies
L78 RoLit	Romance Languages and Literatures
L79 EuSt	European Studies
L81 EALC	East Asian Languages & Cultures
L82 EnSt	Environmental Studies
L83 Russ St	Russian Studies
L84 Lw St	Legal Studies
L85 MedH	Medical Humanities
L86 PBPM Study	Biological & Physical Sciences for PBPM Study
L88 NrsSci	Nursing Science
L89 Sphr	Speech and Hearing
L90 AFAS	African and African-American Studies

L92 APL	Applied Linguistics
L93 IPH	Interdisciplinary Project in the Humanities
L97 GS	Global Studies
L98 AMCS	American Culture Studies
L99 OSP	Overseas Programs
LGS GSAS	The Graduate School

## M (Medicine)

Code	Name
M01 OT	Occupational Therapy Program
M02 PhysTher	Physical Therapy Program-Grad
M04 FYSelect	First-Year Selectives
M05 Neurosci	Neuroscience
M10 Anesth	Anesthesiology
M15 Biochem	Biochemistry and Molecular Biophysics
M17 CLNV	Clinical Investigation
M18 BMI	Biomedical Informatics
M19 PHS	Population Health Sciences
M20 Genetics	Genetics
M21 MSB	Biostatistics and Genetic Epidemiology
M25 Medicine	Internal Medicine
M26 FamMed	Family Medicine
M27 EMED	Emergency Medicine
M30 MoIMB	Molecular Microbiology
M35 Neurol	Neurology
M40 NeurSurg	Neurological Surgery
M45 ObGyn	Obstetrics and Gynecology
M50 Ophth	Ophthalmology and Visual Sciences
M55 Oto	Otolaryngology
M60 Path	Pathology
M65 Peds	Pediatrics
M70 MoIBio/Pha	Molecular Biology and Pharmacology
M75 CellBio	Cell Biology and Physiology
M79 HealthAdm	Health Administration Program
M80 Interdis	Interdisciplinary
M81 Gateway	Gateway Curriculum

M85 Psych	Psychiatry
M88 AHBR	Applied Health Behavior Research
M89 PACS	Audiology and Communication Sciences
M90 Radiol	Radiology
M91 MedPhys	Medical Physics
M92 RadOnc	Radiation Oncology
M95 Surgery	Surgery
M96 Ortho	Orthopedic Surgery
M99 Ind Stdy	Independent Study

## S (Social Work and Public Health)

Code	Name
S15 SWCR	Core
S20 SWHS	History & Professional Theme
S30 SWDP	Direct Practice
S31 SWDP	Direct Practice
S40 SWSP	Social Policy
S48 SWSP	Social Policy
S49 SCWK	Social Work
S50 SWSA	Social Administration
S55 MPH	Public Health
S60 SWCD	Community Development
S65 SWCD	Community Development
S70 SWPR	Practicum
S80 SCWK	Social Work
S81 SKILL	Skill Labs
S90 SWDT	Doctoral
S91 PSTM	Post-Master Certificate

## T (Engineering - Joint Program & Sever Institute)

Code	Name
T11 JCS	Joint Introduction to Computing
T40 SYSIN	Systems Integration
T54 PRJM	Project Management
T55 ETEM	Engineering Management
T60 GSever	General Professional Education
T64 CNST	Construction Management

T71	Health Care Operations
HLHCARE	
T81 INFO	Information Management
T83 CYBER	Cybersecurity Management
T93 CSM	Cybersecurity Management (Online)

## U (University College)

Code	Name
U02	Classics
Classics	
U03 GS	General Studies
U05 Chem	Chemistry
U07 Econ	Economics
U08 Educ	Education
U09 Psych	Psychological & Brain Sciences (Psychology)
U10 ArtArch	Art History and Archaeology
U11 EComp	English Composition
U12 Fr	French
U13 EPSc	Earth and Planetary Sciences
U14	Germanic Languages and Literatures
German	
U15 ELP	English Language Programs
U16 Hist	History
U18 Film	Film and Media Studies
U19 SUST	Sustainability
U20 Math	Mathematics and Statistics
U21 Drama	Drama
U22 Phil	Philosophy
U23 Phys	Physics
U24 Mus	Music
U25 PolSci	Political Science
U26 Port	Portuguese
U27 Span	Spanish
U29 Bio	Biology
U30 Spch	Speech
U31 Dance	Dance and Somatic Movement Studies
U32	Comparative Literature
CompLit	
U35 Arab	Arabic
U36 Japan	Japanese
U37 Hebr	Hebrew
U38	Chinese
Chinese	
U39 Russ	Russian
U40 Ital	Italian
U43 IS	International Studies
U44 Bus	Business

U47 IRISH	Irish Studies
U48 Comm	Communications
U49 JRN	Journalism
U51	Korean
KOREAN	
U56 ISLA	Integrated Studies in Liberal Arts
U65 ELit	English and American Literature
U66 RelSt	Religious Studies
U67 LAS	Latin American Studies
U68 SOC	Sociology
U69 Anthro	Anthropology
U73 Hindi	Hindi
U74 Sci	Science
U76 NPM	Nonprofit Management
U78 EAsia	East Asian Studies
U79 Art	Art
U80 CRM	Clinical Research Management
U82 CIM	Computers and Information Management
U84 AFAS	African and African-American Studies
U85 IA	International Affairs
U86	Health Care
HCARE	
U87 HRM	Human Resources Management
U89 AMCS	American Culture Studies
U90 GIS	Geographic Information Systems
U91 Ling	Linguistics
U92 WGSS	Women, Gender, and Sexuality Studies
U93 Scan	Scandinavian
U94 JME	Jewish, Islamic, and Middle Eastern Studies
U96 DLA	DLA Seminars
U98 MLA	MLA Seminars

## W (Law)

Code	Name
W74 LAW	Law

## X (Design & Visual Arts)

Code	Name
X10	Design & Visual Arts - Core
XCORE	
X20 XELEC	Design & Visual Arts - Elective

## Catalog Editions

The courses and policies listed in this *Bulletin* are subject to change at any time through normal approval channels within Washington University. New courses, changes to existing course work and new policies are initiated by the appropriate

institutional departments, committees or administrators. Academic policy revisions are generally implemented in the next academic year following notification thereof. Washington University publishes a new edition of the *Bulletin* each July, and its contents apply to the subsequent fall, spring, and summer terms. Occasionally a policy or requirement must be changed and implemented during the same academic year (e.g., in the case of relevant external requirements such as state regulations). All changes must be approved by college or school personnel who oversee academic curriculum and policies.

Washington University students must complete the graduation requirements in effect during the term that they matriculated into their program of study as published in the edition of the *Bulletin* from that academic year. Undergraduates who initially enroll in a summer term to pursue a special program follow requirements for the subsequent fall term. Students will need to check their school's processes to potentially change applicable catalog years or alter their degree requirements.

Students should review specific Washington University and individual school policies related to transfer credit, changing programs, leaves of absence, and military service.

## Prior Bulletins

To find program details, course descriptions, and relevant policies, choose the year of enrollment below to find the available *Bulletins*. If the required year is not shown or the school's *Bulletin* is not available, please email the Office of the University Registrar ([registrar@wustl.edu](mailto:registrar@wustl.edu)) with specifics of the needed information.

### 2021-2022

- Graduate Architecture & Urban Design Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/grad/architecture/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Grad\\_Arch.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Grad_Arch.pdf)))
- Graduate Art Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/grad/art/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Grad\\_Art.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Grad_Art.pdf)))
- Graduate Arts & Sciences Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/grad/gsas/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Grad\\_School.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Grad_School.pdf)))
- Graduate Business Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/grad/business/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Grad\\_Business.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Grad_Business.pdf)))
- Graduate Engineering Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/grad/engineering/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Grad\\_Engineering.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Grad_Engineering.pdf)))

- Law Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/law/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Law.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Law.pdf)))
- Medicine Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/medicine/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Medicine.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Medicine.pdf)))
- Social Work & Public Health Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/brownschool/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Brown.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Brown.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2021-22/undergrad/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_Undergraduate.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_Undergraduate.pdf)))
- University College Bulletin (HTML: Undergraduate (<https://bulletin.wustl.edu/prior/2021-22/undergrad/ucollege/>), Graduate (<https://bulletin.wustl.edu/prior/2021-22/grad/ucollege/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2021-22\\_UCollege.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2021-22_UCollege.pdf)))

### 2020-2021

- Graduate Architecture & Urban Design Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/grad/architecture/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Grad\\_Arch.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Grad_Arch.pdf)))
- Graduate Art Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/grad/art/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Grad\\_Art.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Grad_Art.pdf)))
- Graduate Arts & Sciences Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/grad/gsas/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Grad\\_School.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Grad_School.pdf)))
- Graduate Business Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/grad/business/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Grad\\_Business.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Grad_Business.pdf)))
- Graduate Engineering Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/grad/engineering/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Grad\\_Engineering.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Grad_Engineering.pdf)))
- Law Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/law/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Law.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Law.pdf)))
- Medicine Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/medicine/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Medicine.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Medicine.pdf)))
- Social Work & Public Health Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/brownschool/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Brown.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Brown.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2020-21/undergrad/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_Undergraduate.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_Undergraduate.pdf)))

- University College Bulletin (HTML: Undergraduate (<https://bulletin.wustl.edu/prior/2020-21/undergrad/ucollege/>), Graduate (<https://bulletin.wustl.edu/prior/2020-21/grad/ucollege/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2020-21\\_UCollege.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2020-21_UCollege.pdf)))

## 2019-2020

- Graduate Architecture & Urban Design Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/grad/architecture/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_grad\\_architecture.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_grad_architecture.pdf)))
- Graduate Art Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/grad/art/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_grad\\_art.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_grad_art.pdf)))
- Graduate Arts & Sciences Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/grad/gsas/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_graduate\\_school.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_graduate_school.pdf)))
- Graduate Business Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/grad/business/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_grad\\_business.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_grad_business.pdf)))
- Graduate Engineering Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/grad/engineering/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_grad\\_engineering.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_grad_engineering.pdf)))
- Law Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/law/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_law.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_law.pdf)))
- Medicine Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/medicine/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_medicine.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_medicine.pdf)))
- Social Work & Public Health Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/brownschool/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_brownschool.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_brownschool.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2019-20/undergrad/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_undergraduate.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_undergraduate.pdf)))
- University College Bulletin (HTML: Undergraduate (<https://bulletin.wustl.edu/prior/2019-20/undergrad/ucollege/>), Graduate (<https://bulletin.wustl.edu/prior/2019-20/grad/ucollege/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2019-20\\_university\\_college.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2019-20_university_college.pdf)))

## 2018-2019

- Graduate Architecture & Urban Design Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/grad/architecture/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_grad\\_architecture.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_grad_architecture.pdf)))

- Graduate Art Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/grad/art/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_grad\\_art.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_grad_art.pdf)))
- Graduate Arts & Sciences Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/grad/gsas/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_graduate\\_school.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_graduate_school.pdf)))
- Graduate Engineering Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/grad/engineering/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_grad\\_engineering.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_grad_engineering.pdf)))
- Law Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/law/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_law.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_law.pdf)))
- Medicine Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/medicine/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_medicine.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_medicine.pdf)))
- Social Work & Public Health Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/brownschool/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_brownschool.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_brownschool.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2018-19/undergrad/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_undergraduate.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_undergraduate.pdf)))
- University College Bulletin (HTML: Undergraduate (<https://bulletin.wustl.edu/prior/2018-19/undergrad/ucollege/>), Graduate (<https://bulletin.wustl.edu/prior/2018-19/grad/ucollege/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2018-19\\_university\\_college.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2018-19_university_college.pdf)))

## 2017-2018

- Graduate Architecture & Urban Design Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/grad/architecture/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_grad\\_architecture.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_grad_architecture.pdf)))
- Graduate Art Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/grad/art/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_grad\\_art.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_grad_art.pdf)))
- Graduate Arts & Sciences Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/grad/gsas/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_graduate\\_school.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_graduate_school.pdf)))
- Graduate Engineering Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/grad/engineering/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_grad\\_engineering.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_grad_engineering.pdf)))
- Law Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/law/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_law.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_law.pdf)))
- Medicine Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/medicine/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_medicine.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_medicine.pdf)))

- Social Work & Public Health Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/brownschool/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_brownschool.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_brownschool.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2017-18/undergrad/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_undergraduate.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_undergraduate.pdf)))
- University College Bulletin (HTML: Undergraduate (<https://bulletin.wustl.edu/prior/2017-18/undergrad/ucollege/>), Graduate (<https://bulletin.wustl.edu/prior/2017-18/grad/ucollege/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2017-18\\_university\\_college.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2017-18_university_college.pdf)))

## 2016-2017

- Graduate Architecture & Urban Design Bulletin (HTML (<https://bulletin.wustl.edu/prior/2016-17/grad/architecture/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2016-17\\_grad\\_architecture.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2016-17_grad_architecture.pdf)))
- Graduate Art Bulletin (HTML (<https://bulletin.wustl.edu/prior/2016-17/grad/art/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2016-17\\_grad\\_art.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2016-17_grad_art.pdf)))
- Graduate Arts & Sciences Bulletin (HTML (<https://bulletin.wustl.edu/prior/2016-17/grad/gsas/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2016-17\\_graduate\\_school.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2016-17_graduate_school.pdf)))
- Graduate Engineering Bulletin (HTML (<https://bulletin.wustl.edu/prior/2016-17/grad/engineering/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2016-17\\_grad\\_engineering.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2016-17_grad_engineering.pdf)))
- Medicine Bulletin (PDF (<http://bulletin.wustl.edu/about/prior/bulletin17.pdf>))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2016-17/undergrad/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2016-17\\_undergraduate.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2016-17_undergraduate.pdf)))
- University College Bulletin (HTML: Undergraduate (<https://bulletin.wustl.edu/prior/2016-17/undergrad/ucollege/>), Graduate (<https://bulletin.wustl.edu/prior/2016-17/grad/ucollege/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2016-17\\_university\\_college.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2016-17_university_college.pdf)))

## 2015-2016

- Graduate Arts & Sciences Bulletin (HTML (<https://bulletin.wustl.edu/prior/2015-16/gsas/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2015-16\\_gsas.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2015-16_gsas.pdf)))
- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2015-2016\\_Bulletin\\_FINAL\\_3-2-16\\_.pdf](http://bulletin.wustl.edu/about/prior/2015-2016_Bulletin_FINAL_3-2-16_.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2015-16/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2015-16\\_undergraduate.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2015-16_undergraduate.pdf)))

## 2014-2016

- University College Bulletin (undergraduate & graduate) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2014-2016\\_UCollege.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2014-2016_UCollege.pdf)))

## 2014-2015

- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2014-2015\\_bulletin.pdf](http://bulletin.wustl.edu/about/prior/2014-2015_bulletin.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2014-15/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2014-2015.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2014-2015.pdf)))

## 2013-2014

- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2013-2014\\_bulletin.pdf](http://bulletin.wustl.edu/about/prior/2013-2014_bulletin.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2013-14/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_13-14.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_13-14.pdf)))

## 2012-2015

- Graduate Arts & Sciences Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/GSAS\\_Bulletin\\_2012-2015.pdf](http://bulletin.wustl.edu/about/prior/GSAS_Bulletin_2012-2015.pdf)))

## 2012-2014

- University College Bulletin (undergraduate & graduate) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_2012-2014\\_UCollege.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_2012-2014_UCollege.pdf)))

## 2012-2013

- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2012-2013\\_bulletin.pdf](http://bulletin.wustl.edu/about/prior/2012-2013_bulletin.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2012-13/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_12-13.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_12-13.pdf)))

## 2011-2012

- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2011-2012\\_bulletin.pdf](http://bulletin.wustl.edu/about/prior/2011-2012_bulletin.pdf)))
- Undergraduate Bulletin (HTML (<https://bulletin.wustl.edu/prior/2011-12/>)) (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_11-12.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_11-12.pdf)))

## 2010-2011

- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2010-2011\\_bulletin.pdf](http://bulletin.wustl.edu/about/prior/2010-2011_bulletin.pdf)))
- Undergraduate Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_10-11.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_10-11.pdf)))

## 2009-2012

- Graduate Arts & Sciences Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/GSAS\\_Bulletin\\_2009-2012.pdf](http://bulletin.wustl.edu/about/prior/GSAS_Bulletin_2009-2012.pdf)))

## 2009-2010

- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2009-2010\\_bulletin.pdf](http://bulletin.wustl.edu/about/prior/2009-2010_bulletin.pdf)))

## 2008-2010

- Undergraduate Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_08-10.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_08-10.pdf)))

## 2008-2009

- Medicine Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/2008-2009\\_bulletin.pdf](http://bulletin.wustl.edu/about/prior/2008-2009_bulletin.pdf)))

## 2006-2009

- Graduate Arts & Sciences Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/GSAS\\_Bulletin\\_2006-2009.pdf](http://bulletin.wustl.edu/about/prior/GSAS_Bulletin_2006-2009.pdf))) and accompanying 2008 Update (PDF ([http://bulletin.wustl.edu/about/prior/GSAS\\_Bulletin\\_2008\\_insert.pdf](http://bulletin.wustl.edu/about/prior/GSAS_Bulletin_2008_insert.pdf)))

## 2006-2008

- Undergraduate Bulletin (PDF ([http://bulletin.wustl.edu/about/prior/Bulletin\\_06-08.pdf](http://bulletin.wustl.edu/about/prior/Bulletin_06-08.pdf)))

# About Washington University in St. Louis

## Who We Are Today

Washington University in St. Louis — a medium-sized, independent university — is dedicated to challenging its faculty and students alike to seek new knowledge and greater understanding of an ever-changing, multicultural world. The university is counted among the world's leaders in teaching and research, and it draws students from all 50 states, the District of Columbia, Guam, Puerto Rico and the Virgin Islands. Students and faculty come from more than 100 countries around the world.

The university offers more than 250 programs and 5,500 courses leading to associate, bachelor's, master's, and doctoral degrees in a broad spectrum of traditional and interdisciplinary fields, with additional opportunities for minor concentrations and individualized programs. For more information about the university, please visit the University Facts (<http://wustl.edu/about/facts/>) page of our website.

## Enrollment by School

For enrollment information (<https://wustl.edu/about/university-facts/#students>), please visit the University Facts page of our website.

## Our Mission Statement

**The mission of Washington University in St. Louis is to act in service of truth through the formation of leaders, the discovery of knowledge and the treatment of patients for the betterment of our region, our nation and our world.**

*At WashU, we generate, disseminate, and apply knowledge. We foster freedom of inquiry and expression of ideas in our research, teaching and learning.*

We aim to create an environment that encourages and supports wide-ranging exploration at the frontier of discovery by embracing diverse perspectives from individuals of all identities and backgrounds. We promote higher education and rigorous research as a fundamental component of an open, vibrant society. We strive to enhance the lives and livelihoods not only of our students, patients, and employees but also of the people of the greater St. Louis community and beyond. We do so by addressing scientific, social, economic, medical, and other challenges in the local, national, and international realms.

**Our goals are:**

- to foster excellence and creativity in our teaching, research, scholarship, patient care and service
- to welcome students, faculty and staff from all backgrounds to create an inclusive, equitable community that is nurturing and intellectually rigorous
- to cultivate in students habits of lifelong learning and critical and ethical thinking, thereby enabling them to be productive members and leaders of a global society
- to contribute positively to our home community of St. Louis, and to effect meaningful, constructive change in our world

**To this end we intend:**

- to hold ourselves to the highest standards of excellence
- to educate aspiring leaders of great ability from diverse backgrounds
- to encourage faculty and students to be innovative, bold, independent, critical thinkers
- to build an inclusive, equitable, respectful, ethically-principled environment for living, teaching, learning and working for the present and future generations
- to focus on meaningful and measurable outcomes for all of our endeavors

*Mission statement approved by the Faculty Senate Council in April 2021 and approved by the Board of Trustees on October 1, 2021.*

## Trustees & Administration

### Board of Trustees

Washington University's Board of Trustees is the chief governing body of Washington University in St. Louis. Please visit the Board of Trustees website (<http://boardoftrustees.wustl.edu>) for more information.

### University Administration

In 1871, Washington University co-founder and then-Chancellor William Greenleaf Eliot sought a gift from Hudson E. Bridge, a charter member of the university's Board of Directors, to endow the chancellorship. Soon after this endowment was received, the position was renamed the "Hudson E. Bridge Chancellorship."

The officers of the university administration are currently led by Chancellor Andrew D. Martin. University leadership (<https://wustl.edu/about/leadership/>) is detailed on the Washington University website.

## Academic Calendar

The academic calendar of Washington University in St. Louis is designed to provide an optimal amount of classroom instruction and examination within a manageable time frame, facilitating our educational mission to promote learning among both students



and faculty. Individual schools — particularly our graduate and professional schools — may have varying calendars due to the nature of particular fields of study. Please refer to each school's website for more information.

## Fall Semester 2022

College of Arts & Sciences, McKelvey School of Engineering, Olin Business School, Sam Fox School of Design & Visual Arts, and University College

Date	Day	Description
August 29	Monday	First day of classes
September 5	Monday	Labor Day (no classes)
October 8-11	Saturday-Tuesday	Fall Break (no classes)
November 23-27	Wednesday-Sunday	Thanksgiving Break (no classes)
December 9	Friday	Last day of classes
December 12-21	Monday-Wednesday	Reading and finals

## Spring Semester 2023

College of Arts & Sciences, McKelvey School of Engineering, Olin Business School, Sam Fox School of Design & Visual Arts, and University College

Date	Day	Description
January 17	Tuesday	First day of classes
March 12-18	Sunday-Saturday	Spring Break (no classes)
April 28	Friday	Last day of classes
May 1-10	Monday-Wednesday	Reading and finals

## Commencement Ceremonies

Date	Day	Description
May 15	Monday	Class of 2023 Commencement

## Summer Semester 2023

Date	Day	Description
May 22	Monday	First Summer Session begins
May 29	Monday	Memorial Day (no classes)
July 4	Tuesday	Independence Day (no classes)
August 17	Thursday	Last Summer Session ends

Washington University recognizes the individual student's choice in observing religious holidays that occur during periods when classes are scheduled. Students are encouraged to arrange with their instructors to make up work missed as a result of religious observance, and instructors are asked to make every reasonable effort to accommodate such requests.

## Campus Resources

### Student Support Services

**The Learning Center.** The Learning Center is located on the lower level of the Mallinckrodt Center, and it is the hub of academic support at Washington University in St. Louis. We provide undergraduate students with assistance in a variety of forms. Most services are free, and each year more than 2,000 students participate in one or more of our programs. For more information, visit the Learning Center website (<https://ctl.wustl.edu/learningcenter/>) or call 314-935-5970. There are three types of services housed within the Learning Center:

- **Academic Mentoring Programs** offer academic support in partnership with the academic departments in a variety of forms. Academic mentoring programs are designed to support students in their course work by helping them develop the lifelong skill of "learning how to learn" and by stimulating their independent thinking. Programs include course-specific weekly structured study groups facilitated by highly trained peer leaders as well as course-specific weekly walk-in sessions facilitated by academic mentors in locations, at times and in formats convenient for the students. The Learning Center also offers individual consulting/coaching for academic skills such as time management, study skills, note taking, accessing resources and so on. Other services include fee-based graduate and professional school entrance preparation courses.
- **Disability Resources** supports students with disabilities by fostering and facilitating an equal access environment for the Washington University community of learners. Disability Resources partners with faculty and staff to facilitate academic and housing accommodations for students with disabilities on the Danforth Campus. Students enrolled in the School of Medicine should contact their program's director. Please visit the Disability Resources website (<https://students.wustl.edu/disability-resources/>) or contact the Learning Center at 314-935-5970 for more information.
- **TRIO: Student Support Services** is a federally funded program that provides customized services for undergraduate students who are low income, who are the first in their family to go to college, and/or who have a documented disability. Services include academic coaching, academic peer mentoring, cultural and leadership programs, summer internship assistance and post-graduation advising. First-year and transfer students are considered for selection during the summer before they enter their first semester.

Eligible students are encouraged to apply when they are notified, because space in this program is limited. For more information, visit the TRIO Program website (<https://students.wustl.edu/trio-program/>).

**Medical Student Support Services.** For information about Medical Student Support Services, please visit the School of Medicine website (<https://medicine.wustl.edu>).

**Office for International Students and Scholars.** If a student is joining the university from a country other than the United States, this office can assist that individual through their orientation programs, issue certificates of eligibility (visa documents), and provide visa and immigration information. In addition, the office provides personal and cross-cultural counseling and arranges social, cultural and recreational activities that foster international understanding on campus.

The Office for International Students and Scholars is located on the Danforth Campus in the Danforth University Center at 6475 Forsyth Boulevard, Room 330. The office can be found on the Medical Campus in the Mid Campus Center (MCC Building) at 4590 Children's Place, Room 2043. For more information, visit the Office for International Students and Scholars website (<https://students.wustl.edu/international-students-scholars/>) or call 314-935-5910.

**Office of Military and Veteran Services.** This office serves as the university's focal point for military and veteran matters, including transitioning military-connected students into higher education, providing and connecting students with programs and services, and partnering across campus and in the community. Services include advising current and prospective students on how to navigate the university and maximize Department of Defense and Veterans Affairs (VA) educational benefits, transition support, Veteran Ally training for faculty and staff, veteran-unique programming, and connecting students to campus and community resources. Military-connected students include veterans, military service members, spouses, dependent children, caregivers, survivors and Reserve Officer Training Corp cadets. There are two university policies that apply to students who still serve in the Armed Forces and students who use VA educational benefits:

- The Policy on Military Absences, Refunds and Readmissions (<https://veterans.wustl.edu/policies/policy-for-military-students/>) applies to students serving in the U.S. Armed Forces and their family members when military service forces them to be absent or withdraw from a course of study.
- The Policy on Protections for VA Educational Benefit Users (<https://veterans.wustl.edu/policies/policy-for-va-students/>) applies to students using VA education benefits when payments to the institution and the individual are delayed through no fault of the student.

The Office of Military and Veteran Services is located in Umrath Hall on the Danforth Campus. Please visit the Military and Veteran Services website (<https://veterans.wustl.edu/>) or send an email to [veterans@wustl.edu](mailto:veterans@wustl.edu) for more information.

**Relationship and Sexual Violence Prevention (RSVP) Center.** The RSVP Center offers free and confidential services including 24/7 crisis intervention, counseling services, resources, support and prevention education for all students on the Danforth Campus. The RSVP Center operates from a public health model and uses trauma-informed practices to address the prevalent issues of relationship and sexual violence. By providing support for affected students, it is our goal to foster post-traumatic growth and resilience and to help ensure academic retention and success. Our prevention efforts call for community engagement to engender an intolerance of violence and an active stance toward challenging cultural injustices that perpetuate such issues. Learn more at the RSVP Center website (<https://students.wustl.edu/relationship-sexual-violence-prevention-center/>).

**WashU Cares.** WashU Cares assists the university with handling situations involving the safety and well-being of Danforth Campus students. WashU Cares is committed to fostering student success and campus safety through a proactive, collaborative and systematic approach to the identification of, intervention with and support of students of concern while empowering all university community members to create a culture of caring. If there is a concern about the physical or mental well-being of a student, please visit the WashU Cares website (<https://students.wustl.edu/washu-cares/>) to file a report.

**The Writing Center.** The Writing Center — a free service — offers writing advice to all Washington University undergraduate and graduate students. Tutors will read and discuss any kind of work in progress, including student papers, senior theses, application materials, dissertations and oral presentations. The Writing Center staff is trained to work with students at any stage of the writing process, including brainstorming, developing and clarifying an argument, organizing evidence, and improving style. Rather than editing or proofreading, tutors will emphasize the process of revision and teach students how to edit their own work.

The Writing Center is located in Mallinckrodt Center on the lower level. Appointments (<http://writingcenter.wustl.edu>) are preferred and can be made online, but walk-ins will be accepted if tutors are available.

## Student Health Services, Danforth Campus

The Habib Health and Wellness Center provides medical and mental health care and health promotion for undergraduate and graduate students on the Danforth Campus. Habib staff members include licensed professionals in Medical Services, Mental Health Services and Health Promotion Services. Please

visit Habif in the lower level of Dardick House on the South 40 or the Habif Health and Wellness Center website (<https://students.wustl.edu/habif-health-wellness-center/>) for more information about Habif's services and staff members.

**Hours:**

Monday, Tuesday, Thursday, and Friday: 8 a.m.-5 p.m.

Wednesday: 10 a.m.-5 p.m.

Saturday, Sunday, and university holidays: Closed

For after-hours care, students should access TimelyCare (<https://students.wustl.edu/timelycare/>).

**Medical Services** staff members provide care for the evaluation and treatment of an illness or injury, preventive health care and health education, immunizations, nutrition counseling, and travel medicine and sexual health services. Habif Health and Wellness Center providers are participating members of the Washington University in St. Louis Physician's Network. Any condition requiring specialized medical services will be referred to an appropriate specialist. Habif accepts most health insurance plans and will be able to bill the plan according to plan benefits. The student health insurance plan requires a referral for medical care any time care is not provided at Habif (except in an emergency). Call 314-935-6666 or visit the Habif website to schedule an appointment (<https://students.wustl.edu/habif-health-wellness-center/>).

Appointments are also available for the assessment, treatment, and referral of students who are struggling with substance abuse.

Quadrangle Pharmacy, located in the Habif Health and Wellness Center, is available to all Washington University students and their dependents. The pharmacy accepts most prescription insurance plans; students should check with the pharmacist to see if their prescription plan is accepted at the pharmacy.

The Habif Health and Wellness Center lab provides full laboratory services. Approximately 20 tests can be performed in the lab. The remainder of all testing that is ordered by Habif is completed by LabCorp. LabCorp serves as Habif's reference lab, and it is a preferred provider on the student health insurance plan. This lab can perform any test ordered by Habif providers or outside providers.

All incoming students must provide proof of immunization for measles, mumps, and rubella (i.e., two vaccinations after the age of one year old; a titer may be provided in lieu of the immunizations). Proof of receiving a meningococcal vaccine is required for all incoming undergraduate students. A PPD skin test in the past six months is required for students entering the university from certain countries; this list of countries may be found on the Habif website. It is also recommended that, during the five years before beginning their studies at Washington University, all students will have received the tetanus diphtheria immunization, the hepatitis A vaccine series, the hepatitis B vaccine series, and the varicella vaccine. Medical history

forms (<https://students.wustl.edu/habif-health-wellness-center/>) are available online. Failure to complete the required forms will delay a student's registration and prevent their entrance into housing assignments. Please visit the Habif website for complete information about requirements and deadlines (<https://students.wustl.edu/habif-health-wellness-center/>).

**Mental Health Services** staff members work with students to resolve personal and interpersonal difficulties, including conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. Staff members help each person figure out their own situation. Services include individual, group and couples counseling; crisis counseling; psychiatric consultation; and referral for off-campus counseling. Visit the Habif website to schedule an appointment (<https://students.wustl.edu/habif-health-wellness-center/>), or call 314-935-6666 during business hours.

**Health Promotion Services** staff and Peer Health Educators provide free programs and risk reduction information related to stress, sleep, sexual health, alcohol/other drugs, and community care. For more information, visit the Zenker Wellness Suite in Sumers Recreation Center to learn about the programs on campus led by student peer health educators. For information, visit the Health and Wellness Digital Library (<https://students.wustl.edu/health-wellness-digital-library/>), follow Habif on Instagram (<https://www.instagram.com/>) (@washu\_habif), or email [wellness@wustl.edu](mailto:wellness@wustl.edu).

In 2018, this department launched the **WashU Recovery Group** to provide an opportunity for students in recovery from substance use to connect with other students with similar experiences. The group provides local resources, support, meetings and activities. Members have 24/7 access to a private facility to study, meet and socialize (*in-person services will resume as COVID-19 pandemic restrictions allow*). The group is not a recovery program; it is a confidential resource that students can add to their support system. For more information, send an email to [recovery@wustl.edu](mailto:recovery@wustl.edu).

## Important Information About Health Insurance, Danforth Campus

Washington University has a student health fee that was designed to improve the health and wellness of the entire Washington University community. This fee supports health and wellness services and programs on campus. In addition, all full-time, degree-seeking Washington University students are automatically enrolled in the Student Health Insurance Plan upon completion of registration, with an additional health insurance fee applied to their student account. Students may opt out of this coverage and receive a refund of the health insurance fee if they provide proof of existing comprehensive insurance coverage that meets all university requirements. Information concerning opting out of the student health insurance plan (<https://students.wustl.edu/habif-health-wellness-center/>) can be found online after June 1 of each year. All students must request

to opt out by September 5 of every year in which they wish to be removed from the Student Health Insurance Plan. Habif provides billing services to many of the major insurance companies in the United States. Specific fees and copays apply to students using Medical Services and Mental Health Services; these fees may be billable to the students' insurance plans. More information is available on the Habif Health and Wellness Center website (<https://students.wustl.edu/habif-health-wellness-center/>).

## Student Health Services, Medical Campus

For information about student health services on the Medical Campus, please visit the Student & Occupational Health Services page (<https://wumhealth.wustl.edu/students/>) of the School of Medicine website.

## Campus Security

The Washington University campus is among the most attractive in the nation, and it enjoys a safe and relaxed atmosphere. Personal safety and the security of personal property while on campus is a shared responsibility. Washington University has made safety and security a priority through our commitment to a full-time professional police department, the use of closed-circuit television, card access, good lighting, shuttle services, emergency telephones, and ongoing educational safety awareness programs. The vast majority of crimes that occur on college campuses are crimes of opportunity, which can be prevented.

The best protection against crime is an informed and alert campus community. Washington University has developed several programs to help make everyone's experiences here safe and secure. An extensive network of emergency telephones — including more than 200 "blue light" telephones — is connected directly to the University Police Department and can alert the police to a person's exact location. In addition to the regular shuttle service, an evening walking escort service and a mobile Campus Circulator shuttle are available on the Danforth Campus.

The Campus2Home shuttle will provide a safe ride home for those living in four designated areas off campus — Skinker-DeBaliviere, Loop South, north of the Loop, and just south of the campus — from 7:00 p.m. to 4:00 a.m. seven days a week. The shuttle leaves from the Mallinckrodt Bus Plaza and Forsyth/Goldfarb Hall Center every 15 minutes from 7:00 p.m. to 1:00 a.m. and at the top (:00) and bottom (:30) of the hour from 1:00 a.m. to 4:00 a.m. The shuttle takes passengers directly to the front doors of their buildings. Shuttle drivers will then wait and watch to make sure passengers get into their buildings safely. Community members can track the shuttle in real time using the WUSTL Mobile App. The app can be downloaded free of charge from the Apple iTunes Store or the Google Play Store.

The University Police Department is a full-service organization staffed by certified police officers who patrol the campus 24 hours a day throughout the entire year. The department offers a variety of crime prevention programs, including a high-security bicycle lock program, free personal-safety whistles, computer security tags, personal safety classes for women and men, and security surveys. Community members are encouraged to download and install the WashU Safe personal safety app on their phones; this app allows users to call for help during emergencies, to use Friend Walk to track their walks on and off campus, and to access many additional safety features. For more information about these programs, visit the Washington University Police Department website (<https://police.wustl.edu/>).

In compliance with the Campus Crime Awareness and Security Act of 1990, Washington University publishes an annual report (<http://police.wustl.edu/clery-reports-logs/>) entitled *Safety & Security: Guide for Students, Faculty, and Staff — Annual Campus Security and Fire Safety Reports and Drug & Alcohol Abuse Prevention Program*. This report is available to all current and prospective students on the Danforth Campus and to university employees on the Danforth, North and West campuses. To request a hard copy, contact the Washington University Police Department, CB 1038, One Brookings Drive, St. Louis, MO 63130-4899, 314-935-9011.

For information regarding protective services at the School of Medicine, please visit the Campus Safety page (<https://facilities.med.wustl.edu/security-new/>) of the Washington University Operations & Facilities Management Department.

## University Policies

Washington University has various policies and procedures that govern our faculty, staff and students. Highlighted below are several key policies of the university. Web links to key policies and procedures are available on the Office of the University Registrar website (<http://registrar.wustl.edu>) and on the university's Compliance and Policies page (<http://wustl.edu/policies/>). Please note that the policies identified on these websites and in this *Bulletin* do not represent an entire repository of university policies, as schools, offices and departments may implement policies that are not listed. In addition, policies may be amended throughout the year.

## Nondiscrimination Statement

Washington University encourages and gives full consideration to all applicants for admission, financial aid and employment. The university does not discriminate in access to, treatment during, or employment in its programs and activities on the basis of race, color, age, religion, sex, sexual orientation, gender identity or expression, national origin, veteran status, disability or genetic information.

## Policy on Discrimination and Harassment

Washington University is committed to having a positive learning and working environment for its students, faculty and staff. University policy prohibits discrimination on the basis of race, color, age, religion, sex, sexual orientation, gender identity or expression, national origin, veteran status, disability or genetic information. Harassment based on any of these classifications is a form of discrimination; it violates university policy and will not be tolerated. In some circumstances, such discriminatory harassment may also violate federal, state or local law. A copy of the Policy on Discrimination and Harassment (<http://hr.wustl.edu/policies/Pages/DiscriminationAndHarassment.aspx>) is available on the Human Resources website.

### Sexual Harassment

Sexual harassment is a form of discrimination that violates university policy and will not be tolerated. It is also illegal under state and federal law. Title IX of the Education Amendments of 1972 prohibits discrimination based on sex (including sexual harassment and sexual violence) in the university's educational programs and activities. Title IX also prohibits retaliation for asserting claims of sex discrimination. The university has designated the Title IX Coordinator identified below to coordinate its compliance with and response to inquiries concerning Title IX.

For more information or to report a violation under the Policy on Discrimination and Harassment, please contact the following individuals:

#### Discrimination and Harassment Response Coordinator

Apryle Cotton, Assistant Vice Chancellor for Human Resources  
Section 504 Coordinator  
Phone: 314-362-6774  
[apryle.cotton@wustl.edu](mailto:apryle.cotton@wustl.edu)

#### Title IX Coordinator

Jessica Kennedy, Director of Title IX Office  
Title IX Coordinator  
Phone: 314-935-3118  
[jwkennedy@wustl.edu](mailto:jwkennedy@wustl.edu)

You may also submit inquiries or a complaint regarding civil rights to the United States Department of Education's Office of Civil Rights at 400 Maryland Avenue, SW, Washington, DC 20202-1100; by visiting the U.S. Department of Education website (<https://www.ed.gov/>); or by calling 800-421-3481.

## Student Health

### Drug and Alcohol Policy

Washington University is committed to maintaining a safe and healthy environment for members of the university community by promoting a drug-free environment as well as one free of the abuse of alcohol. Violations of the Washington University Drug and Alcohol Policy (<https://hr.wustl.edu/items/drug-and-alcohol-policy/>) or the Alcohol Policy for Graduate Student Organizations (<https://sites.wustl.edu/prograds/university-wide-graduate-student-group-handbook/alcohol-policy-for-graduate-student-organizations/>) will be handled according to existing policies and procedures concerning the conduct of faculty, staff and students. This policy is adopted in accordance with the Drug-Free Workplace Act and the Drug-Free Schools and Communities Act.

### Tobacco-Free Policy

Washington University is committed to providing a healthy, comfortable and productive work and learning environment for all students, faculty and staff. Research shows that tobacco use in general, including smoking and breathing secondhand smoke, constitutes a significant health hazard. The university strictly prohibits all smoking and other uses of tobacco products within all university buildings and on university property, at all times. A copy of our complete Tobacco-Free Policy (<https://hr.wustl.edu/items/tobacco-free-policy/>) is available on the Human Resources website.

### Medical Examinations

Entering students must provide medical information to the Habif Health and Wellness Center. This will include the completion of a health history and a record of all current immunizations.

If students fail to comply with these requirements prior to registration, they will be required to obtain vaccinations for measles, mumps and rubella at the Habif Health and Wellness Center, if there is no evidence of immunity. In addition, undergraduate students will be required to obtain meningitis vaccinations. Students will be assessed the cost of the vaccinations. Students will be unable to complete registration for classes until all health requirements have been satisfied.

Noncompliant students may be barred from classes and from all university facilities, including housing units, if in the judgment of the university their continued presence would pose a health risk to themselves or to the university community.

Medical and immunization information is to be given via the Habif Health and Wellness Center (<https://students.wustl.edu/habif-health-wellness-center/>) website. All students who have completed the registration process should access the website and create a student profile by using their WUSTL Key. Creating a student profile enables a student to securely access the

medical history form. Students should fill out the form and follow the instructions for transmitting it to the Habib Health and Wellness Center. Student information is treated securely and confidentially.

## Student Conduct

The Student Conduct Code sets forth community standards and expectations for Washington University students. These community standards and expectations are intended to foster an environment conducive to learning and inquiry. Freedom of thought and expression is essential to the university's academic mission.

Disciplinary proceedings are meant to be informal, fair and expeditious. Charges of non-serious misconduct are generally heard by the student conduct officer. With limited exceptions, serious or repeated allegations are heard by the campuswide Student Conduct Board or the University Sexual Assault Investigation Board where applicable.

Complaints against students that include allegations of sexual assault or certain complaints that include allegations of sexual harassment in violation of the Student Conduct Code are governed by the procedures found in the University Sexual Assault Investigation Board Policy (<https://wustl.edu/about/compliance-policies/governance/usaib-procedures-complaints-sexual-assault-filed-students/>), which is available online or in hard copy from the Title IX coordinator or the director of Student Conduct and Community Standards.

Students may be accountable to both governmental authorities and to the university for acts that constitute violations of law and the Student Conduct Code.

For a complete copy of the Student Conduct Code (<https://wustl.edu/about/compliance-policies/academic-policies/university-student-judicial-code/>), visit the university website.

## Undergraduate Student Academic Integrity Policy

Effective learning, teaching and research all depend upon the ability of members of the academic community to trust one another and to trust the integrity of work that is submitted for academic credit or conducted in the wider arena of scholarly research. Such an atmosphere of mutual trust fosters the free exchange of ideas and enables all members of the community to achieve their highest potential.

In all academic work, the ideas and contributions of others must be appropriately acknowledged, and work that is presented as original must be, in fact, original. Faculty, students and administrative staff all share the responsibility of ensuring the honesty and fairness of the intellectual environment at Washington University.

## Scope and Purpose

This statement on academic integrity applies to all undergraduate students at Washington University. Graduate students are governed by policies in each graduate school or division. All students are expected to adhere to the highest standards of behavior. The purpose of the statement is twofold:

1. To clarify the university's expectations with regard to undergraduate students' academic behavior; and
2. To provide specific examples of dishonest conduct. The examples are only illustrative, *not* exhaustive.

## Violations of This Policy Include but Are Not Limited to the Following:

### 1. Plagiarism

Plagiarism consists of taking someone else's ideas, words or other types of work product and presenting them as one's own. To avoid plagiarism, students are expected to be attentive to proper methods of documentation and acknowledgment. To avoid even the suspicion of plagiarism, a student must always do the following:

- Enclose every quotation in quotation marks and acknowledge its source.
- Cite the source of every summary, paraphrase, abstraction or adaptation of material originally prepared by another person and any factual data that is not considered common knowledge. Include the name of author, title of work, publication information and page reference.
- Acknowledge material obtained from lectures, interviews or other oral communication by citing the source (i.e., the name of the speaker, the occasion, the place and the date).
- Cite material from the internet as if it were from a traditionally published source. Follow the citation style or requirements of the instructor for whom the work is produced.

### 2. Cheating on an Examination

A student must not receive or provide any unauthorized assistance on an examination. During an examination, a student may use only materials authorized by the faculty.

### 3. Copying or Collaborating on Assignments Without Permission

When a student submits work with their name on it, this is a written statement that credit for the work belongs to that student alone. If the work was a product of collaboration, each student is expected to clearly acknowledge in writing all persons who contributed to its completion.

Unless the instructor explicitly states otherwise, it is dishonest to collaborate with others when completing any assignment or test, performing laboratory experiments, writing and/or documenting computer programs, writing papers or reports, or completing problem sets.

If the instructor allows group work in some circumstances but not others, it is the student's responsibility to understand the degree of acceptable collaboration for each assignment and to ask for clarification, if necessary.

To avoid cheating or unauthorized collaboration, a student should never do any of the following:

- Use, copy or paraphrase the results of another person's work and represent that work as one's own, regardless of the circumstances.
- Refer to, study from or copy archival files (e.g., old tests, homework, solutions manuals, backfiles) that were not approved by the instructor.
- Copy another's work or permit another student to copy one's work.
- Submit work as a collaborative effort if they did not contribute a fair share of the effort.

#### 4. Fabrication or Falsification of Data or Records

It is dishonest to fabricate or falsify data in laboratory experiments, research papers or reports or in any other circumstances; to fabricate source material in a bibliography or "works cited" list; or to provide false information on a résumé or other document in connection with academic efforts. It is also dishonest to take data developed by someone else and present them as one's own. Examples of falsification include the following:

- Altering information on any exam, problem set or class assignment being submitted for a re-grade.
- Altering, omitting or inventing laboratory data to submit as one's own findings. This includes copying laboratory data from another student to present as one's own; modifying data in a write-up; and providing data to another student to submit as one's own.

#### 5. Other Forms of Deceit, Dishonesty or Inappropriate Conduct

Under no circumstances is it acceptable for a student to do any of the following:

- Submit the same work, or essentially the same work, for more than one course without explicitly obtaining permission from all instructors. A student must disclose when a paper or project builds on work completed earlier in their academic career.
- Request an academic benefit based on false information or deception. This includes requesting an extension of time, a better grade or a recommendation from an instructor.

- Make any changes (including adding material or erasing material) on any test paper, problem set or class assignment being submitted for a re-grade.
- Willfully damage the efforts or work of other students.
- Steal, deface or damage academic facilities or materials.
- Collaborate with other students planning or engaging in any form of academic misconduct.
- Submit any academic work under someone else's name other than one's own. This includes but is not limited to sitting for another person's exam; both parties will be held responsible.
- Engage in any other form of academic misconduct not covered here.

This list is not intended to be exhaustive. To seek clarification, students should ask the professor or the assistant in instruction for guidance.

## Reporting Misconduct

### Faculty Responsibility

Faculty and instructors are strongly encouraged to report incidents of student academic misconduct to the academic integrity officer in their school or college in a timely manner so that the incident may be handled fairly and consistently across schools and departments. Assistants in instruction are expected to report instances of student misconduct to their supervising instructors. Faculty members are expected to respond to student concerns about academic dishonesty in their courses.

### Student Responsibility

If a student observes others violating this policy, the student is strongly encouraged to report the misconduct to the instructor, to seek advice from the academic integrity officer of the school or college that offers the course in question, or to address the student(s) directly.

### Exam Proctor Responsibility

Exam proctors are expected to report incidents of suspected student misconduct to the course instructor and/or the Disability Resource Center, if applicable.

## Procedure

### Jurisdiction

This policy covers all undergraduate students, regardless of their college of enrollment. Cases will be heard by school-specific committees according to the school in which the class is listed rather than the school in which the student is enrolled. All violations and sanctions will be reported to the student's college of enrollment.

## Administrative Procedures

Individual undergraduate colleges and schools may design specific procedures to resolve allegations of academic misconduct by students in courses offered by that school, so long as the procedures are consistent with this policy and with the Student Conduct Code.

## Student Rights and Responsibilities in a Hearing

A student accused of an academic integrity violation — whether by a professor, an assistant in instruction, an academic integrity officer or another student — is entitled to do the following:

- Review the written evidence in support of the charge
- Ask any questions
- Offer an explanation as to what occurred
- Present any material that would cast doubt on the correctness of the charge
- Receive a determination of the validity of the charge without reference to any past record of misconduct

When responding to a charge of academic misconduct, a student may do the following:

- Deny the charges and request a hearing in front of the appropriate academic integrity officer or committee
- Admit the charges and request a hearing to determine sanction(s)
- Admit the charges and accept the imposition of sanctions without a hearing
- Request a leave of absence from the university (however, the academic integrity matter must be resolved prior to re-enrollment)
- Request to withdraw permanently from the university with a transcript notation that there is an unresolved academic integrity matter pending

A student has the following responsibilities with regard to resolving the charge of academic misconduct:

- Admit or deny the charge. This will determine the course of action to be pursued.
- Provide truthful information regarding the charges. It is a Student Conduct Code violation to provide false information to the university or anyone acting on its behalf.

## Sanctions

### If Found *Not* in Violation of the Academic Integrity Policy

If the charges of academic misconduct are not proven, no record of the allegation will appear on the student's transcript.

## If Found in Violation of the Academic Integrity Policy

If, after a hearing, a student is found to have acted dishonestly or if a student has admitted to the charges prior to a hearing, the school's academic integrity officer or committee may impose sanctions, including but not limited to the following:

- Issue a formal written reprimand
- Impose educational sanctions, such as completing a workshop on plagiarism or academic ethics
- Recommend to the instructor that the student fail the assignment (a given grade is ultimately the prerogative of the instructor)
- Recommend to the instructor that the student fail the course
- Recommend to the instructor that the student receive a course grade penalty less severe than failure of the course
- Place the student on disciplinary probation for a specified period of time or until defined conditions are met. The probation will be noted on the student's transcript and internal record while it is in force.
- In cases serious enough to warrant suspension or expulsion from the university, refer the matter to the Student Conduct Board for consideration.

Additional educational sanctions may be imposed. This list is not intended to be exhaustive.

Withdrawing from the course will not prevent the academic integrity officer or hearing panel from adjudicating the case, imposing sanctions or recommending grade penalties, including a failing grade in the course.

A copy of the sanction letter will be placed in the student's academic file.

## Appeals

If a student believes the academic integrity officer or the committee did not conduct a fair hearing or if a student believes the sanction imposed for misconduct is excessive, they may appeal to the Student Conduct Board within 14 days of the original decision. Appeals are governed by Section VII C of the Student Conduct Code.

## Records

### Administrative Record-Keeping Responsibilities

It is the responsibility of the academic integrity officer in each school to keep accurate, confidential records concerning academic integrity violations. When a student has been found to have acted dishonestly, a letter summarizing the allegation, the outcome and the sanction shall be placed in the student's official file in the office of the school or college in which the student is enrolled.



In addition, each school's academic integrity officer shall make a report of the outcome of every formal accusation of student academic misconduct to the director of Student Conduct and Community Standards, who shall maintain a record of each incident.

## Multiple Offenses

When a student is formally accused of academic misconduct and a hearing is to be held by an academic integrity officer, a committee, or the Office of Student Conduct and Community Standards, the person in charge of administering the hearing shall query the Office of Student Conduct and Community Standards about the student(s) accused of misconduct. The director shall provide any information in the records concerning that student to the integrity officer. Such information will be used in determining sanctions *only* if the student is found to have acted dishonestly in the present case. Evidence of past misconduct may not be used to resolve the issue of whether a student has acted dishonestly in a subsequent case.

## Reports to Faculty and Student Body

School and college academic integrity officers are encouraged to make periodic (at least annual) reports to the students and faculty of their school concerning accusations of academic misconduct and the outcomes, without disclosing specific information that would allow identification of the student(s) involved.

## Graduate Student Academic Integrity Policies

For graduate student academic integrity policies, please refer to each individual graduate school.

## Statement of Intent to Graduate

Students are required to file an Intent to Graduate via WebSTAC (<https://acadinfo.wustl.edu/>) prior to the semester in which they intend to graduate. Additional information is available from school dean's offices and the Office of the University Registrar (<http://registrar.wustl.edu>).

## Student Academic Records and Transcripts

Under the Family Educational Rights and Privacy Act of 1974 (FERPA) — Title 20 of the United States Code, Section 1232g, as amended — current and former students of the university have certain rights with regard to their educational records. Washington University's FERPA policy is available via the Office of the University Registrar's website (<http://registrar.wustl.edu>).

All current and former students may request official Washington University transcripts from the Office of the University Registrar via either WebSTAC (if they remember their WUSTL Key) or Parchment (if they do not have or cannot remember their

WUSTL Key). Students may print unofficial transcripts for their personal use from WebSTAC. Instructions and additional information are available on the Office of the University Registrar's website (<http://registrar.wustl.edu>).

Washington University does not release nor certify copies of transcripts or other academic documents received from other schools or institutions. This includes test score reports and transcripts submitted to Washington University for purposes of admission or evaluation of transfer credit.

## University Affiliations

Please click the arrows below for listings of the accrediting organizations and memberships of the different areas of the university.

Additional information about professional and specialized accreditation can be found on the Office of the Provost website (<https://provost.wustl.edu/assessment/accreditors/>).

## Washington University in St. Louis

### Accreditation

- Higher Learning Commission (<https://www.hlcommission.org/>)

### Memberships

- American Academy of Arts & Sciences (<https://www.amacad.org/>)
- American Association of Colleges & Universities (<https://www.aacu.org/>)
- American Council of Learned Societies (<https://www.acls.org/>)
- American Council on Education (<https://www.acenet.edu/>)
- Association of American Universities (<https://www.aau.edu/>)
- College Board (<https://www.collegeboard.org/>)
- Hispanic Association of Colleges and Universities (<https://www.hacu.net/>)
- Independent Colleges and Universities of Missouri (<https://www.independentcollegesanduniversitiesofmo.com/>)
- National Association of Independent Colleges and Universities (<https://www.naicu.edu/>)
- National Council for State Authorization Reciprocity Agreements (<https://nc-sara.org/>)
- Oak Ridge Associated Universities (<https://www.orau.org/>)
- Universities Research Association (<https://www.ura-hq.org/>)

## College of Arts & Sciences

### Memberships

- Association of University Summer Sessions (<https://www.theauss.org/>)
- International Center for Academic Integrity (<https://www.academicintegrity.org/>)
- Midwest Association of Pre-Law Advisors (<https://mapla.org/>)
- National Association of Advisors for the Health Professions (<https://www.naahp.org/>)
- National Association of Fellowships Advisors (<https://nafadvisors.org/>)
- North American Association of Summer Sessions (<https://naass.org/>)

## Office of Graduate Studies, Arts & Sciences

### Memberships

- Association of Graduate Schools (<https://www.aau.edu/taxonomy/term/446/>)  
(Founding member)
- Council of Graduate Schools (<https://cgsnet.org/>)  
(Founding member)

## Sam Fox School of Design & Visual Arts

### Accreditation — College of Art

- National Association of Schools of Art & Design (<https://nasad.arts-accredit.org/>)  
(Founding member)

### Accreditation — College of Architecture

- Master of Architecture: National Architectural Accrediting Board (<https://www.naab.org/>)
- Master of Landscape Architecture: Landscape Architectural Accreditation Board (<https://www.asla.org/accreditationlaab.aspx>)

### Membership — College of Architecture

- Association of Collegiate Schools of Architecture (<https://www.acsa-arch.org/>)

### Accreditation — Mildred Lane Kemper Art Museum

- American Alliance of Museums (<https://www.aam-us.org/>)

### Membership — Mildred Lane Kemper Art Museum

- Association of Art Museum Directors (<https://aamd.org/>)

## Olin Business School

### Accreditation

- Association of MBAs (<https://www.associationofmbas.com/>)
- Association to Advance Collegiate Schools of Business International (<https://www.aacsb.edu/>)  
(Charter member since 1921)
- EQUIS (<https://www.efmdglobal.org/accreditations/business-schools/equis/>)

## McKelvey School of Engineering

### Accreditation

- In the McKelvey School of Engineering, many of the undergraduate degree programs are accredited by the Engineering Accreditation Commission of ABET (<http://abet.org/>).

### Membership

- American Society for Engineering Education (<https://www.asee.org/>)

## School of Law

### Accreditation

- American Bar Association (<https://www.americanbar.org/>)

### Memberships

- American Association of Law Libraries (<https://www.aallnet.org/>)
- American Society of Comparative Law (<https://ascl.org/>)
- American Society of International Law (<https://www.asil.org/>)
- Association of Academic Support Educators (<https://associationofacademicsupportededucators.org/>)
- Association of American Law Schools (<https://www.aals.org/>)
- Central States Law Schools Association (<http://cslsa.us/>)
- Clinical Legal Education Association (<https://www.cleaweb.org/>)
- Equal Justice Works (<https://www.equaljusticeworks.org/>)
- Mid-America Association of Law Libraries (<https://maall.wildapricot.org/>)
- Mid-America Law Library Consortium (<https://mallco.libguides.com/>)
- National Association for Law Placement (<https://www.nalp.org/>)
- Southeastern Association of Law Schools (<https://sealslawschools.org/>)

## School of Medicine

### Accreditation

- Liaison Committee on Medical Education (<https://www.aamc.org/services/first-for-financial-aid-officers/lcme-accreditation/>)

### Membership

- Association of American Medical Colleges (<https://www.aamc.org/>)

## Brown School

### Accreditation

- Council on Education for Public Health (<https://ceph.org/>)
- Council on Social Work Education (<https://www.cswe.org/>)

## University College

### Memberships

- American Association of Collegiate Registrars and Admissions Officers (<https://www.aacrao.org/>)
- International Center for Academic Integrity (<https://www.academicintegrity.org/>)
- National Academic Advising Association (<https://nacada.ksu.edu/>)
- National Association of Advisors for the Health Professions (<https://www.naahp.org/>)
- National Association of Student Personnel Administrators (<https://www.naspa.org/>)
- University Professional and Continuing Education Association (<https://upcea.edu/>)

**Note:** Business-related programs in University College are not accredited by the Association to Advance Collegiate Schools of Business International (<https://www.aacsb.edu/>).

## University Libraries

### Membership

- Association of Research Libraries (<https://www.arl.org/>)

## University PhD Policies & Requirements

### Academic PhD Programs

The following policies and practices apply to all PhD students regardless of school affiliation. They are specific to PhD program administration and experience. Schools may set stricter standards but must not relax these. This list does not include those policies and practices that apply to the student community as a whole (e.g., the University Student Conduct Code).

In 2022, all former Graduate School policies were revised to reflect the dean of the student's respective school or the Vice Provost of Graduate Education in lieu of the "Dean of the Graduate School." References to the former entity known as the "Graduate School" were adjusted to reflect the student's home school.

### Academic and Professional Integrity for PhD Students

The Academic and Professional Integrity Policy of the former Graduate School (<https://wustl.app.box.com/s/7p84v07ly47rz2gfo2xy0vrqoifpikts/>) continues to apply to all PhD students on the Danforth and Medical campuses, including dual-degree students when one of the degree programs is a PhD program.

### Involuntary Leave of Absence

The Involuntary Leave of Absence Policy (<https://wustl.edu/about/compliance-policies/governance/involuntary-leave-policy-undergraduate-students/>) that applies to undergraduates was adopted to apply to all PhD students in 2014.

### Financial Policies & Practices

#### Academic Load Status for Financial Aid, Immigration and Enrollment Verification Graduate (Fall, Spring):

Status	Enrolled Units of Credit
Full time	9+ units
Half time	4.5-8.99 units
Less than half time	Fewer than 4.5 units

#### Graduate (Summer):

Status	Enrolled Units of Credit
Full time	6+ units
Half time	3-5.99 units
Less than half time	Fewer than 3 units

Certain courses may, due to appropriate curriculum and monitoring circumstances, be encoded to carry a load value higher than the actual academic credit awarded. Examples include certain engineering co-op experiences, doctoral research study and select clinical or practicum courses.

### Child Day Care Subsidy

The purpose of the Child Day Care Subsidy is to help financially stressed graduate student families meet the costs of child day care tuition at licensed facilities while they pursue PhD degrees.

The amount of Child Day Care Subsidy awarded to eligible applicants is based on their financial need, the number of children they have enrolled in licensed child day care facilities, their child day care expenses, and available funding. Eligible students can expect the following:

- For one child, the maximum award is \$1,750 per semester.
- For two children, the maximum award is \$2,650 per semester.
- For three or more children, the maximum award is \$3,550 per semester.

The subsidy amount cannot exceed the cost of the licensed child day care facility.

Students should contact their home schools for more information and for application instructions.

## Interdisciplinary Courses

PhD students can speak with their advisors with regard to enrolling in individual courses available outside of their school that may advance their research or professional goals. A university tuition agreement signed by all of the deans of the university's graduate and professional schools fosters interdisciplinary study across the schools and allows enrollment in classes outside of the student's home school. Many undergraduate and graduate courses are available for graduate student enrollment, subject to the following eligibility guidelines:

- The student must be enrolled full-time in a graduate degree program and have the approval of their faculty advisor or administrative officer to take a course outside of their home school.
- Courses will be open to students outside of the discipline only if those students have met the required prerequisites and have the approval of both their department/advisor and the course instructor.
- Finally, courses in the evening divisions, including University College and its Summer School, are not part of this agreement. Courses that require individualized instruction and/or additional fees (e.g., independent studies, individual music lessons) are also excluded.

## Minimum Stipend Award

The amounts and vehicles of financial support for graduate students are usually decided by the individual schools.

Washington University is committed to funding most PhD students for five to six years, depending on the time needed to complete a particular program. Funding typically consists of full tuition remission and a stipend to defray living expenses. Monetary support may come from the university or from outside sources, and it is usually administered by an administrative staff member of the program or the school acting in accordance with instructions received from the program/school administration or from a faculty member.

## New Child Leave

Full-time PhD students may request a New Child Leave to assume care for a new child. They should maintain their full-time student status. Students on New Child Leave are not expected to participate in mentored teaching or research experience for up to 60 calendar days while they receive their current stipend support. Additional time off without receiving a stipend for up to a full semester will ordinarily be granted by the student's home school if approved by the student's department.

New Child Leave does not affect the student's full-time status and will not appear on the student's official transcript. New child leave must be taken within the first year after the child's birth or adoption. Students should contact their department to request a New Child Leave.

Students who receive support from external agencies should consult the policies and guidelines of the sponsor.

## PhD General Requirements

To earn a PhD at Washington University, a student must complete all courses required by their department/program; maintain satisfactory academic progress; pass certain examinations; fulfill residence and mentored experience requirements; write, defend, and submit a dissertation; and file an Intent to Graduate form via WebSTAC (<https://acadinfo.wustl.edu>).

## Residence Requirement

Each PhD student must spend at least one academic year enrolled full-time at Washington University. Any exceptions must be approved by the dean of the student's respective school and the Vice Provost for Graduate Education.

## Program Length Limit

The maximum number of semesters of continuous enrollment is 18 (9 years). Students in PhD programs who have not completed their terminal degrees and who have not withdrawn will be dismissed at the end of 18 semesters. An exception may be granted by the dean of the student's respective school on request by the designated faculty graduate program director (in most departments, this position is called the *Director of Graduate Studies*) if the student is expected to complete their degree during a tenth year of enrollment. Enrollment for an eleventh continuous year will not be allowed. Semesters during which the student is on an approved leave of absence are not included on the enrollment clock.

## Qualifying Examinations

Progress toward the PhD is contingent upon the student passing examinations that are variously called preliminary, qualifying, general, comprehensive or major field exams. The qualifying process varies according to the program. In some programs, it consists of a series of incremental, sequential and cumulative exams over a considerable time. In others, the exams are

held during a relatively short period of time. Exams may be replaced by one or more papers. The program, which determines the structure and schedule of the required examinations, is responsible for notifying the school registrar or the appropriate record custodian of the student's outcome, whether successful or unsuccessful.

## Mentored Experience Requirement

PhD students at Washington University must complete a department-defined Mentored Experience. The Mentored Experience Requirement is a doctoral degree milestone that is notated on the student's transcript when complete. Each department has an established Mentored Experience Implementation Plan in which the number of semesters that a student must engage in a Mentored Teaching Experience or a Mentored Professional Experience is defined. The Mentored Experience Implementation Plans outline how doctoral students within the discipline will be mentored to achieve competencies in teaching at basic and advanced levels. Some departments may elect to include the Mentored Professional Experiences as an avenue for completing one or more semesters of the Mentored Experience Requirement. Doctoral students will enroll in Mentored Teaching Experiences or Mentored Professional Experiences to signify their progression toward completing the overall Mentored Experience Requirement for their degree.

## Dissertation

As evidence of the mastery of a specific field of knowledge and of the capacity for original scholarly work, each candidate must complete a dissertation. Each PhD candidate will form a Research Advisory Committee (RAC) approved by their department or program and by their school's graduate program oversight body. The RAC will approve the subject and approach of the dissertation, which will be evidenced by the student's completion of the Title, Scope and Procedure requirement.

The RAC should consist of at least three full-time Washington University faculty members who are authorized to supervise PhD students and who have appropriate expertise in the proposed field of study. One of these faculty members must be the student's primary research advisor/mentor. Additional members, including external members with active research programs at outside institutions, may serve on the RAC subject to approval by the school's graduate program oversight body.

- For cross-school/interdisciplinary PhD programs, the approvals referenced above should be obtained from the graduate program oversight body of the school of the primary research advisor/mentor.
- For a PhD program offered in partnership with an external academic institution, one full-time faculty member of the partner institution who is authorized to supervise PhD students and who has appropriate expertise in the proposed field of study may serve on the RAC as part of the three-member minimum requirement.

A Title, Scope and Procedure form for the dissertation must be signed by the RAC members and by the program chair. It must be submitted to the school registrar or the appropriate record custodian at least six months before the degree is expected to be conferred or before the beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide and a template that provides instructions regarding the format of the dissertation are available through the website of the Office of the Provost (<https://provost.wustl.edu/vpge/phd-education-and-governance/>); both of these should be read carefully at every stage of dissertation preparation.

Each student is required to make the full text of the dissertation available to the committee members for their review at least one week before the dissertation defense. Most degree programs require two or more weeks for the review period; students should check their program's policies.

## Dissertation Defense

Approval of the written dissertation by the Research Advisory Committee (RAC) is strongly recommended before the student can orally defend the dissertation. The doctoral dissertation committee that examines the student during the defense consists of at least five members. Normally, the members of the RAC also serve on the doctoral dissertation committee. The dissertation committee is then additionally augmented to ensure that the following criteria are met:

1. Three of the five members (or a similar proportion of a larger committee) must be full-time Washington University faculty members or, for programs offered by Washington University-affiliated partners, full-time members of a Washington University-affiliated partner institution who are authorized to supervise PhD students and who have appropriate expertise in the proposed field of study. One of these three members must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty.
2. All other committee members must be active in research/scholarship and have appropriate expertise in the proposed field of study whether at Washington University, at another university, in government or in industry.
3. At least one of the five members must bring expertise outside of the student's field of study to the committee, as judged by the relevant school's graduate program oversight body.

The approval processes outlined under RAC in the Doctoral Council bylaws formation also apply to the doctoral dissertation committee, including approval of each dissertation committee by the host school's graduate program oversight body/bodies.

The student is responsible for making the full text of the dissertation accessible to their committee members for their review in advance of the defense according to program rules. Faculty outside of the committee and graduate students who are interested in the subject of the dissertation are normally welcome to attend all or part of the defense but may ask questions only at the discretion of the committee chair. Although there is some variation among degree programs, the defense ordinarily focuses on the dissertation itself and its relation to the student's field of expertise.

*(Policy amended by the Doctoral Council on Aug. 25, 2022)*

### **Dissertation Submission**

After the defense, the student must submit an electronic copy of the dissertation online to the university. The submission website requires students to choose among publishing and copyrighting services offered by ProQuest ETD Administrator (<https://www.etdadmin.com/main/home/>), but the university permits students to make whichever choices they prefer. Students are asked to submit the Survey of Earned Doctorates (<https://graduateschool.wustl.edu/forms/>) separately. The degree program is responsible for delivering the final approval form, signed by the committee members at the defense and then by the program chair or director, to the school registrar or the appropriate record custodian. Students who defend their dissertations successfully have not completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by their school of record.

# Washington University School of Medicine in St. Louis

Washington University School of Medicine is a world leader in medical education, research and patient care. Its graduate programs in medical education (p. 58), occupational therapy (<http://www.ot.wustl.edu/>), physical therapy (<https://pt.wustl.edu/>) and audiology (<https://pacs.wustl.edu/>) are perennially ranked among the nation's best by *U.S. News & World Report*. Faculty lead a robust research enterprise, supported by \$575.9 million from the National Institutes of Health during the fiscal year ending June 30, 2021. The school's physicians provide care in partnership with the nationally ranked Barnes-Jewish Hospital (<http://www.barnesjewish.org>) and St. Louis Children's Hospital (<http://www.stlouischildrens.org>).

## Official Course Catalog

The *Bulletin* of Washington University School of Medicine presents the academic policies, services, and course and degree program offerings of the school. It also includes academic calendars, leadership, and directories for faculty, students and staff.

## Contact Information

Washington University School of Medicine  
660 S. Euclid Ave.  
St. Louis, MO 63110

Website: <https://medicine.wustl.edu/education>

## Mission & Vision

### Our Vision

Washington University School of Medicine will lead in advancing human health through the promotion of wellness and the delivery of outstanding health care, innovative research, and the education of tomorrow's leaders in biomedicine within a culture that supports diversity, inclusion, critical thinking and creativity.

### Our Mission

In leading the advancement of human health, Washington University School of Medicine will do the following:

- Cultivate excellence and collegiality within an equitable and inclusive community
- Attract, develop, advance and support a diverse and talented current and future workforce
- Innovate through discoveries and inventions in basic, clinical, translational and population sciences

- Build and support an environment that fosters exceptionally creative research, health care, education and the well-being of our workforce
- Use our academic excellence and scientific rigor to continually advance and enhance health care in a way that ensures access, compassion, high value, equity, and evidence-based care for all people in our community, including those who are underserved and uninsured
- Observe the highest standards of ethics, integrity and humanity across all missions
- Apply advances in research, education and health care to the betterment of the human condition locally and globally

*The School of Medicine Vision and Mission were approved by the Executive Faculty on Sept. 8, 2021.*

## Areas of Study

- Applied Health Behavior Research (p. 30)
- Audiology and Communication Sciences (p. 34)
- Biology and Biomedical Sciences (p. 40)
- Biomedical Informatics (p. 44)
- Biostatistics (p. 48)
- Clinical Investigation (p. 51)
- Genetic Counseling (p. 55)
- Medical Education (MD, GME, CME) (p. 58)
- Medical Physics (p. 58)
- Nursing Science (p. 61)
- Occupational Therapy (p. 65)
- Physical Therapy (p. 73)
- Population Health Sciences (p. 85)
- Public Health (p. 88)

## Applied Health Behavior Research

Health behavior research is a multidisciplinary field that applies psychology, public health, behavioral medicine, communication science and statistics to promote health and prevent disease. Researchers in this area do the following: (1) study the broad range of factors that influence health behaviors and their impact on health outcomes and quality of life; (2) design and test innovative interventions to promote health and reduce disparities; and (3) disseminate evidence-based programs in diverse settings globally. Health behavior research is an important component of clinical research involving human participants, because benefits from medical care are dependent on health behaviors such as clear doctor-patient communication, patient adherence, self-management and risk avoidance.

Applied research seeks to solve practical, real-world problems; to develop innovative treatments, interventions and methods; and to immediately and practically apply its findings in clinical and community settings.

The skills-based graduate programs in Applied Health Behavior Research (AHBR) (<https://generalmedicalsciences.wustl.edu/education/ahbr/>) are offered through the Washington University School of Medicine. The AHBR program provides a strong foundation for graduates to contribute to the development and evaluation of programs and research trials to improve health behaviors, health care quality, health outcomes and quality of life.

## Location

All courses are held on the School of Medicine campus after 4:00 p.m. to accommodate working professionals and full-time students participating in mentored research activities.

## Additional Information

Request Information (<https://www.applyweb.com/fixie/form/s/T8o1ho3/>)

### Sara O'Neal, PhD, M.Ed

Senior Project Manager  
Email: [ahbr@wustl.edu](mailto:ahbr@wustl.edu)

### Amy McQueen, PhD

Program Director  
Email: [amcqueen@wustl.edu](mailto:amcqueen@wustl.edu)

Washington University School of Medicine  
Applied Health Behavior Research Program  
Division of General Medical Sciences  
600 South Taylor Avenue, CB 8005  
St. Louis, MO 63110

Email: [ahbr@wustl.edu](mailto:ahbr@wustl.edu)  
Website: <https://ahbr.wustl.edu>

## Degrees & Offerings

- Master of Science in Applied Health Behavior Research (p. 90)
- Graduate Certificate in Health Behavior Planning and Evaluation (p. 90)

## Research

The graduate programs in Applied Health Behavior Research (AHBR) (<https://generalmedicalsciences.wustl.edu/education/ahbr/>) provide a deeper understanding of the growing fields of health behavior research and behavioral medicine, which conduct research and disseminate findings across a variety of academic and hospital settings, nonprofit organizations, government agencies and private industry.

For professionals currently working in health-related fields, the skills-based curriculum provides hands-on methods and resources to enhance the knowledge and practical skills needed for career advancement. Courses (<https://generalmedicalsciences.wustl.edu/education/ahbr/courses/>) prepare students for project management, leadership, research design and evaluation, data management, and analysis, and they increase students' content expertise in health behavior theory and methods.

For recent graduates planning for their future, the one-year research-intensive master's degree option (<https://generalmedicalsciences.wustl.edu/education/ahbr/concentrations/>) provides opportunities for students to fulfill specific medical and graduate school core competencies and to enhance the competitiveness of their applications, making the program an ideal gap-year option. Through the mentored research experience provided, students develop theoretical knowledge and gain practical experience to pursue careers in medicine, allied health, psychology, public health, and other research or health-related fields.

AHBR graduates (<https://generalmedicalsciences.wustl.edu/education/ahbr/student-experiences/>) are prepared to conduct all phases of research: intervention design and implementation, survey development and administration, participant recruitment and tracking, data collection, data management and data analysis. In academic settings, graduates work for MD or PhD researchers in labs or research centers. In industry, graduates work for health insurance companies, managed care organizations and corporate wellness programs. For nonprofit and community organizations, graduates may lead the design, implementation, evaluation and dissemination of health and wellness programs; contribute to grant applications; and develop partnerships across agencies.

## Faculty

### Sam Biver, MPH (<https://generalmedicalsciences.wustl.edu/people/sam-biver/>)

Senior Public Health Research Coordinator  
Department: General Medical Sciences

### Patricia Cavazos-Rehg, PhD (<https://psychiatry.wustl.edu/people/patricia-cavazos-rehg-phd/>)

Professor of Psychiatry  
Department: Psychiatry

### Melissa Chapnick, RD, MS, MPH

Research Affiliate, AHBR Lecturer  
PhD student at Emory University

### Ling Chen, PhD, MSPH (<https://biostatistics.wustl.edu/faculty-staff/ling-chen/>)

Assistant Professor  
Department: Biostatistics



**Emily Dreher, MEd, LPC, NCC, DBT-LC**

Licensed Professional Counselor and DBT Clinician

**Michael Elliott, PhD** (<https://www.slu.edu/public-health-social-justice/faculty/elliott-michael.php>)

Associate Professor and Associate Dean of Public Health  
Department: Biostatistics, School of Public Health, Saint Louis  
University

**Matthew Ellis, MPE** (<https://psychiatry.wustl.edu/people/matthew-ellis/>)

Instructor in Psychiatry  
Department: Psychiatry

**Lindsey Filiatreau, PhD, MPH** (<https://sites.wustl.edu/lead/people/lindsey-filiatreau/>)

Postdoctoral Research Associate  
Department: Psychiatry

**Robert Fitzgerald, PhD, MPH** (<https://psychiatry.wustl.edu/people/robert-fitzgerald-phd-mp/>)

Assistant Professor  
Department: Psychiatry (Child)

**Emily Hawkins, MS, CCRP**

Clinical Research Education Specialist  
Department: Oncology

**Julia López, PhD, MPH, LCSW** (<https://publichealth.wustl.edu/scholars/julia-d-lopez/>)

Instructor in Medicine  
Department: Obstetrics & Gynecology

**Ragini Maddipati, MSW, MPH** (<https://brownschool.wustl.edu/Faculty-and-Research/Pages/Ragini-Maddipati.aspx>)

AHBR Lecturer

**Amy McQueen, PhD** (<https://generalmedicalsciences.wustl.edu/directory/amy-mcqueen-phd/>)

Professor of Medicine  
Department: Internal Medicine  
Division: General Medical Sciences

**Don Rickert, PhD**

Lecturer, AHBR  
Department: Pharmacy Administration, St. Louis College of  
Pharmacy

**Stephen Scroggins, PhD, MSPH**

Lecturer, AHBR  
Department: Public Health & Social Justice, Saint Louis  
University

**Amaris Tippey, PhD**

Assistant Professor  
Department: Alvin J. Siteman Cancer Center, Barnes-Jewish  
Hospital

**Mary Uhrich, MS**

Clinical Research Specialist  
Department: Siteman Cancer Center

## Courses

Visit online course listings to view offerings for M88 AHBR  
(<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M88>).

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### M88 AHBR 501 Fundamentals of Scientific Writing

In this course, students will learn the fundamental principles of scientific research and writing. Through lectures, group discussion, and written assignments, students will learn effective ways to search scientific publication databases, recognize how content in abstracts, background, method, results and discussion vary across different types of articles, understand how to appropriately cite and reference prior work, and ultimately practice writing and revising parts of a scientific manuscript.  
Credit 1 unit.

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### M88 AHBR 502 Basics of Data Visualization and Presentation

This course presents best practices and principles for communicating data to diverse audiences and provides practical application through the creation and presentation of data visuals. The course work is primarily completed in Microsoft Excel and Microsoft Power Point. Students will learn how to create effective visuals for academic and non-academic presentation. Skills and techniques for developing visuals will be applied within course assignments. Students will have the opportunity to practice orally presenting the visuals they create as part of a final class presentation assignment. This is a short course and will take place on the following Saturdays from 9-12pm: 1/22, 1/29, 2/5, 2/19, and 3/5.  
Credit 1 unit.

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### M88 AHBR 505 Mentored Research

Students are paired with faculty researchers to obtain hands-on experience and exposure to directed research. (*Not offered for Graduate Certificate*).  
Credit 3 units.

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### M88 AHBR 508 Project Management in Clinical and Community Settings

This course trains students in the day-to-day management of research projects and/or health behavior programs in clinical and community settings, including a review of ethics, data collection and management. Students develop skills for managing and coordinating all aspects of health behavior projects, including recruitment and retention of participants, developing and maintaining various databases for study/program tracking and analysis, writing reports, managing a project team, and using basic statistical tools for project reporting. Successful completion of this course enables students to better manage health-related studies and programs.  
Credit 3 units.

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**M88 AHBR 510 Fundamentals of Exercise Science, Fitness and Healthy Aging Research**

Students will learn about the role exercise plays in health, disease prevention and 'successful aging'. The 5 health-related components of fitness (cardiovascular fitness, muscular strength, muscular endurance, body composition and flexibility) will be the backbone of the course with skills required to conduct a research project incorporated into the content. Research studies (primarily those conducted at Washington University) involving 'special populations' will be discussed.

Credit 3 units.

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**M88 AHBR 514 Health Behavior Theory**

This course features analysis and application of behavior theories to health promotion/education planning, implementation, and evaluation in a variety of settings. Primary emphasis is on research related to determinants of health behavior such as personal, family and sociocultural factors that influence health, and lifestyle issues related to behavior change and adherence. Strategies and techniques used by professionals to foster human health are also featured.

Credit 3 units.

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**M88 AHBR 515 Health Psychology**

This course explores the complex interactions between biological, psychological and social factors as they influence health, health behaviors and coping with illness. In a seminar format, students read, present and discuss empirical literature related to health psychology. Specific class topics include the history and current roles of health psychology as a professional discipline, theoretical models of health and illness prevention with an emphasis on the biopsychosocial model, stress, pain, and the role of biopsychosocial factors in several specific medical illnesses including diabetes, asthma, heart disease and cancer. Developmental issues related to health knowledge and perception, disease management and coping with illness are also discussed.

Credit 3 units.

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**M88 AHBR 524 Foundations of Health Care Research**

This course provides an introduction to the basic scientific concepts and methods of investigation used in health care, social science and behavioral science. Students develop an advanced understanding of all phases and components of the research process. Topics include generating research questions and hypotheses, designing a study, selecting a study sample, measuring variables and constructs, collecting data, and planning data analysis and presentation. Prerequisite: M88-525 Introduction to Biostatistics.

Credit 3 units.

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**M88 AHBR 525 Introduction to Biostatistics**

This course introduces the basic principles and methods of biostatistics, providing a sound methodological foundation for applications in health care, medicine, public health and epidemiology. Basic statistics, including probability, descriptive statistics, inference for means and proportions, and regression methods are presented. Course work and assignments are designed to provide regular feedback, require repetition of core techniques necessary for mastery of statistical thinking and analysis, challenge students to tackle both straightforward

and difficult applications of descriptive and analytic statistics to practical public health problems, and incorporate statistical tools and results into oral and written presentations, emphasizing proper use of language and effective communication.

Credit 3 units.

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**M88 AHBR 535 Health Disparities: Applications in Clinical Settings**

This course explores how membership in a diverse/special group can impact health and health care, the identification of barriers to research participation, and effective strategies for improving recruitment efforts of minority and underserved populations. Exploration of health care services and policies governing these services is also included. Students are encouraged to give critical thought to the question of what it means to deliver culturally competent care. The goal of this course is to understand what it means to create environments (social and otherwise) that help to make individuals and communities healthy.

Credit 3 units.

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**M88 AHBR 536 Health Education: Methods, Planning, and Evaluation**

This course introduces the student to the fundamentals of health education and health promotion program planning. Strategies for planning, monitoring and evaluating health education programs that support the improvement of health outcomes will be presented and utilized. A variety of settings in which health education programs are implemented will be explored. Emphasis will be placed on assessing the needs of target populations based on an ecological framework and the application of appropriate methods at each level of that framework. Students who take this class will have the knowledge and skills to plan, develop, implement, monitor and evaluate behavior change programs for improving health status. Students also will learn how to assess the health needs of communities and organizations. This course is offered fully online, with lectures and certain activities conducted asynchronously via Canvas. Required synchronous sessions may also be scheduled. Weekly one-on-one student/faculty meetings will also be required.

Credit 3 units.

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**M88 AHBR 540 Community Health Promotion**

In this course students explore concepts in health promotion including community assessment, resource identification, intervention strategies and evaluation. State and national interventions for lifestyle change and model school and work site programs are featured. Prerequisite: M88-514 Health Behavior Theory.

Credit 3 units.

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**M88 AHBR 547 Power and Sample Size**

Students learn the theoretical and practical aspects of how to calculate sample size for common study designs under various restraints (time, resources, etc.). An overview of statistical power computations for a variety of experimental and epidemiological study designs is provided. These include single sample designs, two-sample designs, cohort designs, case-control designs and various other experimental designs based on the Analysis of Variance model. The concepts of statistical power, statistical precision, sample size and effect size are also reviewed. Prerequisite: M88-525 Introduction to Biostatistics.

Credit 1 unit.

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#### **M88 AHBR 548 Applied Data Management**

This class is designed as an advanced seminar intended for students in the health and social sciences who plan to engage in applied research and includes a survey of important data management topics and techniques including: data programming and manipulation, data storage and security, data cleaning, relational database theory, and legal and ethical issues of data management. Students develop skills in data programming and manipulation, data storage and security, data cleaning, and relational database theory using software such as SPSS, SAS, Excel and Microsoft Access. Prerequisite: M88-525 Introduction to Biostatistics.

Credit 3 units.

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#### **M88 AHBR 550 Introduction to Using REDCap for Research**

Students will learn the purpose and benefits of using sophisticated software platforms such as REDCap for conducting research. Through in-class demonstrations and exercises, students will gain critical hands-on experience using various features of REDCap software, including creating new projects and assigning user rights; development vs. production mode; participant tracking; project calendars and scheduling features; data collection and management; customizable survey design and administration mode; database design; data import and export functions; default and custom reporting tools; audit trails; file sharing; interoperability with other data systems (EMR) and software, including common reporting tools (Excel) and statistical packages (SPSS, SAS, R); and more. Students will learn about the HIPAA compliance standards of REDCap and how the same databases can be used across sites in a multisite study. Students will apply their skills to a proposal for using REDCap to address a specific research objective of their choosing.

Credit 1 unit.

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#### **M88 AHBR 551 Introduction to SPSS**

Students will learn the purpose and benefits of using statistical software programs such as SPSS for managing and analyzing data. Students will learn the superior functional capability of using SPSS vs. Excel for collecting and analyzing data. Through in-class demonstrations and exercises, students will gain critical hands-on experience using various features of SPSS software including: database design, options for quantitative and qualitative variable formats, data entry, data importing and exporting features, output and graphing functions, and common statistical procedures (e.g., descriptive statistics, chi-square, t-test, ANOVA) and basic inferential analyses (e.g., bivariate linear and logistic regression) using both drop-down menu functions and syntax options. Students also will learn how to annotate and manipulate output including tables and figures and how to export or paste output into Word or PDF documents.

Credit 1 unit.

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#### **M88 AHBR 560 Survey Methods: Design and Evaluation**

This applied course focuses on methodological issues regarding the design, implementation, analysis, and interpretation of surveys and questionnaires in public health research. Essential theoretical concepts are addressed, and practical applications are emphasized. Survey design and planning, sampling, and data collection procedures are three of the major topic areas covered.

Credit 3 units.

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#### **M88 AHBR 562 Leadership and Change in Health Care Services**

Students engage in the advanced study of leadership, integrating theory, research and application in a diagnostic approach. Leadership skills for managing planned organizational change are developed through group discussions, class exercises, case studies, and the application of organizational approaches to change and innovation. Topics include personal effectiveness, team building, and creating learning environments in organizations.

Same as U80 CRM 562

Credit 3 units.

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#### **M88 AHBR 582 Evaluation of Health Services Programs**

This course introduces students to the fundamentals of program evaluation methodology, methods of data collection, and related measurement reliability and validity. The curriculum features practical applications and illustrations. Topics include the link between program planning and program evaluation; evaluation research designs and their limitations; integrating process and outcome approaches; and methods of data collection and the utilization of evaluation results. This course is offered fully online, with lectures and certain activities conducted asynchronously via Canvas. Three to five required synchronous sessions will be held throughout the semester. Prerequisite: M88 536 recommended.

Credit 3 units.

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#### **M88 AHBR 584 Internship**

Provides an opportunity to participate in health promotion through various health promotion agencies. Students work with agency site supervisor for 42 contact hours developing, implementing and evaluating a health promotion project. Also, students meet monthly for 2.5-hour seminars with HCS internship adviser. Students must submit an application (to be obtained in Health Care Services office) and résumé. Approved applicants will be interviewed by agency site supervisor. Deadline for application: one month before registration deadline of intended semester.

Credit 3 units.

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#### **M88 AHBR 588 Epidemiology for Clinical Research**

The purpose of this course is to provide an understanding of the use of epidemiological concepts and methods in clinical research. Two primary foci are included: 1) common applications of epidemiologic principles and analytic tools in evaluating clinical research questions; and 2) student development of skills to review and interpret the medical literature and utilize publicly available datasets to address clinical research questions.

Credit 3 units.

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## **Audiology and Communication Sciences**

The Program in Audiology and Communication Sciences (PACS) offers exceptional graduate education programs in clinical audiology (AuD), deaf education (MSDE), and speech and hearing sciences (PhD) as well as an undergraduate minor in speech and hearing (<http://bulletin.wustl.edu/undergrad/artsci/speechhearing/#minors>).

PACS provides students with a uniquely supportive and approachable atmosphere where they are encouraged and respected by one another and by faculty as they develop their passion, knowledge, and experience. With hearing research programs, a school for children who are deaf or hard of hearing, and audiology clinics located on campus, our students gain a breadth and depth of firsthand experience with opportunities to further their educations and careers. As one of the oldest and most respected centers for education, clinical care, and research in hearing disorders, balance, and language, our history is rich in groundbreaking discoveries, and our highly ranked graduate programs are taught by some of the leading minds in these fields.

By preparing passionate and experienced graduates, we strive to improve outcomes for people with hearing disorders.

### Additional Information

Additional information — including application and admission information, program descriptions, and tuition and fees — can be found on the PACS website (<https://pacs.wustl.edu/>) or through direct correspondence with PACS.

Washington University School of Medicine  
Program in Audiology and Communication Sciences  
MSC 8042-26-2000  
660 S. Euclid Ave.  
St. Louis, MO 63110

Phone: 314-747-0104  
Email: [pacs@wustl.edu](mailto:pacs@wustl.edu)  
Website: <https://pacs.wustl.edu>

### Degrees & Offerings

- Doctor of Audiology (p. 91)
- Master of Science in Deaf Education (p. 91)
- PhD in Speech and Hearing Sciences (p. 92)
- Minor in Speech and Hearing Sciences (<http://bulletin.wustl.edu/undergrad/artsci/speechhearing/#minors>)

### Research

The integration of research into the curriculum is a distinctive feature of the PACS graduate programs. All students receive research training through course work and the completion of an independent research project. Additional opportunities to pursue individual research interests are also available, including via Grand Rounds, colloquia, brown bag seminars, journal clubs and similar opportunities. In addition, elective summer research opportunities, which include a stipend, are also available for interested and qualified AuD students.

The affiliated Department of Otolaryngology's (<https://oto.wustl.edu/>) Harold W. Siebens Hearing Research Center provides focused research in two primary areas. The Fay & Carl Simons Center for the Biology of Hearing and Deafness

is made up of a group of investigators within the department who study the cellular and molecular mechanisms of auditory signal transduction, sensory cell death, and regeneration and development. Ongoing and new studies within this group are adding to our understanding of the molecular and cellular processes of the development of neural connections, hearing loss and the potential for future treatments. In the Center for Childhood Deafness and Adult Aural Rehabilitation, researchers are achieving a better understanding of how communication disorders can be measured, treated and overcome.

Additional areas of research focus within the department include the study of normal vestibular function and vestibular disorders, hearing aids, cochlear implants, auditory brain stem implants, age-related and noise-induced hearing loss, and the education of children who are deaf or hard of hearing.

### Faculty

#### Program Directors

**Kate McClannahan**  
Director of Undergraduate Studies  
Assistant Professor of Otolaryngology

**Amanda Ortmann** (<https://pacs.wustl.edu/people/amanda-j-ortmann-phd/>)  
Director of Audiology Studies  
Assistant Professor of Otolaryngology

**Casey Reimer** (<https://pacs.wustl.edu/people/casey-reimer-phd/>)  
Director of Deaf Education Studies  
Assistant Professor of Otolaryngology

#### Faculty and Staff List

For a full list of faculty and staff (<https://pacs.wustl.edu/our-people/>), please visit the PACS website.

### Courses

Visit online course listings to view offerings for M89 PACS (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M89>).

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#### M89 PACS 324 Acoustics and Speech Perception

Topics include principles of acoustics, with applications to speech and hearing. Basic physics of sound -- including simple harmonic motion, wave propagation in air, resonance, sound measurement and spectral analyses, filtering, and digital sound processing -- are discussed. Principles will be applied to the production and physical properties of speech. An overview of the acoustic characteristics of individual speech sounds and of suprasegmental speech patterns will be provided. Perceptions of speech and non-speech sounds are discussed.  
Credit 3 units.

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**M89 PACS 344 Observation and Methods in Speech-Language Pathology**

This course surveys a broad range of speech and language disorders in terms of associated characteristics, assessment techniques, and treatment considerations. Prerequisite: Permission of department required.  
Credit 3 units.

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**M89 PACS 360 Introduction to Audiology**

This course covers the role of the audiologist in the diagnosis and treatment of hearing loss; the administration and interpretation of audiologic test results; and amplification systems and assistive devices. It explores practical experience with the clinical issues professionals will face when working with individuals who are deaf or hard of hearing. This course is recommended for future practitioners in speech-language pathology/audiology/deaf education who will be serving individuals with hearing loss across the lifespan.  
Credit 3 units.

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**M89 PACS 401 Anatomy and Physiology of Speech and Hearing**

Introduction to anatomy and physiology of the peripheral hearing system and central nervous system, including functional descriptions of the systems and processes underlying speech and hearing function and dysfunction.  
Credit variable, maximum 3 units.

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**M89 PACS 4011 Behavior Management**

Introduction to various behavior management systems effective in both individual and group environments. Behavior interventions, classroom management strategies, environmental controls, psychodynamic techniques, and biophysical interventions are discussed, observed, and practiced. Focus is on working with children who are deaf or hard of hearing. Prerequisite: Permission of department required.  
Credit 2 units.

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**M89 PACS 416 Evaluation Techniques for Children Who Are Deaf or Hard of Hearing**

A basic introduction to psychometrics with emphasis on the selection, interpretation and evaluation of assessments. Specific techniques for evaluating intellectual, educational, and linguistic abilities and achievement in children who are deaf or hard of hearing, from infancy through adolescence, are discussed and demonstrated. Prerequisite: Permission of department required.  
Credit 3 units.

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**M89 PACS 421 Introduction to Electroacoustics**

Introduction to the physics of sound. Topics include production, transmission and reception of sound and factors affecting human communication. Includes discussion, lectures, problems and lab.  
Credit 3 units.

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**M89 PACS 424 Speech and Hearing Sciences**

Surveys a broad array of speech and hearing science topics. Focus is on how speech and hearing science research findings can be applied to the practice of deaf education.  
Credit 1 unit.

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**M89 PACS 4301 Sign Language I**

Basics of American Sign Language are introduced, including vocabulary, grammatical structure, fingerspelling and cultural information about the deaf community. This is a highly interactive and participatory course.  
Credit 2 units. EN: H

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**M89 PACS 4302 Sign Language II**

Continues development of American Sign Language with additional vocabulary, emphasis on expressive and receptive abilities, conversational skills, and knowledge of deaf culture. This is a highly interactive and participatory course. Prerequisite: PACS 4301-Sign Language I.  
Credit 2 units. EN: H

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**M89 PACS 434 Typical Language Development**

Study of typical language development, including the phonologic, morphologic, semantic, syntactic and metalinguistic aspects. Interactions between linguistic and other areas of child development will be discussed. Contrasts will be explored between typical and atypical child development to shed light on language learning processes.  
Credit 3 units.

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**M89 PACS 438 Early Literacy Development of Children Who Are Deaf or Hard of Hearing**

Development of early print-recognition, reading and writing of children who are typically hearing and children who are deaf or hard of hearing. Focus is on the years leading up to kindergarten. An overarching theme is the interaction between early language and early literacy development. Evidence-based strategies for differentiated instruction will also be discussed. Permission of department required.  
Credit 3 units.

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**M89 PACS 443 Speech and Language Disorders**

This course surveys a broad range of speech and language disorders in terms of associated characteristics, assessment techniques and treatment considerations. Prerequisite: Permission of department required.  
Credit 3 units.

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**M89 PACS 444 Amplification Systems and Aural Rehabilitation for Children**

This course will provide students with a broad understanding of amplification systems and principles and methods of aural rehabilitation as they apply to children who are deaf or hard of hearing. Amplification systems to be covered will include digital hearing aids, cochlear implants and a full range of assistive devices. Aural rehabilitation topics will emphasize patient management and will include communication strategies, conversation styles and speech recognition assessment. Students will be provided with videotapes, live demonstrations and in-class activities. Direct contact with children and technological devices will also be used to support lectures and discussions. Prerequisite: Permission of department required.  
Credit 2 units.

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**M89 PACS 4511 Practicum in Deaf Education**

Study of typical language development, including the phonologic, morphologic, semantic, syntactic and metalinguistic aspects. Interactions between linguistic and other areas of child development will be discussed. Contrasts will be explored between typical and atypical child development to shed light on language learning processes. Prerequisite: Permission of department required.

Credit 6 units.

**M89 PACS 4512 Practicum in Deaf Education**

Supervised practicum in education of children who are deaf or hard of hearing. Students will be placed in field experiences (early, mid-level and culminating levels) in a variety of educational settings with a variety of age ranges, using interventions in areas such as language, speech, auditory training, reading, math and other content areas. Prerequisite: Permission of department required.

Credit 7 units.

**M89 PACS 4515 Language Instruction for Children Who Are Deaf or Hard of Hearing**

Principles and methods of developing competence in spoken English in children who are deaf or hard of hearing, birth to grade 12. Includes presentation of differentiated instructional techniques for teaching a diverse population of children who are deaf or hard of hearing English vocabulary, syntax and pragmatics, as well as techniques for auditory training. Evaluations and data-driven lesson planning/IEP/IFSP development will be discussed, as well as the role of families as engaged, educational partners in spoken language development. Prerequisite: Permission of department required.

Credit 3 units.

**M89 PACS 4525 Foundations of Literacy Theory and Instruction**

Principles and methods of developing reading and writing competence in children who are typically hearing, with an emphasis on the stages of development and appropriate teaching sequences. Based on this foundation, strategies and methods will be presented for making appropriate differentiated learning adaptations and interventions for reading instruction with students who are deaf or hard of hearing who have language and reading deficits. Additional topics include the use of children's literature in instruction, the intersection of language and reading development, content literacy, and general language arts instruction. Prerequisite: Permission of department required.

Credit 4 units.

**M89 PACS 4526 Literacy Lab: A Focus on Typical and Atypical Learners**

Emphasizes observation and some practice planning and teaching reading and writing with students who are typical and atypical learners, including children who are deaf or hard of hearing and who struggle to develop appropriate literacy skills. Observations will focus on areas such as how teachers use differentiated learning strategies for diverse learners, the use of children's literature in instruction, the intersection of language and reading development, instruction in content literacy, and general language arts instruction. Prerequisite: Permission of department required.

Credit 2 units.

**M89 PACS 454 Mathematics and Content-Area Instruction for Children Who Are Deaf or Hard of Hearing I**

Principles and methods of teaching mathematics to students who are typically hearing and those who are deaf or hard of hearing. Strategies for other content-area instruction (science, social studies), use of instructional technology, and strategies for improving content literacy will also be discussed, with an emphasis on techniques for working with children who are deaf or hard of hearing. Students will practice developing and implementing lesson plans that are aligned to state and national standards. Prerequisite: Permission of department required.

Credit 3 units.

**M89 PACS 455 Mathematics and Content-Area Instruction for Children Who Are Deaf or Hard of Hearing II**

A continuation of PACS 454. Principles and methods of teaching mathematics to students who are typically hearing and those who are deaf or hard of hearing. Strategies for other content-area instruction (science, social studies), use of instructional technology, and strategies for improving content literacy will also be discussed, with an emphasis on techniques for working with children who are deaf or hard of hearing. Students will practice developing and implementing lesson plans that are aligned to state and national standards. Prerequisites: PACS 454 and permission of department required.

Credit 3 units.

**M89 PACS 457 Counseling Parents of Children Who Are Deaf or Hard of Hearing**

Examines the psychological needs of families who have children who are deaf or hard of hearing. The aim of the course is to help teachers of children who are deaf or hard of hearing interact more effectively with parents and caregivers, using a collaborative model that views families as engaged partners in the educational process. Students will develop a repertoire of interviewing and counseling skills, as well as learn about a wealth of resources to share with families. Prerequisite: Permission of department required.

Credit 3 units.

**M89 PACS 458 Speech for Children Who Are Deaf or Hard of Hearing**

Development, improvement and maintenance of speech skills for children who are deaf or hard of hearing through multisensory approaches. Articulation, voice and rhythm patterns are considered. Lectures, demonstrations and practice. Prerequisite: Permission of department required.

Credit 3 units.

**M89 PACS 460 Audiology Staffing**

Discussion and presentations of clinical cases and issues related to practice in clinical audiology. Prerequisite: Permission of department required.

Credit 1 unit.

**M89 PACS 4611 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.

Credit 1 unit.

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**M89 PACS 4612 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 1 unit.

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**M89 PACS 4613 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 3 units.

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**M89 PACS 4621 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 2 units.

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**M89 PACS 4622 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 2 units.

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**M89 PACS 4623 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 4 units.

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**M89 PACS 4631 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 2 units.

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**M89 PACS 4632 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 2 units.

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**M89 PACS 4633 Practicum in Audiology**

Supervised practicum in audiology. Prerequisite: permission of department required.  
Credit 6 units.

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**M89 PACS 463A Pre-Clinical Externship**

Credit 1 unit.

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**M89 PACS 4641 Clinical Externship in Audiology**

Clinical externship in audiology (on campus). Prerequisite: permission of department required.  
Credit 9 units.

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**M89 PACS 4642 Clinical Externship in Audiology**

Clinical externship in audiology (on campus). Prerequisite: permission of department required.  
Credit 9 units.

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**M89 PACS 4651 Clinical Externship in Audiology**

Clinical externship in audiology (off campus). Prerequisite: permission of department required.  
Credit 9 units.

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**M89 PACS 4652 Clinical Externship in Audiology**

Clinical externship in audiology (off campus). Prerequisite: permission of department required.  
Credit 9 units.

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**M89 PACS 466 Rehabilitative Audiology**

This course presents principles and methods of aural rehabilitation, with an emphasis on patient management. Topics include communication strategies and conversation styles, speech recognition assessment, and hearing aid service provisions for adults, older persons, children, and family members. Prerequisite: Permission of department.  
Credit 3 units.

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**M89 PACS 468 Pediatric Audiology**

Fundamentals of audiologic assessment for infants and children. Behavioral and electrophysiologic procedures, and assessment of auditory processing abilities, are presented. Prerequisite: permission of department required.  
Credit 3 units.

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**M89 PACS 470 Business Practices**

Issues relating to establishing a private practice including clinical management, small business and accounting practices, models of private practice, referrals and reimbursement, and managed care. Prerequisite: permission of department required.  
Credit 2 units.

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**M89 PACS 5001 Electrophysiologic Techniques I**

Introduces basic concepts in administration and interpretation of physiologic and electrophysiologic measures, with focus on auditory evoked potentials (AEP). Content covers basic instrumentation, parameters and variables affecting the AEP, auditory brainstem response (ABR), middle (MLR) and late (LLR) evoked potentials, auditory steady state response (ASSR) and otoacoustic emissions (OAE). Prerequisite: permission of department required.  
Credit 3 units.

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**M89 PACS 5002 Electrophysiology II**

Advanced concepts related to the administration and interpretation of physiologic and electrophysiologic measures. Content includes in-depth study of ABR and other auditory evoked potentials, and the clinical application of these for the audiologist. Additional topics include study of electrocochleography (ECoChG), P300 auditory responses, and mismatched negativity (MMN). This course will include a thorough study of intraoperative monitoring including neurophysiology and anatomy review, cranial nerve monitoring, spinal cord monitoring, and facial nerve monitoring. Prerequisites: permission of department required.  
Credit 1 unit.

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**M89 PACS 502 Pharmacology**

Includes basic information related to medications utilized for treating common hearing/balance disorders. Hearing and balance side effects of medications are discussed, as are ototoxic and preventative mechanisms related to pharmacology. Prerequisites: permission of department required.  
Credit 1 unit.

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**M89 PACS 505 Auditory Neuroscience**

Development of an in-depth understanding of issues related to auditory neurophysiology from the auditory nerve to the cortex.

Prerequisites: permission of department required.

Credit 2 units.

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**M89 PACS 506 Genetics in Hearing Loss**

Study of the genetic causes of hearing loss and balance disorders, and syndromes affecting the auditory and vestibular systems. Prerequisites: Permission of department required.

Credit 1 unit.

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**M89 PACS 507 Vestibular Disorders**

Comprehensive course covering the assessment, diagnosis and treatment of vestibular disorders. Prerequisites: Permission of department required.

Credit variable, maximum 3 units.

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**M89 PACS 510 Auditory Perception**

Study of how the listener perceives parameters of and differences in acoustical stimuli. Perception of the speech stimulus is also studied in detail, both for listeners who are typically-developing and those who are deaf or hard of hearing. Prerequisites: Permission of department required.

Credit 3 units.

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**M89 PACS 511 Hearing Conservation**

This course will cover topics related to hearing conservation, including effects of noise on hearing, environmental noise, classroom acoustics, federal regulations, interactions of noise and other agents, and ototoxicity. Additional topics may vary year-to-year. Prerequisites: Permission of department required.

Credit 3 units.

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**M89 PACS 517 Counseling for Audiology**

Examines the relationship between clinician and patient in audiology. Topics include counseling theory and practices, and principles and methods of effective interviewing and counseling across the lifespan. Prerequisites: Permission of department required.

Credit 2 units.

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**M89 PACS 519 Psychosocial and Educational Foundations of Deafness**

Examines psychological, social, educational, legal, historical, and cultural influences related to individuals who are deaf or hard of hearing. Additional topics include IEPs and interprofessional collaboration related to post-high-school transitions. Prerequisite: Permission of department required.

Credit 2 units.

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**M89 PACS 551 Research Seminar**

A seminar of variable topics related to research in speech and hearing sciences. Each semester/section has its own specific area of focus, which may include an investigation of active areas of research, an overview of outcomes-based research and evidence-based practice for students' research projects, or thorough analysis and discussion of a specific area of active research. Refer to section description for information on specific topics by section. Prerequisite: Permission of department required.

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Credit variable, maximum 3 units.

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**M89 PACS 552 Hearing and Communication Seminar**

Provides an overview of hearing, auditory neuroscience, language, and deaf education.

Credit 3 units.

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**M89 PACS 554 Fundamentals of Early Intervention and Child Development**

Course provides information about general and exceptional child development, focusing on ages birth through five years. Course also discusses historical and philosophical tenets of early intervention practice, focusing on a collaborative coaching model, which views families as engaged partners in the child's education. Other topics include addressing needs of families from a variety of cultural and economic backgrounds, linking families to resources, and federal laws that govern special education services for children with disabilities including transitions in service provisions for children at the age of 3 years. Prerequisites: Permission of department required.

Credit 1 unit.

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**M89 PACS 555 Early Intervention: Serving Children Who Are Deaf or Hard of Hearing, Birth to Age 5**

This course provides an overview of early childhood development of children who are deaf or hard of hearing, birth to age 5, with particular focus on early speech and language development, intervention strategies, assessment techniques, instructional strategies, and aural rehabilitation. Course discusses the philosophical tenets of early intervention practice, which views families as engaged partners in the child's education, and respects cultural and linguistic diversity. Students will learn about IFSP and IEP development, as well as a variety of resources that can be provided to families. Prerequisite: Permission of department required.

Credit 3 units.

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**M89 PACS 558 Pre-Service Teacher Preparation**

This course is designed to help students in the deaf education teacher training program create a teaching portfolio that reflects their own teaching development. Students will demonstrate their ability to reflect on and critique their own teaching practice, especially in relation to course planning, instructional strategies, differentiated learning, data-based decision making, tiered systems for supporting instruction, and classroom management.

Professional issues, including developing a résumé and conducting interviews, will also be discussed. Prerequisite: permission of department required.

Credit 1 unit.

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**M89 PACS 5601 Clinical Audiology I**

An introduction to the field of clinical audiology. Covers the role of the audiologist in the diagnosis and treatment of hearing disorders; the administration and interpretation of audiologic test results; and amplification systems and assistive devices, such as DM/FM technology. Additional topics may include relevant calibration and instrumentation requirements, audiology as a career, aural rehabilitation, and legal and ethical issues in the field. Prerequisites: Permission of department required.

Credit 3 units.

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**M89 PACS 5602 Clinical Audiology II**

Covers hearing evaluation and diagnosis in clinical audiology from infancy through adulthood. Topics include auditory processing disorders, functional hearing loss, and other advanced measures. Prerequisites: Permission of department required.

Credit 3 units.

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**M89 PACS 5651 Hearing Devices in Audiology I**

Philosophical issues related to the selection and evaluation of hearing devices, including hearing aids and alternative devices. Means of adjusting hearing devices and measuring their function and benefit are covered.

Credit 4 units.

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**M89 PACS 5652 Hearing Devices in Audiology II**

Advanced issues related to the selection and evaluation of hearing aids. Means of adjusting hearing aids and measuring their function and benefit. Prerequisite: permission of department required.

Credit 3 units.

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**M89 PACS 5653 Hearing Devices in Audiology III**

Course covers a variety of topics related to selection, fitting and rehabilitation of cochlear implant patients. Lectures and practical experience in psychophysical testing, programming of the cochlear implant, and auditory training. Prerequisite: permission of department required.

Credit 3 units.

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**M89 PACS 569 Hearing Disorders**

This course covers the nature and causes of hearing disorders, including outer and middle ear, cochlear, retrocochlear and central nervous system. Prerequisites: Permission of department required.

Credit 2 units.

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**M89 PACS 570 Independent Study**

Students engage in independent work on the Independent Study, which demonstrates advanced critical thinking and writing skills. Prerequisites: Permission of department required.

Credit variable, maximum 6 units.

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**M89 PACS 5700 Capstone Project**

Independent work on the Capstone Project. Prerequisites: Permission of department required.

Credit variable, maximum 6 units.

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**M89 PACS 5701 Capstone Project Seminar**

This weekly, joint meeting is intended to provide extra and preliminary support for initiation of the Capstone Project. Areas will include but are not limited to: journal article critique, scientific writing, overview of research design and methodologies, statistical review, support for graph and table construction, and others. Prerequisites: Permission of department required.

Credit 1 unit.

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**M89 PACS 573 Research Design and Methods**

Prerequisite: Permission of department required.

Credit variable, maximum 2 units.

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**M89 PACS 574 Statistics and Research Methods**

Examines experimental and field research methods as they apply to audiology and communication sciences. Covers such methods as surveys, survey interviews, content analysis, and experimental design. Prerequisites: Permission of department required.

Credit 3 units.

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**M89 PACS 575 Special Topics**

Special topics in speech and hearing sciences, audiology and/or education of the deaf or hard of hearing. Contact the department for more information. Prerequisites: Permission of department required.

Credit variable, maximum 4 units.

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**M89 PACS 577 Research in Speech and Hearing**

Prerequisites: Permission of department required.

Credit variable, maximum 12 units.

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**M89 PACS 587 Dissertation Research**

Prerequisites: Permission of department required.

Credit variable, maximum 12 units.

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**M89 PACS 600 Mentored Teaching Experience in Speech and Hearing**

This course involves mentored teaching experience as a graduate teaching assistant. Under faculty supervision, credit may be earned through the instruction of undergraduate or graduate students in courses offered by PACS. Corequisite: LGS 600-48.

Credit variable, maximum 12 units.

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**M89 PACS 603 Mentored Professional Experience**

Credit variable, maximum 12 units.

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**M89 PACS 9000 Full-Time Graduate Study/Research****M89 PACS 9001 Full-Time Graduate Study in Absentia****M89 PACS 9002 Full-time Graduate Study Extension**

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## Biology and Biomedical Sciences

The Roy and Diana Vagelos Division of Biology & Biomedical Sciences at Washington University offers exceptional doctoral education at one of the nation's preeminent biomedical research centers. The Division includes 13 doctoral programs:

- Biochemistry, Biophysics and Structural Biology
- Biomedical Informatics and Data Science
- Cancer Biology
- Computational and Systems Biology
- Developmental, Regenerative and Stem Cell Biology
- Evolution, Ecology and Population Biology
- Human and Statistical Genetics

- Immunology
- Molecular Cell Biology
- Molecular Genetics and Genomics
- Molecular Microbiology and Microbial Pathogenesis
- Neurosciences
- Plant and Microbial Biosciences

A collaborative, interdisciplinary approach to research and education is a hallmark of Washington University and the Division. As a universitywide consortium, the Division transcends departmental lines and removes traditional boundaries of scientific fields. Faculty and graduate students regularly cross disciplines, devising novel questions and approaches that might otherwise go unexplored. The Division consists of approximately 700 PhD and MD/PhD students, with more than 600 faculty members from 38 departments.

Washington University in St. Louis provides unique opportunities for translating basic science into practical application. In addition, the Division's associations with internationally prominent local institutions provide exciting opportunities: students in the biomedical sciences enrich their work with the clinical perspective of our outstanding medical school; students in plant, population, evolutionary and ecological sciences benefit from our close affiliation with the internationally renowned Missouri Botanical Garden (<http://www.missouribotanicalgarden.org/>), the Tyson Research Center (<https://tyson.wustl.edu/>) and the Donald Danforth Plant Science Center (<http://www.danforthcenter.org/>).

To help prepare graduates for careers in academia, government, industry or another field of their choice, educational opportunities are offered for skills development and career exploration. The DBBS offers career-planning curriculum, and students can pursue noncredit elective credentials to build transferable professional skills in four areas that apply to a wide variety of scientific careers: leadership, entrepreneurship, science communication, and teaching. Through the Initiative for Maximizing Student Development Career Pathway Talks program, professionals from a variety of fields (e.g., biotech startups, patent law) provide presentations and Q&A sessions to students throughout the year. In addition — through partnerships with groups such as the Teaching Center, the Career Center, and student organizations such as ProSPER, InPrint, Sling Health, the BALSAs Group, and the Young Scientist Program — students have additional opportunities to develop experiences relevant to their future career goals.

## Additional Information

Further information, including full program descriptions, may be obtained in the following ways:

**Mailing address:**

Division of Biology & Biomedical Science  
Washington University in St. Louis  
660 S. Euclid Ave., CB 8226

St. Louis, MO 63110

**Physical location:**

Bernard Becker Medical Library, Fourth Floor  
660 S. Euclid Ave.  
St. Louis, MO 63110

Email: [dbbspdadmissions@wustl.edu](mailto:dbbspdadmissions@wustl.edu)

Website: <http://dbbs.wustl.edu>

## Degrees & Offerings

- PhD Degrees in Biology & Biomedical Sciences (p. 93)

## Research

### Biochemistry, Biophysics and Structural Biology (<http://dbbs.wustl.edu/divprograms/biophysics/Pages/BBSB.aspx>)

**Biochemistry** uses the concepts and approaches of chemistry to understand the molecular basis of biological processes. Biochemical studies include enzymology, metabolism, DNA replication, cell signaling, and drug discovery. Insights from these studies may shed light on fundamental biological processes as well as mechanisms of disease, new drug treatments, and new diagnostics.

**Biophysics** brings together elements of biology, chemistry, physics and mathematics to describe and understand biological processes. It is a fusion of scientific cultures: the systems and processes of biochemistry and computational and molecular biology are joined with the principles and quantitative laws of physical chemistry. The goal is to develop a quantitative and predictive understanding of biology at a detailed molecular level.

**Structural Biology** seeks a mechanistic understanding of macromolecular function through molecular structure and dynamics. X-ray diffraction, cryo-electron microscopy, and nuclear magnetic resonance are among the tools used by structural biologists, whose insights address important questions throughout biology and medicine at Washington University.

Visit our website for information about our Biochemistry, Biophysics and Structural Biology faculty (<http://dbbs.wustl.edu/divprograms/biophysics/Pages/Faculty.aspx>).

### Biomedical Informatics and Data Science (<http://dbbs.wustl.edu/divprograms/BIDS/Pages/default.aspx>)

**Biostatistics and Data Science Research Track:** The goal of the Biostatistics and Data Science track is to train independent and innovative researchers who will contribute to the development and application of cutting-edge statistical and data science methodologies in health science disciplines. The track provides a balance of theory, methods, and applications

of biostatistics and data science that are central to modern interdisciplinary research. Under the supervision of advisors, PhD students participate in the design of clinical studies and are involved in the analysis, inference, and interpretation of these studies.

**Biomedical Informatics Research Track:** Through the Biomedical Informatics track, students will have training and research opportunities in the five subdisciplines of biomedical informatics as defined by the American Medical Informatics Association (AMIA (<https://www.amia.org/>)), the largest professional scientific community in the field of biomedical informatics:

- Applied Clinical Informatics (ACI): applying innovative measurement and informatics approaches to inform and improve clinical practice
- Consumer Health Informatics (CHI): investigating consumers' needs and integrating consumers' preferences into health information systems
- Clinical Research Informatics (CRI): managing information related to clinical trials as well as secondary use of clinical data
- Translational Bioinformatics (TBI): developing storage, analytic, and interpretive methods to optimize the transformation of biomedical data
- Population Health Informatics (PopHI): integrating aspects of public health, clinical informatics, and health care delivery

Visit our website for information about our Biomedical Informatics and Data Science faculty (<http://dbbs.wustl.edu/divprograms/BIDS/Pages/Faculty.aspx>).

## **Cancer Biology (<http://dbbs.wustl.edu/divprograms/cancerbiology/Pages/default.aspx>)**

The graduate program in Cancer Biology spans many disciplines, including cell biology, genetics, biochemistry, microbiology, pharmacology, pathology, epidemiology, bioinformatics, and immunology, to name a few. It represents a unique set of training and educational activities that, taken collectively, expose the student to the full breadth of cancer biology while allowing immersion in a specific dissertation topic of the student's choice. A common theme that unites these diverse endeavors is the desire to push the limits of our understanding of these processes to the highest possible molecular resolution. The program is designed to provide graduate and medical students with the education and training they need to make significant contributions to the field of cancer biology, both in the laboratory and in the clinic.

Visit our website for information about our Cancer Biology faculty (<http://dbbs.wustl.edu/divprograms/cancerbiology/Pages/Faculty.aspx>).

## **Computational and Systems Biology (<http://dbbs.wustl.edu/divprograms/compbio/Pages/default.aspx>)**

The graduate program in Computational and Systems Biology trains the next generation of scientists in technology-intensive, quantitative, systems-level approaches to molecular biology. As technological changes generate exponentially larger amounts of data, the scale of the biological questions under investigation grows ever larger. Students in the Computational and Systems Biology program learn to leverage advances in cutting-edge, high-throughput experimental and computational tools. Because of its interdisciplinary nature, the program's curriculum accommodates students with a wide variety of backgrounds, including genetics, biochemistry, molecular biology, mathematics, engineering, physics, chemistry, computer science, and statistics. The faculty in the program are highly interdisciplinary and specialize in the application of computer science, information technology, biophysics, biochemistry, genetics, applied mathematics, and statistics to problems in molecular biology.

Visit our website for information about our Computational and Systems Biology faculty (<http://dbbs.wustl.edu/divprograms/compbio/Pages/Faculty.aspx>).

## **Developmental, Regenerative and Stem Cell Biology (<http://dbbs.wustl.edu/divprograms/devbio/Pages/default.aspx>)**

A central theme of the Developmental, Regenerative and Stem Cell Biology program is the desire to understand the genetic and molecular basis of specific developmental events and how defects in these events lead to developmental disorders and disease, such as cancer and neurodegeneration. Students and faculty members in the program employ genetics, cell biology, and biochemistry as well as cutting-edge imaging, genomic, and systems-level approaches to dissect key outstanding questions in the fields of development, regeneration, and stem cell biology.

Visit our website for information about our Developmental, Regenerative and Stem Cell Biology faculty (<http://dbbs.wustl.edu/divprograms/devbio/Pages/Faculty.aspx>).

## **Evolution, Ecology and Population Biology (<http://dbbs.wustl.edu/divprograms/eepb/Pages/default.aspx>)**

The graduate program in Evolution, Ecology and Population Biology studies the origins and maintenance of biodiversity on both evolutionary and ecological timescales. The program combines field studies with the technical advances of molecular genetics, statistics, large-scale genomics, quantitative genetics, and mathematical theory to gain an understanding of evolutionary history and environmental biology. Research

in the program is extremely diverse. Study organisms include model systems such as yeast, *Drosophila*, *Arabidopsis*, and *Dictyostelium*; human populations; agricultural species; and various natural plant and animal populations. Students' research opportunities are enriched by the university's partnerships with local institutions. Our Tyson Research Center allows field studies in local natural ecosystems. The Missouri Botanical Garden conducts systematic studies of plant diversity worldwide. The Saint Louis Zoo facilitates studies of the conservation biology of exotic large animals. Our faculty and students also conduct studies on a global scale at field sites in Africa, Asia, and South America.

Visit our website for information about our Evolution, Ecology and Population Biology faculty (<http://dbbs.wustl.edu/divprograms/eeepb/Pages/Faculty.aspx>).

### **Human and Statistical Genetics (<http://dbbs.wustl.edu/divprograms/hsg/Pages/default.aspx>)**

The graduate program in Human and Statistical Genetics offers an interdisciplinary approach to preparing future scientists with analytical/statistical, computational, and human genetic methods for the study of human disease. This PhD training program is currently being consolidated with other quantitative and genetics training programs, so the program is not accepting new students starting with the 2022-23 recruiting season. Applicants with an interest in this area should consider Molecular Genetics and Genomics, Computational and Systems Biology, Bioinformatics and Data Sciences, or another DBBS program as a point of entry. Elective course work in these programs offers students rigorous preparation for research in human/mammalian genetics, statistical genetics, and bioinformatics.

Visit our website for information about our Human and Statistical Genetics faculty (<http://dbbs.wustl.edu/divprograms/hsg/Pages/Faculty.aspx>).

### **Immunology (<http://dbbs.wustl.edu/divprograms/immunology/Pages/default.aspx>)**

The graduate program in Immunology offers an outstanding learning environment in one of the largest and most diverse Immunology programs in the nation and a faculty that is highly committed to graduate education. The Immunology faculty are leaders in their field, developing and employing cutting-edge technologies, including the generation of genetically modified mice by gene targeting, proteomics, intravital microscopy, and high-throughput pathogen discovery. Some of the key questions explored here are specific to the field, while others deal with the immunological versions of more basic phenomena in areas such as developmental biology, signal transduction, and the regulation of gene expression. Because immunology

is interdisciplinary and rapidly developing, the program trains students to develop specialty expertise in immunology itself, as well as basic knowledge in a number of general "emphasis" areas with broader applicability.

Visit our website for information about our Immunology faculty (<http://dbbs.wustl.edu/divprograms/immunology/Pages/Faculty.aspx>).

### **Molecular Cell Biology (<http://dbbs.wustl.edu/divprograms/cellbio/Pages/default.aspx>)**

The graduate program in Molecular Cell Biology involves a wide array of investigations into many fundamental cell processes and the mechanisms that control them. Among the subjects currently under investigation are gene expression; mechanisms of transcription and tissue-specific transcription regulation; molecular mechanisms involved in cell proliferation; the cell cytoskeleton, motility, and chemotaxis; pathways for the trafficking of molecules into and out of cells; receptor-ligand interactions involved in the regulation of cell growth and the cell phenotype; signal transduction molecules and pathways; lipid metabolism; the assembly of supramolecular structures, including the extracellular matrix; mechanisms of enzyme catalysis and inhibition; and mechanisms of pathogenesis. A common theme uniting these research programs is the desire to understand essential cellular functions at the highest possible level of molecular resolution.

Visit our website for information about our Molecular Cell Biology faculty (<http://dbbs.wustl.edu/divprograms/cellbio/Pages/Faculty.aspx>).

### **Molecular Genetics and Genomics (<http://dbbs.wustl.edu/divprograms/genetics/Pages/default.aspx>)**

The graduate program in Molecular Genetics and Genomics provides an ideal interdisciplinary training environment for students interested in exploring basic questions in biology. Students and faculty members in the program employ genetic and genomic approaches to investigate questions in genetics, cell biology, development, and physiology. Common themes include research aimed at identifying and characterizing the genes and the genetic and molecular networks that control fundamental genetic and cellular processes; deciphering how defects in gene function disrupt these processes and lead to disease; and devising genetic and molecular methods to identify and treat diseases.

Visit our website for information about our Molecular Genetics and Genomics faculty (<http://dbbs.wustl.edu/divprograms/genetics/Pages/Faculty.aspx>).

## **Molecular Microbiology and Microbial Pathogenesis (<http://dbbs.wustl.edu/divprograms/micro/Pages/default.aspx>)**

### **Molecular Microbiology**

Research in molecular microbiology employs genetics, cell biology, biochemistry, and biophysics to investigate fundamental biological problems including environmental sensing and cell-cell signaling, transcriptional and post-transcriptional regulation, secretion, energy generation, and the bacterial cell cycle. State-of-the-art computational and comparative genomic approaches are used to study commensal, pathogenic, and environmental organisms in their natural environments.

### **Microbial Pathogenesis and Host Defense**

Research in this area involves the molecular biology and biochemistry of pathogenic bacteria, fungi, protozoa, helminths, and viruses, with an emphasis on mechanisms of virulence and host-parasite interactions. By applying a wide range of emerging technologies in molecular genetics and cell biology, this work includes the discovery and analysis of virulence-associated genes, the study of innate and acquired immunity to pathogens, and the identification and exploration of novel targets for chemotherapy.

Visit our website for information about our Molecular Microbiology and Microbial Pathogenesis faculty (<http://dbbs.wustl.edu/divprograms/micro/Pages/Faculty.aspx>).

## **Neurosciences (<http://dbbs.wustl.edu/divprograms/neuro/Pages/default.aspx>)**

The graduate program in the Neurosciences has a large and interactive faculty drawn from numerous preclinical and clinical departments across two campuses. We study nearly every area of modern neuroscience, from the structural analysis of ion channels to the mapping of the functional connections of the human brain. Students enjoy a challenging and productive environment in which to define and pursue their professional goals. The superb resources and remarkable breadth of research possibilities at Washington University guarantee the student's exposure to the most fundamental issues in the field and the tools to address those issues in depth in a diverse, collaborative, and interdisciplinary scientific community. Active areas of research include cellular, molecular, and developmental neurobiology; systems and integrative neuroscience; and clinical and computational neuroscience.

Visit our website for information about our Neurosciences faculty (<http://dbbs.wustl.edu/divprograms/neuro/Pages/Faculty.aspx>).

## **Plant and Microbial Biosciences (<http://dbbs.wustl.edu/divprograms/PlantMicroBioSci/Pages/default.aspx>)**

The graduate program in Plant and Microbial Biosciences provides training in the use of prokaryotes, eukaryotic microbes, mosses, and vascular plants as experimental organisms to address fundamental and applied biological questions. Contemporary research on plant and microbial systems adds to our knowledge of basic biology, informs our understanding of the natural world, and leads to innovations in biomedicine, agriculture, and energy production. Our graduate students have unparalleled opportunities to pursue multidisciplinary training in genetics, biochemistry, cell biology, development, molecular evolution, and physiology, capitalizing on current interest and investment in biological research and fueled by experimental resources found at Washington University and our partnership with the Donald Danforth Plant Sciences Center.

Visit our website for information about our Plant and Microbial Biosciences faculty (<http://dbbs.wustl.edu/divprograms/PlantMicroBioSci/Pages/Faculty.aspx>).

## **Faculty**

For a list of divisions and their areas of study, including more information about program faculty members, please refer to the Research (p. 41) section of this page.

## **Courses**

For a full listing of courses offered through the Division of Biology and Biomedical Sciences, please visit the university's online course listings (<https://courses.wustl.edu/CourseInfo.aspx?sch=L&dept=L41&crslvl=5:9>).

## **Biomedical Informatics**

The mission of the Institute for Informatics (I<sup>2</sup>) focuses on the informatics landscape at Washington University School of Medicine in order to transform research, education and patient care by emphasizing precision medicine and efforts to improve the quality of health care and public health initiatives locally, nationally and worldwide.

Our vision at I<sup>2</sup> is to serve as the academic and professional home for a preeminent interdisciplinary program of research, education and service in informatics at Washington University by enabling advances in biomedical research and improvements in the quality of health care.

The institute coordinates informatics efforts across the Medical Campus and the Danforth Campus while also developing partnerships with the Health Systems Innovation Laboratory at BJC HealthCare, the Cortex Innovation Community and other regional partners.

I<sup>2</sup> offers a Master of Science (MS) and a certificate program in biomedical informatics. The purpose of the MS and certificate courses is to provide comprehensive and competency-based training in core biomedical informatics theories and methods for the following individuals:

- Recent college graduates with backgrounds in the biological and/or computational sciences
- In-career learners with a broad range of experiences in biomedicine/biosciences, mathematics, physical or computer information sciences or engineering, and cognitive and/or social sciences

Website: <https://informatics.wustl.edu/>

## Degrees & Offerings

- PhD in Biomedical Informatics (<http://dbbs.wustl.edu/divprograms/BIDS/Pages/default.aspx>)
- Master of Science in Biomedical Informatics (p. 93)
- Certificate Program in Biomedical Informatics (p. 94)

## Research

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**Joanna Abraham, PhD** (<https://informatics.wustl.edu/research-lab-joanna-abraham/>), is focused on improving collaborative practices in health care using principles and techniques from informatics to promote patient safety, quality and care continuity.

**Research interests:** handoffs, care transitions, care coordination, decision making, health IT, medical errors, mixed methods, systematic reviews, evidence synthesis

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**Chih-Hung Chang, PhD** (<https://informatics.wustl.edu/research-lab-chih-hung-chang/>), is focused on the integration of methodology and technology to advance clinical care, research and education.

**Research interests:** item response theory, Rasch measurement, computerized adaptive testing, psychometrics, informatics, smart testing and smart learning, health-related quality of life, patient-reported outcomes, clinical outcomes, shared decision making, quality improvement

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**Randi Foraker, PhD** (<https://informatics.wustl.edu/research-lab-randi-foraker/>), is focused on applying epidemiology and informatics techniques to solve problems in the population health domain.

**Research interests:** approaches for the integration of socioeconomic and patient-reported outcome data with electronic health record data; interventional approaches to the use of electronic health records in order to address modifiable risk factors for disease and enable patient-centered decision making; study design methodology and data analysis

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**Thomas Kannampallil, PhD** (<https://informatics.wustl.edu/research-lab-thomas-kannampallil/>), is focused on integrating cognitive, behavioral and computational informatics techniques to develop health information technology solutions in the areas of clinical decision support, clinical reasoning and clinical workflow.

**Research interests:** clinical decision support applications for tracking, monitoring and evaluating electronic health record-based activities such as medication/lab orders, decision-making for chronic care, and opioid management; tracking and analysis of medical errors in a variety of situations (e.g., medication orders, transitions of care, clinical decision-making) and evaluating their impact on clinical outcomes and patient safety; use of cognitive and human factors approaches for identifying behavioral, collaborative and workflow challenges in the design and use of health information technology

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**Albert M. Lai, PhD** (<https://informatics.wustl.edu/research-lab-albert-lai/>), is focused on applying computer science and informatics techniques to solve problems in the clinical domain.

**Research interests:** clinical research informatics, clinical informatics, consumer health informatics, telemedicine, usability, natural language processing, mobile health

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**Fuhai Li, PhD** (<https://informatics.wustl.edu/research-lab-fuhai-li/>), is focused on applying statistical, machine learning, deep learning and data mining approaches to diverse biomedical dataset integration and interpretation to solve the challenges of bioinformatics, systems biology and image informatics.

**Research interests:** integrative large-scale pharmacogenomics analysis for target, signaling network, drug and drug combination discovery; genomics data driven tumor-stromal communication discovery and modeling

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**Philip R.O. Payne, PhD, FACMI** (<https://informatics.wustl.edu/research-lab-philip-payne/>), is the founding director of I<sup>2</sup> at Washington University in St. Louis, where he also serves as the Robert J. Terry Professor and Professor of Computer Science and Engineering. Previously, Dr. Payne was Professor and Chair of the Department of Biomedical Informatics at The Ohio State University.

**Research interests:** knowledge-based approaches to the discovery and analysis of biomolecular and clinical phenotypes and the ensuing identification of precision diagnostic and therapeutic strategies in cancer; interventional approaches to the use of electronic health records in order to address modifiable risk factors for disease and enable patient-centered decision making; the study of human factors and workflow issues surrounding the optimal use of health care information technology

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**Po-Yin Yen, PhD, RN** (<https://informatics.wustl.edu/research-lab-po-yin-yen/>), is focused on applied clinical informatics research to support clinicians adapting to health information technology.

**Research interests:** clinical informatics, usability, technology acceptance, human-computer interaction, literature mining, data visualization, workflow analysis, time motion study

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## Faculty

**Philip R.O. Payne, PhD, FACMI** (<https://informatics.wustl.edu/research-lab-philip-payne/>)

Director, Institute for Informatics  
Robert J. Terry Professor  
Professor of Medicine, Division of General Medical Sciences, School of Medicine  
Professor of Computer Science and Engineering, School of Engineering and Applied Science

**Joanna Abraham, PhD** (<https://informatics.wustl.edu/research-lab-joanna-abraham/>)

Assistant Professor of Anesthesiology, School of Medicine

**Chih-Hung Chang, PhD** (<https://informatics.wustl.edu/research-lab-chih-hung-chang/>)

Professor of Occupational Therapy and of Medicine, Division of General Medical Sciences, School of Medicine

**Randi Foraker, PhD, MA, FAHA** (<https://informatics.wustl.edu/research-lab-randi-foraker/>)

Associate Professor of Medicine, Division of General Medical Sciences, School of Medicine  
Director, Center for Population Health Informatics

**Thomas Kannampallil, PhD** (<https://informatics.wustl.edu/research-lab-thomas-kannampallil/>)

Assistant Professor of Anesthesiology, School of Medicine  
Associate Chief Research Information Officer, School of Medicine

**Albert M. Lai, PhD** (<https://informatics.wustl.edu/research-lab-albert-lai/>)

Deputy Director, Institute for Informatics  
Chief Research Information Officer, School of Medicine  
Associate Professor of Medicine, Division of General Medical Sciences, School of Medicine

**Fuhai Li, PhD** (<https://informatics.wustl.edu/research-lab-fuhai-li/>)

Assistant Professor of Pediatrics, School of Medicine

**Aristeidis Sotiras, PhD** (<https://informatics.wustl.edu/dr-aristeidis-sotiras/>)

Assistant Professor of Medicine, School of Medicine

**Po-Yin Yen, PhD, RN** (<https://informatics.wustl.edu/research-lab-po-yin-yen/>)

Assistant Professor of Medicine, Division of General Medical Sciences, School of Medicine

Assistant Professor, Goldfarb School of Nursing, Barnes-Jewish College

## Courses

Visit online course listings to view offerings for M18 BMI (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M18>).

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### M18 BMI 5000 Independent Study in Biomedical Informatics

Investigation of a topic in biomedical informatics of mutual interest to the student and mentor. Students and mentor must fill out an agreement and return to the I2 education office to gain MS credit approval.

Credit variable, maximum 3 units.

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### M18 BMI 5200 Biomedical Informatics Journal Club

Trainees will attend weekly one-hour seminars and student-led journal club discussions in which current peer-reviewed publications relevant to biomedical informatics will be reviewed and discussed.

Credit 1 unit.

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### M18 BMI 5201 Biomedical Informatics Rotation

Students will be responsible for arranging two rotations to identify a thesis lab or capstone project site. Each rotation will last approximately one month, with the goal being to expose students to research and practical biomedical informatics opportunities in both academic and industry settings.

Credit 1 unit.

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### M18 BMI 5204 Mixed Methods in Biomedical Informatics

Building on the fundamentals of biomedical informatics in BMI I & II, this course will introduce students to the various research methods and underlying theories used to conduct biomedical informatics research studies. This course will cover research methods, including the systematic review of published research as well as qualitative, quantitative, and mixed methods. Under each topic, we will focus on the formulation of research questions/hypotheses, the selection of appropriate study design, data collection and analysis methods, and methods to ensure rigor and reproducibility of research. The course will encompass several hands-on components for students to practice and apply their learned skills.

Credit 3 units.

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### M18 BMI 5205 The Electronic Health Record

The electronic health record (EHR) has become a central technology for the provision of clinical care. This course will use the EHR as a reference point to explore key areas in clinical informatics, including history, applications and policy.

Credit 3 units.

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### M18 BMI 5302 Introduction to Biomedical Informatics I

This survey and methods course provides an overview of the theories and methods that comprise the field of biomedical informatics. Topics to be covered include the following: (1) information architecture as applied to the biomedical computing

domain; (2) data and interoperability standards; (3) biological, clinical, and population health relevant data analytics; (4) health care information systems; (5) human factors and cognitive science; (6) the evaluation of biomedical computing applications; and (7) ethical, legal, and social implications of technology solutions as applied to the field of biomedicine. The course will consist of both didactic lectures and experiential learning opportunities, including hands-on laboratory sessions and journal-club-style discussions. The course will culminate with a capstone project requiring the in-depth examination, critique, and presentation of a student-selected topic related to the broad field of biomedical informatics. Biomedical Informatics I is designed primarily for individuals with a background in the health and/or life sciences who have completed a course in introductory statistics (e.g., Math 1011). No assumptions are made about computer science or clinical background; however, some experience with computers and a high-level familiarity with health care will be useful. This course does not require any programming knowledge, and it will not teach students how to program.

Credit 3 units.

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**M18 BMI 5303 Introduction to Biomedical Informatics II**

This course builds upon the principles taught in Biomedical Informatics I by focusing on theories and informatics methods used in the study of populations. Topics include study design, statistical inference, bias, confounding factors, causality, and multi-level populations scale data. This course is intended to enable individuals to critically select relevant methods and evaluate their results as part of both the design of new projects as well as the review of results available in the public domain (e.g., literature, public data sets). Core concepts to be reviewed during this course include computational skills, data modeling and integration, formal knowledge representation, in silico hypothesis generation, quantitative data analysis principles, and critical thinking skills surrounding the ability to ask and answer questions about complex and heterogeneous biomedical data. Prerequisite: M18 5302 or instructor permission.

Credit variable, maximum 4 units.

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**M18 BMI 5304 Introduction to Biomedical Data Science I**

This course (formerly Biomedical Computing I) provides an introduction to fundamental principles of informatics tools and data analysis, and it is expected to fulfill the requirements of computer science prerequisites for suggested biomedical informatics electives. Competencies and concepts covered will include the following: (1) an overview of the Linux/Unix command line interface; (2) an introduction to programming using Python and R; (3) database models, management, and querying using MySQL; (4) basic data manipulation, analysis, and visualization using Excel, Python, and R; and (5) an introduction to the development of web applications. This course is designed primarily for individuals who wish to learn the basic skills required for biomedical informatics-based research and who have little or no computational experience using command line shells, programming, and databases. No assumptions are made about computer science or clinical background; however, some experience with computers and a high-level familiarity with the health and life sciences will be useful. The course will consist of both didactic lectures as well as experiential learning opportunities including hands-on laboratory sessions and a culminating project.

Credit 3 units.

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**M18 BMI 5305 Introduction to Biomedical Data Science II**

Building upon the fundamental principles of informatics tools and data analysis taught in Biomedical Data Science I (M18-5304), this course provides students with more advanced methods in the areas of biomedical computing, including data analysis, machine learning, deep learning models, natural language processing, deployment of data analysis models on supercomputers, and development of web apps. Both theory and coding applications and practices will be introduced for usage in the space of genomics, imaging, and medical records data analysis to help students apply learned computational tools and models. Prerequisite: M18-5304 or instructor permission.

Credit variable, maximum 4 units.

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**M18 BMI 5401 Biomedical Informatics Capstone**

Students will demonstrate how to synthesize and apply the full spectrum of biomedical informatics theories and methods used in the program curriculum. The capstone project focuses on an applied informatics problem with relevance to health care research or delivery at the individual or population level, resulting in a report that outlines the student's problem selection and the design, conduct, and results of the student's research. Each trainee will also be expected to present their project and its outcomes or findings in a public seminar, where questions will be posed by both the audience and a committee of faculty members. The specific selection of the capstone or thesis project track as part of a trainee's degree program is to be discussed with and approved by the individual's faculty and academic adviser. Students who do not enroll in the capstone course will enroll in the thesis course. Prerequisites: Introduction to Biomedical Informatics I and II (M18 5302 and M18 5303), Introduction to Biomedical Data Science I and II (M18 5304 and M18 5305), and a minimum of one Advanced Topics course. Permission of the faculty and adviser is also required.

Credit variable, maximum 3 units.

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**M18 BMI 5402 Biomedical Informatics Thesis**

Students will demonstrate how to synthesize and apply the full spectrum of biomedical informatics theories and methods included in the program curriculum. The thesis project requires students to formulate research questions that focus on the development or extension of a theoretical framework or a novel method with relevance to the field of informatics, resulting in a report that outlines the student's topic selection and the design, conduct, and results of the student's research. Each trainee will also be expected to present their project and its outcomes or findings in a public seminar, where questions will be posed by both the audience and a committee of faculty members. The specific selection of the capstone or thesis project track as part of a trainee's degree program is to be discussed with and approved by the individual's faculty and academic adviser. Students who do not enroll in the thesis course will enroll in the capstone course. Prerequisites: Introduction to Biomedical Informatics I and II (M18 5302 and M18 5303), Introduction to Biomedical Data Science I and II (M18 5304 and M18 5305), and a minimum of one Advanced Topics course. Permission of the faculty and academic adviser is also required.

Credit variable, maximum 3 units.



## Biostatistics

The biostatistics education programs offered by the Division of Biostatistics include three master's degrees and two graduate certificates: the Master of Science in Biostatistics (<https://biostatistics.wustl.edu/education/master-of-science-in-biostatistics-msibs-2/>) (MSIBS), the Master of Science in Biostatistics and Data Science (<https://biostatistics.wustl.edu/education/master-of-science-in-biostatistics-msbds/>) (MSBDS), the Master of Science in Genetic Epidemiology (<https://biostatistics.wustl.edu/education/master-of-science-in-genetic-epidemiology-gems/>) (GEMS; for postdocs only), the Certificate in Genetic Epidemiology (<https://biostatistics.wustl.edu/education/certificate-in-genetic-epidemiology/>), and the Certificate in Biostatistics and Data Science (<https://biostatistics.wustl.edu/education/certificate-in-biostatistics-and-data-science/>). Interested students may pursue individual courses offered by the division.

The Washington University School of Medicine is known for being at the forefront of medical research and primary care; the school engages students in research and practical training so that they can contribute to improving health outcomes. Our programs train students as critical thinkers and collaborators in biostatistics, genetics, and data science. We seek those with undergraduate degrees in the quantitative and biomedical sciences, including fields such as mathematics, statistics, computer science, informatics, and biomedical engineering.

Our programs are designed to teach students how to manage, analyze, and interpret health data using statistical and data science approaches. Internationally renowned faculty from multiple disciplines — including biostatistics, genetics, informatics, medicine, and public health — will train a new generation of quantitative scientists. The curriculum offers a unique training experience that combines core data science learning in statistical and computational methodologies with practical training in real-world data analysis of cutting-edge biomedical and genomics research.

## NIH-Sponsored Training Program

The PRIDE Summer Institute in Cardiovascular Genetics and Epidemiology (CVD-CGE) focuses on cardiovascular and other heart, lung, blood, and sleep disorders. This all-expenses-paid summer institute is supported by funding from the National Heart, Lung, and Blood Institute. The goal is to mentor junior faculty from underrepresented minorities as well as faculty with disabilities into independent research careers in the biomedical sciences. For more information, visit the PRIDE CVD-CGE website (<https://biostatistics.wustl.edu/education/pridecge/>) or email the program administrator ([schreierl@wustl.edu](mailto:schreierl@wustl.edu)).

## Academic Calendar

The academic programs begin in early July each year. They start with preparatory workshops, which are followed by intensive summer semester courses. For fall and spring courses, the program follows the Washington University academic calendar (p. 15).

## Location

The program is located in the Division of Biostatistics, which can be found on the fifth floor of the Bernard Becker Medical Library (660 S. Euclid Ave., St. Louis, MO 63110) in rooms 500 through 508.

## Additional Information

### Kim Freels

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### Treva Rice, PhD

Interim Program Director  
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### Lei Liu, PhD

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Washington University School of Medicine  
Biostatistics Education Programs  
Division of Biostatistics  
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## Degrees & Offerings

- Master of Science in Biostatistics (p. 95)
- Master of Science in Biostatistics and Data Science (p. 96)
- Master of Science in Genetic Epidemiology (p. 96)
- Certificate in Biostatistics and Data Science (p. 96)
- Certificate in Genetic Epidemiology (p. 97)

## Research

Master's students have multiple opportunities to engage in biomedical research. After completing the first summer semester, students in the MSIBS and MSBDS program are eligible to work as part-time research assistants. These positions are frequently available, both within the Division of Biostatistics as well as in other departments and research labs on the Medical School campus. In addition, depending on the degree

program, students will intern and/or work on an independent mentored research project to hone their research skills, including study design, data analysis, and interpretation. GEMS students will work on a mentored research project to explore and characterize the interplay between genes and the environment that affects the biological processes underlying disease.

## Faculty

**Randi Foraker, PhD** (<https://informatics.wustl.edu/research-lab-randi-foraker/>)

Division Interim Director

Visit our website for more information about our faculty (<https://biostatistics.wustl.edu/faculty-staff/>) and their appointments.

## Courses

Visit online course listings to view offerings for M21 MSB (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M21>).

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### M21 MSB 503 Statistical Computing with SAS

Intensive hands-on summer training in SAS (Statistical Analysis System) during seven full weekdays. Students will learn how to use SAS for handling, managing, and analyzing data. Instruction is provided in the use of SAS programming language, procedures, macros, and SAS SQL. The course will include exercises using existing programs written by SAS experts. Contact the Program Managers for details, to register or to obtain permission of the Course Master ([biostat-msibs@email.wustl.edu](mailto:biostat-msibs@email.wustl.edu)).

Credit 2 units.

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### M21 MSB 506 Introduction to R for Data Science

This is an introduction to the R Statistical Environment for new users. R is "a freely available language and environment for statistical computing and graphics which provides a wide variety of statistical and graphical techniques: linear and nonlinear modeling, statistical tests, time series analysis, classification, clustering, etc." The goal is to give students a set of tools to perform statistical analysis in medicine, biology, or epidemiology. At the conclusion of this primer, students will: be able to manipulate and analyze data, write basic models, understand the R environment for using packages, and create standard or customized graphics. This primer assumes some knowledge of basic statistics as taught in a first-semester undergraduate or graduate sequence. Topics should include: probability, cross-tabulation, basic statistical summaries, and linear regression in either scalar or matrix form. Contact the program manager ([biostat-msibs@email.wustl.edu](mailto:biostat-msibs@email.wustl.edu)) for details, to register, or to obtain permission from the course director.

Credit 2 units.

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### M21 MSB 512 Ethics in Biostatistics and Data Science

This course prepares biostatisticians to analyze and address ethical and professional issues in the practice of biostatistics across the range of professional roles and responsibilities of a biostatistician. The primary goals are for biostatisticians to recognize complex situational dynamics and ethical issues in their work and to develop professional and ethical problem-solving skills. The course specifically examines ethical challenges related to research design, data collection,

data management, ownership, security, and sharing, data analysis and interpretation, and data reporting and provides practical guidance on these issues. The course also examines fundamentals of the broader research environment in which biostatisticians work, including principles of ethics in human subjects and animal research, regulatory and compliance issues in biomedical research, publication and authorship, and collaboration in science. By the conclusion of the course, participants will understand the ethical and regulatory context of biomedical research; identify ethical issues, including situational dynamics that serve to foster or hinder research integrity, in the design and conduct of research and the management, analysis and reporting of data; and utilize strategies that facilitate ethical problem-solving and professionalism. Contact the program manager for details, to register, or to obtain permission of the course director (by email ([biostat-msibs@email.wustl.edu](mailto:biostat-msibs@email.wustl.edu)) or phone: 314-362-1384).

Credit 2 units.

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### M21 MSB 515 Fundamentals of Genetic Epidemiology

In this course, lectures cover causes of phenotypic variation, familial resemblance and heritability, Hardy-Weinberg equilibrium, ascertainment, study designs, and basic concepts in genetic segregation, linkage, and association. The computer laboratory portion is designed for the hands-on practice of fundamental concepts. Students will gain practical experience with various genetics computer programs (e.g., SOLAR, MERLIN, QDT, PLINK). Auditors will not have access to the computer lab sessions. Prerequisite: M21 506. Contact the program manager for details, to register, or to obtain permission from the course master ([biostat-msibs@email.wustl.edu](mailto:biostat-msibs@email.wustl.edu)).

Credit 3 units.

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### M21 MSB 5483 Human Genetic Analysis

Basic Genetic Concepts: meiosis, inheritance, Hardy-Weinberg equilibrium, linkage, segregation analysis; Linkage Analysis: definition, crossing over, map functions, phase, LOD scores, penetrance, phenocopies, liability classes, multipoint analysis, nonparametric analysis (sibpairs and pedigrees), quantitative trait analysis, determination of power for Mendelian and complex trait analysis; Linkage Disequilibrium Analyses: allelic association (case control designs and family based studies), QQ and Manhattan plots, whole genome association analysis; population stratification; Quantitative Trait Analysis: measured genotypes and variance components. Hands-on computer lab experience doing parametric linkage analysis with the program LINKAGE, model free linkage analyses with GeneHunter and Merlin, power computations with SLINK, quantitative trait analyses with SOLAR, LD computations with Haploview and WGAViewer, and family-based and case-control association analyses with PLINK and SAS. The methods and exercises are coordinated with the lectures, and students are expected to understand underlying assumptions and limitations and the basic calculations performed by these computer programs. Auditors will not have access to the computer lab sessions. Prerequisite: M21-515 Fundamentals of Genetic Epidemiology. For details, to register, and to receive the required permission of the course director, contact the MSIBS program manager (by email ([biostat-msibs@email.wustl.edu](mailto:biostat-msibs@email.wustl.edu)) or phone: 314-362-1384).

Same as L41 Biol 5483

Credit 3 units.

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#### **M21 MSB 550 Introduction to Bioinformatics**

This course provides broad exposure to the basic concepts, methodology, and application of bioinformatics to solve biological problems. Specifically, the students will learn the basics of online genomic/protein databases and database mining tools, and they will acquire understanding of mathematical algorithms in genome sequence analysis (alignment analysis, gene finding/predicting), of gene expression microarray (genechip) analysis, and of the impact of recent developments in protein microarray technology. Prerequisite: M21 506. Contact the program manager for details, to register, or to obtain permission from the course master (biostat-msibs@email.wustl.edu).

Credit 3 units.

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#### **M21 MSB 560 Biostatistics I**

This course is designed for students who want to develop a working knowledge of basic methods in biostatistics. The course is focused on biostatistical and epidemiological concepts and on practical hints and hands-on approaches to data analysis rather than on details of the theoretical methods. We will cover basic concepts in hypothesis testing, introduce students to several of the most widely used probability distributions, and discuss classical statistical methods that include t-tests, chi-square tests, regression analysis, and analysis of variance. Both in-class examples and homework assignments will involve extensive use of SAS. Prerequisite: M21 503 or sufficient practical experience with SAS. Students are required to participate in the "Computing/Unix" workshops offered free of charge prior to this course. For details, to register, or to obtain the required permission from the course master, contact the program manager (biostat-msibs@email.wustl.edu).

Credit 3 units.

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#### **M21 MSB 570 Biostatistics II**

This course is designed for students who have taken Biostatistics I or the equivalent and who want to extend their knowledge of biostatistical applications to more modern and more advanced methods. Biostatistical methods to be discussed include logistic and Poisson regression, survival analysis, Cox regression analysis, and several methods for analyzing longitudinal data. Students will be introduced to modern topics that include statistical genetics and bioinformatics. The course will also discuss clinical trial design, the practicalities of sample size and power computation and meta analysis, and will ask students to read journal articles with a view toward encouraging a critical reading of the medical literature. Both in-class examples and homework assignments will involve extensive use of SAS. Prerequisite: M21-560, Biostatistics I or its equivalent as judged by the course directors. For details, to register, and/or to obtain the required permission of the course director, contact the program manager (by email (biostat-msibs@email.wustl.edu) or phone: 314-362-1384).

Credit 3 units.

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#### **M21 MSB 600 Mentored Research**

Student undertakes supervised research in a mentor's lab. The goal is to acquire important research skills as well as good writing and presentation skills. The student finds a mentor and they together identify a research topic. A written thesis based on the research, prepared in the format of an actual scientific publication, must be submitted and presented to a select

audience. The course masters will organize a few meetings throughout to facilitate the whole process. The course masters will determine the grade (pass/fail) in consultation with the mentors. Permission of the course masters is required.

Credit variable, maximum 6 units.

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#### **M21 MSB 617 Study Design and Clinical Trials**

The course will focus on statistical and epidemiological concepts of study design and clinical trials. Topics include: different phases of clinical trials, various types of medical studies (observational studies, retrospective studies, adaptive designs, and comparative effectiveness research), and power analysis. Study management and ethical issues are also addressed. Students will be expected to do homework and practice power analysis during lab sessions. Prerequisites: M21-560 Biostatistics I and M21-570 Biostatistics II. Permission of the course director required. For details, to register, and to receive the required permission of the course director, contact the program manager (biostat-msibs@email.wustl.edu).

Credit 3 units.

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#### **M21 MSB 618 Survival Analysis**

This course will cover the basic applied and theoretical aspects of models to analyze time-to-event data. Basic concepts will be introduced including the hazard function, survival function, right censoring, and the Cox-proportional hazards (PH) model with fixed and time dependent covariates. Additional topics will include regression diagnostics for survival models, the stratified PH model, additive hazards regression models and multivariate survival models. Permission of the course director required. Prerequisites: M21-560 Biostatistics I and M21-570 Biostatistics II. For details, to register, and to receive permission from the course director, contact the program manager (by email (biostat-msibs@email.wustl.edu) or phone: 314-362-1384).

Credit 3 units.

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#### **M21 MSB 621 Computational Statistical Genetics**

This course is designed to give the students computational experience with the latest statistical genetics methods and concepts so that they will be able to computationally implement the method(s) and model(s) developed as part of their thesis. By concentrating on the applications of genomics and computing, it deals with creating efficient new bioinformatic tools to interface with some of the latest, most important genetic epidemiological analysis software and addresses how to derive, design, and implement new statistical genetics models. The course also includes didactic instruction on haplotype estimation and the modeling of relationship to phenotype, LD mapping, DNA pooling analysis methods, analysis approaches in pharmacogenomics (with an emphasis on possible genomic role in drug response heterogeneity), and epistasis (GxG) and GxE interactions; data mining methods, including clustering, recursive partitioning, boosting, and random forests; and fundamentals of meta-analysis, importance sampling, permutation tests, and empirical p-values, as well as the design of Monte Carlo simulation experiments. Prerequisite: Biostatistics I and II and permission of instructor. Contact the program manager for the required permission of the course master (biostat-msibs@email.wustl.edu).

Credit 3 units.

### M21 MSB 630 Internship

The primary goal of the Internship program is for students to acquire critical professional experience so that they will be well prepared to enter the job market upon graduation. This provides an opportunity for students to develop contacts, build marketable skills and perceive likes and dislikes in the chosen field. Students will have an opportunity to work with experienced mentors (PIs) on a range of projects that may include data management, data analysis, study design, and protocol development among other things. Students may have opportunities to contribute to and participate in the preparation of publishable quality manuscripts. As part of the Internship requirements, each student will submit a one-page Abstract of the work performed as part of the internship and will give a presentation of the Internship experience. The grade (pass/fail) for each student will be determined in consultation with the mentor.

Credit variable, maximum 6 units.

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### M21 MSB 660 Biomedical Data Mining

This course introduces methods and applications of biomedical data mining. Various computational and statistical methods will be presented, such as model selection and regularization, resampling methods, tree-based methods, and artificial intelligence. In addition to the common applications of the covered methods in biomedical sciences, this course will prepare students for future challenges and opportunities in data science. Prerequisites: M21 506, M21 560, M21 570, and M21 550. Matrix algebra is also highly recommended.

Credit 3 units.

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## Clinical Investigation

The Master of Science in Clinical Investigation (MSCI) and the Certificate in Clinical Investigation (CI) are programs for young investigators committed to pursuing academic careers in clinical research. The unique MSCI degree combines didactic course work with mentored research and career development opportunities, and it provides students with the knowledge and tools needed to excel in the areas of clinical investigation most relevant to their careers. The CI certificate is made up of the core MSCI didactic course work in study design, research implementation, statistical approaches, responsible conduct of research, scientific communication and literature critique, leadership, and community engagement. Clinical investigation programs offered through the Washington University School of Medicine are sponsored by the Clinical Research Training Center (<https://crtc.wustl.edu/>) and the Institute of Clinical and Translational Sciences (<http://icts.wustl.edu/>).

Students in the 33-credit MSCI program will do the following:

- Engage in high-quality didactic courses (refer to the MSCI course list (<https://crtc.wustl.edu/courses/class-list/msci-courses/>)) with mentored research and a weekly multidisciplinary seminar to meet the needs of clinicians seeking training in clinical research

- Gain knowledge in the core competencies of clinical research and investigation, such as study design, research implementation, statistical approaches, responsible conduct of research, community engagement, scientific communication and literature critique, and leadership
- Pursue one of four concentrations: Translational Medicine, Genetics/Genomics, Clinical Investigation, or Dissemination and Implementation (<https://crtc.wustl.edu/msci-concentrations/>), with each concentration providing focused training that is tailored specifically to a student's interest within clinical and translational research
- Attend a weekly multidisciplinary seminar to learn about alternative research designs and methods through the discussion and presentation of peers' research and to obtain key feedback from senior faculty and peers with expertise in their fields
- Attend monthly career development sessions to learn best practices in areas critical to success in clinical research, including grant writing, data management, intellectual property management, budgeting, ethics and other areas
- Complete a thesis requirement (<https://crtc.wustl.edu/thesis-requirement/>) consisting of a manuscript of original clinical research submitted for publication
- Participate in a formal, structured mentorship program that offers an opportunity to work alongside faculty renowned for their innovative clinical research and teaching experience

## Location

Core courses are held on the School of Medicine campus after 4:00 p.m. to accommodate working professionals and full-time students participating in mentored research activities.

## Additional Information

### Karlee Kreienkamp

Program Manager – Curriculum and Evaluation

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### David Warren, MD, MPH

Program Director

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### Dominic Reeds, MD

Program Director

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Master of Science in Clinical Investigation Program  
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Website: <https://crtc.wustl.edu>

## Degrees & Offerings

- Master of Science in Clinical Investigation (p. 97)
- Graduate Certificate in Clinical Investigation (p. 99)
- Graduate Certificate in Dissemination and Implementation (p. 99)

## Research

While in the program, scholars conduct their own clinical research projects. These projects must receive Institutional Review Board approval, and they need to involve either patients, human tissue, human cell lines or clinical data. The resulting thesis manuscript cannot be a review article, case report or case series. Multidisciplinary mentors and leaders guide research projects and encourage career development activities. Research in progress is presented at multidisciplinary seminar sessions during which peer and mentor feedback is received. Program graduates have published more than 740 peer-reviewed manuscripts; secured more than 100 federal, state and privately sponsored grants; and presented at more than 1,000 conferences, symposia and meetings locally, nationally and internationally.

## Faculty

**Ana A. Baumann, PhD** (<https://publichealth.wustl.edu/scholars/ana-a-baumann/>)  
Research Assistant Professor  
Brown School of Social Work

**Stephanie Solomon Cargill, PhD**  
Adjunct Assistant Professor, Medicine  
Department: Internal Medicine

**Patricia Cavazos-Rehg, PhD** (<https://publichealth.wustl.edu/scholars/patricia-cavazos-rehg/>)  
Associate Professor  
Department: Psychiatry

**Karen L. Dodson, MBA**  
Manager, Professional Development  
Department: Office of the Associate Dean of Faculty Affairs

**Brian F. Gage, MD, MSc** (<https://generalmedicalsciences.wustl.edu/directory/brian-f-gage-md-msc/>)  
Professor of Medicine  
Department: Internal Medicine  
Division: General Medical Sciences

**Elvin Geng, MD, MPH** (<https://publichealth.wustl.edu/scholars/elvin-geng/>)

Professor of Medicine  
Department: Internal Medicine  
Division: Infectious Diseases

**Jane Garbutt, MB, ChB** (<https://generalmedicalsciences.wustl.edu/directory/jane-garbutt-mb-chb/>)

Professor of Medicine  
Department: Internal Medicine & Pediatrics  
Division: General Medical Sciences

**Dorina Kallogjeri, MD, MPH** (<https://pacs.wustl.edu/people/dorina-kallogjeri-md/>)

Research Statistician  
Department: Otolaryngology

**Jessica Mozersky, PhD** (<https://generalmedicalsciences.wustl.edu/directory/jessica-mozersky-phd/>)

Assistant Professor in Medicine  
Department: General Medical Sciences

**Jay F. Piccirillo, MD, FACS** (<https://medicine.wustl.edu/news/jay-f-piccirillo-md-facs/>)

Professor of Otolaryngology  
Department: Otolaryngology

**Dominic Reeds, MD** (<https://gns.wustl.edu/about/faculty/dominic-reeds-md/>)

Assistant Professor of Medicine  
Department: Internal Medicine  
Division: Nutritional Science

**Carl Siekmann, MBA** (<https://crtc.wustl.edu/people/carl-siekmann-mba/>)

Adjunct Instructor  
Department: University College, Clinical Research Management Program

**Peter Takes, PhD, RAC, FRAPS** (<https://crtc.wustl.edu/people/peter-takes-phd-rac-fraps/>)

Adjunct Instructor  
Department: University College, Clinical Research Management Program

**David K. Warren, MD, MPH** (<https://crtc.wustl.edu/people/david-k-warren-md-mp/>)

Professor of Medicine  
Department: Internal Medicine  
Division: Infectious Diseases

## Courses

Visit online course listings to view offerings for M17 CLNV (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M17>).

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#### **M17 CLNV 503 PIRTT Mentored Independent Research**

Trainees earn Predoctoral Interdisciplinary Clinical Research Training Mentored Independent Research credits for conducting clinical research, completing a report, and developing and presenting a poster describing their work. They are also expected to attend a half-day research symposium in the fall with other clinical investigators. Mentored Independent Research will be presented each semester to an advisory committee that includes the scholar's departmental mentors as well as Clinical Research Training Center program faculty. The research presented will be in the form of a research paper submitted for publication in a peer-reviewed journal. Under some circumstances, a grant application submitted for review will be acceptable in place of the research paper. PICRT Mentored Independent Research will provide scholars with the practical application of skills learned in the Clinical Research Training Program didactic course work and seminars. Open to CRTC Predoctoral Program scholars only.

Credit variable, maximum 6 units.

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#### **M17 CLNV 510 Ethical and Legal Issues in Clinical Research**

This course prepares clinical researchers to critically evaluate ethical and regulatory issues in clinical research. The principal goal of this course is to prepare clinical researchers to identify ethical issues in clinical research and the situational factors that give rise to them, to identify ethics and compliance resources, and to foster ethical problem-solving skills. The course aims to deliver practical guidance for investigators through discussion of critical areas of clinical research ethics. An additional aim of the course is to enable participants to recognize the different ways in which research participants may be vulnerable and the ethical issues raised by including and excluding vulnerable participants. By the end of the course, participants will understand the regulatory framework that governs human subjects research and the distinction between compliance and ethics; be able to identify major ethical concerns in the conduct of clinical research, including situational factors that may give rise to ethical concerns; and be able to apply an ethical problem-solving model in clinical research. Please contact the MSCI Program for permission to enroll in this course.

Credit 2 units.

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#### **M17 CLNV 5110 MTPCI Mentored Independent Research**

Scholars earn Mentored Independent Research credits for conducting clinical research, completing a report, and developing and presenting a poster describing their work. They are also expected to attend a half-day research symposium in the fall with other clinical investigators. Mentored Independent Research will be presented each semester to an advisory committee that includes the scholar's departmental mentors as well as Clinical Research Training Center program faculty. The research presented will be in the form of a research paper submitted for publication in a peer-reviewed journal. Under some circumstances, a grant application submitted for review will be acceptable in place of the research paper. MTPCI Mentored Independent Research will provide scholars with the practical application of skills learned in the Clinical Research Training Program didactic course work and seminars. Open to CRTC Postdoctoral Program scholars only.

Credit variable, maximum 4 units.

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#### **M17 CLNV 513 Designing Outcomes and Clinical Research**

This course covers how to select a clinical research question, outline a research protocol, and execute a clinical study. Topics include: subject selection, observational and experimental study designs, sample size estimation, clinical measurement, bias and confounding, and data management. The course is designed for health care professionals who wish to conduct patient-oriented clinical research. Students incorporate research design concepts into their own research proposal. The course consists of lectures, weekly problem sets, weekly reading assignments, outlining a research protocol, and a final exam.

Credit 3 units.

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#### **M17 CLNV 5140 MTPCI Research Seminar**

Weekly seminar series are required for Postdoctoral Program and Career Development Program scholars for four semesters, one credit per semester. An important learning experience in research is the presentation and critical discussion of research ideas and projects at various points in their evolution. Seminars will alternate discussion of work in progress with critical reading of current clinical research in order to practice and enhance analysis and communication skills. Each scholar will formally present their own research in progress twice per year for feedback by peers and faculty from multiple disciplines. In addition to presenting their own work in oral and written form for peer and faculty evaluation, scholars will formally review the written proposals of their peers in a way that emulates the duties of a member of an NIH study section. This formal research evaluation exercise is a highly successful element of other clinical training instruction at Washington University. The program director and co-directors will lead a weekly seminar with participation of other core faculty. The weekly, small group, intensive discussions of research issues are one of the most valuable aspects of the program, allowing scholars to learn in an active and participatory fashion. Open to CRTC Postdoctoral Program scholars only.

Credit 1 unit.

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#### **M17 CLNV 515 PIRTT Research Seminar**

Pre/Postdoctoral Interdisciplinary Research Training in Translation (PIRTT) Seminar. Two semesters of this course are required for the TL1 Scholars. This course alternates faculty presentations, research-in-progress discussions, and reading and journal discussions. CRTC scholars only.

Credit 2 units.

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#### **M17 CLNV 518 Drug and Device Development**

This course will provide an overview of the commercial development pathways for both pharmaceuticals and medical devices, from inception to market. Through lectures and discussions, students will gain an appreciation for the role clinical study programs play in the broader scope of product development. Class topics will include preclinical, clinical, regulatory, and marketing factors which influence discovery and development of new medical products.

Same as U80 CRM 518

Credit 3 units. UColl: OLI

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#### **M17 CLNV 520 Entrepreneurship for Biomedicine I**

Today's biomedical research trainees have the opportunity to pursue multiple career paths within academic, industry, nonprofit, and entrepreneurial settings. In addition to scientific and technical expertise, today's trainees need additional skills in innovation and entrepreneurship (I&E) to take advantage of this

opportunity. This course is designed to teach these skills. This course consists of seven "nanocourses" focused on different aspects of the entrepreneurial process. Throughout the course, trainees will work to identify an innovation and assess a new academic, entrepreneurial, or nonprofit venture to bring that innovation to market. Nanocourses are taught by successful real-world entrepreneurs and experts in their fields. The primary instructional methods are via video and hands-on learning experiences, with some supplementary reading. To succeed in this class, students should be prepared to work with their peers and coursemasters using online communication tools both inside and outside Canvas.

Credit 1 unit.

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**M17 CLNV 522 Introduction to Statistics for Clinical Research**

This is an introductory course in statistics with a focus on the use of statistical analysis in clinical research. It is taught using SPSS, statistical analysis software commonly used in clinical research. The course teaches basic statistical methods with which clinical researchers will have the facility to execute their own analyses.

Credit 3 units.

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**M17 CLNV 524 Intermediate Statistics for the Health Sciences**

This course builds upon Introduction to Statistics for Clinical Research (M17-522) and will focus on SPSS, Cox proportional hazards, generalized linear models, multiple linear models, ANOVA, repeated measures, regression, applied modeling, 2X2, ROC curves, checking assumptions and regression diagnostics. Completion of this course will enable clinical investigators to work independently with their own data and run their own analyses. Content will include data sets with applied exercises, interpreting output, lab assignments, and a midterm and final exam. Course director is Mark Walker, PhD, and instructor is Brian Waterman, MPH. Prerequisite: M17-522.

Credit 3 units.

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**M17 CLNV 528 Grantsmanship**

Scholars will learn how to 1) develop research and career development grant proposals that incorporate well-formulated hypotheses, rationales, specific objectives and long-range research goals; 2) organize and present sound research and career development plans that accurately reflect the ideas and directions of the proposed research activities; and 3) avoid many common grant-writing mistakes. Scholars will also learn about the peer review process for grant evaluations and will participate in a mock NIH review exercise (study section) at the end of the semester. Though it is not required, scholars will get maximum benefits from the class if they are working on grant proposals.

Credit 2 units.

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**M17 CLNV 529 Scientific Writing and Publishing**

The objective of this course is to teach the proper techniques of writing and publishing a biomedical manuscript. Writing a working title and structured abstract as well as hand drawing of figures and tables is covered. Publishing strategies are also discussed.

Credit 2 units.

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**M17 CLNV 532 Genomics in Medicine I**

This course introduces principles of genomics in medicine as they apply to clinical research and provides a practical background in molecular biology and genetics. Students will be provided with an introduction to genomic research and applications of genomic technologies in the research environment and an understanding of the clinical application of genetic/genomic knowledge. Critical thinking and scientific/analytic competencies are emphasized through weekly lectures by renowned faculty. Reflection papers are required. Prior clinical research experience is helpful but not required. Course options include face-to-face, hybrid and online.

Credit 1 unit.

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**M17 CLNV 533 Genomics in Medicine II**

This course introduces principles of genomics in medicine as they apply to clinical research and provides a practical background in molecular biology and genetics. Students will be provided with an introduction to genomic research and applications of genomic technologies in the research environment and an understanding of the clinical application of genetic/genomic knowledge. Critical thinking and scientific/analytic competencies are emphasized through weekly lectures by renowned faculty. Reflection papers are required. Students may enroll in this course even if they have not taken Genomics in Medicine I (M17-532). Prior clinical research experience is helpful but not required. Course options include face-to-face, hybrid and online.

Credit 1 unit.

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**M17 CLNV 540 Introduction to Dissemination and Implementation Science**

Upon successfully completing this class, scholars will be able to: Describe the need for dissemination and implementation research, compare theories and frameworks in the field, select the appropriate designs, strategies, outcomes, and measures for implementation studies. Scholars will also: Understand the importance and language of D&I basic science, explore the theories and frameworks that are commonly used in D&I research and practice, describe the importance of context at multiple levels in D&I science, distinguish between implementation strategies and outcomes from those in efficacy and effectiveness research, describe various study designs, methods, and measures that support D&I science, understand D&I methods and challenges across various settings and populations, recognize opportunities to apply D&I science to intervention development and evaluation, and understand how D&I science can further your research/practice plans and career.

Credit 3 units.

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**M17 CLNV 541 Implementation Science: Approaches in Local, Regional and Global Contexts**

This course will address key conceptual dimensions of implementation science in the setting of social, political and organizational constraints due to inadequate or uncertain investments in health. Such environments create distinctive needs for implementation of evidence-based interventions. These contexts are common in Lower-and-Middle Income countries, where human resources for health, health care infrastructure and investments in social protections are limited. However, limited, concentrated and racialized investments in public health are also characteristic in High-Income Countries, and lead to health disparities. In both cases, this structural

setting shapes the limitations in availability of evidence-based interventions for health, as well as the strategies needed to overcome those barriers. Specific topics in the course will touch on current global and regional distribution of disease burden, parallels in health systems in health systems in Low- and-Middle-Income countries and regions locally, global trends and efforts around use of evidence based treatments for major infectious diseases (e.g., HIV, TB and Malaria), rising burden of cardiovascular disease, as well as around Global Health, theories and frameworks on health disparities (e.g., post-colonial studies, Black scholarship). Topics will also include conceptualizing implementation strategies (and implementation outcomes) appropriate for this setting, and which are tailored for these constraints; study designs (e.g., stepped wedge, natural experiments) frequently employed in such settings; and the notion of preferences and personalization in public health delivered in such environments.

Credit 3 units.

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**M17 CLNV 5544 Developing and Evaluating Implementation Strategies in Health and Social Services**

Internationally, there is a substantial gap between the establishment of effective interventions and their delivery in routine practice. Implementation research has emerged as a means of addressing that gap. It is defined as "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices" to improve the quality of service delivery in routine care settings (Eccles & Mittman, 2006). It includes the study of influences on professional and organizational behavior that impact implementation effectiveness. This course focuses on developing and evaluating implementation strategies or the methods and techniques that are used to enhance the adoption, implementation, sustainment, and scaling up of effective interventions. It is intended for graduate students, postdoctoral students, staff, and faculty in public health, social work, medicine, and other areas of health science who are interested in developing and/or testing strategies to promote improved implementation of effective health and social service interventions.

Same as S55 MPH 5554

Credit 3 units.

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**M17 CLNV 588 Epidemiology for Clinical Research**

The purpose of this course is to provide an understanding of the use of epidemiological concepts and methods in clinical research. Two primary foci are included: 1) common applications of epidemiologic principles and analytic tools in evaluating clinical research questions; and 2) student development of skills to review and interpret the medical literature and utilize publicly available datasets to address clinical research questions.

Same as M88 AHBR 588

Credit 3 units.

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**M17 CLNV 589 Advanced Methods for Clinical and Outcomes Research**

This course focuses on the application of advanced epidemiologic principles and outcomes research as applied to clinical research. Students study the tools used in clinical research, in clinical issues, and in understanding the medical literature concerning these issues, which are crucial for making informed decisions in the care of patients. Critical thinking and scientific/analytic competencies are emphasized throughout the course. Prerequisite: M17 513.

Credit 3 units.

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**Genetic Counseling**

The Program in Genetic Counseling is an innovative, 21-month Master of Science program that will prepare graduates to become certified genetic counselors. The program is composed of medical genetic- and counseling-focused curriculum, clinical rotations, and a research project.

In the United States, genetic counselors are recognized as individuals who have obtained a master's degree (either MS or MA) from a genetic counseling graduate program accredited by the Accreditation Council for Genetic Counseling (ACGC) (<https://www.gceducation.org/>). The Program in Genetic Counseling at Washington University has been granted accredited, new program status. Admission to programs accredited by ACGC requires registering for the Genetic Counseling Admissions Match (<https://natmatch.com/gcadmissions/>).

Applicants to the Program in Genetic Counseling must have a bachelor's degree (or equivalent if from a foreign college or university). Most applicants will have majored in biology or a related field (e.g., biochemistry, genetics) or in psychology. Along with the required prerequisite undergraduate course work in genetics, biochemistry, statistics, and psychology, the Program in Genetic Counseling also highly recommends that applicants have obtained the following types of experiences prior to applying:

- Exposure to the field via shadowing and/or informational interviewing
- Advocacy and/or counseling experience

The mission of the Program in Genetic Counseling at Washington University is to educate future generations of genetic counselors to serve the growing need for diverse, culturally competent, innovative genetic counselors serving patients, working in industry, and conducting research. The objectives of the program are to provide a rigorous curriculum, broad and robust clinical experiences, and expert research guidance to graduate students who are well prepared to fill the ever-expanding professional roles in which genetic counselors may be employed.

All graduates of accredited genetic counseling graduate programs are prepared for entry-level genetic counseling positions, regardless of the area of specialization. Common areas of specialization for genetic counselors include oncology, prenatal, pediatrics, neurogenetics, and cardiology. Many genetic counselors do select a specialty area of practice that they focus on throughout their careers. Others change their area of practice many times. The field of genetic counseling provides a great deal of career flexibility.



As a result of its ACGC accreditation, the Program in Genetic Counseling curriculum meets the educational requirements to sit for the American Board of Genetic Counseling (ABGC) (<https://www.abgc.net/>) Certification Examination and to pursue licensure in all states and territories of the United States and Washington, DC, in which licensure is available.

Email: [geneticcounseling@wustl.edu](mailto:geneticcounseling@wustl.edu)  
Website: <http://geneticcounseling.wustl.edu>

## Degrees & Offerings

- Master of Science in Genetic Counseling (p. 99)

## Research

Program in Genetic Counseling faculty members are active collaborators and leaders of interdisciplinary research projects that inform the practice of genetic counseling. To benefit from this active research portfolio, our students will undertake research-related activities throughout the program. Students will be introduced to key genetic counseling research concepts and encouraged to note areas of research interest throughout the first semester. Formal training in genetic counseling research methods and responsible conduct will take place during the second semester course, Genetic Counseling Research Methods and Ethics. Assignments in this course will culminate in students having a proposal for an independent research project that will be completed prior to graduation.

Our program is committed to generating research results that enhance the genetic counseling evidence base and patient care. To support impactful research, students will have the opportunity to collaborate across cohorts on legacy research projects. Students are also strongly encouraged to submit their findings for peer-reviewed publication and presentation.

## Faculty

**Rachael Bradshaw, MS, CGC**  
Program Director

**Tomi L. Toler, MS, CGC**  
Associate Director  
Clinical Fieldwork Coordinator

**Erin Linnenbringer, PhD, MS, CGC**  
Assistant Director  
Research Coordinator

**Marwan Shinawi, MD, FACMG**  
Medical Director

**Meagan Corliss, MS, CGC**  
Course Director

**Katherine (Abell) King, MD**  
Course Director

**Elizabeth Yoder**  
Program Coordinator

Visit the Program in Genetic Counseling website (<https://geneticcounseling.wustl.edu/team/>) for more information about our faculty and their appointments.

## Courses

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### M65 Peds 501 Introduction to Genetic Counseling I

This seminar provides an overview of genetic counseling and health care, and it discusses how individual differences can affect health care choices and belief systems. Students will become familiar with the process of genetic counseling, and they will build an awareness of related health professions, the health care system, and important terminology. Attendance and active participation are expected and required. Course activities will include interactive lectures, class discussions, class member presentations, guest presentations, and outside reading. This course is open to students in the Program in Genetic Counseling. Admittance may be offered to other students by request.

Credit 4 units.

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### M65 Peds 503 Laboratory Genetic Counseling

This course is designed for genetic counseling students, and it focuses on a variety of areas related to genetic counseling in the laboratory. Students will become familiar with various laboratory testing methodologies, data interpretation, and report writing in addition to professional and regulatory scenarios encountered in the lab. Attendance and active participation are expected and required. The course will consist of lectures, class discussions, hands-on demonstrations and tutorials, laboratory tours, and written materials. Some travel will be required. This course is open to students in the Master's in Genetic Counseling Program. Admittance may be offered to other students by request.

Credit 3 units.

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### M65 Peds 504 Genetic Counseling Journal Club

This journal club is a monthly, two-hour discussion of a relevant topic in clinical genetics. Research articles are selected from the literature and presented by attendees (one article per attendee). Summaries of the articles include a critical appraisal of the study and its methodology and results; the potential implications of the results for clinical practice (if any); the limitations of the conclusions that can be drawn from the study; and any biases or conflicts of interest that could have affected the study results. This course is open to students in the Master's Program in Genetic Counseling. Admittance may be offered to other students by request.

Credit 1 unit.

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### M65 Peds 505 Introduction to Genetic Counseling II

This course is a seminar focusing on preparing students for their clinical rotations and learning and practicing basic counseling skills. Attendance and active participation is expected and required. Course activities will include interactive lectures, class discussions, class member presentations, guest presentations, and outside reading. This course is open to students in the Master's in Program in Genetic Counseling. Admittance may be offered to other students by request. Prerequisite for this course is Introduction to Genetic Counseling I.

Credit 4 units.

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#### **M65 Peds 506 Clinical Genetic Specialties**

This course is a seminar focusing on a variety of specialty areas in clinical genetics. Attendance and active participation are expected and required. Course activities will include interactive lectures, class discussion, and class member presentations. There will be 2 examinations - mid-term and final. This course is open to students in the Master's Program in Genetic Counseling. Admittance may be offered to other students by request. Prerequisites for this course are Introduction to Genetic Counseling I and Laboratory Genetic Counseling. Credit 3 units.

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#### **M65 Peds 507 Genetic Counseling Research Design and Ethics**

This course will provide the foundation for the development and execution of the research project required for successful completion of the Master's of Science in Genetic Counseling degree. Through a series of interactive lectures, class discussions, student presentations, guest presentations, and outside reading, students will learn about common genetic counseling-relevant research methods; areas of active genetic counseling research on both a local and national level; and ethical guidelines for the conduct of responsible human subjects research. By the end of the course, students will select a topic for their research project and submit a research proposal. Students will register for Research Project I, II, and III to complete their research projects with faculty mentorship and peer support. This course is open to graduate students at Washington University School of Medicine. Prerequisites for this course are admission into the WUSM Graduate Program in Genetic Counseling or special permission from the instructor. Credit 3 units.

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#### **M65 Peds 601 Advanced Genetic Counseling I**

This course is a seminar focusing on starting to build advanced genetic counseling skills. Students will become familiar with unique aspects of various genetic counseling specialties, with a focus on prenatal genetics. Students will also learn about counseling theories, psychosocial assessment, psychosocial counseling techniques, and professional development skills. Attendance and active participation are expected and required. Credit 4 units.

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#### **M65 Peds 602 Research Project II**

The primary objective of this course series is to ensure the timely completion of student research projects. This course series provides research project scaffolding, mentorship, and opportunities for peer feedback. Research Project II is taken during the fall semester of the second year. Credit 2 units.

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#### **M65 Peds 603 Clinical Fieldwork Rotations II**

This course covers clinical fieldwork rotations. Participation as requested by supervisors is required. Clinical Fieldwork Rotations II involves two 14-day clinical rotations during the fall semester of the second year. Students who complete this course successfully will be able to demonstrate management of a genetic counseling case from contracting to follow-up and successfully use psychosocial counseling skills with patients. Credit 3 units.

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#### **L41 Biol 5285 Current Topics in Human and Mammalian Genetics**

This course aims to provide both biologists and those with mathematical backgrounds with a basis in mammalian genetics. The course will include the following modules: Nucleic acid biochemistry; Gene and chromosome organization; Introduction to Human Genetics; Mutations and DNA repair; Cancer Genetics; Genomic methodologies; Biochemical genetics; Murine Genetics; Epigenetics; Neurodegenerative diseases; Mitochondrial disorders; Pharmacogenetics; Introduction to human population genetics; Applications of modern human genetics; Introduction to web-based informatics tools for molecular genetics. One of the required courses in the Quantitative Human Statistical Genetics graduate program. Credit 3 units.

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#### **L41 Biol 5487 Genetics and Genomics of Disease**

The course will cover the use of genomic and genetic information in the diagnosis and treatment of disease, with an emphasis on current practice and existing gaps to be filled to achieve precision medicine. Areas of discussion include: bioinformatics methods; assessment of pathogenicity; use and curation of disease variant databases; discovery of incidental findings; genomics applications in Mendelian disease, complex traits, cancer, pharmacogenomics, and infectious disease; design of clinical trials with genetic data; ethical and policy issues. Prerequisites: Genomics (Bio 5488), Advanced Genetics (Bio 5491), or Fundamentals of Mammalian Genetics (Bio 5285) or equivalent (permission from instructor) Credit 2 units.

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#### **Human Embryology (online course via University of Cincinnati)**

This course helps students understand normal human development and to use this knowledge to explain the anatomy of the newborn and adult. This course also provides a basis for explaining the process of and possible cures for developmental anomalies. Finally, this course provides an introduction to the treatment of patients with congenital anomalies as well as counseling options for the families of affected individuals.

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#### **Elective Course (to be approved by Program Director)**

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##### **Research Project I, II, III**

The primary objective of this course series is to ensure the timely completion of student research projects. This course series provides research project scaffolding, mentorship, and opportunities for peer feedback. Research Project I is an eight-week course taken remotely or in person during the summer between the first and second years; Research Project II is taken during the fall semester of the second year; and Research Project III is taken during the spring semester of the second year.

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##### **Clinical Fieldwork Rotations I, II, III**

This course covers clinical fieldwork rotations. Participation as requested by supervisors is required. Clinical Fieldwork Rotations I is a 28-day clinical rotation over the summer between the first and second years; Clinical Fieldwork Rotations II involves two 14-day clinical rotations during the fall semester of the second year; and Clinical Fieldwork Rotations III includes

two 14-day clinical rotations during the spring semester of the second year. Students who complete this course successfully will be able to demonstrate management of a genetic counseling case from contracting to follow-up and successfully use psychosocial counseling skills with patients.

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### Advanced Genetic Counseling II

This course is a seminar focusing on building and honing advanced genetic counseling skills. Students will learn about complex issues such as family dynamics, crisis intervention, and implicit biases, and they will use this knowledge to increase their psychosocial assessment and counseling skills. This course will also help prepare students for graduation with a focus on ABGC Board Examination readiness and learning how to use self-care techniques to assist with stress management.

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### Teratology

This course is a weekly seminar focusing on human teratogens. Students will become familiar with the mechanisms by which exposures affect human development, learn about known and potential teratogens, and understand the methods by which exposures are studied to understand their potential effects. Finally, students will learn how to incorporate data available in the medical literature and databases to provide information about teratogens to patients and providers.

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## Medical Education

### Degrees & Offerings

#### MD and Joint MD Degrees

- Doctor of Medicine (MD) (p. 100)
- Doctor of Medicine Five-Year Program (p. 110)
- Doctor of Medicine and Master of Science in Clinical Investigation (p. 110)
- Doctor of Medicine and Master of Population Health Sciences (p. 110)
- Doctor of Medicine and Master of Public Health (p. 110)
- Doctor of Medicine and Master of Business Administration (p. 110)
- Doctor of Medicine and Doctor of Philosophy (p. 111)

#### Postgraduate Medicine

- Graduate Medical Education (p. 111)
- Continuing Medical Education (p. 112)

## Medical Physics

The Department of Radiation Oncology at the School of Medicine currently offers three programs for graduate and postgraduate physics students who are interested in exploring pathways to prepare for residency programs as well as for careers in the field of medical physics: the Master of Science in Medical Physics (MSMP) (<https://radonc.wustl.edu/education/master-of-science-in-medical-physics/>), the **new** Doctor of

Philosophy (PhD) in Medical Physics (<https://radonc.wustl.edu/education/doctor-of-philosophy-phd-in-medical-physics/>), and the Post-PhD Graduate Certificate in Medical Physics (<https://radonc.wustl.edu/education/post-phd-graduate-certificate-in-medical-physics/>).

## Contacts for Programs

### Program Director

Michael Altman, PhD

### Associate Program Director

Tiezhi Zhang, PhD

### Program Coordinator

Julie Follman, MBA

## Degrees & Offerings

- Master of Science in Medical Physics (p. 112)
- Doctor of Philosophy (PhD) in Medical Physics (<https://radonc.wustl.edu/education/doctor-of-philosophy-phd-in-medical-physics/>)
- Post-PhD Graduate Certificate in Medical Physics (p. 114)

## Research

### Master of Science in Medical Physics

Established in 2020, the MSMP program offers two different pathways to allow students to choose either a thesis option or a clinical option. Students who choose the thesis pathway will be required to complete 6 credits of thesis research, with the option for additional research opportunities over the summer semester as part of the 30-credit requirement. Students who choose the clinical pathway will be required to complete a 1-credit clinical rotation and a 3-credit clinical project, with the option for additional clinical rotations over the summer. Each pathway takes two years to complete.

### Doctor of Philosophy (PhD) in Medical Physics

**New** in 2022, the Doctor of Philosophy (PhD) in Medical Physics program is designed for full-time study with a minimum of 70 credit units required for degree completion. The program is comprised of 34 credit units of didactic course work, which are largely completed over the first two years of the program; this includes 22 credit units of medical physics “core” classes and 12 credit units of elective course work, as well as a minimum of 36 credit units of thesis research. The program commences in the fall semester, and didactic courses will run over traditional 16-week schedules during the fall and spring semesters. During the summer, students will be expected to work on their thesis research projects. Clinical shadowing opportunities will also be available for those who have interest.

## Post-PhD Graduate Certificate in Medical Physics

The medical physics division in the Department of Radiation Oncology currently provides research and training opportunities to a large number of PhD researchers in different areas of science and engineering as applied to radiation oncology. The Department of Radiation Oncology established the Post-PhD Graduate Certificate in Medical Physics program in 2017, with the intent of providing a pathway for postdoctoral fellows to enter into clinical physics residencies.

Our post-PhD certificate program focuses on providing students with the medical physics background necessary for future success in medical physics while also offering students the opportunity to perform cutting-edge research in patient-focused areas. Didactics include 18 credits and can be completed over the course of one or two years.

## Faculty

### Program Director

#### Michael Altman, PhD

Associate Professor of Radiation Oncology  
BA, Physics, University of Chicago, 2002  
MS, Physics, Drexel University, 1999  
PhD, Medical Physics, University of Chicago, 2010  
Medical Physics Residency, Henry Ford Health System, 2012

### Associate Program Director

#### Tiezhi Zhang, PhD (<https://radonc.wustl.edu/people/tiezhi-zhang-phd/>)

Associate Professor of Radiation Oncology (primary appointment)  
BS, Physics, Jilin Medical University, 1994  
MS, Physics, Drexel University, 1999  
PhD, Medical Physics, University of Wisconsin–Madison, 2004

### Instructors

#### Jose Garcia-Ramirez, MSc (<https://radonc.wustl.edu/people/jose-garcia-ramirez-ms/>)

Assistant Professor of Radiation Oncology  
BS, Physics, University of Puerto Rico, 1995  
MS, Medical Radiation Physics, Finch University of Health Sciences (Rosalind Franklin University), 1997

#### Yao Hao, PhD

Instructor in Radiation Oncology (primary appointment)  
BS, Physics, Shanxi University, 2004  
MA, Logic, Shanxi University, 2007  
PhD, Medical Physics, University of Massachusetts, 2016

#### Joseph O'Sullivan, PhD (<https://engineering.wustl.edu/faculty/Joseph-OSullivan.html>)

Samuel C. Sachs Professor of Electrical Engineering  
BS, Electrical Engineering, University of Notre Dame, 1982  
MS, Electrical Engineering, University of Notre Dame, 1984  
PhD, Electrical Engineering, University of Notre Dame, 1986

#### Naim Ozturk, PhD

Chief Physicist, Cox Health Springfield  
BS, Physics, Bogazici University (Turkey), 1984  
MS, Physics, University of Toledo, 1989  
PhD, Physics, University of Toledo, 1993  
MS, Medical Physics, East Carolina University, 2003

#### Michael Prusator, PhD

Assistant Professor of Radiation Oncology  
BS, Chemistry, University of the Ozarks, 2012  
MS, Radiological Sciences, University of Oklahoma, 2014  
PhD, Radiological Sciences, University of Oklahoma, 2018

#### Buck Rogers, PhD (<https://radonc.wustl.edu/people/buck-rogers-phd/>)

Professor of Radiation Oncology (primary appointment)  
Adjunct Professor of Chemistry (courtesy affiliation)  
Professor of Radiology  
BS, Chemistry, Loyola University Chicago, 1989  
MA, Chemistry, Washington University in St. Louis, 1991  
PhD, Inorganic Chemistry, Washington University in St. Louis, 1995

#### David Strait, PhD (<https://anthropology.wustl.edu/people/david-strait/>)

Professor of Anthropology  
BA, Anthropology, Harvard College, 1991  
MA, Anthropological Sciences, State University of New York at Stony Brook, 1995  
PhD Anthropological Sciences, State University of New York at Stony Brook, 1998

## Courses

Visit online course listings to view offerings for M91 MedPhys (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M91>).

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### M91 MedPhys 501 Clinical Imaging Fundamentals

This course will cover the physical principles underlying various imaging modalities used in medicine, including radiography, computed tomography, ultrasound, positron emission tomography and magnetic resonance imaging. Topics to be covered include (1) aspects of X-ray generation for imaging, including X-ray tube construction and imaging geometries; and (2) image-acquisition devices, such as storage phosphor plates, image intensifiers, and various digital imagers. Clinical applications of X-ray imaging, including mammography and angiography, will be reviewed. Advanced imaging systems to be covered include diagnostic computed tomography (CT) scanners and cone-beam CT scanners. Basics of MRI imaging systems will be reviewed, including (1) the physics underlying both commonly used and specialized pulse sequences; and (2) the design and construction of typical scanners. The physics

and clinical applications of both ultrasound and PET imaging will also be discussed. Topics to be considered throughout the course include image-quality metrics used to evaluate the performance of any imaging system and how the performance of imaging platforms can be degraded or improved in terms of these metrics. In addition to the didactic component, there will also be hands-on laboratory sessions on ultrasound, cone-beam CT, MRI imaging, radiography, and computed tomography performance testing for various clinical systems. Prerequisites: modern physics and calculus; permission of the program director.

Credit 2 units.

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#### **M91 MedPhys 502 Radiological Physics and Dosimetry**

This course is designed to construct a theoretical foundation for ionizing radiation dose calculations and measurements in a medical context and to prepare graduate students for proper scientific applications in the field of X-ray imaging and radiation therapy. This course will cover the fundamental concepts of radiation physics, how ionizing radiation interacts with matter, and how the energy that is deposited in the matter can be measured in theory and practice. Prerequisites: calculus and modern physics; permission of the program director. Instructor: Tiezhi Zhang, PhD. Fall.

Credit 3 units.

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#### **M91 MedPhys 503 Independent Study**

The graduate student will pursue independent laboratory or industrial research during the academic year. Many WUSM faculty have research opportunities for students. Students should reach an agreement with a faculty member who is willing to serve as their supervisor for the objective and scope of the project. The faculty supervisor must be either employed full-time in the Department of Radiation Oncology or affiliated with its Medical Physics Division. The grade for the independent study will be pass/fail. The student may continue to develop their research during a second term and expand the research into either a clinical project or thesis research. Instructor Rao Khan, PhD. Fall and spring.

Credit 1 unit.

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#### **M91 MedPhys 503C Clinical Project**

Students will complete a clinically focused, hands-on project under the supervision of a faculty mentor. The student will develop a project statement that includes the purpose, overview of proposed methods, expected duration, and required effort to complete the project. The statement must be approved by the mentor and program director prior to the student initiating work on the project. An oral presentation and/or a written report describing the completed project work is required. Prerequisites: Radiological Physics and Dosimetry, Radiation Oncology Physics, Radiobiology, and Independent Study courses, or permission of the program director.

Credit 3 units.

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#### **M91 MedPhys 503R Phd Research Rotation**

The research rotations course is designed to provide graduate students with an opportunity to gain insight into an aspect of the field of medical physics. The goal of the course is to provide introductory experience on a focused project with one or more faculty mentor(s). Graduate students will be matched with a

project/mentor based on a number of factors, including student interest in the area of study and availability. Prerequisite: Physics and calculus; Permission of the Program Director. Instructor: Michael B. Altman, PhD, 3 credit hours, Fall and Spring. Credit 3 units.

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#### **M91 MedPhys 503T Thesis Research**

Students will complete a research project under the supervision of a faculty mentor. Thesis students will develop a thesis proposal, conduct mentored research, and disseminate this research in the form of an oral defense and written thesis. Thesis proposals must be approved by the faculty mentor and program director prior to initiating the thesis research. Prerequisites: Radiological Physics and Dosimetry, Radiation Oncology Physics, Independent Study courses, and permission of the program director.

Credit 3 units.

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#### **M91 MedPhys 504 Ethics, Professionalism and Current Topics**

This course prepares students to critically evaluate ethical, regulatory and professional issues and for leadership in clinical practice and research. The principal goal of this course is to prepare students to recognize ethics and compliance resources in clinical research and the situational factors that give rise to them, to identify ethics and compliance resources, and to foster ethical problem-solving skills. In addition, the course introduces professionalism, core elements, common traits of the medical physics profession, confidentiality, conflict of interest, interpersonal interactions, negotiations and leadership skills. Characteristics of successful leadership are also identified. Interaction with patients, colleagues, vendors, and clinic staff will also be emphasized. Prerequisite: Permission of the program director.

Credit 1 unit.

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#### **M91 MedPhys 505 Radiobiology**

This course is designed to establish a foundation for ionizing radiation interaction with biological tissues. It will cover the fundamental concepts of cell biology, how ionizing radiation interacts with cells, radiation damage and carcinogenesis, and radiation therapy fractionation and related concepts. The effects of ionizing radiation on living cells and organisms -- including the physical, chemical, and physiological basis of radiation cytotoxicity, mutagenicity, and carcinogenesis -- are also covered. Prerequisites: One year each of biology, physics and organic chemistry; permission of the program director.

Credit 2 units.

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#### **M91 MedPhys 506 Radiation Oncology Physics**

This course is designed to build on the concept of radiation dosimetry techniques and bring them into the clinical realm. The students will learn clinical applications of radiation dose measurements as used in radiation therapy for the treatment of cancer. Ionizing-radiation-producing devices such as external beam, brachytherapy, protons and charged particles, imaging modalities, simulation, radiation delivery, treatment verification imaging, quality assurance, motion management, and image-guided techniques will be the major focus. Prerequisites: Radiological Physics and Dosimetry; permission of the program director.

Credit 3 units.

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**M91 MedPhys 521 Radiation Protection and Safety**

This class is designed to introduce concepts of radiation protection and safety as well as the biological consequences of human radiation exposure. Protection and safety of the radiation worker and patient as well as detection equipment and shielding analysis will be the main focus. The course will broadly cover regulations and radiological protection in various clinical environments. Prerequisites: one year each of biology, physics and organic chemistry; permission of the program director. Instructor: Rao Khan, PhD. Fall. Credit 2 units.

**M91 MedPhys 522 Clinical Rotations**

The student will rotate through various areas within the Radiation Therapy Clinic and develop an understanding of the applications of physics in the use of radiation for the treatment of cancers. This will include simulation, quality assurance of various imaging and radiation sources, dose calculation, intensity modulation treatments, radiosurgery, stereotactic body radiotherapy, brachytherapy, radiopharmaceutical therapy, and more. Prerequisites: Radiological Physics and Dosimetry, Radiation Oncology Physics; permission of the program director. Credit 1 unit.

**M91 MedPhys 523 Advanced Clinical Medical Physics Laboratory**

This course is designed to introduce concepts of radiation protection and safety as well as biological consequences of human radiation exposure. Protection and safety of the radiation worker and patient, as well as detection equipment and shielding analysis, will be main focus. The course will broadly cover regulations and radiological protection in various clinical environments. Prerequisites: One year each of biology, physics and organic chemistry; permission of the program director. Credit 2 units.

## Nursing Science

The Department of Nursing Science is a collaboration between Goldfarb School of Nursing at Barnes-Jewish College and the School of Medicine at Washington University. The Goldfarb School of Nursing emphasizes the reciprocation among research, clinical practice, and teaching based on the belief that clinical practice advises research, research advises clinical practice, and both research and clinical practice advise teaching. The school's commitment to the preparation of the next generation of nurse scientists is reflected in the strong research emphasis of the PhD program in the science of nursing.

The goal of the PhD program is to educate nurse scientists whose career goals include conducting nursing research. Students bring a unique combination of nursing knowledge and clinical experiences to doctoral study, and these serve as the basis for the development of programs of study that are both compatible with the core doctoral curriculum and individualized to allow for the gaining of in-depth knowledge in a specialized

area of study. The PhD in Nursing Science provides a solid foundation for graduates to pursue rigorous programs of nursing research that are clinically significant and contribute to the advancement of nursing science.

Contact: Rebecca Boettcher  
Phone: 314-273-5449  
Email: rebecca.boettcher@barnesjewishcollege.edu  
Website: <https://www.barnesjewishcollege.edu/phd>

## Degrees & Offerings

- PhD in Nursing Science (p. 115)

## Research

**Deborah Birk, PhD, RN, MHA, NEA-BC**, is the Director of the Health Systems and Population Health Leadership concentration in the Doctor of Nursing Practice program and Assistant Professor at Goldfarb School of Nursing. Dr. Birk's program of research involves executive nursing leadership and quality of nurse leaders in health systems.

*Research interests:* Executive nursing leadership, health systems, population health, health policy, women's health, nursing curriculum, evidence-based practice, quality improvement in health care, and emotional intelligence and resilience in health-care leaders

**Maryann Bozzette, PhD, RN, CLC**, is an Associate Professor at Goldfarb School of Nursing. Dr. Bozzette's program of research is focused on the perceptual and social development of premature infants, developmentally supportive care, and parent-infant interaction.

*Research interests:* Sensory interventions for premature infants, biomedical measures, observational research, attachment, breastfeeding high-risk infants, and early communication behaviors of premature infants

**Mary Curtis, PhD, DNP, RN**, is the Director of the Adult Gerontology Primary Care Nurse Practitioner concentration in the Master of Science in Nursing program and a Professor at Goldfarb School of Nursing. Dr. Curtis is a certified adult and family care nurse practitioner whose clinical practice focuses on adult primary care with an emphasis on end-of-life, palliative, and hospice care.

*Research interests:* Injury prevention interventions, quality, safety, end-of-life care, health promotion, and action research/scholarship of teaching and learning

**Sarah Farabi, PhD, RN**, is an Assistant Professor at Goldfarb School of Nursing. Dr. Farabi's program of research is focused on understanding the biobehavioral mechanisms underlying obesity. She has a particular interest in the influence of diet and sleep on metabolic disturbances.

*Research interests:* Obesity, diet, sleep, diabetes, nurse-led interventions, and pregnancy

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**Judy Frain, PhD, RN**, is the Director of the PhD in Nursing Science program and an Associate Professor at Goldfarb School of Nursing. Dr. Frain's program of research is focused on improving quality of life in older adults, with an emphasis on those living with HIV.

*Research interests:* Symptom science, self-management of chronic disease, quality of life, and examining the intersection of aging and chronic disease

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**Heidi Holtz, PhD, RN**, is an Assistant Professor at Goldfarb School of Nursing. Dr. Holtz was a research fellow at Johns Hopkins Berman Institute of Bioethics. Dr. Holtz's program of research focuses on nursing students' experiences and the consequences of faculty incivility, with a special interest in researching the construct of moral resilience and applying that research to develop innovative approaches to foster moral resilience in health-care environments.

*Research interests:* Civility in nursing, moral resilience among health-care professionals, and burnout among health-care professionals

---

**James R. Kennett, PhD, RN**, is an Assistant Professor at Goldfarb School of Nursing. Dr. Kennett's program of research is focused on living with chronic illness and improving health-care outcomes.

*Research interests:* Theory development, chronic illness, the patient/provider relationship, collaborative research, engineering principles used in health care, communication patterning, behavior patterning, and the application of intermodernism

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**Pamela Newland, PhD, RN, CMSRN**, is an Associate Professor at Goldfarb School of Nursing. Dr. Newland is a nurse scientist with expertise in symptom science and self-management in persons with disabilities and chronic conditions.

*Research interests:* Designing self-management interventions, validating patient-reported outcome measures, shared decision making, examining biobehavioral and quality improvement, promoting health and well-being, mobile health technology, and mixed methods

**MaryAnn Niemeyer, PhD, MSN, RN-BC**, is an Assistant Professor at Goldfarb School of Nursing. Dr. Niemeyer's program of research investigates the improvement of safety and quality of nursing practice and health care. She is also interested in simulation research for the improvement of nursing practice, especially regarding practice and decision making.

*Research interests:* Health-care simulation research, failure-to-rescue research, nursing care handoffs, medical errors, clinical outcomes, and principles and techniques to promote patient health, communication, safety, comfort, and care quality

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**Amy Piontek, PhD, RN, CHES**, is an Assistant Professor at Goldfarb School of Nursing. Dr. Piontek's program of research is on the improvement of patient and caregiver self-efficacy in managing end-of-life symptoms through education and early referral to palliative and hospice programs.

*Research interests:* Creating effective virtual and simulation learning environments for nursing students, exploring technology to improve student engagement, and designing outreach platforms for health educators to educate the general population about end-of-life and palliative care options

---

**Dominic Reeds, MD**, is the Associate Dean for Research at Goldfarb School of Nursing and the Associate Director of Washington University's Nutrition and Obesity Research Center and Center for Diabetes Translation Research. He is a Professor in the Geriatrics and Nutritional Science Division at Washington University School of Medicine, and he is Director of the Barnes-Jewish Hospital Nutrition Support Service. Dr. Reeds is Director of Washington University's KL2 program and Co-Director of the Master of Science in Clinical Investigation. His research focuses on the pathogenesis of HIV-associated diabetes and obesity.

*Research interests:* Clinical nutrition; diabetes and metabolism; prevention, pathogenesis, and management of cardiometabolic risk factors, including obesity, hypertension, and HIV; and nurse-led implementation science programs for the management of hypertension and diabetes

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**Nancy Ridenour, PhD, APRN, FAAN**, is the President of Goldfarb School of Nursing. Dr. Ridenour's program of research is focused on increasing health equity using health policy, population health and primary care.

*Research interests:* Advanced practice nursing, access and quality in primary care, underserved populations, global health, and health policy

**Judy Smith, PhD, RN, GCNS-BC**, is the Assistant Dean of the Bachelor of Science in Nursing Program at Goldfarb School of Nursing. Dr. Smith's program of applied research addresses adults who are impacted by aging and its accompanying losses utilizing a biopsychosocial approach.

*Research interests:* Loneliness, dementia, and delirium and how these common geriatric syndromes impact the holistic health of older adults

**Po-Yin Yen, PhD, RN**, is an Associate Professor at Goldfarb School of Nursing and an Associate Professor of Medicine in the Division of General Medical Sciences at Washington University School of Medicine. Dr. Yen's program of research is focused on applied clinical informatics research to promote a user-friendly health information technology environment for clinicians and patients.

*Research interests:* Clinical informatics, usability, technology acceptance, human-computer interaction, user-centered design, mixed methods, literature mining, data visualization, workflow analysis, and time and motion study

## Faculty

### Program Chair

**Judy Frain** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=39>)

Director, PhD in Nursing Science Program  
Associate Professor  
PhD, University of Missouri–St. Louis

### Associate Dean for Research

**Dominic Reeds** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=223>)

Associate Dean for Research, Goldfarb School of Nursing  
Associate Director, Washington University's Nutrition and Obesity Research Center and Center for Diabetes Translation Research  
Professor, Geriatrics and Nutritional Science Division, Washington University School of Medicine  
Director, Barnes-Jewish Hospital Nutrition Support Service  
MD, Texas Tech University Health Sciences Center

## Faculty

**Deborah Birk** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=151>)

Assistant Professor  
Director, Health Systems & Population Health  
Leadership concentration, Doctor of Nursing Practice program  
PhD, University of Missouri

**Maryann Bozzette** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=206>)

Associate Professor  
PhD, University of Washington–Seattle

**Mary Curtis** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=22>)

Professor  
Director, Adult Gerontology Primary Care Nurse Practitioner concentration, Doctor of Nursing Practice program  
PhD, Saint Louis University

**Sarah Farabi** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=186>)

Assistant Professor  
PhD, University of Illinois–Chicago

**Heidi Holtz** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=231>)

Assistant Professor  
PhD, Indiana University–Purdue University Indianapolis

**James Kennett** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=181>)

Assistant Professor  
PhD, University of San Diego

**Pamela Newland** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=78>)

Associate Professor  
PhD, University of Missouri–Columbia

**MaryAnn Niemeyer** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=215>)

Assistant Professor  
PhD, University of Missouri–Columbia

**Tamara Otey** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=140>)

Assistant Professor  
PhD, Indiana University

**Amy Piontek** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=214>)

Assistant Professor  
PhD, Southern Illinois University–Carbondale

**Nancy Ridenour**

President and Professor, Goldfarb School of Nursing  
PhD, Texas Tech University

**Mayola Rowser** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=203>)

Dean and Professor, Goldfarb School of Nursing  
PhD, University of Tennessee Health Science Center

**Judy Smith** (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=100>)

Assistant Dean and Professor, Undergraduate Nursing Program  
PhD, Saint Louis University



**Po-Yin Yen (<https://www.barnesjewishcollege.edu/Employee-Search-Directory/?id=166>)**

Associate Professor, Goldfarb School of Nursing  
Associate Professor, Institute of Informatics,  
Washington University School of Medicine  
PhD, Columbia University

## Courses

Visit online course listings to view semester offerings for M93 NrsSci (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M93&crslvl=1:5>).

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**M93 NrsSci 510 Symptom Science and Precision Health Care: Omics and Big Data**

This course focuses on symptom science as a major branch of nursing research as it relates to precision healthcare. Precision healthcare considers individual variability in genes, environment, and lifestyles. An introduction to the omic sciences, big data science, and their relationships is also provided.  
Credit 3 units.

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**M93 NrsSci 511 Philosophical and Theoretical Underpinnings of Nursing Science**

This course explores the evolution, assumptions, and principal themes that underpin philosophies of nursing science and their influence on knowledge development for nursing practice and nursing theory. The interrelationships among theoretical perspectives, theoretical thinking, scientific inquiry, and knowledge development in nursing will be discussed. The relationship of scientific integrity and bioethics to the scientific method will be discussed.  
Credit 3 units.

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**M93 NrsSci 512 Literature Critique and Synthesis**

The focus of this course is on synthesizing evidence from the published research literature to determine the state of knowledge about a selected research topic and to guide a research plan. The course emphasizes the processes of critiquing, analysis, and synthesis of existing research in order to draw useful conclusions or make decisions about the topic, problem, or research plan. Prerequisite: M93 510.  
Credit 3 units.

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**M93 NrsSci 513 Dissemination and Implementation Science**

This course focuses on dissemination and implementation research. Strategies underlying the creation, transmission, and reception of information will be explored. The goal of this course is to bridge the gap among clinical research, everyday practice, and public health by building a knowledge base to improve population health. Prerequisite: M93 512.  
Credit 3 units.

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**M93 NrsSci 514 Grant Writing and Scientific Review**

This course focuses on developing and evaluating fundable research applications. Grant-writing and scientific review processes are emphasized, including identifying various types of funding mechanisms, developing successful grant applications,

and reviewing research proposals. Strategies for developing high impact scientific protocols and a feasible research budget will be discussed. Opportunities to conduct peer reviews of grant applications will be provided. Prerequisite: M93 513.  
Credit 3 units.

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**M93 NrsSci 515 Interdisciplinary Science and the Innovative Nurse Scientist**

This course provides an educational opportunity to understand diverse disciplines with their specific perspective in conducting research. The emphasis is placed on understanding key scientific concepts and methodologies. The goal is to connect and integrate different schools of thought and demonstrate how the disciplines of science come together in innovative ways to identify and solve scientific challenges. Preparation, training, support, challenges, and roles of the nurse scientist are also explored. Related topics include how to advance a career as a nurse scientist with a focus on building a research trajectory, obtaining funding and becoming an innovative researcher who is able to identify trends in emerging science. Discussions will focus on integrating biologic and behavioral factors to achieve translational bench-to bedside nursing science. Prerequisites: M93 513 and M93 534.  
Credit 3 units.

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**M93 NrsSci 520 Research I: Research Designs and Measurements for Scientific Inquiry: Quantitative Methods**

The goal of this course is to deepen the understanding of scientific inquiry pertaining to quantitative methods in nursing research. This course emphasizes research questions/hypotheses, frameworks, designs, methodology, and analysis. Methods of dissemination of research findings in symptom science are examined.  
Credit 3 units.

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**M93 NrsSci 521 Research II: Research Designs and Measurements for Scientific Inquiry: Qualitative Methods**

This is an introductory course in qualitative research, with particular focus on the health sciences. The course focuses on the study of traditions and methods, scientific issues, techniques of data collection, analysis, and interpretation. Emphasis is given to the contribution of qualitative research in expanding nursing knowledge.  
Credit 3 units.

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**M93 NrsSci 522 Research III: Research Designs and Measurements for Scientific Inquiry: Psychometrics & Biobehavioral Measurement**

This course offers information on psychometric theories. The application of these theories in constructing and evaluating measurements in nursing research is presented. Relevant course content includes statistical techniques to evaluate measurements, such as reliability and validity tests. This course also provides an introduction to the issues that arise when writing/selecting questions for the psychosocial instruments. The focus is on examining the logic of measurement in standardized survey administration and selected techniques for testing scale items. Another focus of this course is on integrating biological and behavioral measurement. Emphasis is placed on understanding ways to optimize measurement of study variables

using both biological and behavioral measures. The focus is on strengthening behavioral measures, explaining behavioral data and elucidating underlying mechanisms by employing biophysical measures. Prerequisite: M93 520.

Credit 3 units.

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#### **M93 NrsSci 530 Mentored Research Experience I**

This course is the first in a five serial mentored research course series designed to provide one-to-one mentoring for students to have hands-on research experiences and to gain the skills necessary to conduct interdisciplinary research. Students will be paired with a nursing mentor and a non-nursing mentor. In courses I and II, students will learn about a chosen research project led by the non-nursing mentor and work with that person's research team. In courses III and IV, under the supervision of both the nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan that integrates methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors to develop their dissertation research proposal.

Credit 1 unit.

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#### **M93 NrsSci 531 Mentored Research Experience II**

This course is the second in a five serial mentored research course series designed to provide one-to-one mentoring for students to have hands-on research experiences and to gain the skills necessary to conduct interdisciplinary research. Students will be paired with a nursing mentor and a non-nursing mentor. In courses I and II, students will learn about a chosen research project led by the non-nursing mentor and work with that person's research team. In courses III and IV, under the supervision of both the nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan that integrates methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors to develop their dissertation research proposal. Prerequisite: M93 530.

Credit 1 unit.

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#### **M93 NrsSci 532 Mentored Research Experience III**

This course is the third in a five serial mentored research course series designed to provide one-to-one mentoring for students to have hands-on research experiences and to gain the skills necessary to conduct interdisciplinary research. Students will be paired with a nursing mentor and a non-nursing mentor. In courses I and II, students will learn about a chosen research project led by the non-nursing mentor and work with that person's research team. In courses III and IV, under the supervision of both the nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan that integrates methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors to develop their dissertation research proposal. Prerequisite: M93 531.

Credit 1 unit.

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#### **M93 NrsSci 533 Mentored Research Experience IV**

This course is the fourth in a five serial mentored research course series designed to provide one-to-one mentoring for students to have hands-on research experiences and to gain the skills necessary to conduct interdisciplinary research. Students will be paired with a nursing mentor and a non-nursing mentor. In courses I and II, students will learn about a chosen research project led by the non-nursing mentor and work with that person's research team. In courses III and IV, under the supervision of both the nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan that integrates methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors to develop their dissertation research proposal. Prerequisite: M93 532.

Credit 1 unit.

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#### **M93 NrsSci 534 Mentored Research Experience V**

This course is the fifth and final in a five serial mentored research course series designed to provide one-to-one mentoring for students to have hands-on research experiences and to gain the skills necessary to conduct interdisciplinary research. Students will be paired with a nursing mentor and a non-nursing mentor. In courses I and II, students will learn about a chosen research project led by the non-nursing mentor and work with that person's research team. In courses III and IV, under the supervision of both the nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan that integrates methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors to develop their dissertation research proposal. Prerequisite: M93 533.

Credit 1 unit.

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#### **M93 NrsSci 540 Qualifying Exam**

The qualifying examination consists of the student's oral presentation of their dissertation proposal to their committee. The qualifying examination will take place once the written dissertation proposal is approved by the dissertation committee.

Credit 1 unit.

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#### **M93 NrsSci 550 Dissertation**

Original investigation research experience designed by the student to prepare for completing the proposed research, public defense, and publication of a dissertation as based on the student's substantive areas of interest and program of research. Offered every semester.

Credit variable; maximum 4 units.

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## **Occupational Therapy**

The Program in Occupational Therapy offers several professional degrees as well as a joint degree with the George Warren Brown School of Social Work.

Students interested in entering the field of occupational therapy may do so with a master's or doctoral degree. It is possible to enroll in either program and then apply to transfer to the other program later, as both the master's and doctoral programs share

the same curriculum for the first year of study. Students may also decide to apply to both programs if they like. Typically, the doctoral program attracts students who have further interest in research and leadership in the field.

The Program in Occupational Therapy prepares students for professional practice and, through its research, generates knowledge to address the issues facing individuals with disabilities, chronic diseases and developmental disabilities. Students are prepared as generalists, but they can also concentrate their studies for work in pediatrics, aging, rehabilitation, work and industry, or social participation. The curriculum focuses on the dynamic interaction of the biological with the psychological, environmental and occupational factors that enable persons to fulfill their roles and lead meaningful and productive lives. Students interact with leading physicians and scientists whose practices and science are contributing to better methods for the treatment of persons with disabilities. In addition, students are linked with community agencies and leaders providing services to individuals with disabling conditions.

Undergraduate students in pre-medical, psychology, biology or anthropology will find that the program offers a means of applying their knowledge in a professional field.

The Program in Occupational Therapy is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), located at 6116 Executive Boulevard, Suite 200, North Bethesda, MD 20852-4929. ACOTE's telephone number, care of AOTA, is 301-652-AOTA. For more information, visit the ACOTE Accreditation webpage (<https://www.aota.org/Education-Careers/Accreditation.aspx>).

Email: [wuotinfo@wustl.edu](mailto:wuotinfo@wustl.edu)  
Website: <http://www.ot.wustl.edu>

## Degrees & Offerings

- Master of Science in Occupational Therapy (p. 115)
- Clinical Doctorate of Occupational Therapy (p. 116)
- PhD in Rehabilitation and Participation Science (p. 116)

## Research

Faculty in the Program in Occupational Therapy at Washington University are involved in research that is changing the way occupational therapy is practiced. In collaboration with colleagues in the School of Medicine, public health, social work and community agencies, these individuals are involved in projects that encompass many of the challenges facing society. By providing evidence through scientific research, they are validating the profession as an important partner in the health care team. By acting as innovators, they are developing new and better ways to provide care.

To find more information about research activities in the Program of Occupational Therapy, please visit the Research (<http://www.ot.wustl.edu/research-105/>) page of our website.

## Faculty

**Lisa Tabor Connor, PhD, MSOT, OTR/L** (<https://www.ot.wustl.edu/about/our-people/lisa-tabor-connor-171/>)

Associate Dean and Director of Occupational Therapy  
Elias Michael Professor of Occupational Therapy  
Professor of Neurology  
Director, Division of Research

**Lenin Grajo, PhD, EdM, OTR/L** (<https://www.ot.wustl.edu/about/our-people/lenin-grajo-1240/>)

Associate Professor of Occupational Therapy and Psychiatry  
Director, Division of Professional Education  
Associate Director, Program in Occupational Therapy  
Associate Director, Diversity, Equity and Inclusion

**Patricia Nellis, OTD, OTR/L** (<https://www.ot.wustl.edu/about/our-people/patricia-nellis-65/>)

Associate Professor of Occupational Therapy and Neurology  
Director, Division of Clinical Operations

Visit our website for more information about our faculty (<https://www.ot.wustl.edu/about/our-people-117/?typed=2>) and their appointments.

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## B

**Salma Hussain Bachelani, Ph.D.**

Instructor in Occupational Therapy (primary appointment)  
Bachelor of Arts, Northwest Missouri State University, 2013  
Doctor of Philosophy, Washington University in St Louis, 2016

**Parul Bakhshi, Ph.D.**

Assistant Professor of Occupational Therapy (primary appointment)  
Assistant Professor of Surgery (Public Health Sciences)  
Doctor of Philosophy, University Rene' Descartes, 2003

**Peggy Barco, O.T.D.**

Associate Professor of Occupational Therapy (primary appointment)  
Associate Professor of Medicine  
Master of Education, Washington University in St Louis, 1987

**M. Carolyn Baum, M.A., Ph.D.**

Professor of Occupational Therapy (primary appointment)  
Professor of Neurology (Occupational Therapy)  
Professor of Social Work (Courtesy)  
Bachelor of Science, University of Kansas, 1966  
Master of Arts, Webster University, 1979  
Doctor of Philosophy, Washington University in St Louis, 1993

**Christine R. Berg, M.S., Ph.D.**

Professor of Occupational Therapy (primary appointment)  
Professor of Neurology

Master of Science, Boston University, 1980  
Doctor of Philosophy, Washington University in St Louis, 1999

**Jessie Lynne Bricker, M.S., O.T.D.**

Instructor in Occupational Therapy (primary appointment)  
Instructor in Medicine  
Bachelor of Science, Illinois Wesleyan University, 2000  
Master of Science, Washington University in St Louis, 2001  
Doctor of Occupational Therapy, Eastern Kentucky University,  
2018

**C**

**Chih-Hung Chang, Ph.D.**

Professor of Occupational Therapy (primary appointment)  
Professor of Medicine  
Professor of Orthopedic Surgery  
Bachelor of Science, National Chengchi University, 1987  
Doctor of Philosophy, University of Chicago, 1995

**Lisa Tabor Connor, M.A., M.S., Ph.D.**

Professor of Occupational Therapy (primary appointment)  
Elias Michael Executive Director of the Program in Occupational  
Therapy  
Professor of Neurology  
Associate Dean for Occupational Therapy  
Bachelor of Arts, Johns Hopkins University, 1986  
Master of Arts, Washington University in St Louis, 1990  
Doctor of Philosophy, Washington University in St Louis, 1992  
Master of Science, Washington University in St Louis, 2013

**D**

**Jessica L Dashner, O.T.D.**

Assistant Professor of Occupational Therapy (primary  
appointment)  
Assistant Professor of Neurology  
Bachelor of Science, McKendree University, 2000  
Doctor of Occupational Therapy, Washington University in St  
Louis, 2002

**F**

**Susan M Fitzpatrick, Ph.D.**

Adjunct Associate Professor of Occupational Therapy  
Adjunct Associate Professor of Neuroscience  
Bachelor of Science, Saint Johns University, 1978  
Doctor of Philosophy, Cornell University, 1984

**G**

**Lenin Grajo, M.Ed., Ph.D.**

Associate Professor of Occupational Therapy (primary  
appointment)  
Director of Professional Education  
Master of Education, Harvard University, 2010  
Doctor of Philosophy, Texas Woman's University, 2015  
Bachelor of Science, University of the Philippines Manila, null

**H**

**Kelly McClelland Harris, M.A., Ph.D.**

Assistant Professor of Occupational Therapy (primary  
appointment)  
Lecturer in Education  
Assistant Professor of Surgery (Public Health Sciences)  
Bachelor of Arts, University of Kansas, 2000  
Master of Arts, Northwestern University, 2001  
Doctor of Philosophy, Washington University in St Louis, 2017

**Catherine R Hoyt, O.T.D., Ph.D.**

Instructor in Occupational Therapy (primary appointment)  
Bachelor of Science, Juniata College, 2007  
Doctor of Occupational Therapy, Washington University in St  
Louis, 2010  
Doctor of Philosophy, Washington University in St Louis, 2019

**J**

**Brian Johnson, M.S., Ph.D.**

Assistant Professor of Occupational Therapy (Pending Executive  
Faculty Approval) (primary appointment)  
null, University of Wisconsin Milwaukee, 2011  
null, University of Wisconsin Milwaukee, 2012  
null, University of Maryland Baltimore, 2019

**K**

**Allison A King, M.D.**

Professor of Occupational Therapy (primary appointment)  
Professor of Education (Courtesy)  
Professor of Pediatrics  
Professor of Surgery (General Surgery)  
Professor of Medicine  
Bachelor of Science, Washington University in St Louis, 1992  
Doctor of Medicine, University of Missouri Columbia, 1996

**Kathleen Marie Knipmann, M.P.H., O.T.D.**

Associate Professor of Occupational Therapy (primary  
appointment)  
Associate Professor of Neurology  
Bachelor of Arts, Washington University in St Louis, 1974  
Bachelor of Science, Washington University in St Louis, 1974  
Doctor of Education, Harvard University, 1981  
null, Washington University in St Louis, 2009

**M**

**Amanda Mack, M.S., O.T.D.**

Assistant Professor of Occupational Therapy (primary  
appointment)  
Assistant Professor of Medicine  
Bachelor of Science, Boston University, 2011  
Master of Science, Boston University, 2013  
Other professional doctorate, Boston University, 2019

**Wanda Jean Mahoney, M.A., M.S., Ph.D.**

Associate Professor of Occupational Therapy (primary appointment)  
Associate Professor of Medicine  
Bachelor of Science, Saint Louis University, 1997  
Master of Science, Washington University in St Louis, 1999  
Doctor of Philosophy, Nova Southeastern University, 2008  
Master of Arts, De Paul University, 2018

**Lauren Elizabeth Milton, O.T.D.**

Assistant Professor of Occupational Therapy (primary appointment)  
Assistant Professor of Medicine  
Bachelor of Science, Saint Louis University, 2001  
Doctor of Philosophy, Washington University in St Louis, 2008

**Marian A Minor, M.P.H., Ph.D.**

Associate Professor of Occupational Therapy  
Bachelor of Science, University of Kansas, 1965  
Master of Public Health, University of Missouri Columbia, 1979  
Doctor of Philosophy, University of Missouri Columbia, 1989

**Kerri A Morgan, M.S., Ph.D.**

Assistant Professor of Occupational Therapy (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Arts, Texas Christian University, 1996  
Master of Science, Washington University in St Louis, 1998  
Doctor of Philosophy, Washington University in St Louis, 2015

**N**

**Patricia K Nellis, M.B.A., O.T.D.**

Associate Professor of Occupational Therapy (primary appointment)  
Associate Professor of Neurology  
Director of Clinical Practice  
Master of Business Administration, Columbia College Missouri, 2004  
Doctor of Occupational Therapy, A T Still University of Health Sciences, 2017

**O**

**Grayson Owens, O.T.D.**

Instructor in Occupational Therapy (Pending Dean's Approval) (primary appointment)  
null, University of Central Arkansas, 2016  
Main Campus, 2019

**P**

**Monica S Perlmutter, M.A., O.T.D.**

Associate Professor of Occupational Therapy (primary appointment)  
Associate Professor of Ophthalmology and Visual Sciences  
Master of Arts, Washington University in St Louis, 1989  
Doctor of Occupational Therapy, Washington University in St Louis, 2012

**Benjamin Allen Philip, Ph.D.**

Assistant Professor of Occupational Therapy (primary appointment)  
Assistant Professor of Neurology  
Assistant Professor of Surgery (Plastic and Reconstructive Surgery)  
Doctor of Philosophy, Brown University, 2009

**Roberta G Pineda, M.H.S.**

Adjunct Assistant Professor of Occupational Therapy  
Master of Health Science, University of Florida, 1994

**R**

**Duana C Russell, M.S.**

Assistant Professor of Occupational Therapy (primary appointment)  
Director of the Center for Community Living  
Assistant Professor of Medicine  
Master of Science, Washington University in St Louis, 1997

**S**

**Jaclyn Schwartz, M.S., Ph.D.**

Assistant Professor of Occupational Therapy (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Science, University of Texas Austin, 2008  
Master of Science, Washington University in St Louis, 2010  
Doctor of Philosophy, University of Wisconsin Milwaukee, 2015

**Emily K Somerville, M.A., O.T.D.**

Instructor in Occupational Therapy (primary appointment)  
Instructor in Neurology  
Bachelor of Arts, Covenant College, 2005  
Master of Arts, Washington University in St Louis, 2007  
null, Washington University in St Louis, 2017

**Susan L Stark, M.S., Ph.D.**

Professor of Occupational Therapy (primary appointment)  
Professor of Neurology  
Professor of Social Work  
Bachelor of Science, Alma College, 1988  
Master of Science, Washington University in St Louis, 1989  
Doctor of Philosophy, University of Missouri Columbia, 1998

**T**

**Steven D Taff, M.S., Ph.D.**

Associate Professor of Occupational Therapy (primary appointment)  
Associate Professor of Medicine  
Bachelor of Science, Missouri State University (Formerly Southwest Missouri State), 1989  
Master of Science, Washington University in St Louis, 1997  
Doctor of Philosophy, University of Missouri in St Louis, 2005

**Garth D Tubbs**

Assistant Professor Emeritus of Occupational Therapy

Bachelor of Science, School Not Listed, 1953

**Susan M Tucker, M.S., O.T.D.**

Instructor in Occupational Therapy (primary appointment)

Instructor in Neurology

Master of Science, Washington University in St Louis, 2002

null, Washington University in St Louis, 2014

**Quinn Peal Tyminski, M.S.**

Assistant Professor of Occupational Therapy (primary appointment)

Assistant Professor of Psychiatry

Bachelor of Science, Adrian College, 2010

Master of Science, Washington University in St Louis, 2012

**Ellen Twining Tyson, M.A.**

Assistant Professor Emerita of Occupational Therapy

Bachelor of Arts, Syracuse University, 1949

Master of Arts, Syracuse University, 1950

**V**

**Erin Foster Voegtli, O.T.D., Ph.D.**

Associate Professor of Occupational Therapy (primary appointment)

Associate Professor of Neurology

Associate Professor of Psychiatry

Bachelor of Science, Washington University in St Louis, 2003

Doctor of Occupational Therapy, Washington University in St Louis, 2005

Doctor of Philosophy, Washington University in St Louis, 2018

**W**

**Carla W Walker, O.T.D.**

Instructor in Occupational Therapy (primary appointment)

Master of Science, Washington University in St Louis, 2014

**Marit Watson, O.T.D.**

Instructor in Occupational Therapy (Pending Dean's Approval) (primary appointment)

Bachelor of Science, Colorado State University, 1999

Doctor of Occupational Therapy, Creighton University, 2019

**Stacy E West-Bruce, M.S.W., O.T.D.**

Instructor in Occupational Therapy (primary appointment)

Instructor in Medicine

Bachelor of Science, Saint Louis University, 2000

Master of Social Work, Washington University in St Louis, 2004

Doctor of Occupational Therapy, Saint Louis University, 2018

## Courses

Visit online course listings to view offerings for M01 OT (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M01>).

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### M01 OT 593A Fieldwork II

Provides fieldwork experiences under the supervision of an occupational therapist. Students' participation includes in-depth experience in delivering occupational therapy services to clients including evaluation, treatment and intervention. Students have the opportunity to practice in a variety of clinical or community based settings. During the fieldwork process, students are expected to assume increasing responsibilities related to patient or client care. The fieldwork experience is designed to promote clinical reasoning, professionalism and competency. Duration is 12 weeks per course section.

Credit 6 units.

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### M01 OT 593B Fieldwork II

Provides fieldwork experiences under the supervision of an occupational therapist. Students' participation includes in-depth experience in delivering occupational therapy services to clients including evaluation, treatment and intervention. Students have the opportunity to practice in a variety of clinical or community based settings. During the fieldwork process, students are expected to assume increasing responsibilities related to patient or client care. The fieldwork experience is designed to promote clinical reasoning, professionalism and competency. Duration is 12 weeks per course section.

Credit 6 units.

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### M01 OT 595 Independent Study

Active participation in research activities with program faculty.

A written plan of study agreed upon by faculty and student.

Permission of faculty adviser required.

Credit variable, maximum 6 units.

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### M01 OT 596 Fieldwork II — Elective

Optional fieldwork after graduation. Permission required to register.

Credit variable, maximum 6 units.

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### M01 OT 611 Professional Immersion in Occupational Therapy

This foundational course prepares students to manage the changing paradigms of health care that are encountered in future practice. Students are introduced to settings across the continuum of care, professional team roles, and health policy which are integrated into future coursework. Health informatics systems support professional practice and are explored as a means to understand continuum of service delivery, documentation, and reimbursement systems. Students learn foundational tools of the profession, including the current practice framework and activity analysis.

Credit 3 units.

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### M01 OT 612 Neuroscience Principles Supporting Occupational Performance

This foundational course explores the structures and functions of the nervous system as they relate to occupational performance. Students develop a basic understanding of the neural mechanisms that underlie motor function, sensation, perception, cognition, and affect.

Credit 3 units.

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**M01 OT 613 Theoretical Foundations Supporting Occupational Performance**

This course explores the philosophical and theoretical foundations of the profession. The evolving theories, models, and frames of reference which support occupational therapy research and practice are compared and applied to case scenarios. Emphasis will be on the PEOP model of occupational performance and the core principles of client-centered care and disability. The meaning and complexity of occupation and occupational performance will be explored as students gain an understanding of humans as occupational beings.

Credit 2 units.

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**M01 OT 614 Elements of Research Design and Use of Data**

Building on prerequisite knowledge, the student engages in research design and data analysis. Students locate sources of grant funding, compose an IRB proposal, identify appropriate statistical analyses of data based on the research question, evaluate the psychometrics of assessments, and analyze both qualitative and quantitative data.

Credit 3 units.

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**M01 OT 641 Elective MSOT to PhD Mentored Scholarship II**

This is the second in a three-course sequence in which students participate in a mentored scholarship experience to prepare for entry into a PhD program. Students conduct clinical research or engage in the scholarship of teaching and learning under the direction of a researcher. Learning experiences include designing, implementing, evaluating, and disseminating research to advance knowledge translation, professional practice, service delivery, or professional issues. Students will actively participate in a research laboratory as a means to gain exposure to the skills needed to run an independent laboratory as a career scientist.

Credit 2 units.

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**M01 OT 642 Evaluation and Intervention: Adults and Older Adults I**

This course explores the person, environment, and occupation factors that influence occupational performance of adults and older adults. Students evaluate these factors, interpret findings, and design components of intervention plans using applicable theories, models, frames of reference and best evidence. Mechanisms for reimbursement, re-evaluation, and discharge planning as applicable to various practice settings are addressed.

Credit 6 units.

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**M01 OT 643 Case-Based Learning II: Occupational Performance Enabling Participation**

In this second of a three-semester sequence, students continue to study select health conditions and apply the occupational therapy process to cases under the guidance of a facilitator. Students integrate concepts learned in the evaluation and intervention coursework to design comprehensive evidence-based intervention plans using applicable theories, models, frames of reference and best evidence. They select assessments, plan interventions, delineate OT/OTA roles, and make discharge recommendations that are client-centered and incorporate appropriate community resources.

Credit 3 units.

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**M01 OT 645 Management Strategies for a Changing Practice Environment I**

This is the first of a two-course series examining management and organizational principles for occupational therapy services as delivered in multiple practice environments. Students perform a needs assessment, begin building capacity with a community partner, and develop a business or program plan. Interactions with managers, clinic leaders, community agencies, interprofessional teams, and other entrepreneurs allow students the opportunity for experiential learning.

Credit 3 units.

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**M01 OT 646 Professional Identity and Practice III**

This four-course series emphasizes the personal and professional growth of the student as a representative of the profession and institution. Students continue to develop professional identity and ethical practice in this third course. Students reflect on individual contributions to institutional culture, mission, vision, and core values. Supervised experiences in a clinical or community setting allow the student to practice skills and behaviors learned in the classroom.

Credit 2 units.

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**M01 OT 648 OTD Mentored Scholarship II**

This is the second in a three-course sequence in which students participate in a mentored scholarship experience. Students conduct clinical research, clinical and community program development, or the scholarship of teaching and learning within the mentor's line of scholarship. Learning experiences will include designing, implementing, evaluating, and disseminating research to advance knowledge translation, professional practice, service delivery, or professional issues.

Credit 2 units.

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**M01 OT 650 Theories, Models and Classifications**

This course will explore the historical and theoretical foundations of Rehabilitation and Participation Science and track the development of rehabilitation models and classification systems. Students will find and use specific theories to ground their understanding of the area of their specialization, and they will be taught how to classify and apply levels of evidence to build the background for their doctoral work. The course will be team-taught with students and include faculty presentations and discussions.

Credit 3 units.

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**M01 OT 651 Elective MSOT to PhD Mentored Scholarship III**

This is the third in a three-course sequence in which students participate in a mentored scholarship experience to prepare for entry into a PhD program. Students conduct clinical research or engage in the scholarship of teaching and learning under the direction of a researcher. Learning experiences include designing, implementing, evaluating, and disseminating research to advance knowledge translation, professional practice, service delivery, or professional issues. Students will actively participate in a research laboratory as a means to gain exposure to the skills needed to run an independent laboratory as a career scientist.

Credit 2 units.

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**M01 OT 652 Evaluation and Intervention: Adults and Older Adults II**

This course explores the person, environment, and occupation factors that influence occupational performance of adults and older adults. Students evaluate these factors, interpret findings, and design components of intervention plans using applicable theories, models, frames of reference and best evidence. Mechanisms for reimbursement, re-evaluation, and discharge planning as applicable to various practice settings are addressed.

Credit 6 units.

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**M01 OT 653 Case-Based Learning III: Occupational Performance Enabling Participation**

In this last course of the series, students continue to study select health conditions and apply the occupational therapy process to cases under the guidance of a facilitator. Students integrate concepts learned in the evaluation and intervention course work to design comprehensive evidence-based intervention plans using applicable theories, models, frames of reference and best evidence. They select assessments, plan interventions, delineate OT/OTA roles, and make discharge recommendations that are client-centered and that incorporate appropriate community resources.

Credit 3 units.

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**M01 OT 655 Management Strategies for a Changing Practice Environment II**

This is the second of a two-course series that examines management and organizational principles for occupational therapy services as delivered in multiple practice environments. Students implement and evaluate a community program, report an outcomes and sustainability plan back to the community, and prepare an application for funding based on the need for services. Interactions with managers, clinic leaders, community agencies, interprofessional teams, and other entrepreneurs allow students the opportunity for experiential learning.

Credit 3 units.

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**M01 OT 656 Professional Identity and Practice IV**

This four-course series emphasizes the personal and professional growth of the student as a representative of the profession and institution. This last course addresses preparation for national certification, state requirements for scope of practice and licensure, interprofessional collaboration, supervision of other OT personnel, ethical behavior, continuing competence and professional service. Orientation to Level II fieldwork is covered.

Credit 2 units.

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**M01 OT 658 OTD Mentored Scholarship III**

This is the third in a three-course sequence in which students participate in a mentored scholarship experience. Students conduct clinical research, clinical and community program development, or the scholarship of teaching and learning within the mentor's line of scholarship. Learning experiences will include designing, implementing, evaluating, and disseminating research to advance knowledge translation, professional practice, service delivery, or professional issues.

Credit 2 units.

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**M01 OT 660 Biopsychosocial Factors Influencing Performance**

The course will provide an in-depth understanding of the biomedical research literature pertaining to factors that influence performance. The course focuses on psychological, physiological, sensory, perceptual, motor, cognitive processes as well as subjective and objective assessments of the environment for home, work and community contexts that contribute to performance and performance changes with rehabilitation. The course will be team taught with a combination of lecture and seminar formats to lay the foundational principles of performance and to discuss how the capacity to perform supports participation.

Credit 3 units.

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**M01 OT 670 Environment Factors and Participation**

The course will provide an in-depth understanding of person-environment interactions and the link between biomedical factors and community participation. The course focuses on the physical, technology and policy aspects of the environment that impact participation of persons with or at risk for chronic illness or disability. The course will be team taught with a combination of lecture and seminar formats.

Credit 3 units.

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**M01 OT 680 Measurement Theory and Development**

The course will provide a broad framework and specific knowledge for assessment in areas of rehabilitation and participation. The course focuses on psychological, physiological, sensory, perceptual, motor, cognitive processes as well as subjective and objective assessments of the environment for home, work and community contexts. The course will be team taught with a combination of lecture and discussion formats.

Credit 3 units.

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**M01 OT 681 Implementing PEOP in Practice**

Using the Person-Environment-Occupation-Performance (PEOP) model, students synthesize interdisciplinary knowledge from literature and theory to develop an assessment and intervention model for a population. This model relates to the student's mentored scholarship or capstone experience to support best practice with a select population.

Credit 4 units.

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**M01 OT 682 Translational Science in Action**

Students explore the construct of translational science and the challenges of integrating evidence into practice. Advocating for and using evidence in clinical settings has many barriers; strategies to influence professional practice through application of evidence are integral to this course.

Credit 3 units.

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**M01 OT 683 Leading Change in Practice**

This course immerses students in the basic principles of personal and professional leadership theories and practices necessary for success in a dynamic healthcare environment. A variety of methods for planning, implementing, and evaluating change in various settings are addressed.

Credit 3 units.

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**M01 OT 690 Rehabilitation Neuroscience**

The role of experience in shaping brain functions is a central question in psychology and neuroscience. The prevailing view is that the functional organization of even the mature brain is dynamic — changing in response either to increases or decreases in stimulation. However, this has not always been the accepted perspective. Even now, many fundamental questions remain, and the answers should directly impact the way that we approach learning and the rehabilitation (re-learning) in the future. Just what are the limits on plasticity in the adult brain? How should environments be structured to exploit this capacity effectively? Is all reorganization behaviorally relevant? What factors contribute to adaptive, as opposed to maladaptive, changes? Together, we will consider historical perspectives on, and what is presently known about, these and related questions. Credit 3 units.

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**M01 OT 691 Doctoral Capstone Proposal**

Students prepare for the capstone experience and develop a plan for an in-depth experience in advanced clinical practice, scholarship, administration, leadership, advocacy, program and policy development, education, or theory development. Students develop specific learning objectives for the capstone in collaboration with a mentor. Credit 2 units.

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**M01 OT 692 Doctoral Capstone Project**

Students document the scholarship achieved in the capstone experience. Evidence of scholarship may include the protocol for a community program, a business development plan, a systematic review of the literature, a research manuscript, course syllabi or course development materials, policies and procedures, or other scholarly writing that demonstrates a synthesis of the knowledge gained in the capstone experience. The course culminates with dissemination of the scholarly work. Credit 1 unit.

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**M01 OT 693 Doctoral Capstone Experience**

This course provides a 14-week customized student experience specific to doctoral pursuits and allows for the development of in-depth knowledge in an area of interest. Students engage in advanced clinical practice, scholarship, administration, leadership, advocacy, program and policy development, education, or theory development, and work toward achieving individual learning objectives established in collaboration with a mentor and onsite supervisor. Credit 7 units.

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**M01 OT 710 Lab Practicum**

Laboratory practicum is designed to permit the student to learn the basic processes of their selected laboratory. The practicum will involve ongoing research projects and can be both laboratory and clinical in nature. Credit 2 units.

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**M01 OT 720 Teaching Practicum I**

The teaching practicum provides an opportunity to engage in a focused and supervised classroom teaching experience. The student's teaching should be in a content area relevant to the student's area of interest. Credit 1 unit.

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**M01 OT 721 Teaching Practicum II**

The teaching practicum provides a continued opportunity to engage in a focused and supervised classroom teaching experience. The student's teaching should be in a content area relevant to the student's area of interest. Credit 1 unit.

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**M01 OT 750A Directed Practice Research: Productive Aging**

This is the first course in a series of three courses designed as an applied clinical experience or clinical research project under the guidance of a graduate faculty mentor. The focus of the project will be in productive aging. The project, over the course of three semesters, will result in a scholarly paper. Students enter this course after they have completed OT 630, the Proposal Seminar course. Credit 3 units.

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**M01 OT 750D Directed Practice Research: Social Participation**

This is the first course in a series of three courses designed as an applied clinical experience or clinical research project under the guidance of a graduate faculty mentor. The focus of the project will be in social participation. The project, over the course of three semesters, will result in a scholarly paper. Students enter this course after they have completed OT 630, the Proposal Seminar course. Credit 3 units.

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**M01 OT 750P Directed Practice Research: Pediatrics**

This is the first course in a series of three courses designed as an applied clinical experience or clinical research project under the guidance of a graduate faculty mentor. The focus of the project will be in pediatrics. The project, over the course of three semesters, will result in a scholarly paper. Students enter this course after they have completed OT 630, the Proposal Seminar course. Credit 3 units.

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**M01 OT 750R Directed Practice Research: Rehabilitation**

This is the first course in a series of three courses designed as an applied clinical experience or clinical research project under the guidance of a graduate faculty mentor. The focus of the project will be in rehabilitation. The project, over the course of three semesters, will result in a scholarly paper. Students enter this course after they have completed OT 630, the Proposal Seminar course. Credit 3 units.

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**M01 OT 750W Directed Practice Research: Work & Industry**

This is the first course in a series of three courses designed as an applied clinical experience or clinical research project under the guidance of a graduate faculty mentor. The focus of the project will be in Work & Industry. The project, over the course of three semesters, will result in a scholarly paper. Students enter this course after they have completed OT 630, the Proposal Seminar course. Credit 3 units.

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**M01 OT 751A Directed Practice / Research Aging I**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member.

Credit variable, maximum 6 units.

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**M01 OT 751D Directed Practice / Research Disability I**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member.

Credit variable, maximum 6 units.

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**M01 OT 751P Directed Practice / Research Pediatrics I**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member.

Credit variable, maximum 6 units.

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**M01 OT 751R Directed Practice / Research Rehab**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member.

Credit variable, maximum 6 units.

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**M01 OT 751W Directed Practice / Research Work I**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member.

Credit variable, maximum 6 units.

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**M01 OT 752A Directed Practice / Research Aging II**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member. Prerequisite: OT 751A.

Credit variable, maximum 6 units.

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**M01 OT 752D Directed Practice / Research Disability II**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member. Prerequisite: OT 751D.

Credit variable, maximum 6 units.

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**M01 OT 752P Directed Practice / Research Pediatrics II**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member. Prerequisite: OT 751P.

Credit variable, maximum 6 units.

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**M01 OT 752R Directed Practice Research III: Rehab**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member. Prerequisite: OT 751R.

Credit variable, maximum 6 units.

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**M01 OT 752W Directed Practice / Research Work II**

Student will engage in applied clinical research under the guidance of a graduate faculty member. Topics will be in the area of specialization chosen by the student in consultation with the faculty member. Prerequisite: OT 751W.

Credit variable, maximum 6 units.

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**M01 OT 762 Seminar in Education Strategies**

This course offers an opportunity for students to reflect on and examine concurrent occupational therapy teaching assistantship experiences. Attention will be given to learning theories underlying practice, teaching tools and strategies, and situated and distributed learning. Activities will include critical reading, peer supervision, and self-assessment.

Credit 3 units.

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**M01 OT 770 Research Seminar**

Regular meeting where research is presented and discussed. Presentations will be made by Washington University faculty, faculty outside the university, and students.

Credit 1 unit.

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**M01 OT 780 Research Practicum**

The mentored research credit units will be used to develop the research skills of the student. The student will work with the mentor's guidance to conduct research that adds value to the laboratory and gains experience for the student. The mentored independent studies should lead to refereed publications and may contribute to the dissertation research.

Credit variable, maximum 6 units.

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**M01 OT 793C Doctoral Experiential Component**

Provides a customized field experience specific to the doctoral pursuit of the student. Students may participate in research, policy, clinical practice, advocacy, teaching, etc. Students are expected to achieve specific goals established by the student, their doctoral chair, and the site mentor. Duration is 16 weeks.

Credit 6 units.

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**M01 OT 793D Doctoral Experiential Component**

Provides a customized field experience specific to the doctoral pursuit of the student. Students may participate in research, policy, clinical practice, advocacy, teaching, etc. Students are expected to achieve specific goals established by the student, their doctoral chair, and the site mentor. Duration is 16 weeks.

Credit variable, maximum 6 units.

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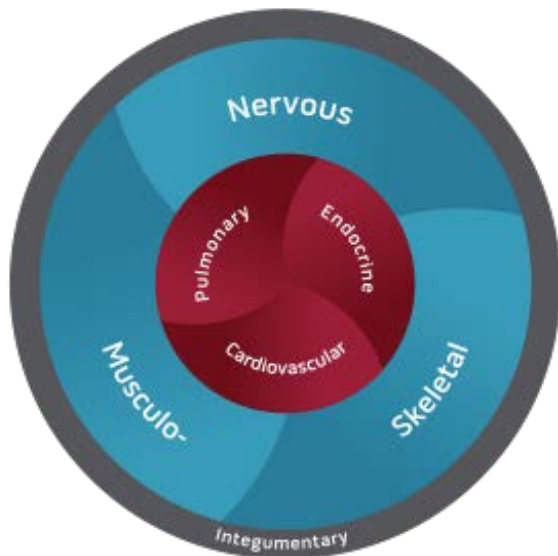
## Physical Therapy

Physical therapy is the science of human movement applied to rehabilitation, injury, fitness, injury prevention and overall health. Practicing in a variety of settings, physical therapists diagnose and treat movement dysfunction in patients with skill, competence and compassion. The Program in Physical Therapy

is committed to providing students with excellent scientific and clinical education in an environment that strives to continually lead the industry in practice, research, innovation and advocacy of movement health.

The Program in Physical Therapy at the School of Medicine offers two formal curricula that collectively foster opportunities for lifelong learning and comprehensive career development: the Doctor of Physical Therapy (p. 116) and the PhD in Movement Science (p. 118).

## The Human Movement System Approach



The Program in Physical Therapy has pioneered a unique, movement-based approach to physical therapy. The human movement system is at the core of our approach to physical therapy education, research and patient care. This system consists of physiological organ systems that interact to produce and support the movement of the body and its parts. Movement science is the study of the movement system, and we believe physical therapists are the world's movement system experts.

Our program (<https://outlook.wustl.edu/movement-redefined/>) has pioneered the development of movement-focused physical therapy education, research and treatment. The human movement system continues to be our foundation for treating patients, conducting research, and training the next generation of leaders in physical therapy. Our vision is aligned with the vision of the American Physical Therapy Association (APTA) (<http://www.apta.org/>), which is to "transform society by optimizing movement to improve the human experience."

## Additional Information

Further information, including complete admissions instructions and program descriptions, may be obtained through direct correspondence with the Program in Physical Therapy:

Program in Physical Therapy  
Washington University School of Medicine  
4444 Forest Park Avenue, CB 8502  
St. Louis, MO 63108-2212  
Fax: 314-286-1410

Phone: 314-286-1400  
Email: [ptadmissions@email.wustl.edu](mailto:ptadmissions@email.wustl.edu)  
Website: <https://pt.wustl.edu>

## Degrees & Offerings

- Doctor of Physical Therapy (p. 116)
- PhD in Movement Science (p. 118)

## Research

The mission of the Research Division is to understand how the movement system (<https://pt.wustl.edu/about-us/>) is affected by disease, injury, lifestyle, development and aging and to understand how movement can be used to promote health by enhancing physical function, activity and participation across the lifespan.

Our interdisciplinary scientific endeavors include mechanistic and translational investigations at all levels of organization, from the cell to society. Our research (<https://pt.wustl.edu/research/our-research-areas/>) is supported by millions of dollars in federal, private foundation and university funding. We pursue knowledge in a collaborative work environment within the Movement Science Research Center (<https://pt.wustl.edu/research/movement-science-research-center/>).

Our doctoral and postdoctoral Research Training Programs (<https://pt.wustl.edu/research/research-training-programs/>) prepare students for careers at the forefront of physical therapy and movement science research.

## Research Areas

Research Area	Faculty Investigators
Foot & Ankle Injury & Recovery	Mary K. Hastings, PT, DPT, MSCI, ATC
Hardware & Software Design for Rehabilitation Research	Joseph W. Klaesner, PhD
Integrative Muscle Physiology	Gretchen A. Meyer, PhD
Metabolism & Organ Function in Metabolic Disease	W. Todd Cade, PT, PhD
Movement & Musculoskeletal Problems in Diabetes	Michael J. Mueller, PT, PhD, FAPTA

Movement & Neurodegenerative Disease	Gammon M. Earhart, PT, PhD
Movement & Neurodegenerative Disease	Ryan P. Duncan, PT, DPT
Nutrition & Exercise	Diana C. Parra Perez, MPH, PhD
Physical Activity & Fitness	B. Ruth Clark, PT, PhD
Physical Activity & Fitness	Susan B. Racette, PhD
Prevention, Rehabilitation & Maintenance in Musculoskeletal Conditions	Linda Van Dillen, PT, PhD, FAPTA
Rehabilitation Research for Orthopaedic Conditions	Marcie Harris-Hayes, PT, DPT, MSCI
Stroke Recovery & Rehabilitation Accelerometry	Catherine Lang, PT, PhD
Stroke Recovery & Rehabilitation Accelerometry	Marghureta D. Bland, PT, DPT, NCS
Whole Body & Joint-Level Orthopaedic Biomechanics	Michael D. Harris, PhD

## Movement Science Research Center

The Movement Science Research Center is approximately 13,000 square feet of newly renovated space that provides a collaborative environment for faculty, PhD students and postdoctoral fellows to conduct rehabilitation research.

The facility includes numerous private rooms for clinical interventions and state-of-the-art equipment.

Equipment List	
Accelerometer activity monitors	Gene and protein quantification
Balance platform	Histology
Biological sample processing equipment	Motion capture
Cell culture suite	Muscle physiology testing equipment
Dynamometers	Oscilloscopes
Electromyography	Rotating treadmill
Eye tracking	Simulated spaces for functional activities
Force platforms	Split-belt treadmill
Function generators	Treadmills
GAITRite instrumented walkway	Wheel mill system

## Research Training Programs

We offer physical therapy research training programs designed to prepare students at the doctoral and postdoctoral levels for careers in groundbreaking physical therapy research.

### PhD in Movement Science

Under the Movement Science Program, students work on the research topics that interest them while completing course work that prepares them for their research careers. The Movement Science Program encourages collaboration with other departments within the School of Medicine.

Visit the Program in Physical Therapy website for more information about the Movement Science Program (<https://pt.wustl.edu/education/phd-in-movement-science/>).

### Postdoctoral Fellowship in Movement Science

Our Postdoctoral Fellowship in Movement Science offers an opportunity to develop and complete research projects related to movement science and rehabilitation. Fellows are encouraged to collaborate with other faculty and programs in the School of Medicine.

Visit the Program in Physical Therapy website for more information about the Postdoctoral Fellowship (<https://pt.wustl.edu/education/postdoctoral-fellowship-in-movement-science/>).

### Comprehensive Opportunities in Rehabilitation Research Training Program

The Comprehensive Opportunities in Rehabilitation Research Training (CORRT) Program is a multicenter career development program for physical and occupational therapists.

Visit the CORRT website for more information about the CORRT Program (<https://www.corrt.pitt.edu/>).

### Institute of Clinical and Translational Sciences

The Institute of Clinical and Translational Sciences (ICTS) offers programs designed to support investigators at each phase of their clinical and translational research studies.

Visit the ICTS website for more information about the ICTS (<https://icts.wustl.edu/>).

### Clinical Research Training Center

The Clinical Research Training Center (CRTC) fosters clinical research training and career development for predoctoral students, house staff, postdoctoral fellows and faculty.

Visit the CRTC website for more information about the CRTC (<https://crtc.wustl.edu/>).

## Faculty

**Gammon Earhart, PT, PhD** (<https://pt.wustl.edu/people/gammon-m-earhart-pt-phd-fapta/>)

Executive Director, Program in Physical Therapy

**Jennifer Stith, PT, PhD, LCSW**

Division Director of Education

**Linda Van Dillen, PT, PhD, FAPTA** (<https://pt.wustl.edu/people/linda-van-dillen-pt-phd-fapta/>)

Division Director of Research

**Beth Crowner, PT, DPT, NCS, MPPA** (<https://pt.wustl.edu/people/beth-crowner-pt-dpt-ncs-mppa/>)

Division Director of Clinical Practice

Visit our website for more information about our faculty (<https://pt.wustl.edu/faculty-staff/faculty/>) and their appointments.

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### A

**Steven B Ambler, M.P.H., D.P.T., Ph.D.**

Associate Professor of Physical Therapy (primary appointment)

Associate Professor of Orthopedic Surgery

Division Director of Professional Curriculum in Physical Therapy

Bachelor of Science, University of Illinois, 2002

Doctor of Physical Therapy, Washington University in St Louis, 2005

Master of Public Health, University of South Florida, 2014

Doctor of Philosophy, University of South Florida, 2016

### B

**Marghuretta Dakota Bland, M.S., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)

Associate Professor of Neurology

Associate Professor of Occupational Therapy

Bachelor of Science, Canisius College, 2004

Master of Science, Washington University in St Louis, 2008

Doctor of Physical Therapy, Washington University in St Louis, 2008

**Megan Maupin Burgess, D.P.T.**

Assistant Professor of Physical Therapy (primary appointment)

Assistant Professor of Orthopedic Surgery

Bachelor of Science, University of Virginia, 2006

Doctor of Physical Therapy, Washington University in St Louis, 2010

**Tamara Lavon Burlis, M.H.S., D.P.T.**

Professor of Physical Therapy (primary appointment)

Director for Clinical Education in Physical Therapy

Associate Director of Professional Curriculum in Physical

Therapy

Professor of Medicine

Bachelor of Arts, Wartburg College, 1988

Bachelor of Science, Washington University in St Louis, 1988

Master of Health Science, Washington University in St Louis, 1993

Doctor of Physical Therapy, Washington University in St Louis, 2003

### C

**Billie Ruth Clark, Ph.D.**

Professor of Physical Therapy (primary appointment)

Professor of Neurology

Bachelor of Science, Saint Louis University, 1974

Doctor of Philosophy, Saint Louis University, 1988

**Suzanne Marie Cornbleet, M.A., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)

Associate Professor of Orthopedic Surgery

Bachelor of Science, University of Colorado Boulder, 1975

Master of Arts, Washington University in St Louis, 1987

Doctor of Physical Therapy, Washington University in St Louis, 2003

**Beth Elaine Crowner, M.P.P., M.S., D.P.T.**

Professor of Physical Therapy (primary appointment)

Professor of Neurology

Bachelor of Science, Washington University in St Louis, 1989

Master of Science, Washington University in St Louis, 1989

Master of Public Policy, University of Missouri in St Louis, 1997

Doctor of Physical Therapy, Washington University in St Louis, 2007

**Sylvia Lin Czuppon, M.S., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)

Associate Professor of Orthopedic Surgery

Bachelor of Arts, Washington University in St Louis, 2000

Master of Science, Washington University in St Louis, 2002

Doctor of Physical Therapy, Washington University in St Louis, 2011

### D

**Robert H Deusinger, M.S., Ph.D.**

Associate Professor Emeritus of Physical Therapy

Bachelor of Science, Slippery Rock University (Duplicate of

Slippery Rock University of Pennsylvania), 1967

Master of Science, University of Massachusetts (Duplicate of University of Massachusetts Amherst), 1968

Doctor of Philosophy, University of Iowa, 1981

**Susan S. Deusinger, M.A., Ph.D.**

Professor Emeritus of Physical Therapy

Bachelor of Science, University of Kansas, 1969

Master of Arts, Washington University in St Louis, 1980

Doctor of Philosophy, Washington University in St Louis, 1987

**Kathleen Koller Dixon**

Instructor Emeritus in Physical Therapy

**Ryan Patrick Duncan, M.S., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)

Associate Professor of Neurology

Bachelor of Science, Maryville University, 2007  
Master of Science, Maryville University, 2008  
Doctor of Physical Therapy, Washington University in St Louis,  
2012

## E

### **Gammon Marie Earhart, M.S., Ph.D.**

Professor of Physical Therapy (primary appointment)  
Professor of Neuroscience  
Professor of Neurology  
Associate Dean for Physical Therapy  
Bachelor of Science, Beaver College, 1994  
Master of Science, Beaver College, 1996  
Doctor of Philosophy, Washington University in St Louis, 2000

## F

### **Julaine Marie Florence, M.S., D.P.T.**

Professor of Physical Therapy  
Bachelor of Science, Washington University in St Louis, 1975  
Master of Science, Washington University in St Louis, 1983  
Doctor of Physical Therapy, Washington University in St Louis,  
2002

## H

### **Michael Dennison Harris, Ph.D.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Orthopedic Surgery  
Bachelor of Science, University of Utah, 2007  
Doctor of Philosophy, University of Utah, 2013

### **Mary Kent Hastings, M.S., D.P.T.**

Professor of Physical Therapy (primary appointment)  
Professor of Orthopedic Surgery  
Bachelor of Science, University of Illinois, 1990  
Master of Science, Washington University in St Louis, 1993  
Doctor of Physical Therapy, Washington University in St Louis,  
2002

### **Marcie Harris Hayes, M.S., D.P.T.**

Professor of Physical Therapy (primary appointment)  
Professor of Orthopedic Surgery  
Bachelor of Science, Missouri State University (Formerly  
Southwest Missouri State), 1994  
Master of Science, Northwestern University, 1996  
Doctor of Physical Therapy, Washington University in St Louis,  
2003

### **Carey Lane Holleran, M.P.T., D.H.Sc.**

Associate Professor of Physical Therapy (primary appointment)  
Associate Professor of Neurology  
Assistant Director of Student Assessment and Program  
Evaluation in Physical Therapy  
Bachelor of Science, Duquesne University, 2003  
Master of Physical Therapy, Duquesne University, 2004  
Doctor of Health Science, University of Indianapolis, 2014

### **Gregory William Holtzman, M.S., D.P.T.**

Professor of Physical Therapy (primary appointment)  
Professor of Orthopedic Surgery  
Division Director of Clinical Practice in Physical Therapy  
Bachelor of Arts, Emory University, 1995  
Master of Science, Washington University in St Louis, 2001  
Doctor of Physical Therapy, Washington University in St Louis,  
2007

## I

### **Renee A. Ivens, M.H.S., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)  
Associate Professor of Orthopedic Surgery  
Bachelor of Science, Maryville University, 1984  
Master of Health Science, Washington University in St Louis,  
1996  
Doctor of Physical Therapy, Washington University in St Louis,  
2006

## J

### **Jill Kristine Johnson, D.P.T.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Orthopedic Surgery  
Doctor of Physical Therapy, Washington University in St Louis,  
2006

## K

### **Lynnette C Khoo-Summers, M.S., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)  
Associate Professor of Orthopedic Surgery  
Bachelor of Arts, Colorado State University, 1990  
Master of Science, Washington University in St Louis, 1998  
Doctor of Physical Therapy, Washington University in St Louis,  
2008

## L

### **Catherine Eckels Lang, M.S., Ph.D.**

Professor of Physical Therapy (primary appointment)  
Professor of Neurology  
Professor of Occupational Therapy  
Associate Director of Movement Science PhD Program in  
Physical Therapy  
Bachelor of Science, University of Vermont, 1993  
Master of Science, University of Vermont, 1997  
Doctor of Philosophy, Washington University in St Louis, 2001

### **Vanessa Mae Lanier, D.P.T.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Orthopedic Surgery  
Bachelor of Science, Washington University in St Louis, 2007  
Doctor of Physical Therapy, Washington University in St Louis,  
2012

### **Rebekah Lawrence, D.P.T., Ph.D.**

Assistant Professor of Physical Therapy (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, Bradley University, 2006  
Doctor of Physical Therapy, Saint Ambrose University, 2008  
Doctor of Philosophy, University of Minnesota, 2018

**Keith Robert Lohse, M.A., Ph.D.**

Associate Professor of Physical Therapy (primary appointment)  
Associate Professor of Neurology  
Master of Arts, University of Colorado Boulder, 2009  
Doctor of Philosophy, University of Colorado Boulder, 2012

**M**

**Julian Magee, D.P.T.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Director of Diversity, Equity, and Inclusion in Physical Therapy  
Assistant Professor of Orthopedic Surgery  
Associate of Science, Hinds Community College, 2001  
Bachelor of Science, University of West Alabama, 2004  
Doctor of Physical Therapy, Alabama State University, 2007

**Mary Kate McDonnell, M.H.S., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)  
Associate Director of Residencies and Fellowships in Physical Therapy  
Associate Professor of Orthopedic Surgery  
Bachelor of Science, Saint Louis University, 1981  
Master of Health Science, Washington University in St Louis, 1985  
Doctor of Physical Therapy, Washington University in St Louis, 2003

**Patricia Navarro McGee, D.P.T.**

Associate Professor of Physical Therapy (primary appointment)  
Associate Professor of Orthopedic Surgery  
Associate Professor of Pediatrics  
Assistant Director of Clinical Education in Physical Therapy  
Bachelor of Arts, Washington University in St Louis, 2001  
Doctor of Physical Therapy, Washington University in St Louis, 2004

**Jacob Graves McPherson, M.S., Ph.D.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Anesthesiology  
Bachelor of Science, University of North Carolina at Asheville, 2005  
Master of Science, Northwestern University, 2008  
Doctor of Philosophy, Northwestern University, 2011

**Laura Crego Miller McPherson, D.P.T., Ph.D.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Science, Vanderbilt University, 2006  
Doctor of Physical Therapy, Northwestern University Medical, 2012  
Doctor of Philosophy, Northwestern University, 2014

**Gretchen Ann Meyer, M.S., Ph.D.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Neurology  
Assistant Professor of Orthopedic Surgery  
Bachelor of Science, Washington University in St Louis, 2004  
Master of Science, Washington University in St Louis, 2004  
Doctor of Philosophy, University of California San Diego, 2011

**Jennifer Alaine Miller-Katsafanas, D.P.T.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Obstetrics and Gynecology  
Bachelor of Arts, University of Missouri in St Louis, 1996  
Doctor of Physical Therapy, Washington University in St Louis, 2012

**Michael Jeffrey Mueller, M.H.S., Ph.D.**

Professor Emeritus of Physical Therapy  
Bachelor of Science, Washington University in St Louis, 1979  
Master of Health Science, Washington University in St Louis, 1984  
Doctor of Philosophy, Washington University in St Louis, 1992

**N**

**Barbara Jean Norton, M.H.S., Ph.D.**

Professor of Physical Therapy (primary appointment)  
Associate Director of Education Technology in Physical Therapy  
Professor of Neurology  
Bachelor of Science, Washington University in St Louis, 1966  
Master of Health Science, Washington University in St Louis, 1985  
Doctor of Philosophy, Washington University in St Louis, 1996

**R**

**Kerri S Rawson, M.S., Ph.D.**

Assistant Professor of Physical Therapy (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Arts, University of Texas Austin, 2004  
Master of Science, University of South Florida, 2009  
Doctor of Philosophy, University of South Florida, 2012

**S**

**Shirley Ann Sahrman, M.A., Ph.D.**

Professor Emeritus of Physical Therapy  
Bachelor of Science, Washington University in St Louis, 1958  
Master of Arts, Washington University in St Louis, 1971  
Doctor of Philosophy, Washington University in St Louis, 1973

**David R Sinacore, M.H.S., Ph.D.**

Adjunct Professor of Physical Therapy  
Bachelor of Science, State University of New York, 1979  
Master of Health Science, Washington University in St Louis, 1983  
Doctor of Philosophy, West Virginia University, 1992

**Nancy Bloom Smith, M.S., D.P.T.**

Professor of Physical Therapy (primary appointment)

Professor of Orthopedic Surgery  
Bachelor of Arts, University of Virginia, 1976  
Master of Science, Washington University in St Louis, 1979  
Bachelor of Science, Washington University in St Louis, 1984  
Doctor of Physical Therapy, Washington University in St Louis, 2002

**Theresa M Spitznagle, M.H.S., D.P.T.**

Professor of Physical Therapy (primary appointment)  
Professor of Obstetrics and Gynecology  
Coordinator of Clinical Residency in Women's Health in Physical Therapy  
Bachelor of Science, Marquette University, 1986  
Master of Health Science, Washington University in St Louis, 1994  
Doctor of Physical Therapy, Washington University in St Louis, 2006

**Jennifer S Stith, M.S., M.S.W., Ph.D.**

Professor Emerita of Physical Therapy  
Bachelor of Science, University of California, 1976  
Master of Science, University of Southern California, 1979  
Doctor of Philosophy, Washington University in St Louis, 1994  
Master of Social Work, Washington University in St Louis, 2006

**T**

**Dale Allen Thuet, D.P.T.**

Assistant Professor of Physical Therapy (Pending Executive Faculty Approval) (primary appointment)  
Coordinator of Clinical Residency in Orthopedics in Physical Therapy  
Bachelor of Arts, University of Missouri Columbia, 2004  
Doctor of Physical Therapy, Washington University in St Louis, 2009

**Stacy Lynne Tylka, M.S., D.P.T.**

Associate Professor of Physical Therapy (primary appointment)  
Associate Professor of Orthopedic Surgery  
Associate Professor of Obstetrics and Gynecology  
Bachelor of Science, Saint Louis University, 2000  
Master of Science, Saint Louis University, 2002  
Doctor of Physical Therapy, Washington University in St Louis, 2009

**V**

**Linda R Van Dillen, M.S., Ph.D.**

Professor of Physical Therapy (primary appointment)  
Division Director of Research in Physical Therapy  
Professor of Orthopedic Surgery  
Bachelor of Science, University of Missouri Columbia, 1979  
Master of Science, Washington University in St Louis, 1985  
Doctor of Philosophy, Washington University in St Louis, 1994

**Z**

**Jennifer Ann Zellers, D.P.T., Ph.D.**

Assistant Professor of Physical Therapy (primary appointment)

Assistant Professor of Orthopedic Surgery  
Bachelor of Science, Arcadia University, 2007  
Doctor of Physical Therapy, Columbia University, 2010  
Doctor of Philosophy, University of Delaware, 2018

## Courses

Visit online course listings to view semester offerings for M02 PhysTher (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M02>).

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### M02 PhysTher 5001 Independent Study

Independent research work under supervision of a faculty member in the Program in Physical Therapy. Prerequisite: junior or senior standing and permission of faculty. Petition forms are available from Dr. Clark.  
Credit variable, maximum 6 units.

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### M02 PhysTher 601 Diagnosis and Evidence Analysis in PT Practice I

Includes processes required for effective clinical decision-making such as the use of disablement models, decision trees, diagnostic classification systems, patient interviewing and outcome measures. An introduction to basic research methods and systematic review of the literature. Patient cases will be used to practice clinical decision-making skills.  
Credit 2 units.

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### M02 PhysTher 602 Professional Issues and Skills 1

An introduction to the profession of physical therapy, the APTA, professional behavior and clinical activities such as documentation and quality improvement. Includes ethics, legal issues and policies that guide professional behavior. Students will learn and practice using principles of patient teaching, negotiation and team building. Students will spend 80 hours at clinical sites.  
Credit 3 units.

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### M02 PhysTher 603 Essential Clinical Skills I

Beginning skills for patient management include using systems screening and reliable assessment of impairments including visual appraisal, vital signs, sensation, reflexes, pain, range of motion, muscle strength and infection control. Skill and safety in positioning, draping and managing equipment during patient care activities such as walking and transfers will be developed.  
Credit 4 units.

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### M02 PhysTher 604 Cells, Systems and Disease I

The first of a two-semester course, this course focuses on advanced human physiology and pathological mechanisms of disease. Course content emphasizes cellular and organ system physiology, pathological mechanisms of disease, and medical management of pathological conditions. Physicians will discuss medical diagnosis, clinical signs and symptoms, and management of selected diseases. Students will be introduced to pharmacology and to the relevance of clinical laboratory values. Patient case studies will be used to integrate information.  
Credit 4 units.

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**M02 PhysTher 605 Neuroscience**

Focuses on the study of structures, organization and function of the nervous and muscular systems. Emphasis is on the sensory and motor systems involved in motor control and on basic knowledge required for clinical practice.

Credit 3 units.

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**M02 PhysTher 606 Kinesiology I**

An introduction to the analysis of normal human movement activities through the application of mechanical concepts including displacement, velocity, acceleration, force and torque. Emphasizes kinematic and kinetic concepts relevant to human movement and study of the structures involved in movement.

Credit 3 units.

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**M02 PhysTher 610 Cells, Systems and Disease II**

A continuation of the first semester. Open only to individuals enrolled in the Physical Therapy program.

Credit 4 units.

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**M02 PhysTher 611 Human Anatomy**

Emphasis is on: 1) Musculoskeletal, neural and vascular systems of the extremities, head, neck and trunk; and 2) anatomical features relevant to current physical therapy practice. Lectures are complemented by student-performed dissection of human cadavers, instructor-prepared prosections and computer-assisted instruction. Open only to individuals enrolled in the Physical Therapy program.

Credit 5 units.

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**M02 PhysTher 612 Diagnosis and Evidence Analysis in PT Practice II**

Continuation of research methods from the first semester, including use of statistics and outcome measurements. Students will complete a reliability project and write a paper based on the literature. Cases will permit further practice using decision trees and assigning diagnoses of basic movement-related conditions. *Open only to individuals enrolled in the Physical Therapy program.*

Credit 2 units.

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**M02 PhysTher 613 Kinesiology II**

Emphasizes principles of maturation and motor learning relative to the application of biomechanical principles to the analysis of human movement. Standardized methods of characterizing movement by observation and with the use of technology will be addressed. Topics include developmental, anatomical, electromyographical and physiological elements of kinesiology with regard to individual joints and common functional activities such as gait and transitional movements.

Credit 5 units.

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**M02 PhysTher 614 Diagnosis and Management of Musculoskeletal Conditions in PT I**

Students will learn postural assessment and application of Movement Systems Balance. Analysis of functional activities, the essential components and compensatory strategies, will prepare the student to begin to plan interventions for individuals with musculoskeletal problems. Skill in providing interventions of manual exercise, fitness training and functional mobility training will be developed. Cases will provide use of diagnostic systems relevant to musculoskeletal conditions.

Credit 3 units.

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**M02 PhysTher 615 Professional Issues and Skills**

**Development II**

Students will be assigned to part-time clinical experiences for 45 hours to allow practice of acquired skills in patient care, documentation and communication.

Credit 0.5 units.

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**M02 PhysTher 621 Exercise Physiology**

A study of the responses of various physiological systems to exercise. Includes application and integration of these systems to various diseases and to human performance. Content will be coordinated with Diagnosis and Management of Cardiopulmonary Conditions in Physical Therapy. Open only to individuals enrolled in the Physical Therapy program.

Credit 3 units.

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**M02 PhysTher 622 Diagnosis and Management of Cardiopulmonary Conditions in PT**

Students will learn to assess, diagnose and treat movement-related cardiopulmonary conditions. Treatment techniques will include exercise and conditioning, breathing techniques, postural drainage and percussion. Interpretation of laboratory tests and pharmacology will prepare students to work with patients safely. Case studies will prepare students for general practice. *Open only to individuals enrolled in the Physical Therapy program.*

Credit 3 units.

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**M02 PhysTher 623 Orthopaedic Medicine**

Physician lectures will provide students with information on surgical and non-surgical procedures and postoperative management of patients with orthopaedic conditions. Physicians will discuss medical diagnosis, clinical signs and symptoms, and management of selected conditions to prepare the student to use this information in Diagnosis and Management of Musculoskeletal Conditions in PT II - III. Open only to individuals enrolled in the Physical Therapy program.

Credit 2 units.

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**M02 PhysTher 624 Diagnosis and Management of Musculoskeletal Conditions in PT II**

Students will acquire the skills needed to manage and prevent movement-related musculoskeletal problems of the spine and lower quarter. Acute and post-acute care will be addressed. Integration of information from previous and concurrent courses will be stressed with emphasis on screening, examination, analysis of findings, diagnosis, design and implementation of intervention programs for patients with increasingly complex problems. Functional activities across the life span also will be addressed. Open only to individuals enrolled in the Physical Therapy program.

Credit 3 units.

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**M02 PhysTher 625 Neurology Medicine**

Physician lectures will provide students with information on the medical management of patients with neurological conditions. Physicians will discuss medical diagnosis, clinical signs and symptoms, and management of selected conditions to prepare the student to use this information in Diagnosis and Management of Neuromuscular Conditions in PT. *Open only to individuals enrolled in the Physical Therapy program.*

Credit 2 units.

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**M02 PhysTher 626 Moderators of Health, Wellness and Rehabilitation**

Designed to explore individual attitudes toward health, illness, disability and death. Emphasizes the effect of these attitudes on individual goals, motivation, expectations, interpersonal relationships and exercise adherence. Investigates individual health attitudes, personal values, family interaction, stress management and concepts of wellness. Age-related issues will be addressed. *Open only to individuals enrolled in the Physical Therapy program.*

Credit 3 units.

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**M02 PhysTher 627 Essential Clinical Skills II**

Skill in providing interventions including massage and mobilization and the application of thermal, mechanical, hydro and electrotherapeutic modalities will be developed. Students will learn the basic indications for and prescription of adaptive equipment and wheelchairs. Open only to individuals enrolled in the Physical Therapy program.

Credit 3 units.

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**M02 PhysTher 628 Case Integration Lab I**

Paper, video and live patient cases provided by faculty and students will be completed to provide practice in managing patients with varying movement-related diagnoses of the cardiopulmonary and musculoskeletal systems. Open only to individuals enrolled in the Physical Therapy program.

Credit 1 unit.

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**M02 PhysTher 629 Diagnosis and Management of Neuromuscular Conditions in PT I**

Students will acquire the skills to examine patients with neuromuscular disorders. Emphasis will be on screening, selecting tests and measures, examination, determining impairments and functional loss, and making a movement system diagnosis. Students will practice examining both adult and pediatric patients. Content related to motor control and motor learning will be integrated into the course. Course content will be integrated with the concurrent Neurology Medicine course. *Open only to individuals enrolled in the Physical Therapy program.*

Credit 2 units.

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**M02 PhysTher 635 Professional Issues and Skill Development III**

Focuses on clinical application of compliance and motivation principles. Peer teaching, communication, consultation skills, leadership skills, lobbying legislation, documentation and negotiation in the clinic will be practiced. Students will practice decision making, supervision and delegation. Students will prepare resumes and begin career planning.

Credit 3 units.

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**M02 PhysTher 636 Diagnosis and Management of General Medical Conditions in PT**

Students will acquire the skills needed to manage movement-related problems in patients with diabetes, burns, arthritis, wounds, amputation and prosthetics, obesity, oncological problems, incontinence, pain, genetic conditions, osteoporosis, malnutrition, transplants and neonatology. Integration of

information from previous and concurrent courses will be stressed with emphasis on screening, examination, analysis of findings, diagnosis, design and implementation of intervention programs for patients with increasingly complex problems. Functional activities across the life span will be addressed.  
Credit 3 units.

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**M02 PhysTher 638 Diagnosis and Management of Musculoskeletal Conditions in PT III**

Students will acquire the skills needed to manage and prevent movement-related musculoskeletal problems of the spine, neck, elbow, wrist and hand, ankle and foot. Integration of information from previous and concurrent courses will be stressed with emphasis on screening, examination, analysis of findings, diagnosis, design and implementation of intervention programs for acute and post-acute patients with increasingly complex problems. Functional activities across the life span will be addressed.

Credit 3 units.

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**M02 PhysTher 642 Case Integration Lab II**

Students will use paper, computer, video and live patients to integrate information learned across the curriculum. Students will orally present cases they managed during Clinical Experience II.

Credit 1 unit.

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**M02 PhysTher 643 Diagnosis and Management of Neuromuscular Conditions in PT II**

Students will build on their skills for examining patients with neuromuscular disorders and diagnosing movement system dysfunction. Additional skills acquired will be designing and implementing intervention plans to address impairments and functional loss in patients of all ages. To aid in selecting appropriate interventions, students will consider patient prognosis. Students will learn to prescribe wheelchairs and orthotics, fabricate splints, apply kinesiotape, and use a variety of medical equipment. Motor control and motor learning principles will be integrated into the course. Open only to individuals enrolled in the Physical Therapy program.

Credit 4 units.

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**M02 PhysTher 650 Diagnosis and Evidence Analysis in PT Practice III**

Students will prepare written case reports based on patients seen during their clinical experiences. Students will defend use of diagnostic classifications and integrate the literature to support their case. Students will practice selecting appropriate outcome measures, designing clinical research questions, and use data to make decisions about individual and group treatment.

Credit 3 units.

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**M02 PhysTher 651 Organizational and Management Issues**

Dynamics of organizations and departments will be discussed using case examples. Focuses on the knowledge and skills needed by physical therapists early in their careers. Principles of administration and management that enable the physical therapist to supervise supportive personnel, to understand fiscal issues including reimbursement, and to recommend staffing schedules and patterns will be addressed. Students will learn marketing and public relations strategies.

Credit 3 units.

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**M02 PhysTher 652 Alternative Settings and Practice Environments**

Physical therapy practice in work and community settings will be addressed with an emphasis on ergonomics and group treatment. Special PT tests and the interpretation of other tests will be integrated into cases. Students will be introduced to care for the patient with vestibular problems, care in the ER, and an update in genetics/genomics. Alternative medicine and alternative PT practice will be studied. Students will explore recreational options for disabled populations.

Credit 3 units.

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**M02 PhysTher 653 Health Fitness and Prevention**

Emphasis will be on critiquing and designing fitness and wellness programs for well and special populations. Programs will focus on those for employee fitness, diabetes, arthritis, obesity and the elderly. Students will participate in and evaluate group treatments and recreational exercise. Use of exercise equipment will be addressed.

Credit 3 units.

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**M02 PhysTher 654 Case Integration Lab III**

A variety of teaching methods, including rounds format, assessment centers and student presentations will enable students to integrate information from across the curriculum to complete complex case studies. Emphasis will be on pharmacology, other tests, moderators, establishing time frames and setting priorities for care. Age-related issues will be addressed.

Credit 3 units.

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**M02 PhysTher 655 Professional Issues and Skill Development IV**

Focus will be on the professional skills students need to function in entry-level practice in a variety of settings. Students will study licensure, and will participate in lobbying and a mock House of Delegates. Skills in serving as an expert witness, a leader, a peer instructor and in clinical instruction will be developed. Students will be expected to participate in a service project and activities of the American Physical Therapy Association. Cultural and race issues will be actively explored.

Credit 4 units.

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**M02 PhysTher 691 Clinical Experience I**

An eight-week, full-time clinical experience supervised by clinical faculty. Allows the student to practice evaluation and treatment skills acquired in the classroom and laboratory. Also emphasizes development of professional behaviors.

Credit 4 units.

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**M02 PhysTher 692 Clinical Experience II**

An eight-week, full-time clinical experience supervised by clinical faculty. Allows the student to practice evaluation and treatment skills acquired in the classroom and laboratory. Also emphasizes development of professional behaviors.

Credit 4 units.

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**M02 PhysTher 693 Clinical Experience III**

A 10-week, full-time clinical experience supervised by clinical faculty. Allows the student to practice evaluation and treatment skills acquired in the classroom and laboratory. Also emphasizes the development of professional behaviors.

Credit 5 units.

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**M02 PhysTher 694 Clinical Experience IV**

A 12-week, full-time clinical experience supervised by clinical faculty. Allows the student to practice evaluation and treatment skills acquired in the classroom and laboratory. Also emphasizes the development of professional behaviors.

Credit 6 units.

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**M02 PhysTher 700 Learning, Health and Equity**

Learners will explore the impact of health and equity on achieving our profession's vision: "Transforming society by optimizing movement to improve the human experience." Faculty will describe the learner-centered academic physical therapy learning environment, and learners will engage in partnership with faculty to form the foundation for their shared success. Learners will be guided to understand the importance and utility of competency-based physical therapist education, learning science principles, and both the stages and attributes of the master adaptive learner in professional formation and lifelong professional development.

Credit 1 unit.

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**M02 PhysTher 701 Professions and Movement**

Learners will gain an understanding of their roles as ethical professionals and movement system practitioners. Faculty will guide learners' discovery of significant events in the history of the profession, with an emphasis on the concepts of movement and diagnosis. Faculty will introduce a model for integrating the movement system with health and movement across the lifespan. Learners will begin to develop skills in screening, interviewing, movement analysis, and clinical reasoning through case examples that will span the curriculum.

Credit 1 unit.

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**M02 PhysTher 702 Movement and Population Health**

Learners will integrate the foundations of movement and the movement system through a population health framework. The movement system practitioner's role in health promotion and prevention will prepare the learner to promote health and prevent movement-related problems for populations, groups, and individuals across the lifespan. Learners will be guided in the understanding of social and structural systems, moving beyond the health care system, and how they impact the health of society and the individual. The learner will continue to develop the patient-client relationship and begin to demonstrate the communication skills necessary to work in interprofessional teams to promote health and prevent movement-related problems.

Credit 2 units.

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**M02 PhysTher 703A Movement and Precision Health**

Learners will focus on the role of the movement system practitioner in individual health. They will integrate the foundations of movement, the movement system, and foundations of movement-related conditions through a precision health framework that includes interactions across the spectrum of the environmental level to the cell molecular level. Learners will be guided in a basic understanding of the health care system and how it impacts the health of individuals. The

learner will begin to prevent and manage movement-related problems for individuals across the lifespan while developing an understanding of their professional responsibilities in practice and how to identify areas for improvement in their practice.  
Credit 10 units.

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#### **M02 PhysTher 703B Movement and Precision Health**

Learners will focus on the role of the movement system practitioner in individual health. They will integrate the foundations of movement, the movement system, and foundations of movement-related conditions through a precision health framework that includes interactions across the spectrum of environmental to cell molecular level. Learners will be guided in a basic understanding of the health care system and how it impacts the health of individuals. The learner will begin to prevent and manage movement-related problems for individuals across the lifespan, while developing an understanding of their professional responsibilities in practice and how to identify areas for improvement in their practice.  
Credit 15 units.

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#### **M02 PhysTher 710 Prevention, Diagnosis and Management of Movement-Related Problems**

Learners will apply the foundations and moderators of movement in the prevention, diagnosis, and management of movement problems across the lifespan. An emphasis is placed on patient care and the impact of social, environmental, and health systems on patient/client management. Learners will begin to take on more responsibility for identifying and improving as a movement system practitioner to improve their practice, the profession, and the society the profession serves.  
Credit 12 units.

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#### **M02 PhysTher 731A Patient and Client Care 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to provide informed, effective, and efficient care for the management of movement-related health conditions and the promotion of health and wellness. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 731B Patient and Client Care I**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to provide informed, effective, and efficient care for the management of movement-related health conditions and the promotion of health and wellness. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 732A Knowledge for Practice 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to integrate knowledge from established and evolving movement and other relevant biomedical, clinical, epidemiological and social-behavioral sciences to guide practice. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 732B Knowledge for Practice 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to integrate knowledge from established and evolving movement and other relevant biomedical, clinical, epidemiological and social-behavioral sciences to guide practice. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 733A Practice-Based Learning and Improvement 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to evaluate one's delivery of care, appraise and assimilate scientific evidence, and continuously improve performance based on self-evaluation. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 733B Practice-Based Learning and Improvement 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to evaluate one's delivery of care, appraise and assimilate scientific evidence, and continuously improve performance based on self-evaluation. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 734A Interpersonal & Communication Skills 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to use effective interpersonal and communication skills to interact and collaborate with others. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 734B Interpersonal & Communication Skills 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to use effective interpersonal and communication skills to interact and collaborate with others. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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#### **M02 PhysTher 735A Professionalism 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to adhere to ethical and legal principles, model professional behaviors, and display a commitment to citizenship within the profession and the community. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.  
Credit 0.5 units.

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**M02 PhysTher 735B Professionalism 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to adhere to ethical and legal principles, model professional behaviors, and display a commitment to citizenship within the profession and the community. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 736A Systems-Based Practice 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to function effectively and proactively within evolving systems and environments that contribute to the health of individuals and populations. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 736B Systems-Based Practice 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to function effectively and proactively within evolving systems and environments that contribute to the health of individuals and populations. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 737A Interprofessional Collaboration 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to engage within interprofessional teams as an effective member and collaborative leader. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 737B Interprofessional Collaboration 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to engage within interprofessional teams as an effective member and collaborative leader. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 738A Personal & Professional Development 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to demonstrate the attributes required to engage in lifelong personal and professional growth. The learner will choose topics organized through the clinician/scholar/educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 738B Personal & Professional Development 1**

The learner will demonstrate a minimum of the level 1 benchmark in competency development to demonstrate the attributes required to engage in lifelong personal and professional growth. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 741A Patient and Client Care 2**

The learner will demonstrate a minimum of the level 2 benchmark in competency development to provide informed, effective, and efficient care for the management of movement-related health conditions and the promotion of health and wellness. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 742A Knowledge for Practice 2**

The learner will demonstrate a minimum of the level 2 benchmark in competency development to integrate knowledge from established and evolving movement and other relevant biomedical, clinical, epidemiological and social-behavioral sciences to guide practice. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 743A Practice-Based Learning and Improvement 2**

The learner will demonstrate a minimum of the level 2 benchmark in competency development to evaluate one's delivery of care, appraise and assimilate scientific evidence, and continuously improve performance based on self-evaluation. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 744A Interpersonal & Communication Skills 2**

The learner will demonstrate a minimum of the level 2 benchmark in competency development to use effective interpersonal and communication skills to interact and collaborate with others. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 745A Professionalism 2**

The learner will demonstrate a minimum of the level 2 benchmark in competency development to adhere to ethical and legal principles, model professional behaviors, and display a commitment to citizenship within the profession and the community. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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**M02 PhysTher 746A Systems-Based Practice 2**

The learner will demonstrate a minimum of the level 2 benchmark in competency development to function effectively and proactively within evolving systems and environments that contribute to the health of individuals and populations. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

### M02 PhysTher 747A Interprofessional Collaboration 2

The learner will demonstrate a minimum of the level 2 benchmark in competency development to engage within interprofessional teams as an effective member and collaborative leader. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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### M02 PhysTher 748A Personal & Professional Development 2

The learner will demonstrate a minimum of the level 2 benchmark in competency development to demonstrate the attributes required to engage in lifelong personal and professional growth. The learner will choose topics organized through the clinician, scholar, educator thread to improve in this domain, as needed.

Credit 0.5 units.

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## Population Health Sciences

The Master of Population Health Sciences (MPHS) offered by the School of Medicine is a 10-month degree program for clinicians, clinical doctorates, medical students and health sciences students seeking training in clinical research methods. The curriculum emphasizes the role of epidemiology and biostatistics in approaching clinical effectiveness and outcomes research for all medical specialties. The MPHS does not require a research thesis upon completion of the program. Instead, the program innovatively uses applied course work to focus on the long-term mastery of skills. Using topics relevant to their careers and interests, MPHS students practice the art of developing research study protocols, performing systematic reviews, designing epidemiologic studies and much more. Many students go on to produce award-winning research using their applied course work and skills learned in the program. MPHS students deepen their learning by choosing one of four concentrations: Clinical Epidemiology, Health Services, Quantitative Methods, or Psychiatric and Behavioral Health Sciences.

Contact: Blanka Hodzic, Program Coordinator

Email: [bhodzic@wustl.edu](mailto:bhodzic@wustl.edu)

Website: <http://www.mphs.wustl.edu>

## Degrees & Offerings

- Master of Population Health Sciences (p. 118)

## Research

### Research Projects & Assignments

The MPHS program uses applied course work, which means students use their own research projects and interests for class discussions and assignments. This format helps our students apply and master research concepts quickly, and it maximizes research productivity during students' time in the program.

For example, students will write and design research protocols, systematic reviews and meta-analyses, grant proposals and more. In addition, our instructors select case studies, prioritize reading lists, and shape class discussions from current, in-the-news clinical outcomes research and population health topics.

Students are **not** required to complete a research project for graduation. The focus in the MPHS program is on the practice and mastery of clinical research skill sets for long-term benefit.

Students are encouraged to have a primary mentor connected to their research while in the MPHS program. If needed, our program leadership can help students find a research project or mentor.

## Faculty

**Graham Colditz, MD, DrPH** (<https://surgery.wustl.edu/people/graham-colditz/>)

Director

**Yikyung Park, ScD** (<https://surgery.wustl.edu/people/yikyung-park/>)

Co-Deputy Director

**Adetunji Toriola, MD, PhD** (<http://publichealthsciences.wustl.edu/Faculty/ToriolaAdetunji/>)

Co-Deputy Director

**Allison King, MD, MPH, PhD** (<https://wuphysicians.wustl.edu/for-patients/find-a-physician/allison-a-king/>)

Associate Director for Medical Students

Visit our website for more information about our faculty (<http://publichealthsciences.wustl.edu/Faculty/>) and their appointments.

## Courses

Visit online course listings to view offerings for M19 PHS (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M19>).

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### M19 PHS 500 Current Topics in Public Health

Students will review public health research, interventions and problems making headlines in print and television media. Discussion of how the problem is presented and evaluated will take place, and students will discuss alternate approaches. Course activities: brief presentations, short written assignments, class participation. Course note: required for medical students. Credit 1 unit.

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### M19 PHS 501 Introduction to Epidemiology

This course introduces the basic principles and methods of epidemiology, with an emphasis on critical thinking, analytic skills, and application to clinical practice. Topics include outcome measures, methods of adjustment, surveillance, quantitative study designs, and sources of data. Designed for those with a clinical background, the course will provide tools for critically evaluating the literature and skills to practice evidence-based medicine. Course activities: lectures, midterm and final exams, class participation, problem sets and papers. Course note: M21 503 required prerequisite.

Credit 3 units.

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**M19 PHS 502 Intermediate Epidemiology**

The second course in the Epidemiology series, this course builds upon the basic principles and methods of epidemiology and introduces additional tools and concepts that are critical to a comprehensive study design. Topics include risk and association, sampling strategies, interaction, confounding, adjustment, lifetables, applied causal inference, validity and reliability, social epidemiology, and approaches to data analysis. Upon exiting this course, students will be prepared to approach the study design portion of a protocol, as required by the final course in the Epidemiology series. Course activities: lectures, midterm and final exams, class participation, problem sets and papers. Course note: M19-501 required prerequisite. Credit 3 units.

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**M19 PHS 505 Ethics in Population and Clinical Health**

This course will expose population and clinical health researchers to the various ethical issues and situations encountered in their research and clinical duties, with a focus on research-related issues and solutions. It will also familiarize them with available ethics and compliance resources. Case studies and scenario presentations will facilitate discussion on topics such as informed consent, rights to health, personal responsibility for health, allegations of misconduct, research with communities, data objectivity and presentation, publications, collaborators' rights and responsibilities, intellectual property, and student-mentor relationships. Credit 1 unit.

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**M19 PHS 507 Applied Research Independent Study**

The purpose of the Independent Study course is to develop and refine the skills students learn in the fall core courses, Introductory and Intermediate Clinical and Epidemiology and Biostatistics series. Students enrolling in this course must come prepared with a circumscribed and well-defined project that relates to public health and population sciences. A research mentor within Washington University School of Medicine must be identified and approved of by MPHS leadership prior to the course enrollment. Objectives, a synopsis and milestones of the project per each student's individualized syllabus should be identified and submitted to the MPHS leadership and mentor prior to the start of the semester. Students will be expected to submit a report, for example, drafted manuscript, an abstract for a conference, data analysis results, at the end of the spring semester to the MPHS leadership for credit. Course credit will be evaluated by both the research mentor and MPHS leadership. This two-credit course will be offered only as a pass/fail course to current MPHS students. Prerequisites: Approval from MPHS leadership and students must have completed the Introductory and Intermediate Clinical and Epidemiology and Biostatistics series. Credit 2 units.

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**M19 PHS 510 Introduction to SAS for Clinical Research**

This one-week course is designed to equip medical students, clinicians and health researchers with basic SAS programming skills. Students will learn how to operate SAS, import external data, create SAS data sets, create, format and manipulate variables, and export data and results. Upon completion of this course, students will have obtained a basic understanding of the SAS environment. Credit 1 unit.

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**M19 PHS 511 Introductory Biostatistics for Clinical Research**

This introductory course in biostatistics is designed for medical students, clinicians and health researchers. The course will introduce students to basic statistical concepts including hypothesis testing, probability distributions and relevant basic statistical methods. Through in-class and homework assignments, students will learn to apply statistical concepts to the medical context. Upon completion of the course, students will be able to summarize quantitative data and carry out and interpret simple data description and analyses using the SAS program. Prerequisite for the course is knowledge in SAS. Credit 3 units.

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**M19 PHS 512 Intermediate Biostatistics for Clinical Research**

This intermediate course is designed for medical students, clinicians and health researchers and builds on the skills developed in Introduction to Biostatistics for Clinical Research. The course will focus on more advanced statistical concepts as applied to clinical and population-based data sets, including linear and logistic regression analyses, and survival analyses. Through applied course work, students will learn how to analyze and interpret clinical research data. Upon completion of the course, students will be able to perform statistical data analyses for regression models with continuous, categorical, and survival outcomes using the SAS program, and will be able to use these models to address their research questions. Prerequisite for the course is an introductory course in biostatistics and SAS knowledge. Credit 3 units.

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**M19 PHS 520 Introduction to R for Clinical Research**

This course is designed to introduce medical students, clinicians and health researchers to the R programming language. Students will learn how to operate R via R Studio; import external data; create data sets; create, format and manipulate variables; and export data and results. Each session will consist of a combination of lecture and practical hands on exercises. Upon completion of this course, students will have obtained a basic understanding of the R environment. Credit 1 unit.

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**M19 PHS 5254 Using Administrative Data for Health Services Research**

The objective of this advanced graduate course is to prepare highly motivated students to perform health services research using administrative data. Lectures will provide tutorials on national administrative databases, review journal articles using these databases, instruction in SAS programming and application of health services research methods using administrative databases. Strengths and limitations of large databases that are commonly used for research will be considered, and special attention will be devoted to large federal databases that are readily available to new investigators. Students will learn how to obtain, link and analyze large databases, understand the key issues related to data security and confidentiality, and become knowledgeable about key methodologic issues in observational studies using administrative data. Students will evaluate published studies based on large administrative databases, develop a health services research proposal and complete a short research project that uses administrative data.

Credit 3 units.

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**M19 PHS 526 Patient Safety, Quality Management, and Quality Improvement**

This course introduces principles of patient safety, quality measurement and quality improvement. Classes are designed to provide students with hands-on skills in systems thinking and in preventing, learning from, and dealing with medical error and adverse events. Students will also learn fundamentals in approaches to evaluating quality, including quantitative methods in measure development. We will discuss various approaches and challenges to knowledge translation and effective change management in improving quality. Students will be encouraged to use their real-world experiences in problem solving around patient safety concerns, to develop and evaluate quality measures in their respective fields and to develop a quality improvement project in their area of interest as part of the course. If student is not in the MPHS program, they must contact the program regarding registration.

Credit 3 units.

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**M19 PHS 527 Development, Validation and Application of Risk Prediction Models**

This course will present detailed discussion of the methods of predictive modeling, with applications to clinical and population health settings. Risk prediction/stratification models are used to identify patients at risk for developing poor outcomes, which can help clinical decision-making. Risk prediction models are also used to assess eligibility to clinical trials and interventions and to guide prevention priorities. Building from traditional risk factor identification through regression analysis to model refinement and validation of prediction, a number of statistical approaches will be reviewed. Each method is motivated by clinical examples. Topics covered will include data source, statistical methods for model development, internal and external validation of models, model updating, other methods such as classification and regression trees, and machine learning, and clinical usefulness. Students will critically read and discuss a range of prediction model manuscripts. Through examples, class discussion, practice lab, and homework, students will become familiar with the methods for development and validation, and use of prediction models.

Credit 3 units.

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**M19 PHS 532 Applied Qualitative Methods for Health Research**

This course will introduce students to the most commonly used qualitative methods for medical-related research. It will provide a foundation in the application of qualitative methods to medical and health research. Topics addressed will include uses of qualitative data, designing studies, sampling strategies, collecting data, and qualitative analysis. A variety of methods will be discussed, with an emphasis on using focus groups and various interviewing techniques. Students will learn the best practices in qualitative research and how to critically evaluate qualitative studies and articles. Upon completion of the course, students will be able to plan, conduct and analyze a qualitative study. If student is not in the MPHS program, they must contact the program regarding registration.

Credit 3 units.

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**M19 PHS 540 Decision Analysis for Clinical Investigation and Economic Evaluation**

In this course, we will introduce students to the methods and applications of decision analysis and cost-effectiveness analysis in health care technology assessment, medical decision making, and health resource allocation. At the conclusion of the class, the student will have an understanding of the theoretical basis for economic evaluation and decision analysis, its application, and hands-on experience in the application of the methods. Among the topics covered are the development of a research question, choice of decision perspective, development of a decision analytic model, estimation of costs and benefits, use of preference based measures, addressing uncertainty and preparation of a manuscript presenting a decision analytic study.

Credit 3 units.

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**M19 PHS 550 Randomized Controlled Trials**

This course provides a comprehensive introduction to randomized controlled clinical trials. Topics include types of clinical trials research (efficacy and effectiveness trials), study design, treatment allocation, randomization and stratification, quality control, analysis, sample size requirements, patient consent, data safety and monitoring plans, reporting standards, and interpretation of results. Course activities: lectures, manuscript critiques, class project, paper. Course note: Students are strongly encouraged to have taken or be concurrently enrolled in M21-560. If student is not in the MPHS program, they must contact the program regarding registration.

Credit 3 units.

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**M19 PHS 551 Systematic Reviews and Meta-Analysis**

Introduction to the use of meta-analysis and related methods used to synthesize and evaluate epidemiological and clinical research in public health and clinical medicine. Concepts introduced and illustrated through case studies of public health and medical issues. Course activities: lectures, class discussion, group project, paper. Stata IC required. Course note: M21-570 required prerequisite. If student is not in the MPHS program, they must contact the program regarding registration.

Credit 3 units.

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**M19 PHS 559 Dissemination and Implementation Science**

This course provides an overview of dissemination and implementation (D&I) science (i.e., translational research in health). Topics include the importance and language of D&I science; designs, methods, and measures; differences and similarities across clinical, public health, and policy settings; selected tools for D&I research and practice; and future issues.

Credit 3 units.

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**M19 PHS 560 Principles of Shared Decision Making and Health Literacy in the Clinical Setting**

This course will provide a comprehensive introduction to principles of shared decision making and health literacy and their implications for clinical communication. Topics may include basic and applied research on shared decision making, principles of designing and evaluating patient decision aids, principles of health literacy, research on relationship between health literacy, numeracy, and health outcomes, best practices for communication with low-numerate and low-literate individuals, best practices (and controversies) in communicating probabilities and their associated uncertainty about screening and treatment outcomes, and best practices for designing and evaluating



written information for clinical populations (such as intake forms, brochures, and informed consent documents). Course activities: lectures, manuscript critiques, class project, paper. If student is not in the MPHS program, they must contact the program regarding registration.  
Credit 3 units.

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### **M19 PHS 570 Communicating Research Findings to the Media and Lay Audiences**

A critical step in the dissemination of population-level clinical research is communicating research findings and key messages to the media and lay audiences. With conflicting messages coming from advocacy groups and others, the burden falls on the clinician-researcher to distill complex information, dispel misinformation, and tell a compelling story that resonates with the audience. The course will equip students with the skills, technique, experience and confidence needed to give successful, engaging media interviews and presentations related to the publication of research and expertise-specific topics. Through critique, tape and review exercises, class discussion, and guest speakers, students will learn about the facets that make an interview or presentation successful, including nonverbal communication and delivery skills (body language and vocal interpretation), content and messaging, and navigating interactions with the media. The instructor will evaluate each student's skill set and create a working skills inventory on which the student will build throughout the course in a series of on-camera experiences.  
Credit 1 unit.

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### **M19 PHS 580 Introduction to Health Disparities and the Structural and Social Determinants of Health**

The purpose of this course is to explore how structural and social determinants of health (SSDoH) produce and maintain health disparities. There will be a variety of learning modalities, including expert guest lectures to discuss cutting-edge research, key foundational and recent readings related to SSDoH and health disparities, and in-class discussion. The course will use case studies and a research proposal to help students apply what they've learned to real-life situations. By the end of the course, students will be able to (a) define health disparities; (b) explain how social and structural determinants of health - including interpersonal and structural racism - produce and maintain health disparities across each phase of disease development; and (c) identify strategies for assessing and addressing health disparities in their own research.  
Credit 2 units.

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### **M19 PHS 601 Grant Writing: Applying Clinical and Population Health Methods**

This course provides students with the opportunity to apply methods and principles learned in previous MPHS classes to the development of a grant application. Students prepare this application on a research question of their own choosing and in the format expected for National Institutes of Health (NIH) R03, R21, or K grant applications (research plan only). Students also have the opportunity to evaluate research proposals for scientific merit. This course is required for medical graduates but optional for medical students.  
Credit 3 units.

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### **M19 PHS 610 Multilevel and Longitudinal Data Analyses for Clinical Research**

The course is designed for medical students, clinicians and health researchers. The course is an extension of Intermediate Biostatistics (M19-512, instructor Yan Yan). The topics include basic statistical concepts and methods for various types of clinical data (continuous, categorical, count, and time-to-event outcome data) in multilevel and longitudinal settings. Through lectures, SAS labs, and homework assignments, students will understand the basic statistical concepts and methods for the four types of clinical outcome data in multilevel and longitudinal settings, will be able to address clinical research questions using these concepts and methods, will be able to perform basic data analyses on these types of data with SAS software, and will be able to interpret the results in the context of clinical research.  
Credit 3 units.

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## **Public Health**

The purpose of this joint degree is to train physicians in the knowledge and skills needed to recognize, analyze and solve the key problems affecting the health of our community and society. The Master of Public Health (MPH) degree offered through the Brown School is unique in that it prepares students to apply public health sciences and transdisciplinary approaches to problem solving for improving population health, especially in vulnerable communities. Courses involve learning systematic approaches to implement and sustain public health discoveries regionally, nationally and internationally. Both the Brown School and the School of Medicine are top-ranked academic centers, which makes this joint degree an outstanding opportunity.

## **Additional Information**

For more information about the MD/MPH program, please contact Angela Hobson, PhD, assistant dean for Public Health, by phone at 314-935-2760 or by email at [hobsona@wustl.edu](mailto:hobsona@wustl.edu); information can also be obtained by sending an email to Brown School admissions ([brownschooladmissions@wustl.edu](mailto:brownschooladmissions@wustl.edu)).

## **Degrees & Offerings**

- Doctor of Medicine and Master of Public Health (p. 110)

## **Research**

Please visit the Brown School MPH website for more information about our public health research (<https://brownschool.wustl.edu/Academics/Master-of-Public-Health/Curriculum/>).

## **Faculty**

**Lora Iannotti** (<https://brownschool.wustl.edu/Faculty-and-Research/Pages/Lora-Iannotti.aspx>)

Associate Dean for Public Health

Associate Professor

PhD, Johns Hopkins University Bloomberg School of Public Health

**Angela Hobson** (<https://brownschool.wustl.edu/faculty-and-research/pages/angela-hobson.aspx>)

Assistant Dean for Public Health  
Senior Lecturer  
PhD, Saint Louis University

For a complete list of Brown School faculty (<https://brownschool.wustl.edu/faculty-and-research/>), please visit our website.

## Courses

The Department of Public Health offers courses through Arts & Sciences. Visit the university's online course listings for semester offerings for S55 MPH (<https://courses.wustl.edu/CourseInfo.aspx?sch=S&dept=S55&crslvl=5:9>).

## Degrees & Offerings

### Applied Health Behavior Research

- Master of Science in Applied Health Behavior Research (p. 90)
- Graduate Certificate in Health Behavior Planning and Evaluation (p. 90)

### Audiology and Communication Sciences

- Doctor of Audiology (p. 91)
- Master of Science in Deaf Education (p. 91)
- PhD in Speech and Hearing Sciences (p. 92)
- Minor in Speech and Hearing Sciences (p. 92)

### Biology & Biomedical Sciences

- PhD Degrees in Biology & Biomedical Sciences (p. 93)

### Biomedical Informatics

- Master of Science in Biomedical Informatics (p. 93)
- Certificate in Biomedical Informatics (p. 94)

### Biostatistics

- Master of Science in Biostatistics (p. 95)
- Master of Science in Biostatistics and Data Science (p. 96)
- Master of Science in Genetic Epidemiology (p. 96)
- Certificate in Biostatistics and Data Science (p. 96)
- Certificate in Genetic Epidemiology (p. 97)

## Clinical Investigation

- Master of Science in Clinical Investigation (p. 97)
- Graduate Certificate in Clinical Investigation (p. 99)
- Graduate Certificate in Dissemination and Implementation (p. 99)

## Genetic Counseling

- Master of Science in Genetic Counseling (p. 99)

## Medical Education

- Doctor of Medicine (p. 100)
- Doctor of Medicine (Five-Year Program) (p. 110)
- Doctor of Medicine and Master of Science in Clinical Investigation (p. 110)
- Doctor of Medicine and Master of Population Health Sciences (p. 110)
- Doctor of Medicine and Master of Public Health (p. 110)
- Doctor of Medicine and Master of Business Administration (p. 110)
- Doctor of Medicine and Doctor of Philosophy (p. 111)
- Graduate Medical Education (p. 111)
- Continuing Medical Education (p. 112)

## Medical Physics

- Master of Science in Medical Physics (p. 112)
- PhD in Medical Physics (p. 113)
- Post-PhD Graduate Certificate in Medical Physics (p. 114)

## Nursing Science

- PhD in Nursing Science (p. 115)

## Occupational Therapy

- Master of Science in Occupational Therapy (p. 115)
- Doctorate of Occupational Therapy (p. 116)
- PhD in Rehabilitation and Participation Science (p. 116)

## Physical Therapy

- Doctor of Physical Therapy (p. 116)
- PhD in Movement Science (p. 118)

## Population Health Sciences

- Master of Population Health Sciences (p. 118)

## Applied Health Behavior Research

## Master of Science in Applied Health Behavior Research

The Master of Science (MS) in Applied Health Behavior Research (AHBR) (<https://crtc.wustl.edu/programs/degrees/ahbr/>) is a 33-credit multidisciplinary program that focuses on the applied skills required for the development, management and evaluation of research studies and health behavior programs in academic, clinical and community settings. Students choose one of two concentrations:

1. Health Education, Program Planning and Evaluation (HEPPE) (<https://crtc.wustl.edu/programs/degrees/ahbr/part-time-master-science-applied-health-behavior-research/>): This concentration is designed for individuals who want to develop, manage and evaluate health programs in clinical or community settings. Course work focuses on health behavior theory, program planning, program evaluation, health education and program management.
2. Health Behavior Research (HBR) (<https://crtc.wustl.edu/programs/degrees/ahbr/part-time-master-science-applied-health-behavior-research/>): This concentration is designed for individuals to develop theoretical knowledge and gain practical research experience in order to pursue careers in a variety of health-related fields and/or to manage research studies in clinical settings. Course work focuses on health behavior theory, research methodology, analytic methods and research project management.
  - Health Behavior Research, One-Year/Research Intensive Option (<https://crtc.wustl.edu/programs/degrees/ahbr/one-year-ahbr/>): This program is for individuals who want to develop theoretical knowledge and gain practical research experience in order to pursue careers in a variety of health-related fields or to pursue advanced graduate degrees. It is designed to be completed in three semesters, and it includes 9 credit units of mentored research. In addition, it provides hands-on training for students interested in health-, medical- and psychology-related fields, and it provides students with an opportunity to fulfill specific graduate and medical school core competencies while enhancing their applications to MD and PhD programs.

### Program Requirements

The MS in AHBR can be pursued on a full-time or part-time basis. Registration is open to anyone with a four-year undergraduate degree from an accredited university or college in an appropriate field of study. Applications are accepted on a rolling basis, and students may pursue course work at their own pace. The MS does not require a thesis upon completion of the program, and the GRE is not required for admission.

## Required Core Courses for the Master of Science

Code	Title	Units
AHBR 508	Project Management in Clinical and Community Settings	3
AHBR 514	Health Behavior Theory	3
AHBR 525	Introduction to Biostatistics	3
AHBR 560	Survey Methods: Design and Evaluation	3

Visit the AHBR Courses webpage (<https://generalmedicalsciences.wustl.edu/education/ahbr/courses/>) to view concentration-specific required courses and elective options.

### Admissions

To be considered for admission, applicants must submit the following:

- AHBR application (<https://applyweb.collegenet.com/account/new/create/?instcode=wustl>)
- Application fee
- Résumé/curriculum vitae
- Personal statement
- All college transcripts
- Three letters of recommendation

Please visit the Apply section of the AHBR home page (<http://ahbr.wustl.edu>) or email the program manager ([ahbr@wustl.edu](mailto:ahbr@wustl.edu)) for the application deadline and additional information.

## Graduate Certificate in Health Behavior Planning and Evaluation

The Graduate Certificate in Health Behavior Planning and Evaluation (<https://crtc.wustl.edu/programs/certificates/hbpe/>) is a 15-credit program featuring a curriculum that is focused on key applied and theoretical concepts in health behavior as well as on the processes needed for managing program development and evaluation activities in clinical and community settings.

### Program Requirements

The graduate certificate can be pursued on a full- or part-time basis. Registration is open to anyone with a four-year undergraduate degree from an accredited university or college in an appropriate field of study. Applications are accepted on a rolling basis, and students may pursue course work at their own pace.

## Required Core Courses for the Graduate Certificate

Code	Title	Units
AHBR 508	Project Management in Clinical and Community Settings	3
AHBR 514	Health Behavior Theory	3
AHBR 536	Health Education: Methods, Planning, and Evaluation	3
AHBR 582	Evaluation of Health Services Programs	3

Visit the Applied Health Behavior Research webpage (<https://crtc.wustl.edu/degrees-certificates/health-behavior/>) to view concentration-specific required courses and elective options.

## Admissions

To be considered for admission, applicants must submit the following:

- Applied Health Behavior Research application (<https://applyweb.collegenet.com/account/new/create/?instcode=wustl>)
- Application fee
- Résumé/curriculum vitae
- Personal statement
- All college transcripts
- Three letters of recommendation

Please visit the Apply section of the Applied Health Behavior Research home page (<https://ahbr.wustl.edu>) or email the program manager at [ahbr@wustl.edu](mailto:ahbr@wustl.edu) for the application deadline and additional information.

## Audiology and Communication Sciences

### Doctor of Audiology

The Doctor of Audiology (AuD) (<https://pacs.wustl.edu/programs/doctor-of-audiology/>) program is a four-year course of study that prepares students as independent clinical audiologists. Established in 1947, the program is among the oldest and most prestigious of its kind. Today, its curriculum serves as a national model, immersing students in academic course work, clinical experiences and research opportunities. The program is ranked among the top in the country by *U.S. News & World Report*; the program and its faculty are internationally recognized and draw a diverse body of students.

#### Curriculum

During the first three years, the program's course work is integrated with clinical and research training, with students completing and presenting a capstone project during the third year of study. The fourth year is fully dedicated to clinical training. The four-year curriculum (<https://pacs.wustl.edu/programs/doctor-of-audiology/curriculum/>) emphasizes hands-on experiences and covers the scope of practice for the profession. A pediatric audiology track (<https://pacs.wustl.edu/programs/doctor-of-audiology/pediatric-audiology-specialization/>) is also available.

#### Clinical Experiences

Students in the AuD program begin a clinical practicum during the first semester of study, and hands-on experiences become more immersive with each successive semester. These clinical education experiences culminate during the fourth year with a full-time clinical externship. Housed within the Department of Otolaryngology (<http://oto.wustl.edu/>) in the Washington University School of Medicine, AuD students benefit from a wide variety of clinical opportunities across the life span and scope of practice. Students gain experience alongside our medical faculty and clinicians in our nationally ranked teaching hospitals and in a wide variety of on-campus and off-campus clinical sites (<https://pacs.wustl.edu/programs/doctor-of-audiology/clinic/>).

#### Research Training

The integration of research into the curriculum is a distinctive feature of the AuD program. All students receive research training (<https://pacs.wustl.edu/programs/doctor-of-audiology/research-training-opportunities/>) through course work and the completion of the capstone project during the third year. Students are also encouraged to pursue their individual research interests through a variety of elective interdisciplinary research opportunities, including an elective summer research experience.

## Master of Science in Deaf Education

The Master of Science in Deaf Education (MSDE) (<https://pacs.wustl.edu/programs/master-of-science-in-deaf-education/>) program prepares students as teachers of children who are deaf or hard of hearing (birth to grade 12). The early identification of hearing loss and advanced hearing technologies have increased the national need for teachers with experience in listening and spoken language, creating opportunities for graduates across the country. With origins dating back to 1914, our MSDE program is recognized internationally as one of the most prestigious of its kind. The program's intensive curriculum, emphasis on immersion in practice teaching, and experienced faculty attract students from a wide variety of backgrounds.

#### Curriculum

The two-year curriculum (<https://pacs.wustl.edu/programs/master-of-science-in-deaf-education/curriculum/>) is rooted in the development of speech, language, and social skills. With that foundation in mind, students go on to study the factors necessary for the high-quality education of children who are deaf or hard of hearing.

Students learn about and participate in the teaching process, from the first diagnosis and early intervention through family-centered counseling and educational options for the child. Students also learn about assistive listening devices, including digital hearing aids, cochlear implants, frequency modulation systems, and sound field systems.

The integration of research into the curriculum is a unique feature of this program. Through course work in the fields of speech and hearing, education, psychology, and deafness, students learn how to be consumers of research and to apply the knowledge gained to their own teaching.

#### **Student Teaching Experiences**

Our students build their knowledge and skills through classroom instruction and immersive student teaching experiences. Teaching experiences are available at a number of local sites, including both public and private schools and the on-campus Central Institute for the Deaf (<https://cid.edu/>), which collectively serve more than 700 children who are deaf or hard of hearing. Teaching experiences outside of the St. Louis area are also available.

In addition, our nationally recognized medical school and hospitals provide unique opportunities, such as observing cochlear implant surgery seminars and touring a hospital neonatal intensive care unit.

## **PhD in Speech and Hearing Sciences**

The PhD in Speech and Hearing Sciences prepares students for academic and research careers in speech and hearing sciences. Established in 1947, the program operates in collaboration with the Department of Otolaryngology, with its investigations covering the full spectrum of research endeavors, including basic science, applied and clinical science, and clinical outcomes research. The department is among the largest and most heavily funded otolaryngology research groups in the country, consistently ranking among the top nationally in National Institutes of Health funding.

#### **Curriculum**

The curriculum combines interdisciplinary academic course work, teaching experiences, and research training, culminating in a dissertation. Each student's experience is tailored to their individual interests.

#### **Teaching Experiences**

Teaching experiences prepare students to become effective teachers and communicators of their discipline and their own research. All PhD students receive training in pedagogy and complete teaching experiences at the introductory and advanced levels under the guidance of a faculty mentor.

#### **Research**

Students immerse themselves in the world-class research environment of Washington University. As they conduct their own original work, they participate in colloquia, Grand Rounds, brown bag seminars, research seminars, journal clubs, and similar opportunities. The program fosters opportunities to publish and participate in professional conferences. During the final year of the program, students present and defend their dissertations.

#### **Affiliated Research**

Affiliated research labs include those focusing on applied, basic, and clinical sciences within otolaryngology. The department also operates one of the nation's largest research programs specifically focusing on hearing and deafness.

Visit the Program in Audiology & Communication Sciences website (<https://pacs.wustl.edu/>) for more information.

## **Minor in Speech and Hearing Sciences**

The Minor in Speech and Hearing Sciences (<http://bulletin.wustl.edu/undergrad/artsci/speechhearing/#minors>) is designed for current undergraduate students interested in exploring topics related to human communication. Course work provides an overview of the fields of hearing, deafness, language and speech, with opportunities to explore related topics in more depth. This minor is especially valuable for students in fields such as psychology, education, philosophy-neuroscience-psychology (PNP) and linguistics, but it has broad applicability for many fields of study. Course work completed as part of this minor can also be used to fulfill prerequisites for graduate studies in audiology, deaf education and speech-language pathology.

## **Biology and Biomedical Sciences**

## PhD Degrees in Biology & Biomedical Sciences

### PhD Degrees

Each program has its own steering committee, which provides students with guidance, addresses their needs, and monitors their progress. The committee also helps each student customize the course of study to match their individual needs. Each of the 13 programs establishes its own degree requirements.

Across all of the programs, the course of study consists of five distinct parts:

#### Courses

This generally requires two to five semesters and usually consists of four to nine courses in areas fundamental to the student's program. Students are expected to maintain a B average in graduate courses.

#### Laboratory Rotations

Selecting a thesis advisor is the most important decision a student makes in graduate school. To help each student make an informed, thoughtful choice, the Division builds in flexibility to explore options. Students usually participate in three lab rotations during their first year. Additional rotations can be arranged, and rotation lengths are flexible. Students usually begin their thesis research by the end of their first year.

#### Qualifying Examination

After required courses are completed, each student takes a preliminary or qualifying examination to assess their mastery of the field and their ability to integrate information across fields. Upon successful completion of the qualifying exam, the student concentrates on thesis research.

#### Thesis Research

Thesis research begins once the student has chosen a laboratory in which to work. With their mentor — the laboratory's principal investigator — the student devises a thesis project and chooses an advisory committee. Typically between the end of their second year and the middle of their third year, students present their thesis proposals to the thesis committee. Upon successful approval of the thesis proposal, the student officially becomes a doctoral candidate. For the rest of the student's program of study, the thesis committee monitors progress and meets at least once a year to provide analysis and advice. It also serves as the thesis defense committee when the thesis is ready for presentation. Most students complete and defend their dissertations by the end of their sixth year.

### Scientific Scholarship

Keeping abreast of scientific developments is critical for faculty and students alike. The Division offers many ways to stay current. More than 15 weekly biology seminars provide excellent opportunities to meet outstanding scientists from outside Washington University. Several annual symposia bring internationally recognized speakers to campus. Journal clubs meet weekly for students, postdoctoral fellows and faculty to present and discuss current scientific literature. A number of Interdisciplinary Research Pathways (<http://dbbs.wustl.edu/curstudents/SpecialEmphasisPathways/Pages/SpecialEmphasisPathways.aspx>) allow students to enhance their PhD program. Program retreats allow for informal interaction among students and faculty. The Division also provides funds for each student for professional development.

### Biomedical Informatics

#### Master of Science in Biomedical Informatics

The Institute for Informatics (<sup>1</sup>) is pleased to offer a master of science in biomedical informatics. The master's degree program is administered through I<sup>2</sup>, and the degree is conferred through Washington University School of Medicine.

More information about our programs can be found on the Graduate Programs in Biomedical Informatics webpage (<https://informatics.wustl.edu/ms-biomedical-informatics-degree/>).

#### Master of Science

- 36 units
- Capstone/thesis
- Two to five years for program completion
- Full-time and part-time options
- Three tracks offered:
  - Translational bioinformatics
  - Applied clinical informatics
  - Population health

### Core Courses: All Tracks

All students in this program will be expected to take the core courses listed below:

- BMI 5302 Introduction to Biomedical Informatics I (3 units)
- BMI 5303 Introduction to Biomedical Informatics II (3 units)
- BMI 5304 Introduction to Biomedical Data Science I (3 units)
- BMI 5305 Introduction to Biomedical Data Science II (3 units)
- BMI 5200 Biomedical Informatics Journal Club (2 units)

- CLNV 510 Ethical and Legal Issues in Clinical Research (2 units) or MSB 512 Ethics in Biostatistics and Data Science (2 units)
- Up to 10 units of research including capstone or thesis (3 units)

## Scientific Writing

Students in the MS program will be expected to demonstrate completion of a scientific writing course by the time of graduation. Students who have taken the equivalent at other institutions may be excused from this course with permission of the program director. If this requirement has not been met, students will enroll in CLNV 529. This course will not count toward the 36 units required for graduation.

- CLNV 529 Scientific Writing and Publishing (2 units)

## Suggested Electives

### Track: Translational Bioinformatics

Code	Title	Units
<b>Suggested Electives:</b>		
Biol 5488	Genomics	max. 4
Biol 5491	Advanced Genetics	3
CLNV 513	Designing Outcomes and Clinical Research	3
CSE 530S	Database Management Systems	3
CSE 584A	Algorithms for Biosequence Comparison	3
CSE 587A	Algorithms for Computational Biology	3
CSE 511A	Introduction to Artificial Intelligence	3
CSE 556A	Human-Computer Interaction Methods	3
CSE 514A	Data Mining	3
CSE 517A	Machine Learning	3
MSB 503	Statistical Computing with SAS	2
MSB 506	Introduction to R for Data Science	2
MSB 550	Introduction to Bioinformatics	3
PHS 5252	Comparative Effectiveness Research	2
PHS 5254	Using Administrative Data for Health Services Research	3
PHS 532	Applied Qualitative Methods for Health Research	3

### Track: Applied Clinical Informatics

Code	Title	Units
<b>Suggested Electives:</b>		
CLNV 513	Designing Outcomes and Clinical Research	3
CSE 530S	Database Management Systems	3

CSE 556A	Human-Computer Interaction Methods	3
MSB 506	Introduction to R for Data Science	2
PHS 501	Introduction to Epidemiology	3
PHS 526	Patient Safety, Quality Management, and Quality Improvement	3
PHS 532	Applied Qualitative Methods for Health Research	3
PHS 560	Principles of Shared Decision Making and Health Literacy in the Clinical Setting	3

### Track: Population Health

Code	Title	Units
<b>Suggested Electives:</b>		
Biol 5488	Genomics	max. 4
CSE 511A	Introduction to Artificial Intelligence	3
CSE 530S	Database Management Systems	3
MSB 503	Statistical Computing with SAS	2
MSB 506	Introduction to R for Data Science	2
MSB 560	Biostatistics I	3
MSB 570	Biostatistics II	3
PHS 501	Introduction to Epidemiology	3
PHS 5254	Using Administrative Data for Health Services Research	3

## Prospective Students

Those interested in applying or who would like more information may contact the program manager (ohids-education@wustl.edu).

## Certificate in Biomedical Informatics

i<sup>2</sup> is pleased to offer a certificate program in biomedical informatics. The certificate program is conferred through Washington University School of Medicine.

More information about our programs can be found on the Graduate Programs in Biomedical Informatics webpage (<https://informatics.wustl.edu/ms-biomedical-informatics-degree/>).

## Certificate Program

- 16 units
  - Four core courses (12 units)
  - 4 remaining units can be taken as a mix of Journal Club, mini-capstone, or elective credit
- One to three years for program completion
- Full-time and part-time options

## Core Courses

All students in this program will be expected to take the core courses listed below:

Code	Title	Units
BMI 5302	Introduction to Biomedical Informatics I	3
BMI 5303	Introduction to Biomedical Informatics II	3
BMI 5304	Introduction to Biomedical Data Science I	3
BMI 5305	Introduction to Biomedical Data Science II	3
<b>Total Units</b>		<b>12</b>

## Prospective Students

Those interested in applying or who would like more information may contact the program manager (ohids-education@wustl.edu).

## Biostatistics

### Master of Science in Biostatistics

This 18-month, 42-credit-unit program offers excellent training in biostatistics and statistical genetics for students who earned undergraduate or higher degrees with majors in mathematics, statistics, computer science, biomedical engineering or another related field. It prepares graduates for rewarding employment in academia and industry and for further graduate studies. Students will choose between a traditional biostatistics pathway or a statistical genetics pathway. An internship is a required component of the program, and students have the option to do a thesis project or to enroll in approved elective courses. Students also have the opportunity to enhance their research and statistical training through a paid research assistant position.

Code	Title	Units
<b>Summer Year 1</b>		
MSB 503	Statistical Computing with SAS	2
MSB 560	Biostatistics I	3
MSB 506	Introduction to R for Data Science	2
<b>Fall Year 1</b>		
MSB 570	Biostatistics II (first half of semester)	3
MSB 515	Fundamentals of Genetic Epidemiology (second half of semester)	3
MSB 550	Introduction to Bioinformatics	3
Pathway course		3
<b>Spring Year 2</b>		

MSB 617	Study Design and Clinical Trials	3
MSB 512	Ethics in Biostatistics and Data Science	2
Pathway course		
Elective from approved list		
<b>Summer Year 2</b>		
MSB 630	Internship (The internship may be taken for 3 or 6 credit units. If it is taken for 3 units, students will also enroll in an approved elective to fulfill the remaining 3 required units.)	3
<b>Fall Year 2</b>		
MSB 600	Mentored Research (Students will enroll in the Mentored Research course or 6 credit units of electives.)	6
Elective from approved list*		

\* For a list of approved electives (<https://biostatistics.wustl.edu/education/master-of-science-in-biostatistics-msibs/curriculum-and-degree-requirements/>), please visit our website.

## Specific Courses for Each Pathway

### Biostatistics

Code	Title	Units
PHS 501	Introduction to Epidemiology	3
MSB 618	Survival Analysis	3

### Statistical Genetics

Code	Title	Units
MSB 5483	Human Genetic Analysis	3
MSB 621	Computational Statistical Genetics	3

## Academic Policies

Academic policies for degree programs can be found in the Student Handbook (PDF) ([http://bulletin.wustl.edu/medicine/degrees-offerings/msibs/AY\\_23\\_Student\\_Handbook.pdf](http://bulletin.wustl.edu/medicine/degrees-offerings/msibs/AY_23_Student_Handbook.pdf)).

## Prospective Students

Those interested in applying or who would like more information may contact the program manager (ohids-education@wustl.edu).



## Master of Science in Biostatistics and Data Science

This 18-month, 42-credit-unit program offers excellent training in biostatistics and data science for students who earned undergraduate or higher degrees with majors in mathematics, statistics, informatics, computer science, biomedical engineering or another related field. It prepares graduates for rewarding employment in academia and industry and for further graduate studies. Students will choose between an internship experience or a thesis project. Students also have the opportunity to enhance their research and statistical training through a paid research assistant position.

Code	Title	Units
<b>Summer Year 1</b>		
MSB 503	Statistical Computing with SAS	2
MSB 560	Biostatistics I	3
MSB 506	Introduction to R for Data Science	2
<b>Fall Year 1</b>		
MSB 570	Biostatistics II	3
MSB 515	Fundamentals of Genetic Epidemiology	3
MSB 550	Introduction to Bioinformatics	3
BMI 5302	Introduction to Biomedical Informatics I	3
<b>Spring Year 1</b>		
MSB 617	Study Design and Clinical Trials	3
MSB 618	Survival Analysis	3
MSB 512	Ethics in Biostatistics and Data Science	2
BMI 5303	Introduction to Biomedical Informatics II	-4
<b>Summer Year 2</b>		
MSB 630 or MSB 600	Internship Mentored Research	3
<b>Fall Year 2</b>		
MSB 630 or MSB 600	Internship Mentored Research	3
MSB 660	Biomedical Data Mining	3
Elective from approved list		

### Academic Policies

Academic policies for degree programs can be found in the Student Handbook (PDF) ([http://bulletin.wustl.edu/medicine/degrees-offerings/msbds/AY\\_23\\_Student\\_Handbook.pdf](http://bulletin.wustl.edu/medicine/degrees-offerings/msbds/AY_23_Student_Handbook.pdf)).

## Prospective Students

Those interested in applying or who would like more information may contact the program manager ([ohids-education@wustl.edu](mailto:ohids-education@wustl.edu)).

## Master of Science in Genetic Epidemiology

Because genetic epidemiology is a multidisciplinary field, we expect applicants to come from a variety of backgrounds. However, most individuals who apply to this program are physician-scientists and other clinical investigators, particularly postdoctoral fellows and people with terminal degrees in other related disciplines who seek to gain expertise in genetic epidemiology. All prospective students must provide evidence of basic skills in genetics, mathematics and computer programming through course work and documented experience or by passing a proficiency exam.

An option for those who have completed a doctoral degree (PhD, MD, or equivalent) is to pursue a postdoctoral Master of Science in Genetic Epidemiology (GEMS) degree. This 30-credit-unit program can be pursued either full-time or part-time, but it must be completed within three years.

The GEMS program for postdoctoral students includes eight core courses (24 credits) as listed below, as well as 6 credits of approved electives:

Code	Title	Units
MSB 503	Statistical Computing with SAS	2
MSB 506	Introduction to R for Data Science	2
MSB 515	Fundamentals of Genetic Epidemiology	3
MSB 550	Introduction to Bioinformatics	3
MSB 5483	Human Genetic Analysis	3
MSB 560	Biostatistics I	3
MSB 512	Ethics in Biostatistics and Data Science	2
MSB 600	Mentored Research	6
Electives: Students will work with their advisers to determine elective options		6
<b>Total Units</b>		<b>30</b>

## Certificate in Biostatistics and Data Science

This 18-credit-unit certificate is designed to prepare students to effectively extract, process, analyze, present, and interpret information from modern biomedical research and practices and to translate this new knowledge to improve health outcomes

and public health. The certificate is earned after the successful completion (with a minimum grade of B) of six core courses. To earn the certificate, the following courses must be taken over the course of one to two consecutive years:

Code	Title	Units
MSB 560	Biostatistics I	3
MSB 570	Biostatistics II	3
MSB 550	Introduction to Bioinformatics	3
MSB 660	Biomedical Data Mining	3
BMI 5302	Introduction to Biomedical Informatics I	3
BMI 5303	Introduction to Biomedical Informatics II	var.; max 4
<b>Total Units</b>		<b>15-19</b>

## Academic Policies

Academic policies for degree programs can be found in the Student Handbook (PDF) ([http://bulletin.wustl.edu/medicine/degrees-offerings/biostats-data-science-cert/AY\\_23\\_Student\\_Handbook.pdf](http://bulletin.wustl.edu/medicine/degrees-offerings/biostats-data-science-cert/AY_23_Student_Handbook.pdf)).

## Prospective Students

Those interested in applying or who would like more information may contact the program manager ([ohids-education@wustl.edu](mailto:ohids-education@wustl.edu)).

## Certificate in Genetic Epidemiology

Because genetic epidemiology is a multidisciplinary field, we expect applicants to come from a variety of backgrounds. However, most individuals who apply to this program are physician-scientists and other clinical investigators, particularly postdoctoral fellows and people with terminal degrees in other related disciplines who seek to gain expertise in genetic epidemiology. All prospective students must provide evidence of basic skills in genetics, mathematics and computer programming through course work and documented experience or by passing a proficiency exam.

The 19-credit-unit certificate program is designed to prepare students to work at the interface of genetics, biostatistics, epidemiology and computing. The Certificate in Genetic Epidemiology is earned after the successful completion (with a minimum of a B average) of seven core courses plus labs that are normally offered to master's candidates in Biostatistics. To earn the certificate, the following courses may be taken over the course one or two consecutive years:

Code	Title	Units
MSB 503	Statistical Computing with SAS (summer)	2
MSB 560	Biostatistics I (summer)	3
MSB 506	Introduction to R for Data Science (summer)	2
MSB 570	Biostatistics II (fall)	3
MSB 515	Fundamentals of Genetic Epidemiology (fall)	3
MSB 550	Introduction to Bioinformatics (fall)	3
MSB 5483	Human Genetic Analysis (fall)	3
<b>Total Units</b>		<b>19</b>

## Academic Policies

Academic policies for degree programs can be found in the Student Handbook (PDF) ([http://bulletin.wustl.edu/medicine/degrees-offerings/genetic-epidemiology-cert/AY\\_23\\_Student\\_Handbook.pdf](http://bulletin.wustl.edu/medicine/degrees-offerings/genetic-epidemiology-cert/AY_23_Student_Handbook.pdf)).

## Prospective Students

Those interested in applying or who would like more information may contact the program manager ([biostatmsibs@email.wustl.edu](mailto:biostatmsibs@email.wustl.edu)).

## Clinical Investigation

### Master of Science in Clinical Investigation

## Program Requirements

### Didactic Course Work

All Master of Science in Clinical Investigation (MSCI) scholars must complete 33 credit units of didactic course work, including 16 core credits, 4 credits of MTPCI Research Seminar, at least 6 credits of electives, and variable credits of mentored independent research. For additional information about the specific courses required for each of the concentrations, please visit the MSCI Concentrations (<https://crtc.wustl.edu/msci-concentrations/>) webpage. Core courses include the following:

Code	Title	Units
CLNV 513	Designing Outcomes and Clinical Research	3
CLNV 510	Ethical and Legal Issues in Clinical Research	2
CLNV 522	Introduction to Statistics for Clinical Research	3
CLNV 524	Intermediate Statistics for the Health Sciences	3
CLNV 528	Grantsmanship	2

or CLNV 529	Scientific Writing and Publishing	
CLNV 589	Advanced Methods for Clinical and Outcomes Research	3
<b>Total Units</b>		<b>16</b>

## Thesis

Scholars will form a thesis committee consisting of three faculty members and meet with that committee at least twice per year. The thesis committee should include the scholar's primary mentor, the MSCI program director, and a third faculty member in a closely related research field. The committee meetings will consist of reviewing the scholar's plan for completing and publishing a research project and manuscript. Scholars will return signed mentorship committee forms to the Clinical Research Training Center (CRTC) by December 1 and May 1. The final approval meeting will consist of a formal 15-minute presentation of the research followed by the committee's discussion of the manuscript. Visit the Thesis Requirement webpage (<https://crtc.wustl.edu/thesis-requirement/>) for more detail. The thesis must be based on original human research conducted during the period of pursuit of the degree. An alternate entrepreneurial thesis option (<https://crtc.wustl.edu/programs/degrees/msci/msci-entrepreneurial-thesis-option/>) is also available.

## CRTC Seminar

Scholars are required to attend the weekly CRTC Seminar (currently held on Tuesday afternoons) during the fall and spring semesters (mid-August through May). During their first and second years of the program, scholars are required to present research-in-progress once each year. Feedback will be provided by the directors, mentors and peers in attendance. The second week of each month will be dedicated to career development topics. During these seminars, speakers will be invited from outside the MSCI program to present.

## Mentors

Developing a successful clinical and translational research career requires strong relationships with mentors and a research team. Each scholar must have a program-approved primary research mentor. This mentor will be the scholar's main source of research supervision and career development. It is expected that scholars will meet weekly with their mentor and that the mentor will be available for consultation and support concerning the scholar's current projects and future progress. The mentor is expected to provide formal feedback to the scholar at least semiannually. In addition to the scholar's research mentor, the MSCI program director will serve as a mentor to the scholar to further assist with each scholar's career development during the program.

## Responsible Conduct of Research (RCR)

Scholars are required to complete the Ethical and Legal Issues in Clinical Research (CLNV 510) course during their time in the program as part of their RCR training.

## Institutional Review Board (IRB) Approvals

Scholars are required to obtain IRB approval for all research conducted as part of their MSCI degree and to provide documentation of current IRB approvals for their research project(s) to the MSCI program.

## Individual Development Plans

MSCI scholars must develop an Individual Development Plan in consultation with their mentors, and they must submit the plan by July 1 each year. The plan should include individual development goals for the next one to five years; career objectives for each goal; research activities/projects that will assist the scholar in meeting the objectives; and an overview of the courses, workshops and other educational/training activities that the scholar plans to pursue. For each objective, the scholar should indicate what individual products (e.g., degrees, publications, presentations, grants) are expected. A timeline should be constructed to display the individual objectives, educational activities, research activities and products.

## Career Development Retreat

All MSCI scholars are required to attend the annual retreat hosted by the CRTC. During the late-afternoon event, speakers will highlight topics of relevance to scholars' career development and research.

## Research Training Symposium and Poster Session

In October of each year, the Washington University School of Medicine hosts a schoolwide, half-day Research Training Symposium and Poster Session. All MSCI scholars are strongly encouraged to submit an abstract and present a poster at the symposium each year of their appointments. Scholars are given the option to have their research considered for an oral presentation.

## Program Evaluation

Scholars are expected to complete required program evaluations twice per year. These evaluations are administered online and mandatory for all scholars. Scholars are also required to complete an exit interview one month prior to completing their degree.

## Eligibility

### Level of Education

MSCI candidates must either be enrolled in a predoctoral or postdoctoral mentored research program at Washington University School of Medicine or hold a postdoctoral appointment in health science at Washington University or one of the Institute of Clinical and Translational Sciences (ICTS) affiliates.

### Citizenship

Eligible applicants must be citizens or noncitizen nationals of the United States, or they must have been lawfully admitted to the United States for permanent residence and have in their possession an Alien Registration Receipt Card (I-151 or I-551) or other legal verification of admission for permanent residence. Individuals on temporary or student visas are eligible provided that they hold a valid U.S. visa and a postdoctoral appointment at Washington University or one of the ICTS affiliates. The MSCI program is unable to sponsor visas. Typically, students who desire to enter the program obtain a visa sponsored through their research department.

### Research Project

All applicants must be conducting clinical and translational research. Clinical research is defined as patient-oriented research: research conducted with human subjects or on material of human origin (e.g., tissues, specimens, cognitive phenomena) for which an investigator or colleague directly interacts with human subjects.

### Mentor

Applicants must have an established relationship with a senior faculty member prior to beginning the MSCI program. Applicants should look for mentors who match their research interests. They should contact each mentor they are interested in working with directly, stating their interest in the mentor's research and their desire to work with the mentor. Suggested mentors (<https://crtc.wustl.edu/people/>) can be found on our website. If applicants are having problems finding a mentor, they should contact us.

## Graduate Certificate in Clinical Investigation

The Graduate Certificate in Clinical Investigation (CI) (<https://crtc.wustl.edu/programs/certificates/ci/>) is a 16-credit certificate program for young investigators committed to pursuing academic careers in clinical research. Students will gain knowledge in the core competencies of clinical research and investigation, such as study design, research implementation, statistical approaches, responsible conduct of research, scientific communication and

literature critique, and leadership and community engagement. Four different tracks have been developed for the certificate: clinical investigation, translational medicine, genetics/genomics, and dissemination and implementation.

On average, scholars complete the certificate requirements within one to two years. All course work must be successfully completed within five years from the start of the first course. Credits cannot be transferred into the CI program.

The evening course format allows for full- or part-time enrollment that can accommodate clinical schedules for students at any point during their careers.

## Graduate Certificate in Dissemination and Implementation

The Graduate Certificate in Dissemination and Implementation (<https://crtc.wustl.edu/degrees-certificates/graduate-certificate-in-dissemination-and-implementation/>) is a 16-credit certificate program for young investigators committed to pursuing academic careers in dissemination and implementation research. Students will gain knowledge and be able to describe crucial considerations in the design of survey samples and cluster-level interventions; relate emerging metrics distinctive to implementation research, including of implementation processes, context, adaptation, and implementation outcomes; and understand pitfalls and opportunities for the use of widely representative non-research data, such as data culled from electronic medical records and administrative databases.

On average, scholars complete the certificate requirements within one to two years. All course work must be successfully completed within five years from the start of the first course. Credits cannot be transferred into the program.

The evening course format allows for full- or part-time enrollment that can accommodate clinical schedules at any point during a student's career.

## Genetic Counseling Master of Science in Genetic Counseling

Applicants to the Master of Science in Genetic Counseling (MSGC) program must hold a bachelor's degree (or equivalent if from a foreign college or university), and they must have completed prerequisite courses from an accredited college or university. The Program in Genetic Counseling is accredited by the Accreditation Council for Genetic Counseling (ACGC) (<https://www.gceducation.org/>). The ACGC is a member of the

Association of Specialized and Professional Accreditors (ASPA) (<https://aspa-usa.org/>). The ASPA is dedicated to enhancing quality in higher education through specialized and professional accreditation.

The MSGC program prepares students to become certified genetic counselors. In addition to course work, students will complete clinical fieldwork rotations and complete a research project prior to graduation. The MSGC degree program is a 21-month, full-time program.

Graduates of the Program in Genetic Counseling will be eligible to sit for the American Board of Genetic Counseling (ABGC) (<https://www.abgc.net/>) certification examination. The School of Medicine has determined that, as a result of its ACGC accreditation, its genetic counseling program curriculum meets the educational requirements needed for graduates to sit for the ABGC Certification Examination and to pursue licensure in all states and territories of the United States and Washington, DC, in which licensure is available.

## Medical Education

### Doctor of Medicine

#### Admissions

#### Admission Requirements for the Study of Medicine

Entrance requirements for the School of Medicine include the following:

1. Evidence of superior intellectual ability and scholastic achievement;
2. Completion of at least 90 semester units of college courses in an approved college or university;
3. Completion of the Medical College Admission Test of the Association of American Medical Colleges; and
4. Evidence of character and integrity, a caring and compassionate attitude, scientific and humanitarian interests, effective communication skills, and motivation suitable for a career in medicine.

Chemistry, physics and mathematics provide the tools for modern biology, for medicine and for the biological basis of patient care. Thus, a firm grounding in these subjects is essential for the study of medical sciences. Entering students are expected to have accomplished at least the equivalent of one-year courses at the undergraduate level in physics and biology; mathematics through calculus; and chemistry, including one year of general or inorganic chemistry and one year of organic chemistry. Course work in biochemistry is encouraged although not required. In addition, one semester of biochemistry can be substituted for one semester of organic chemistry. Similarly, one semester of statistics can be substituted for one

semester of calculus. In selected instances, one or more of these prerequisites may be waived by the Committee on Admissions, but applicants are strongly advised to pursue their interests in these and other areas of science.

A major goal of undergraduate college work should be the development of the intellectual talents of the individual. This often involves the in-depth pursuit of some area of knowledge, whether in the humanities, the social sciences or the natural sciences. At the same time, a diversity of background is encouraged in to provide a necessary foundation for the development of cultural awareness, sensitivity and competence. Specific courses (other than the few in the natural sciences) are not prerequisites, because a great variety of courses and life experiences may prepare students for the many roles they may play in their medical careers.

*The admission requirements for the study of medicine were last reviewed by the Committee on the Oversight Medical Education on May 2, 2022.*

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## Technical Standards Statement

Washington University welcomes diverse applicants, including those with physical, sensory, learning, psychological, and chronic disease-related disabilities. The School of Medicine is committed to advocating for its students with disabilities and to educating a medical workforce that mirrors the diversity of the national population. We aim to be leaders in accessibility and inclusion.

Individuals seeking to graduate from Washington University with a Doctor of Medicine degree are expected to gain broad competence in the skills that underlie the practice of medicine and surgery. With or without accommodations, they must have the knowledge, attitudes, and skills necessary to meet the School of Medicine's educational program objectives and meet the Technical Standards outlined in the Washington University School of Medicine Technical Standards for the Medical Program (p. 372), which is available in the Policies & Guidelines section (p. 356) of this *Bulletin*.

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## Application Procedure

General information for prospective medical students and instructions for how to apply can be found on the Medical Student Admissions website (<http://mdadmissions.wustl.edu/>).

Washington University School of Medicine participates in the American Medical College Application Service (AMCAS) of the Association of American Medical Colleges. AMCAS provides a centralized system for applying to any participating medical school with only one application and one set of official transcripts of academic work.

The AMCAS Application for Admission (<https://students-residents.aamc.org/applying-medical-school/applying-medical-school-process/applying-medical-school-amcas/>), which is common to all participating medical schools, is available online. Applicants are urged to file their applications as early as possible.

Applicants to the first-year class must submit their AMCAS application no later than November 30 of the year prior to that in which they want to matriculate. In addition, applicants must complete a supplemental application (<https://mdapply.wustl.edu/>), submit letters of recommendation, and pay a nonrefundable application fee of \$100. These materials must be received no later than December 7. The Committee on Admissions will only evaluate an application when it is complete.

Selected applicants are invited for a personal interview as well as a tour of the School of Medicine and the Washington University Medical Center. This visit provides extensive opportunities for the applicant to meet and talk with students and faculty members.

Admission decisions are made by the Committee on Admissions on a rolling schedule beginning in early November. Applicants are notified as soon as a final decision has been made on their application. By April 15, every applicant should be notified whether they are accepted, on the waiting list or not accepted.

After the applicant has been accepted, matriculation is contingent upon sustained superior academic performance as well as continued ethical, honest and mature deportment. Accepted applicants must report to the Registrar of the School of Medicine all institutional judicial or academic sanctions and/or legal actions in which they have been a party prior to matriculation at the School of Medicine. Accepted applicants must report all institutional judicial and academic charges and/or legal charges brought against them before matriculation at the School of Medicine, where such charges could result in sanctions. Concealing or failing to report such sanctions and/or charges promptly and, more generally, failing to maintain high standards of moral and ethical behavior may result in rescission of acceptance, dismissal from the School of Medicine, or revocation of the Doctor of Medicine degree.

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## Acceptance Protocols

As a participant in the American Medical College Application Service (AMCAS), the Washington University School of Medicine (WUSM) abides by the Application and Acceptance Protocols (<https://students-residents.aamc.org/applying-medical-school/article/application-and-acceptance-protocols-applicants/>) established by the Association of American Medical Colleges and encourages students to use the accompanying AMCAS Choose Your Medical School Tool (<https://students-residents.aamc.org/applying-medical-school/article/amcas-choosing-your-medical-school-tool/>).

Applicants holding at least one acceptance from any medical school will have the option to “Plan to Enroll” in mid-February.

Per WUSM Admissions policy, applicants who have been offered admission to WUSM and who intend to matriculate at WUSM should indicate that they “Plan to Enroll” through the Choose Your Medical School Tool as soon as possible but by no later than April 30 of the year in which they will matriculate. WUSM reserves the right to rescind offers of acceptance if an applicant has not selected “Plan to Enroll” by April 30. After April 30, although applicants will maintain their “Plan to Enroll” status at WUSM, they may continue to hold positions on the waitlists of other schools.

Beginning April 30, accepted applicants have the option to “Commit to Enroll” at WUSM. When an applicant selects “Commit to Enroll” at WUSM, they should notify all other institutions where they hold an acceptance or position on the waitlist that they wish to withdraw their acceptance or position from the waitlist of that school. WUSM reserves the right to rescind an offer of admission to any applicant still holding an active acceptance at another institution while having a “Commit to Enroll” status with WUSM. WUSM reserves the right to rescind offers of admission from any applicant still holding a WUSM acceptance while indicating that they either “Plan to Enroll” or “Commit to Enroll” at another institution after April 30.

For applicants accepted after April 30, the timeline for selecting “Plan to Enroll” will be specified by the Associate Dean for Admissions.

All MD applicants planning to matriculate at WUSM should select the “Commit to Enroll” option no later than one week before the first day of orientation.

Should an applicant have an extenuating circumstance preventing compliance with this policy, it is the applicant’s responsibility to notify the WUSM Admissions Office and seek an extension or exception.

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## Merit-Based Scholarships

Merit-based scholarships are awarded in various amounts as funds allow. Recipients are selected based on their personal and academic accomplishments and their perceived potential to lead and contribute to the profession. There are multiple full and partial awards available. All accepted students are considered for merit-based scholarships without additional applications. Please consult the Financial Information section (p. 417) of this *Bulletin* for further details.

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## Background Checks and Screening for Controlled Substances

Students entering the School of Medicine and who will have contact with patients are required to undergo criminal background checks and screening for controlled substances (e.g., THC/cannabis, cocaine, opiates, amphetamines, phencyclidine) to qualify for participation in patient care activities at WUSM-affiliated facilities. Drug screening usually will be conducted during student orientation prior to the start of classes. Incoming prematriculant students and visiting students will be disqualified to study at the School of Medicine if they do not consent to background checks, if they have significant positive findings on the background checks, or if they have illicit substances detected on drug screening without a bona fide medical indication. Disqualified prematriculant students and disqualified visiting students will be precluded from matriculation and will not be registered as students in the School of Medicine.

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## Important Dates

- AMCAS application (<https://students-residents.aamc.org/applying-medical-school/applying-medical-school-process/applying-medical-school-amcas/>) deadline: November 30, 2022
- WUSM supplemental application (<https://mdapply.wustl.edu/>) deadline: December 7, 2022
- "Plan to Enroll" required: April 30, 2023

Visit the Important Dates page (<https://mdadmissions.wustl.edu/how-to-apply/important-dates/>) of the Admissions website for a complete list of dates and deadlines.

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## Advanced Standing Transfers

Due to the specifics of the new Gateway Curriculum, Washington University School of Medicine does not accept advanced standing (transfer) students from other medical schools. For more details of this policy, please refer to the Washington University School of Medicine Advanced Standing Transfers Policy for Medical Students. (p. 408)

**Visit the Medical Student Admissions website (<http://mdadmissions.wustl.edu/>) for full admissions information and to check the status of an application.**

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## Curriculum

By conferring the MD degree, the university certifies that the student is competent to undertake a career as a doctor of medicine. It certifies further that, in addition to medical knowledge and skills, the graduate possesses qualities of personality — compassion, emotional stability and a responsible attitude — essential to an effective professional life.

## Accreditation

The Washington University School of Medicine's MD program is nationally accredited by the Liaison Committee on Medical Education (LCME (<https://www.aamc.org/services/first-for-financial-aid-officers/lcme-accreditation/>)). The LCME is recognized by the U.S. Department of Education as an accrediting agency for medical education programs leading to the MD degree.

Most state boards of licensure require that applicants graduate from a U.S. medical school accredited by the LCME as a condition for licensure. In addition, most state boards of licensure require that U.S. applicants take and pass the United States Medical Licensing Examination (USMLE (<https://www.usmle.org/>)). For U.S. medical students to be eligible to sit for the USMLE, their school must be accredited by the LCME. Graduates of LCME-accredited schools are also eligible for residency programs accredited by the Accreditation Council for Graduate Medical Education (ACGME (<https://www.acgme.org/>)).

The School of Medicine has determined that, as a result of its LCME accreditation, its MD program curriculum meets the educational requirements to sit for the USMLE and to pursue licensure and certification in all states and territories of the United States and Washington, DC.

## For Students Entering the MD Program in July 2020 or After:

The Gateway Curriculum ensures that students are not only exceptional physicians but that they are also prepared to lead the transformational changes needed to improve the future of health care delivery and the understanding of health and social determinants of health. The curriculum will include three phases.

### Phase 1

Phase 1 will consist of 62 total weeks of curricular time: 1 week of orientation, 46 weeks of Integrated Science Foundational Modules, 9 weeks of Clinical Immersions, 4 weeks of the EXPLORE Immersion, and 2 weeks of Phase 1 Capstone.

The Integrated Foundational Science Modules will present core science content in fundamental areas (basic, clinical, social, behavioral, and health system sciences). The Clinical Immersions consist of clinical experiences that are authentic, varied in content, and appropriate for the student's level of

ability. Every student will have an immersion in each of the following areas: inpatient, ambulatory, and procedural. There will be substantial emphasis on professional identity formation and the social, behavioral, and health systems sciences. The EXPLORE Immersion element of the curriculum will focus on four key areas: research, education, advocacy/global health, and innovation.

## Phase 2

Phase 2 will include 12 months (48 weeks) of clinical clerkship experiences in the content areas of Internal Medicine, Neurology, Obstetrics & Gynecology, Pediatrics, Psychiatry, and Surgery. Each clerkship will begin with one week of specialty-specific foundational science that consists of the purposeful reiteration and expansion of prior material and new material. This material will be taught in a "signs and symptoms" framework in order to facilitate core knowledge transfer to clinical reasoning. Each clerkship will end with one week dedicated to assessment, reflection, coaching, and communities (ARCC).

## Phase 3

Phase 3 will consist of 64 weeks total. Students will engage in 32 weeks of required elements that will include a 4-week Internal Medicine Subinternship; three 4-week Advanced Clinical Rotations (ACRs; 12 weeks total); three 4-week Keystone Integrated Science Courses (KISCs; 12 weeks total); and 4 weeks of Capstone. In addition, students will take 28 weeks of electives (clinical, research, other non-clinical). Up to 8 of the 28 weeks of elective time may be used for USMLE study, and up to 16 weeks may be used for research. During Phase 3, there are 4 weeks of School of Medicine holiday time, and students may also opt to take up to 4 weeks of unscheduled (no credit) time.

## For Students Entering the MD Program Prior to July 2020:

The curriculum includes a core experience based upon a sequence of courses that introduces students to the many domains and disciplines of medicine. The principles, methods of investigation, problems and opportunities in each of the major disciplines of medical science and medical practice are presented in such a way as to help students select the career best suited to their abilities and goals. Through all four years of the curriculum, key topics known as *Threads* are woven throughout the learning experience, linking clinical and course work and enhancing the learning experience.

The preclinical curriculum provides a science and investigative foundation for future clinical practice. First-year and second-year course work combines basic science taught via a variety of didactic means, including lectures, small groups, simulations and case-based learning. It also includes a Practice of Medicine

course that uses regular patient interactions and integrative cases to teach students to skillfully interview and examine patients while integrating current health disparities and issues in the present global spectrum.

In addition, students have the opportunity during their first year to complete four 10-hour selective courses in the humanities, the basic sciences, and various clinical areas, which provides enrichment and in-depth focus on areas beyond the core curriculum. The preclinical curriculum is pass/fail.

The overall goal of the third year is the implementation of the fundamental interactive clinical skills necessary for the practice of medicine at the highest possible level of excellence. Students achieve this goal by participating in intensive, closely supervised training experiences in the core clinical clerkships, which involve inpatient and ambulatory settings and interactions with patients who present a spectrum of emergent, urgent, routine and chronic clinical problems. Through these experiences, students exhibit growth and maturation in their abilities to take medical histories, perform complete physical examinations, synthesize findings into a diagnosis, formulate treatment plans, and document and present information in a concise, logical and organized fashion.

During the final year of the medical school curriculum, the required elective program helps students to decide where their major interests lie. It also enables them to benefit from the wide range of specialized knowledge and skills found in the faculty, and it lays the foundation for lifelong learning and the application of principles. The elective program permits students to select, according to their desires, the areas that they wish to explore or to study in depth. The fourth year also offers students the opportunity to synthesize the learning from the third year in preparation for clinical residency. Toward this end, students are required to complete a Capstone course prior to graduation.

## Washington University School of Medicine Medical Student Program Objectives

The educational program is designed to ensure that each student will demonstrate the following:

### Foundational Knowledge for Practice

1. Demonstrate knowledge of normal human structure and function at the molecular, genetic, cellular, tissue, organ-system and whole-body level in growth, development and health maintenance.
2. Demonstrate knowledge of the epidemiology and basic mechanisms involved in the pathogenesis of common human diseases and their influence on clinical presentation and therapy.
3. Demonstrate basic knowledge of the impact of ethnicity, culture, socioeconomic status, patient and provider biases, and other social factors on health and disease.



4. Demonstrate basic knowledge of the ethical principles and professional values that underpin the medical profession.
5. Demonstrate basic knowledge of the common scientific methods used to study health and disease.
6. Demonstrate basic knowledge of the methods and principles for optimizing value, which include quality measures and cost of health care delivery for patients and populations.

## Patient Care

1. Obtain appropriate medical histories that include psychosocial and behavioral factors that influence health.
2. Perform accurate physical examinations.
3. Participate in clinical procedures as required by the curriculum.
4. Formulate a prioritized differential diagnosis based on the patient's risk factors and clinical presentation.
5. Develop individualized diagnostic and treatment plans across the broad spectrum of acute and chronic conditions.

## Interpersonal and Communication Skills

1. Demonstrate respectful and effective verbal and nonverbal interpersonal and communication skills with patients, families, colleagues, and all members of the educational and health care teams.
2. Discuss preventive strategies and diagnostic and treatment options in a manner that will facilitate the participation of patients and their families in shared decision making.
3. Maintain accurate and thorough medical records.
4. Provide succinct and organized oral patient presentations.
5. Work collaboratively and effectively in teams.

## Professionalism

1. Maintain a professionally appropriate demeanor.
2. Exhibit high standards of professional integrity.
3. Apply legal and ethical principles governing the physician-patient relationship.
4. Act in the patient's best interest, and serve as a patient advocate.

## Systems-Based Practice

1. Recognize the roles of various members of the interprofessional health care team and the scope of their practice.
2. Recognize barriers to and facilitators of high-value patient care, where value equals quality over cost.
3. Demonstrate the ability to identify medical errors when they occur, and describe the individual, team, and/or system factors that may contribute to them.

## Practice-Based Learning and Improvement

1. Demonstrate the skills needed for lifelong learning, including the ability to identify and address personal strengths and weaknesses, to incorporate formative feedback, and to self-assess knowledge and performance to develop a self-improvement plan.
2. Apply an evidence-based approach to selecting, appraising and utilizing evidence from scientific studies related to clinical questions and patients' health problems.

## Contact Information

For additional information or specifics about the MD curriculum, please use the following contact information:

Washington University School of Medicine  
Office of Medical Student Education  
Bernard Becker Medical Library, 3rd Floor  
MSC 8033-12-167  
660 S. Euclid Ave.  
St. Louis, MO 63110  
Hours: 8:00 a.m. to 5:00 p.m., Monday through Friday  
Phone: 314-273-6673  
Fax: 314-362-6951  
MD Program Website (<https://md.wustl.edu/>)

## Core Courses

### Gateway Curriculum

#### Phase 1 Core Courses

Total number of weeks: 62

#### Integrated Foundational Modules

Specifically regarding the foundational sciences content, what is depicted here is intended to provide a reasonable approximation of how the content could be disbursed across curricular units and to provide a general indication of relative amounts of coverage time allotted to content areas. Modules will include the following:

Code	Title	Units
Gateway 500	Molecules to Society	245
Gateway 505	Defense & Response to Injury	245
Gateway 510	Circulation & Breathing	280
Gateway 530	Ins & Outs	245
Gateway 540	Metabolism & Reproduction	210
Gateway 545	Scaffolding & Movement	140
Gateway 550	Brain & Behavior	245
Gateway 555	Phase 1 Capstone	70

#### Clinical Immersions

Courses in the Clinical Immersions will include the following:

Code	Title	Units
Gateway 515	Clinical Immersion: Ambulatory/ED	105
Gateway 520	Clinical Immersion: Inpatient	105
Gateway 525	Clinical Immersion: Procedural	105

### EXPLORE Immersion

Code	Title	Units
Gateway 535	EXPLORE Immersion	140

### Phase 2 Core Courses

Total number of weeks: 48

Code	Title	Units
Gateway 600	Internal Medicine Clerkship	308
Gateway 610	Surgery Clerkship	308
Gateway 620	Pediatrics Clerkship	308
Gateway 630	Psychiatry Clerkship	308
Gateway 640	Neurology Clerkship	308
Gateway 650	Obstetrics & Gynecology Clerkship	308

### Phase 3 Core Courses

Total number of weeks: 64

Course numbers/descriptions* found in course listings	Advanced Clinical Rotations (ACRs): three required (12 weeks) (inclusive of IMI; the remaining two must be completed at WUSM)
Course numbers/descriptions found in course listings	Keystone Integrated Science Courses (KISCs): two required (eight weeks) (MSTP students complete 0 KISCs)
Gateway XXX	Phase 3 Capstone
Course numbers/descriptions found in course listings	Electives: 32 weeks (may include four weeks of dedicated USMLE Step Exam study time; students have the option to take four additional weeks if necessary)

\* Course numbers and descriptions can be found in the Washington University course listings (<https://courses.wustl.edu/Semester/Listing.aspx>).

### Graduation Requirements

- All students must pass the Comprehensive Clinical Exam (CCX) (M25 Medicine 833).
- All students are required to take the USMLE Step 1 and Step 1 examinations prior to graduation.

## Legacy Curriculum

### First-Year Curriculum

Code	Title	Units
Neurosci 501B	Human Body: Anatomy, Embryology, Imaging	140
Neurosci 502A	Histology and Cell Biology	66
Biochem 502	Molecular Foundations of Medicine	46.5
Genetics 511	Medical Genetics	34
MolMB 526	Microbes and Pathogenesis	30
Neurol 554	Neural Science	109
Path 523	Immunology	37
MolBio/Pha 500	Principles of Pharmacology	28
CellBio 501	Physiology	125
Medicine 507	Practice of Medicine I	198.5
Plus four First-Year Selectives (M04) to be chosen by the student		

### Second-Year Curriculum

Code	Title	Units
Medicine 605A	Infectious Diseases	51
Medicine 606A	Rheumatology	17
Medicine 611B	Cardiovascular Disease	30
Medicine 612B	Pulmonary Diseases	22.5
Medicine 613B	Renal & Genitourinary Diseases	38
Medicine 614	Dermatology	8
Medicine 615A	Endocrinology and Metabolism	31
Medicine 620A	Gastroint. and Liver Diseases/ Nutrition	32
Medicine 625A	Hematology and Oncology	39
Neurol 632	Diseases of the Nervous System	53
ObGyn 635B	Obstetrics and Gynecology	16
Oto 660B	Clinical Topics In Otolaryngology	9
Path 665	Pathology	115
Peds 640	Pediatrics: Physicians, Patients & Society	27
Psych 676A	Diseases of the Nervous System: Psychiatry	44
Medicine 607	Practice of Medicine II	89

### Third-Year Curriculum

Code	Title	Units
Medicine 710	Medicine Clerkship	308
Neurol 720	Neurology Clerkship	154
ObGyn 730	OB/GYN Clerkship	192
Peds 760	Pediatric Clerkship	192
Psych 770	Psychiatry Clerkship	154

Surgery 790	Integrated Surgical Disciplines Clerkship	308
Plus four weeks of a Selective Clerkship to be selected by the student		
Medicine 707 or Medicine 705 WUMSCare	Practice of Medicine III	0

## Fourth-Year Curriculum

- All students must complete InterDis 849 Fourth-Year Capstone.
- All students must pass the Comprehensive Clinical Exam (CCX) — M25 Medicine 833.
- All students are required to take the USMLE Step 1 and Step 2 examinations prior to graduation.
- MD-only students must also complete 32 weeks of elective credit (MD courses 800-900).
- MSTP students (MD/PhD) must also complete 8 weeks of elective credit (MD courses 800-900).

## Fourth-Year Electives

The elective year allows students to develop a flexible and individualized program of study at a crucial time in the continuum of formal medical education. Elective courses are offered at the 800 level and in the areas listed within each academic department.

## Department-Based Courses

- Anesthesiology (p. 131)
- Biochemistry and Molecular Biophysics (p. 137)
- Cell Biology and Physiology (p. 141)
- Developmental Biology (p. 146)
- Genetics (p. 151)
- Medicine (p. 173) (Internal Medicine)
- Molecular Microbiology (p. 185)
- Neurology (p. 199)
- Neuroscience (p. 206)
- Neurosurgery (p. 211)
- Obstetrics and Gynecology (p. 222)
- Ophthalmology and Visual Sciences (p. 234)
- Orthopaedic Surgery (p. 242)
- Otolaryngology (p. 251)
- Pathology and Immunology (p. 261)
- Pediatrics (p. 294)
- Psychiatry (p. 310)
- Radiation Oncology (p. 317)
- Radiology (p. 332)
- Surgery (p. 349)

## Interdisciplinary Courses

- List of Interdisciplinary Courses (p. 107)

## Research

Students pursuing the Doctor of Medicine degree may receive elective credit for research projects completed during their fourth year. For additional information about the enrollment process and to learn more about research elective opportunities, please email the Electives Office ([wusmelectives@wustl.edu](mailto:wusmelectives@wustl.edu)).

Research opportunities are not mandatory, but the majority of MD students participate in some form of research during their educational career at Washington University School of Medicine. Our Medical Student Research Program provides a wide array of research opportunities to complement different student interests and to suit various career paths. For more information about these research opportunities and the application process, please reference the Office of Medical Student Research website (<https://mdstudentresearch.wustl.edu/>).

## Faculty

## 2022-23 Course & Clerkship Directors

### Phase 1

#### Module 1: Molecules to Society

Amy Bauernfeind, PhD  
Colleen Wallace, MD

#### Module 2: Defense and Response to Injury

Erika Crouch, MD, PhD  
Brian Edelson, MD, PhD  
Komo Gursahani, MD

#### Module 3: Circulation and Breathing

Jeffrey Atkinson, MD  
Justin Sadhu, MD, MPHS

#### Module 4: Ins and Outs

Steven Cheng, MD  
Sandeep Tripathy, MD, PhD

#### Module 5

Linda Pike, PhD  
Amy Riek, MD  
Marina Litvin, MD

#### Module 6: Scaffolding and Movement

Kari Allen, PhD  
Allyson Zazulia, MD  
Steven Ambler, PhD, MPH

#### Module 7: Brain and Behavior

Simon Haroutounian, PhD  
Allyson Zazulia, MD

### Phase 1 Capstone

Timothy Yau, MD  
Jon Mullin, MD

### Ambulatory/ED Immersion

Maureen Lyons, MD  
Joan Noelker, MD  
Kaytlin Reedy-Rogier, MSW

### Procedures Immersion

Michelle Miller-Thomas, MD  
Erica Traxel, MD

### Inpatient Immersion

Doug Larsen, MD, MEd  
Dennis Chang, MD

### EXPLORE Immersion

Amber Deptola, MD

## Phase 2 Clerkships

### Integrated Surgical Disciplines Clerkship

Bethany Sacks, MD

### Medicine Clerkship

Gerome Escota, MD  
Lisa Zickuhr, MD

### Neurology Clerkship

Robert Naismith, MD  
Doug Larson, MD, MEd

### Obstetrics and Gynecology Clerkship

Stewart Massad, MD  
Gillian Schivone, MD

### Pediatrics Clerkship

Laura Hall, MD  
Sarah Bram, MD

### Psychiatry Clerkship

Brendan O'Connor, MD  
Max Rosen, MD

## Third Year (Legacy Curriculum)

### Integrated Surgical Disciplines Clerkship

Bethany Sacks, MD

### Medicine Clerkship

Gerome Escota, MD  
Lisa Zickuhr, MD

### Neurology Clerkship

Robert Naismith, MD  
Doug Larson, MD

### Obstetrics and Gynecology Clerkship

Stewart Massad, MD  
Tammy Sonn, MD

### Pediatrics Clerkship

Laura Hall, MD  
Colleen Wallace, MD

### Psychiatry Clerkship

Brendan O'Connor, MD

### WUSM Care

Nichole Zehnder, MD

## Fourth Year

### Capstone

Tosin Adeyanju, MD  
Michael DeVita, MD  
Holly Steiner, MD  
Melissa Stewart, MD

### Fourth-Year Electives

Faculty members within all departments and divisions at Washington University School of Medicine offer a vast selection of clinical elective rotations and independent study opportunities for students in their final year of the MD program.

## Interdisciplinary Courses

Return to Doctor of Medicine Core Courses (p. 104)

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### M80 InterDis 799 Selective Clerkship

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#### M80 InterDis 807 Physical Medicine and Rehabilitation

The elective is designed to provide the student with a broad introduction to the field of Physical Medicine and Rehabilitation. Major objective of this clinical elective is to achieve greater knowledge of the neurological and musculoskeletal diseases and their treatment, and gain understanding of basic principles of rehabilitation. The student will learn the clinical and rehabilitative care of patients with strokes, traumatic brain injury, spinal cord trauma and diseases, and limb amputations. Student will gain clinical skills in evaluating in management of functional impairments. Students will be expected to participate in daily rounds on inpatient rehabilitation units with the clinical care team, follow 3-5 patients, attend multidisciplinary team conferences and family meetings, attend outpatient rehabilitation clinics in spinal cord, stroke, traumatic brain injury, and amputee. Teaching and supervision is provided by the psychiatry and neurology faculty of the Division of Rehabilitation. Rehabilitation and neurology residents are involved in student teaching as well. Students are required to participate in didactic teaching conferences within the PM&R residency. This rotation is particularly useful for students considering careers in rehabilitation, neurology, geriatrics, primary care, neurosurgery, or any other field that will require experience in the evaluation and management of patients with physical impairment and disabilities.

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#### M80 InterDis 808 Step Preparation

Step Preparation.

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### **M80 InterDis 809 Ambulatory Care - Jacqueline Maritz Lung Center**

The Jacqueline Maritz Lung Center houses the ambulatory care activities of the Divisions of Pulmonary Medicine, Thoracic Surgery, and Allergy/Immunology, as well as the pulmonary function laboratory. The student will rotate through: 1. both general pulmonary and subspecialty clinics in Pulmonary Medicine (cystic fibrosis, transplantation, emphysema, etc.), 2. the Thoracic Surgery clinic, and 3. the Allergy/Immunology clinic. Students will also interpret pulmonary function tests. Chest imaging is also emphasized in the evaluation process. The rotation can be streamlined to meet areas of emphasis desired by individual students.

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### **M80 InterDis 827 Introduction to Global Health**

This is a cross-disciplinary "crash course" in global health for students considering a career in global health and should be particularly useful for those students planning to complete international electives before graduation or during residency. The course consists of a mix of lectures, workshops, discussions, debates, laboratory sessions, clinics, and simulation labs for two weeks. Topics will include significant coverage of high-burden infectious and tropical diseases (primarily case-based) in addition to discussion of emerging and neglected global health topics including mental health, non-communicable diseases, radiology, and maternal health. Active participation in all activities and discussions is expected in order to obtain credit for this course. The course is team taught by faculty from around the medical school with extensive experience in global health and will include opportunities to network with faculty and residents actively engaged in clinical, research, policy, and implementation work around the world. This course has been run for two years previously for residents only and now is being opened up to senior medical students as well. No specific clinical requirements or call is required. Attendance and active participation for each session throughout the two weeks is required and students should not schedule residency interviews or other time off during this block.

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### **M80 InterDis 829 Biomedical Innovation and Entrepreneurship**

This four-week course will be offered once during the year, from Weeks 25 through 28. The course will serve as both a primer for students interested in medical technology and biotechnology development as well as a hands-on opportunity for them to work directly with teams engaged in clinical problem solving and product development. Students will learn the basics of developing a business plan, market analysis, clinical needs assessment, and project design. Students will split their time between working with an IDEA Labs team, performing independent research, and completing educational modules. During the portion of the year that this course is offered, IDEA Labs teams are beginning to develop solutions to clinical problems. During this process, the teams need to reach out to the clinical community for input on clinical needs and marketability. Fourth-year medical students will work with one IDEA Labs team to help complete the clinical needs assessment and market analysis portions of their business model. They will do this by both reaching out to clinicians and performing the research necessary to complete these portions of the business model. Fourth-year medical students are uniquely qualified to help with the clinical needs assessment given their experiences, clinical knowledge, and connections from their third year of medical school. In addition, during this time, students will also be expected to complete a "passport" of online and hands-on

learning modules from an assortment provided by IDEA Labs from which the student may choose. The lectures will consist of online/in-person lectures outlining business development, clinical needs assessment, market analysis, and product development. The hands-on experiences will consist of 3D printing/prototyping and an open-source, single-board microprocessor workshop. Students are not expected to master any one facet of this experience; instead, this course is intended to introduce students to some of the thought processes and techniques behind moving from a clinical problem to a market ready product. Learning Objectives: By the end of this course, students should be able to do the following: (1) Perform a clinical needs assessment of a proposed solution to a clinical problem, including clearly defining the problem at hand, researching current solutions, designing and implementing a needs-based survey, and obtaining expert opinion and consultation. (2) Perform a preliminary market analysis of a proposed solution to a clinical problem, including estimates of market size, market trends, market growth rate, market profitability, industry cost structure, distribution channels, key success factors, key success details, and a SWOT analysis (strengths, weaknesses, opportunities, and threats) of the proposed solution and IDEA Labs team/business as a whole. (3) Participate and engage in clinical problem identification and solution validation. (4) Print a small 3D object using modern, commercially available 3D printing techniques. This course will be graded on a pass/fail basis. There will be no exam, and the following criteria will be used to determine the final grade: submission of a clinical needs assessment and a market analysis; demonstration of completed passport of experiences, and self-assessment involving the completion of a survey at the beginning and the end of the course reflecting on the knowledge gained during the course.

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### **M80 InterDis 831 One Health; Comparative and Ecological Medicine**

In this elective, medical students will analyze and evaluate their roles as practitioners of One Health: the collaborative, multisectoral, and transdisciplinary approach to health that optimizes health outcomes by recognizing the interdependence among people, animals, plants and their shared environment. Students will explore human and animal health overlaps from the perspective of ecological health, and comparative anatomy and pathology. They will also have the chance to learn first-hand from veterinarians and animal health experts the extent to which human health is dependent on the close connections we have to the health of animals and our ecosystems. These learning opportunities will occur in the anatomy lab, in lectures, and alongside animal health care providers and scientists who are working within the fields of pathology, conservation, and zoological medicine. At the completion of this elective, students will turn in a One Health project applying the core concepts of ecological and comparative medicine.

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### **M80 InterDis 835 Interprofessional Hotspotting**

We are looking for ONE Washington University Medical Student interested in joining an interprofessional team of students that will learn how to take care of patients with complex medical and social needs. This student will join the Interprofessional Student Hotspotting Learning Collaborative (ISHLC), which is an annual program run by the Camden Coalition that trains interdisciplinary teams of professional students from schools across the country to learn to help patients with complex medical and social needs. The Center for Interprofessional Practice and Education (CIPE) at the Washington University Medical Campus will send ONE team this year to the Interprofessional Student Hotspotting Learning Collaborative. The team will consist of

one nursing student from Barnes-Jewish Goldfarb School of Nursing, one occupational therapy student from the WashU OT school, one medical student from WashU School of Medicine, and one pharmacy student from St Louis College of Pharmacy. This team will learn from and take care of high-risk patients from September 2020 through April 2021, with an estimated time commitment of two hours per week.

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**M80 InterDis 849 Fourth-Year Capstone**

The fourth-year Capstone course is highly structured. In order to provide students with the absolute best experience possible, students are REQUIRED to attend all sessions. In general, the morning sessions will start at 8:00 am and run until approximately 12 noon. Afternoon sessions will generally run from 1:00 pm until about 5:00 pm. The afternoon sessions are typically hands-on activities which are faculty/staff intensive. By the end of this four-week course, students should be able to demonstrate improved cognitive and clinical skills needed to enter the internship year of graduate medical training. Topics to be covered include acute clinical problems commonly faced on the inpatient service or emergency room, review of key diagnostic testing, basic procedural skills and patient and family communications regarding informed consent and end-of-life issues. Coursework will be divided between self-study, didactic, small group discussions, hands-on skills practice, and simulation. Parts of the course will be tailored to specialty interests. Students will be assessed by performance on simulation exercises and a written exam.

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**M80 InterDis 851 The Business of Medicine**

This two-week interactive course enhances medical students' Healthcare System Literacy, i.e. their understanding of how the healthcare system is structured, financed, operated, and regulated. They will learn how clinical decisions and options are tied to market forces, business structures, and health policy. From clinical practice management issues up to 'big picture' views of healthcare, the course modules help prepare students for the challenges they will face in their own practices as well as for leadership roles in improving patient care on a large scale. The course will be a blend of case-method sessions, targeted mini-lectures, expert panels, and field trips, all designed to invite student participation and engagement with representatives from a broad spectrum of the healthcare industry.

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**M80 InterDis 863 Mind-Body Stress Reduction**

Mind-Body Stress Reduction is a program that uses intensive training in mindfulness meditation to teach people how to:

- Reduce stress and anxiety
- Increase focus & concentration
- Manage health problems
- Live more fully productive lives

Mind-Body Stress Reduction utilizes both formal and informal mindfulness meditation practices. Mindfulness can be described as non-judgmental, non-striving, moment-by-moment attention. It is often called present-centered awareness, a state of consciousness that has been shown to have health benefits for the autonomic nervous system, to increase immune function, and to increase alpha and theta brain waves, which are present in deep states of relaxation.

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**M80 InterDis 864 Care of the Homeless**

The purpose of this elective is to educate students on the following areas: the causes of homelessness; the health care consequences of homelessness, including medical problems, barriers to care, and distrust of health care providers; the safety net system in St. Louis; and how to provide primary care tailored to the needs of the homeless. The format of the elective will

include individual readings (printed/online/Canvas) and viewing of "The Pruitt-Igoe Myth" and other video resources available for free. Zoom conferences with other instructors or community resources may be arranged. Students may be asked to explore online resources for case studies or to make the course more interactive. At the conclusion, students will complete a reflection paper. At the end of the course, the student will be able to assist homeless persons to access services in St. Louis; list and describe barriers to care for homeless persons; list and discuss some of the ways that providers can be more accommodating to homeless patients; formulate treatment plans that address food insecurity, lack of shelter, and other homeless patients' needs; and understand the special difficulties faced when managing COVID in the homeless population.

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**M80 InterDis 872 Introduction to Medical Education**

During this elective, students will learn key concepts in medical education, including exposure to curriculum development and some experiential learning in teaching skills. A majority of time during the elective will be a mix of synchronous and asynchronous learning activities. Students in the elective will also apply their skills to a teaching presentation at the end of the elective for which they will receive feedback. Students will also have the opportunity to observe clinical teaching and reflect on skills they observed. Course Level Objectives: At the end of the elective, the student will be able to:

- Describe the backwards design process of curriculum development
- Demonstrate skill in writing learning objectives
- Discuss the core components of and evidence for at least one active learning modality
- Describe methods used to evaluate the effectiveness of a curriculum or teaching session
- Demonstrate use of one type of technology in teaching
- Develop and deliver a 20-minute presentation integrating concepts in effective instructional design

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**M80 InterDis 875 Medical Education Scholarship**

This two-week virtual elective will introduce types of education scholarship; provide guidance for selecting a topic, writing a question, and developing project objectives; illustrate meaningful outcomes for the evaluation of education scholarship projects; and introduce qualitative and quantitative methods appropriate for education scholarship. We will meet intermittently throughout the two weeks on a mutually agreed-upon schedule. Much of the work will be done independently, with the instructor available to provide feedback and answer questions. By the end of the elective, the student will be able to define scholarship of teaching, discovery, integration, application, and engagement and provide examples of education scholarship in each type; describe the criteria for evaluating scholarship in medical education; provide examples of education outcomes at each level of Miller's Triangle and Kirkpatrick's Levels of Program Evaluation; and draft a plan for an education scholarship project with clear goals and appropriate plans for adequate preparation, appropriate methods, evaluation of results, dissemination, and reflective critique.

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**M80 InterDis 880 Clinical Informatics**

Clinical informatics is the application of information technology and human resources in transforming data, information, and knowledge into meaningful health care improvements. Physicians practicing in this discipline provide oversight in the effective use of information systems and the development of innovative clinical pathways for patient care. During this rotation, trainees will assist in the operations of clinical informatics teams at BJH, SLCH, and WUSM, including information system management (e.g., incident response and improvement

requests), reporting (data analysis and visualization), and clinical decision support. Trainees will support teams related to their clinical interests and participate in strategic meetings. Additional training in the use of reporting tools in Epic will be provided. Learning objectives include the following: utilize reporting tools to transform health care data into meaningful information and actionable knowledge; champion the safe and effective use of health care information systems; and apply change management principles to improve clinical processes and workflows.

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#### **M80 InterDis 899T Teaching Elective**

Teaching support for second-year courses

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## **Doctor of Medicine (Five-Year Program)**

In addition to the regular four-year program that leads to the MD degree, students are permitted to spend one additional year in an academic program in a medical or medically related field. In exceptional circumstances, a further additional year may be permitted. The student may receive a stipend but may not be considered an employee of the university. The program must be arranged with an academic advisor, and it is subject to the approval of the Associate Dean for Medical Student Research. Students enrolled in the five-year program must maintain insurance coverage through Student Health. Students interested in this program can contact the Office of Medical Student Research.

## **Doctor of Medicine and Master of Science in Clinical Investigation**

The School of Medicine offers a combined MD/MSCI program. Please visit the Clinical Investigation (p. 51) section of this *Bulletin* for more information.

## **Doctor of Medicine and Master of Population Health Sciences**

The School of Medicine offers a combined MD/MPHS program. Please visit the Population Health Sciences (p. 85) section of this *Bulletin* for more information.

## **Doctor of Medicine and Master of Public Health**

The School of Medicine offers a combined MD/MPH program. Please visit the Public Health (p. 88) section of this *Bulletin* for more information.

Applicants should be in the third year of their medical school program. Prior to entering the MPH program, students should have taken courses (up to 11 credit units) that count toward the MPH degree.

The MD/MPH provides medical students with an opportunity to supplement their clinical training with courses and experiences designed to create transdisciplinary competencies related to the improvement of population health. Students learn the basics of public health from the foundations courses. MD/MPH students can also choose from a wide variety of Transdisciplinary Problem-Solving Courses (two are required), and they will participate in small-group public health discussions in Public Health Seminar. The faculty and staff at the Brown School will help guide students toward relevant practicum experiences. At the end of the MPH program, MD/MPH students will complete a two-part capstone course. The capstone course culminates in a learning experience that demonstrates synthesis of foundational and specialized competencies. In addition to completing their course work at Brown, all graduating students are required to sit for the Certification in Public Health exam. Students passing the exam will enter the workforce with CPH credentials that indicate their knowledge of and commitment to the field.

## **Requirements**

### **Program Format**

Medical students will spend their fourth year in the MPH program. The MD/MPH curriculum comprises three full-time semesters of course work (summer, fall, and spring) at the Brown School, followed by the MPH practicum and capstone project. Students will meet the 52 required credit units with the 11 credits earned in the MD program, 40 credits earned at the Brown School, and 1 additional credit earned in either program.

### **Core MPH Courses**

- Cross-cutting Themes in Public Health
- Epidemiology
- Biostatistics
- Environmental Health
- Health Policy and Administration
- Health Behavior and Health Promotion
- Public Health Seminar I & II

## **Doctor of Medicine and Master of Business Administration**

The School of Medicine and the Olin Business School offer a combined MD/MBA program. The program augments medical training with the knowledge and skills to both identify the most pressing problems and propose solutions that will make a difference beyond the bedside. Students learn to make a meaningful difference for patients, partners, communities, and the entire system. This program — which takes one year to complete, in addition to the MD curriculum — provides a valuable educational experience in mentorship, leadership, innovation, formal advising, and integrated experiential learning opportunities that connect the skills of business with the mission

of health care. A particular focus of the program is the integration of concepts across cultures and geographic boundaries.

Financial support is available from several sources. Associate Professor Aaron Chamberlain, MD, is the advisor for this program and may be contacted at [amchamberlain@wustl.edu](mailto:amchamberlain@wustl.edu) for more information.

## Doctor of Medicine and Doctor of Philosophy

Washington University offers a combined MD/PhD degree program that draws on the resources of the College of Arts & Sciences, the McKelvey School of Engineering, and the School of Medicine under the auspices of the Medical Scientist Training Program (MSTP). The purpose of the program is to train individuals in medicine and biomedical research to prepare them for careers as physician-scientists. The program was inaugurated in 1969, and it has since trained more physician-scientists than any program in the nation. More than 70% of the individuals who have completed this postgraduate training are now actively involved in research programs at leading institutions.

The program consists of three parts:

1. An enhanced MSTP thread integrated with the Phase 1 medical curriculum;
2. At least three years of original research in a medically relevant field to satisfy the requirements for the PhD degree; and
3. Core clinical clerkships (Phase 2) and advanced clinical electives (Phase 3)

Both the MD and PhD degrees are awarded upon the completion of the program. The MSTP curriculum (<http://mstp.wustl.edu/program/Pages/MSTP-Curriculum.aspx>) is integrated to allow for the timely completion of training. Students typically complete training in seven or eight years.

The program matriculates an average of 25 students per year, which is the equivalent of 25% of the entering School of Medicine class. All MSTP students receive financial support in the form of stipends (currently \$34,500 per year), health coverage, disability and life insurance, and full tuition remission for both the MD and PhD phases of training.

### Medical Scientist Training Program

Washington University School of Medicine  
MSC 8226-0013-04  
660 South Euclid Avenue  
St. Louis, MO 63110-1093  
Phone: 314-362-7190  
MSTP Website (<http://www.mstp.wustl.edu>)

## Graduate Medical Education

Washington University School of Medicine has a number of Graduate Medical Education (<https://gme.wustl.edu/>) (GME) opportunities.

### GME-Sponsored Programs

In 1997, Washington University School of Medicine (<https://medicine.wustl.edu/>), Barnes-Jewish Hospital (<http://www.barnesjewish.org/>) and St. Louis Children's Hospital (<http://www.stlouischildrens.org/>) joined together to oversee the quality of graduate medical education training programs at these institutions. All three of these institutions have long histories of successfully training outstanding residents and clinical fellows; this collaborative educational effort demonstrates their dedication to quality health care and supports thoughtful patient care in the St. Louis area.

The GME Consortium sponsors more than 99 training programs accredited by the Accreditation Council for Graduate Medical Education (ACGME (<https://www.acgme.org/>)), the organization that accredits sponsoring institutions and training programs across the United States. There are approximately 40 additional subspecialty fellowship programs that are either accredited by other national accrediting bodies or that are in emerging new areas of medicine not yet recognized by the specialty boards. The GME Consortium and all of its sponsored training programs are fully committed to providing a quality educational experience for residents, clinical fellows and other trainees

### Residencies and Fellowships

Advanced medical training is integral to the quality of patient care in the United States. Residents are doctors who have completed their medical education and who are pursuing three to seven years of advanced medical training in a chosen specialty. Clinical fellows have completed their residencies and are board-eligible in their primary specialty training; they are pursuing additional years of training in an advanced subspecialty area of medicine. Both roles allow trainees to progressively assume greater responsibility working with patients while learning from faculty who are highly qualified in their specialties.

### Postdoctoral Training

According to the National Institutes of Health and the National Postdoctoral Association, a postdoctoral appointee is an individual holding a doctoral degree who is engaged in a temporary period of mentored research or scholarly training for the purpose of acquiring the professional skills needed to pursue a career path of their choosing. At Washington University in St. Louis, postdoctoral appointees conduct advanced research training with a faculty mentor and are supported by either research grants, individual fellowships, or institutional training grants.



Under the purview of the Office of the Vice Chancellor for Research, the Office of Postdoctoral Affairs (OPA) (<https://postdoc.wustl.edu/>) serves postdoctoral research associates and postdoctoral research scholars on both the Danforth and Medical campuses. The OPA helps postdoctoral appointees reach their career and professional development goals, advocates for postdoctoral issues, acts as a resource for information regarding postdoctoral life and recruitment, and, in collaboration with the Washington University Postdoc Society (WUPS) (<https://sites.wustl.edu/wupostdocociety/>), creates a lively postdoctoral community. Washington University in St. Louis is an institutional member of the National Postdoctoral Association (<http://nationalpostdoc.org/>).

For more information, visit the OPA website (<https://postdoc.wustl.edu/>).

## Endowed Scholarships & Fellowships

Please visit the Medical Alumni & Development Programs webpage for Endowed Scholarships & Fellowships (<https://medicalalumni.wustl.edu/give/scholarships/endowed-scholarships/>).

## Continuing Medical Education

The study of medicine is a lifelong process, with continuing medical education (<https://cme.wustl.edu/>) being an integral component of the continuum. The School of Medicine has supported this learning endeavor through the operation of the Continuing Medical Education (CME) program, which has been fully accredited since 1973. In 2016, the program achieved accreditation by the Joint Accreditation for Interprofessional Continuing Education to provide credit not only for physicians but for pharmacists and nurses as well. Credit for optometrists was added in 2020. The program's mission is to collaborate with teams of health-care professionals as well as individual members of health-care teams to provide opportunities for educational renewal and advancement to facilitate lifelong learning, the maintenance of professional competencies, and the enhancement of knowledge and skills to improve performance, clinical care and patient outcomes.

Pursuant to this mission, the objectives of the CME program include the following:

- Enable the acquisition of new knowledge and skills for the delivery of quality patient care.
- Translate the results of research into clinical diagnosis and treatment for health-care practitioners.
- Apply educational approaches in support of continuous quality improvement and patient safety in health-care delivery.
- Integrate clinical outcome measures into the educational process.

- Assist with adaptation to changing health-care delivery environments.
- Support the development of faculty as postgraduate medical educators and leaders.
- Evaluate and refine educational activities.
- Support health-care professionals in meeting state and specialty recertification and relicensure requirements.

Each year, the CME department awards credit for more than 160 symposia and more than 150 recurring academic rounds and conferences as well as self-directed learning activities. About 9,000 registrants participate in these activities annually, and they receive more than 110,000 hours of instruction. CME Online (<https://cme.wustl.edu/go/cmeonline/>) provides educational programs via the internet. Since it began in 2000, the CME online program has grown to include more than 150 hours of available CME credit.

## Medical Physics

### Master of Science in Medical Physics

The MSMP program is built on courses accredited by the Commission on Accreditation of Medical Physics Education Programs (CAMPEP), through which students will become familiar with the major texts and literature in the area of medical physics. Students will be exposed to a wide array of radiation treatment techniques and quality control procedures, and they will also perform cutting-edge research with renowned researchers. These experiences will equip students with the knowledge, skills and experiences necessary to further their careers in medical physics.

### Admissions

For a list of MSMP admissions requirements, please visit the Department of Radiation Oncology website (<https://radonc.wustl.edu/education/master-of-science-in-medical-physics/admissions/>).

### Program Format

The MSMP program is designed for full-time study over the course of two academic years, starting in the fall semester. A minimum of 30 credit hours are required for degree completion, and this requirement will be met with a combination of core courses, department-approved electives, and either thesis research or clinical rotations. Courses will run over a traditional 16-week semester schedule during the fall and spring semesters. During the summer, students will be expected to work on their thesis research or clinical project, and they will also have the opportunity to perform clinical rotations to fine-tune their clinical skills.

## Course Schedule

### Sample Clinical Project Stream Schedule

Course	Fall Units	Spring Units	Summer Units
<b>First Year</b>			
Principles of Human Anatomy and Development (Biol 4580)	3	—	—
Radiation Protection and Safety (MedPhys 521)	2	—	—
Radiological Physics and Dosimetry (MedPhys 502)	3	—	—
Independent Study (MedPhys 503)	1	—	—
Radiobiology (MedPhys 505)	—	2	—
Radiation Oncology Physics (MedPhys 506)	—	3	—
Biological Imaging Technology (ESE 589)	—	3	—
Independent Study (MedPhys 503)	—	1	—
Summer: Optional clinical rotation, clinical project, or studentship	—	—	—
	<b>9</b>	<b>9</b>	<b>0</b>
<b>Second Year</b>			
Clinical Imaging Fundamentals (MedPhys 501)	2	—	—
Clinical Rotations (MedPhys 522)	1	—	—
Clinical Project (MedPhys 503C)	3	—	—
Elective Course I (Optional)	—	—	—
Advanced Clinical Medical Physics Laboratory (MedPhys 523)	—	2	—
Ethics, Professionalism and Current Topics (MedPhys 504)	—	1	—
Elective Course II (Optional)	—	3	—
Elective Course III (Optional)	—	3	—
Summer: Optional clinical rotation	—	—	—
	<b>6</b>	<b>9</b>	<b>0</b>

### Sample Thesis Research Stream Schedule

Course	Fall Units	Spring Units	Summer Units
<b>First Year</b>			
Principles of Human Anatomy and Development (Biol 4580)	3	—	—
Radiation Protection and Safety (MedPhys 521)	2	—	—

Radiological Physics and Dosimetry (MedPhys 502)	3	—	—
Independent Study (MedPhys 503)	1	—	—
Radiobiology (MedPhys 505)	—	2	—
Radiation Oncology Physics (MedPhys 506)	—	3	—
Biological Imaging Technology (ESE 589)	—	3	—
Independent Study (MedPhys 503)	—	1	—
Summer: Optional clinical rotation, thesis research	—	—	—
	<b>9</b>	<b>9</b>	<b>0</b>
<b>Second Year</b>			
Clinical Imaging Fundamentals (MedPhys 501)	2	—	—
Clinical Rotations (MedPhys 522)	1	—	—
Thesis Research (MedPhys 503T)	3	—	—
Elective Course I (Optional)	—	—	—
Advanced Clinical Medical Physics Laboratory (MedPhys 523)	—	2	—
Ethics, Professionalism and Current Topics (MedPhys 504)	—	1	—
Elective Course II (Optional)	—	—	—
Thesis Research II	—	—	—
Summer: Optional enhanced clinical rotation, thesis research	—	—	—
	<b>6</b>	<b>3</b>	<b>0</b>

## PhD in Medical Physics

**New in 2022**, the Doctor of Philosophy (PhD) in Medical Physics program at Washington University in St. Louis provides students with the opportunity to learn fundamental concepts and techniques and to perform academic research in the field of medical physics. The program is geared toward undergraduates with a strong background in physics and mathematics, graduate students with a physics and mathematics background from fields outside of medical physics, and continuing learners with a CAMPEP-accredited master's-level degree in medical physics. Students in the program will be exposed to a wide array of diagnostic medical imaging, radiation therapy, nuclear medicine, and radiation safety approaches and techniques, and they will perform cutting-edge research with renowned investigators. These experiences will equip students with the knowledge, skills and experiences necessary to further their careers in clinical and academic medical physics.

## Admissions

For a list of PhD admissions requirements, please visit the Department of Radiation Oncology website (<https://radonc.wustl.edu/education/master-of-science-in-medical-physics/admissions/>).

## Program Format

The program is designed for full-time study, with a minimum of 70 credit units required for degree completion. The program is comprised of 34 credit units of didactic course work, which is largely completed over the first two years of the program. There are 22 credit units of medical physics core classes and 12 credit units of elective course work, as well as a minimum of 36 credit units of thesis research. The program commences in the fall semester, and didactic courses will run over traditional 16-week schedules during the fall and spring semesters. During the summer, students will be expected to work on their thesis research project. Clinical shadowing opportunities will also be available for those who are interested.

## Sample Course Schedule (70 credit units total)

Course	Fall Units	Spring Units	Summer Units
<b>First Year</b>			
Principles of Human Anatomy and Development (Biol 4580)	3	—	—
Radiation Protection and Safety (MedPhys 521)	2	—	—
Radiological Physics and Dosimetry (MedPhys 502)	3	—	—
Phd Research Rotation (MedPhys 503R)	3	—	—
Radiobiology (MedPhys 505)	—	2	—
Radiation Oncology Physics (MedPhys 506)	—	3	—
Biological Imaging Technology (ESE 589)	—	3	—
Phd Research Rotation (MedPhys 503R)	—	3	—
Summer Year 1: Optional additional lab rotation or transition to thesis research lab	—	—	—
	<b>11</b>	<b>11</b>	<b>0</b>
<b>Second Year</b>			
Clinical Imaging Fundamentals (MedPhys 501)	2	—	—
Clinical Rotations (MedPhys 522)	1	—	—
Elective Course I	3	—	—
Elective Course II	3	—	—

Thesis Research	3	3	—
Advanced Clinical Medical Physics Laboratory (MedPhys 523)	—	2	—
Ethics, Professionalism and Current Topics (MedPhys 504)	—	1	—
Elective Course III	—	3	—
Elective Course IV	—	3	—
Summer Year 2 and Year 3+: Thesis research	—	—	24
	<b>12</b>	<b>12</b>	<b>24</b>

## Post-PhD Graduate Certificate in Medical Physics

Through the Commission on Accreditation of Medical Physics Education Programs (CAMPEP)-accredited Washington University Post-PhD Graduate Certificate in Medical Physics program, students will become familiar with the major texts and literature in the area of medical physics, and they will be exposed to a wide array of treatment techniques and quality control procedures. These experiences will equip students with the necessary means to further their education. Graduates of the program will have an understanding of the role of patient safety in clinical physics, and they will have the necessary physical and scientific background for a career in medical physics. They will be able to use research and inquiry to acquire knowledge, and they will also have the ability to critically evaluate research and scholarship and to pose new questions and solve problems in medical physics. This program will help students to develop the professional and interpersonal skills necessary for success in a collaborative, multidisciplinary environment.

The program is led by Associate Professor of Radiation Oncology Michael Altman, PhD, with Associate Professor of Radiation Oncology Tiezhi Zhang, PhD, serving as the assistant program director. This program requires the completion of 18 credit units and is offered in convenient one- and two-year formats.

## Course Schedule

### One-Year Sample Course Schedule

Course	Fall Units	Spring Units	Summer Units
<b>First Year</b>			
Principles of Human Anatomy and Development (Biol 4580)	3	—	—
Radiological Physics and Dosimetry (MedPhys 502)	3	—	—
Radiation Protection and Safety (MedPhys 521)	2	—	—
Radiobiology (MedPhys 505)	—	2	—

Radiation Oncology Physics (MedPhys 506)	—	3	—
Biological Imaging Technology (ESE 589)	—	3	—
Advanced Clinical Medical Physics Laboratory (MedPhys 523)	—	—	2
	<b>8</b>	<b>8</b>	<b>2</b>

## Two-Year Sample Course Schedule

Course	Fall Units	Spring Units	Summer Units
First Year			
Principles of Human Anatomy and Development (Biol 4580)	3	—	—
Radiological Physics and Dosimetry (MedPhys 502)	3	—	—
Radiobiology (MedPhys 505)	—	2	—
Biological Imaging Technology (ESE 589)	—	3	—
Advanced Clinical Medical Physics Laboratory (MedPhys 523)	—	—	2
	<b>6</b>	<b>5</b>	<b>2</b>
Second Year			
Radiation Protection and Safety (MedPhys 521)	2	—	—
Radiation Oncology Physics (MedPhys 506)	—	3	—
	<b>2</b>	<b>3</b>	<b>0</b>

## Nursing Science

### PhD in Nursing Science

The PhD in Nursing Science requires 62 graduate units of course work and research. Students will complete four core areas of study plus a required minor/cognate and a dissertation. The four core areas are Nursing Science, Research Methods, Statistics, and Mentored Research Experience. Students can choose a minor in informatics, clinical investigation, or dissemination and implementation science, or they may propose a customized track that is a match with nursing faculty research areas and that complements the applicant's nursing area of research. Courses in the Nursing Science and Research Methods core areas will be taught by faculty at Goldfarb School of Nursing. Courses in the Statistics core and the minor courses will be taught by faculty at Washington University. The Mentored Research Experience will be taught by scientists at both Goldfarb School of Nursing and Washington University. A Mentored Teaching Experience is also required.

The program is designed to be completed in three years of full-time study. This generally involves five semesters of course work (50 units) followed by a preliminary examination, a qualifying examination, and three semesters of dissertation work (12 units). Students may be eligible for fourth- and fifth-year options if these are necessary for the completion of the proposed dissertation work.

## Occupational Therapy

### Master of Science in Occupational Therapy

Applicants must hold a bachelor's degree or be a participant in an approved 3-2 program, and they must have completed prerequisite courses from an accredited college or university. The Program in Occupational Therapy is accredited by the Accreditation Council for Occupational Therapy Education of the American Occupational Therapy Association.

The MSOT prepares students to become practitioners in any practice area. A minimum of a master's degree is required for entry into the profession of occupational therapy. The MSOT degree prepares generalist clinicians with the knowledge and skills needed to work as direct care providers, consultants, educators, managers and advocates for clients. The MSOT program also includes the option for students to study with experienced community clinicians, community agency administrators and faculty scientists.

For students interested in pursuing a PhD in the future, the MSOT degree program also includes the option for students to study with faculty scientists. Students have exposure to topics in participation, public health, aging, children and youth, mental health, work and industry, and neurorehabilitation.

An experiential portion of the curriculum — six months of full-time fieldwork supervised by experienced clinicians — follows the two years of academic course work for a total of 80 credit units. The MSOT degree program is a 28-month, full-time program.

With either degree, students will be eligible to sit for the NBCOT examination to become a practicing occupational therapist. The exam is administered by the National Board for Certification in Occupational Therapy (NBCOT), located at One Bank Street, Suite 300, Gaithersburg, MD 20878. NBCOT's phone number is 301-990-7979, and its website address is [www.nbcot.org](http://www.nbcot.org) (<https://www.nbcot.org/>). Please visit the Program in Occupational Therapy website to view our NBCOT pass rate (<http://www.ot.wustl.edu/education/nbcot-408/>).

A felony conviction may affect a graduate's ability to sit for the NBCOT certification exam or to attain state licensure.

## Doctorate of Occupational Therapy

Applicants must hold a bachelor's degree or be a participant in an approved 3-2 program, and they must have completed prerequisite courses from an accredited college or university. The Program in Occupational Therapy is accredited by the Accreditation Council for Occupational Therapy Education of the American Occupational Therapy Association.

The OTD is for students who want to assume a leadership position in practice, management, teaching and/or clinical research. In addition to six months of full-time fieldwork supervised by experienced clinicians, OTD students focus on their specialty area and complete the 14-week doctoral capstone for a total of 106 credit units over a three-year period. The OTD degree program is a 36-month, full-time program.

Doctoral students actively engage in leadership experiences to develop capacity as change agents in professional practice and to acquire in-depth knowledge in their practice areas. They learn to analyze the role of occupational therapy across the service delivery continuum for individuals, groups and populations and to design an occupational therapy model for a specific client population. Doctoral students develop an advanced-practice skill set as well as the ability to participate in scholarly work. They may choose from multiple concentrations such as productive aging, social participation and the environment, children and youth, work and industry, neurorehabilitation and rehabilitation science.

Graduates of either degree program will be eligible to sit for the National Board for Certification in Occupational Therapy (NBCOT) examination to become practicing occupational therapists. The exam is administered by NBCOT, which is located at One Bank Street, Suite 300, Gaithersburg, MD 20878. NBCOT's phone number is 301-990-7979. For more information, visit the NBCOT website (<https://www.nbcot.org/>). Consult our Program in Occupational Therapy website for more information about our NBCOT Exam Results (<http://www.ot.wustl.edu/education/nbcot-408/>).

A felony conviction may affect a graduate's ability to sit for the NBCOT exam or to attain state licensure.

## PhD in Rehabilitation and Participation Science

The Rehabilitation and Participation Science (RAPS) PhD program (<https://www.ot.wustl.edu/education/phd-in-rehabilitation-and-participation-science-raps-142/>) aims to develop rehabilitation scientists whose research questions are chosen based explicitly on their potential to generate rehabilitation knowledge that will enhance health, improve quality of life, reduce illness and disability and optimize participation. In our doctoral training model, students devote the majority of

their time to mentored research activities beginning in their first semester, and they then become increasingly independent. Students may choose rehabilitation and participation scientists who hold appointments in the occupational therapy program as mentors to help focus their study in the areas of chronic diseases, evidence-based care, interventions, cognitive rehabilitation, neurorehabilitation, health promotion, decreasing secondary conditions, improving physical fitness for people with disabilities, and rehabilitation outcomes and informatics.

This program is designed to be completed in four to five years of full-time study. There is no provision for part-time study. A tuition stipend and fellowship are provided for up to four years, with the possibility of a one-year extension.

Graduates of the RAPS PhD program will be prepared for careers as academic research scientists.

## Physical Therapy Doctor of Physical Therapy

The professional curriculum is an intensive three-year experience leading to the Doctor of Physical Therapy (DPT) degree. The principle focus of this professional training is to develop scientific and clinical expertise in the diagnosis and treatment of movement-related conditions. By integrating biomedical and physical sciences and clinical education with behavioral and social sciences, the DPT curriculum (PDF) ([http://bulletin.wustl.edu/medicine/degrees-offerings/dpt/DPT-Viewbook-v10\\_GE-5.pdf](http://bulletin.wustl.edu/medicine/degrees-offerings/dpt/DPT-Viewbook-v10_GE-5.pdf)) provides students with the scientific expertise, critical thinking skills and interpersonal communication abilities necessary for effective clinical practice, comprehensive treatment design, patient advocacy, patient education and health promotion.

Applicants for admission must have completed the following:

1. A bachelor's degree at an accredited institution
2. Prerequisite courses in biology, chemistry, physics, anatomy, physiology, psychology and statistics
3. Science, math/science, and core prerequisites with a grade-point average of at least 3.0

Visit our website for more information regarding application and admissions (<https://pt.wustl.edu/education/doctor-of-physical-therapy/application-admissions/>) or eligibility and prerequisites (<https://pt.wustl.edu/education/doctor-of-physical-therapy/eligibility-prerequisites/>).

## DPT Curriculum

### Year One, Fall

Code	Title	Units
PhysTher 601	Diagnosis and Evidence Analysis in PT Practice I	2
PhysTher 602	Professional Issues and Skills 1	3
PhysTher 603	Essential Clinical Skills I	4
PhysTher 604	Cells, Systems and Disease I	4
PhysTher 605	Neuroscience	3
PhysTher 606	Kinesiology I	3
Early Clinical Experience		

### Year One, Spring

Code	Title	Units
PhysTher 610	Cells, Systems and Disease II	4
PhysTher 611	Human Anatomy	5
PhysTher 612	Diagnosis and Evidence Analysis in PT Practice II	2
PhysTher 613	Kinesiology II	5
PhysTher 614	Diagnosis and Management of Musculoskeletal Conditions in PT I	3
PhysTher 615	Professional Issues and Skills Development II	0.5
Early Clinical Experience		

### Year One, Summer

Code	Title	Units
PhysTher 691	Clinical Experience I	4
(8-week, full-time internship)		

### Year Two, Fall

Code	Title	Units
PhysTher 621	Exercise Physiology	3
PhysTher 622	Diagnosis and Management of Cardiopulmonary Conditions in PT	3
PhysTher 623	Orthopaedic Medicine	2
PhysTher 624	Diagnosis and Management of Musculoskeletal Conditions in PT II	3
PhysTher 625	Neurology Medicine	2
PhysTher 627	Essential Clinical Skills II	3
PhysTher 628	Case Integration Lab I	1
PhysTher 629	Diagnosis and Management of Neuromuscular Conditions in PT I	2

### Year Two, Winter

Code	Title	Units
PhysTher 692	Clinical Experience II	4
(8-week, full-time internship)		

### Year Two, Spring

Code	Title	Units
PhysTher 626	Moderators of Health, Wellness and Rehabilitation	3
PhysTher 635	Professional Issues and Skill Development III	3
PhysTher 636	Diagnosis and Management of General Medical Conditions in PT	3
PhysTher 638	Diagnosis and Management of Musculoskeletal Conditions in PT III	3
PhysTher 642	Case Integration Lab II	1
PhysTher 643	Diagnosis and Management of Neuromuscular Conditions in PT II	4

### Year Three, Summer

Code	Title	Units
PhysTher 693	Clinical Experience III	5
(10-week, full-time internship)		

### Year Three, Fall

Code	Title	Units
PhysTher 694	Clinical Experience IV	6
(12-week, full-time internship)		

### Year Three, Spring

Code	Title	Units
PhysTher 650	Diagnosis and Evidence Analysis in PT Practice III	3
PhysTher 651	Organizational and Management Issues	3
PhysTher 652	Alternative Settings and Practice Environments	3
PhysTher 653	Health Fitness and Prevention	3
PhysTher 654	Case Integration Lab III	3
PhysTher 655	Professional Issues and Skill Development IV	4
Focused Clinical Study (30 hours)		

## PhD in Movement Science

The focus of the interdisciplinary doctoral program in movement science is to prepare future researchers and faculty members who can enhance the profession of physical therapy. Admission to this curriculum requires acceptable scores on the Graduate Record Examination, excellence in previous academic work, and demonstrated beginning abilities in posing questions of importance to the study of movement.

The faculty members of the Program in Physical Therapy are committed to being leaders in discovering and transmitting new knowledge related to movement dysfunction, preparing clinicians to assume multiple roles in a complex health care environment, and fulfilling the service mission to society through active participation in humanistic, scientifically based patient care. Students in all curricula are expected to participate actively in an environment that values integrity, initiative, creativity and the strong belief that physical therapy intervention promotes health. In these ways, all individuals associated with the Program in Physical Therapy may achieve their highest professional and personal potential.

Visit our website or more information regarding application and admissions (<https://pt.wustl.edu/education/phd-in-movement-science/application-admissions/>).

## Population Health Sciences

### Master of Population Health Sciences

The MD/MPHS provides medical students with an opportunity to supplement their clinical training and course work with a quantitative approach to population health science research. Students develop core skills in epidemiology and biostatistics, and these can be applied to research in any clinical field, from primary to specialty care. The program is intended for medical students who plan to incorporate clinical or population health research into their clinical careers, including clinical effectiveness and outcomes research. The program is not restricted to Washington University medical students; students from other medical schools are encouraged to apply. The program combines the traditional medical school curriculum with one additional year of full-time study for the MPHS degree. This added year is typically taken after the second or third year of medical school.

## Requirements

### Program Format

The MPHS program is offered in a full-time, 10-month format. A minimum of 12 credit units is required for full-time student status, and the maximum course load is 18 credit units per semester. Part-time study options are available.

## Core MPHS Courses

Code	Title	Units
PHS 510	Introduction to SAS for Clinical Research *	1
PHS 501	Introduction to Epidemiology	3
PHS 502	Intermediate Epidemiology	3
PHS 511	Introductory Biostatistics for Clinical Research	3
PHS 512	Intermediate Biostatistics for Clinical Research	3
PHS 505	Ethics in Population and Clinical Health	1
PHS 500	Current Topics in Public Health (medical students only)	1

\* Students with previous SAS experience may opt out of this required class by taking the final exam. Students who receive a 90% or higher on the exam will be exempt from taking the course.

Information about elective courses is available on the MPHS website (<http://www.mphs.wustl.edu/>).

## Academic Departments

Washington University School of Medicine has 20 academic departments, all of which provide educational opportunities for the Doctor of Medicine (p. 100) and Graduate Medical Education (p. 111) programs.

- Anesthesiology (p. 119)
- Biochemistry and Molecular Biophysics (p. 132)
- Cell Biology and Physiology (p. 137)
- Developmental Biology (p. 141)
- Genetics (p. 146)
- Medicine (p. 151) (Internal Medicine)
- Molecular Microbiology (p. 182)
- Neurology (p. 185)
- Neuroscience (p. 201)
- Neurosurgery (p. 207)
- Obstetrics and Gynecology (p. 212)
- Ophthalmology and Visual Sciences (p. 223)
- Orthopaedic Surgery (p. 236)
- Otolaryngology (p. 244)
- Pathology and Immunology (p. 251)
- Pediatrics (p. 263)

- Psychiatry (p. 298)
- Radiation Oncology (p. 311)
- Radiology (p. 317)
- Surgery (p. 334)

## Department of Anesthesiology

Anesthesiology is a medical specialty encompassing a broad range of medical and scientific activities. The clinical practice of anesthesiology includes the following:

1. Assessment of, consultation for and preparation of patients for anesthesia and surgery;
2. Provision of insensibility to pain during surgical, obstetric, therapeutic and diagnostic procedures;
3. Monitoring and restoration of physiologic homeostasis during the perioperative period as well as homeostasis in the critically ill or seriously injured patient;
4. Diagnosis and treatment of painful syndromes; and
5. Clinical management and teaching of cardiopulmonary resuscitation.

The realm of scientific investigation in anesthesiology also spans a broad range. Scientific efforts at the cellular and molecular levels are directed toward understanding the molecular mechanisms of anesthesia and analgesia. Clinical research in anesthesia includes broad epidemiological approaches to identifying indicators of outcome as well as prospective clinical studies examining new technologies, anesthetic agents and methods.

The Department of Anesthesiology (<http://anest.wustl.edu>) presents the student with the opportunity to do the following:

1. Acquire and apply pharmacologic knowledge related to anesthetic agents, opioids, paralytic and sedative drugs, and drugs affecting the autonomic nervous system;
2. Understand and apply the basic principles of airway management and mechanical ventilation;
3. Understand and apply the principles of cardiopulmonary resuscitation;
4. Understand and apply the technical skills and anatomic and pharmacologic knowledge used in performing regional nerve blocks;
5. Learn and apply the fundamental principles of acute and chronic pain management; and
6. Learn and apply the basic principles of critical care medicine.

Anesthesiology bridges the gap between basic science and clinical medicine. It provides experience with the clinical evaluation and management of patients as well as with applied physiology and pharmacology. The Department of Anesthesiology offers student experiences in the operating room, the intensive care unit, the pain management clinic and the laboratory.

Contact: Maureen Arends  
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Website: <http://anest.wustl.edu>

## Faculty

**Michael Avidan, MBBCh, FCA SA** (<https://anesthesiology.wustl.edu/people/michael-avidan-mbbch/>)  
Department Chair

**Scott Markowitz, MD** (<https://physicians.wustl.edu/people/scott-markowitz-md/>)  
Department Vice Chair for Professional Development & Diversity, Equity and Inclusion

**Robert Gereau, PhD** (<https://anesthesiology.wustl.edu/people/robert-gereau/>)  
Department Vice Chair for Research

**Ivan Kangrga, MD, PhD** (<https://wuphysicians.wustl.edu/for-patients/find-a-physician/ivan-kangrga/>)  
Department Vice Chair for Health Systems Liaison

**Anne Drewry, MD** (<https://physicians.wustl.edu/people/anne-m-drewry-md/>)  
Department Vice Chair

**Chakrapol Lattanand, MD** (<https://physicians.wustl.edu/people/chakrapol-lattanand-md/>)  
Department Vice Chair for Clinical Operations

**Dolores Njoku, MD** (<https://anesthesiology.wustl.edu/people/dolores-njoku-md/>)  
Department Vice Chair for Pediatric Anesthesiology

**Douglas Thompson, MD** (<https://physicians.wustl.edu/people/douglas-royce-thompson-md/>)  
Department Vice Chair for Education

Visit our website for more information about our faculty (<http://anest.wustl.edu/about/faculty/>) and their appointments.

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## A

**Enyo Ama Ablordeppey, M.P.H., M.D.**  
Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Emergency Medicine  
Master of Public Health, University of Pittsburgh, 2007  
Doctor of Medicine, University of Pittsburgh, 2007

**Joanna Abraham, Ph.D.**  
Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Medicine  
Bachelor of Science, SRM Easwari Engineering Colleg, 2001  
Doctor of Philosophy, Pennsylvania State University, 2010

**Hawa Abubakar, MBBS**  
Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
Foreign MD equivalent, King's College London, 2010



**Oluwafunmilayo Beverly Adebayo-Adonis, M.D.**

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Doctor of Medicine, Meharry Medical College, 2013

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Doctor of Medicine, Loyola University Chicago, 2015

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Doctor of Philosophy, State University of New York at Buffalo,  
1997

**Ream Al-Hasani, Ph.D.**

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Doctor of Philosophy, University of Surrey, 2009

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Doctor of Medicine, Ankara University, 1993  
Master of Education, Ankara University, 2000

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null, University of North Texas Health Science Center, 2017

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Bachelor of Science, Rutgers University, 2008  
Doctor of Medicine, Washington University in St Louis, 2013  
Master of Science, Washington University in St Louis, 2019

**Mark Joseph Arcario, Ph.D., M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, University of Florida, 2009  
Doctor of Philosophy, University of Illinois, 2014  
Doctor of Medicine, University of Illinois, 2017

**Umeshkumar Athiraman, M.D.**

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Doctor of Medicine, M.G.R. Medical University, 2013

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Bachelor of Arts, University of Missouri Kansas City, 2005  
Doctor of Medicine, University of Missouri Kansas City, 2008

**Michael Simon Avidan, MB.BCh.**

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Head of the Department of Anesthesiology  
Professor of Psychiatry  
Dr. Seymour and Rose T Brown Professor of Anesthesiology  
Professor of Surgery (Cardiothoracic Surgery)  
Foreign MD equivalent, University of the Witwatersrand, 1991

**Chaltu Blaine Ayano, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Concordia College, 2009  
Doctor of Medicine, University of South Dakota, 2014

**B**

**Sennaraj Balasubramanian, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Tirunelveli Medical College, 1992  
India Inst of Medical Sci, 1998

**Holger Baumann, M.D.**

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null, Freie Universität Berlin, 1989

**Arbi Ben Abdallah, Ph.D.**

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Doctor of Philosophy, Washington University in St Louis, 2011

**Amber Christine Benhardt, M.D.**

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Doctor of Medicine, Texas A&M University, 2013

**George Richard Benzinger, Ph.D., M.D.**

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Bachelor of Science, California Institute Technology, 1993  
Doctor of Philosophy, University of Chicago, 1998  
Doctor of Medicine, University of Chicago, 2000

**Brad Bernstein, Ph.D., M.D.**

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null, Yale University, 1992  
null, University of Washington, 1999  
null, University of Washington, 1999

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Doctor of Medicine, Case Western Reserve University, 2014

**Matthew Eugene Boland, M.D.**

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Doctor of Medicine, University of Missouri Kansas City, 1996

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India Inst of Medical Sci, 2012

**Walter A Boyle, M.D.**

Professor Emeritus of Anesthesiology  
Bachelor of Science, University of California San Francisco,  
1974  
Doctor of Medicine, University of California San Francisco, 1977

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Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, University of Houston, 2009  
Doctor of Medicine, University of Texas Health Science Center, 2014

**Bernard H Brownstein, Ph.D.**

Associate Professor Emeritus of Anesthesiology  
Bachelor of Arts, Occidental College, 1961  
Doctor of Philosophy, University of California, 1968

**Kevin D Bucol, M.D.**

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Doctor of Medicine, University of Missouri Columbia, 1982

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Doctor of Philosophy, University of Missouri in St Louis, 2013

**Reginald Bulkley, M.D.**

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null, University of Missouri Kansas City, 1983

**C**

**Yuqing Cao, Ph.D.**

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Doctor of Philosophy, University of California San Francisco, 1999

**Baron Chanda, M.S., Ph.D.**

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Professor of Biochemistry and Molecular Biophysics  
Professor of Neuroscience  
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Master of Science, University of Poona, 1993  
Doctor of Philosophy, National Centre for Biological, 2000

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Doctor of Medicine, Meharry Medical College, 2017

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Assistant Professor of Emergency Medicine  
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Doctor of Medicine, Washington University in St Louis, 2014

**Tao Che, M.S., Ph.D.**

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Master of Science, Wuhan University, 2010  
Doctor of Philosophy, Case Western Reserve University, 2015  
Bachelor of Science, Wuhan University, 2017

**Zhoufeng Chen, Ph.D.**

Professor of Anesthesiology (primary appointment)  
Professor of Psychiatry  
Professor of Developmental Biology  
Professor of Medicine (Dermatology)  
Russell D and Mary B Shelden Professor of Anesthesiology  
Bachelor of Science, Wuhan University, 1983  
Doctor of Philosophy, University of Texas Medical School Houston, 1994

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Master of Science, Dalian Medical University, 1998  
Doctor of Philosophy, Peking University, 2001

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Doctor of Philosophy, Washington University in St Louis, 2012  
Doctor of Medicine, Washington University in St Louis, 2012

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Doctor of Philosophy, Northwestern University, 2012

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**D**

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Master of Science, University of Cape Town, 2020

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**E**

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**F**

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North  
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**G**

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Bachelor of Science, Missouri State University (Formerly Southwest Missouri State), 1991  
Doctor of Philosophy, Emory University, 1995

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Doctor of Medicine, Southern Illinois University, 2006

**Yehuda Ginosar, M.D.**

Adjunct Professor of Anesthesiology  
Doctor of Medicine, University of London, 1986

**Thomas James Goblirsch, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Notre Dame, 1980  
Doctor of Medicine, Loyola University Chicago, 1985

**Judith P Golden, M.A., Ph.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Hofstra University, 1984  
Master of Arts, Hofstra University, 1986  
Doctor of Philosophy, Saint Louis University, 1994

**Vivian Maria Gonzalez-Perez, Ph.D.**

Instructor in Anesthesiology (primary appointment)  
null, Universidad de la Habana, 1997  
Doctor of Philosophy, Universidad de Valparaíso, 2009

**Thomas J Graetz, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Surgery (Cardiothoracic Surgery)  
Division Chief - Division of Cardiothoracic Anesthesiology  
Doctor of Medicine, Saint Louis University, 2005

**Stephen H Gregory, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Saint Louis University, 2012

**Russell J.I. Groener, MB.ChB.**

Associate Professor of Anesthesiology (primary appointment)  
Foreign MD equivalent, University of Cape Town, 1983

**Ryan C Guffey, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Wayne State University, 2007

**Katharine Nicole Gurba, Ph.D., M.D.**

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Philosophy, Vanderbilt University, 2013  
null, Vanderbilt University, 2014

**H**

**Jason Andrew Jai-Lian Han, M.D.**

Instructor in Anesthesiology (Pending Deans Approval) (primary appointment)  
Bachelor of Science, University of Illinois at Urbana-Champaign, 2013  
Doctor of Medicine, Southern Illinois University, 2017

**Charles B Hantler, M.A., M.D.**

Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Davenport University, 1971  
Master of Arts, Davenport University, 1973  
Doctor of Medicine, Davenport University, 1977

**Courtney Alan Hardy, M.D.**

Vice Chair - Department of Anesthesiology  
Doctor of Medicine, Loyola University Chicago, 2000

**Simon Haroutounian, M.A., Ph.D.**

Associate Professor of Anesthesiology (primary appointment)  
Division Chief - Division of Clinical and Translational Research  
Master of Arts, Hebrew University, 2005  
Doctor of Philosophy, Hebrew University, 2011

**Daniel Luke Helsten, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Kentucky, 1997  
Doctor of Medicine, University of Kentucky, 2001

**Mohammad Anas Helwani, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Surgery (Cardiothoracic Surgery)  
Doctor of Medicine, Damascus University, 1998

**Bernadette M Henrichs, M.S.N., Ph.D.**

Professor of Anesthesiology (primary appointment)  
Master of Science in Nursing, Saint Louis University, 1993  
Doctor of Philosophy, Saint Louis University, 1999

**Omokhaye M Higo, M.B.A., MBBS**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Ibadan, 1984  
Foreign MD equivalent, University of Ilorin, 1990  
null, Washington University in St Louis, 2021

**Alexander Michael Hincker, M.D.**

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Medicine, Columbia University, 2013

**Jiggar Rashmikant Hindia, M.D.**

Instructor in Clinical Anesthesiology  
Bachelor of Science, Truman State University, 2004  
Doctor of Medicine, A T Still University of Health Sciences, 2007

**Gary E Hirshberg, M.D.**

Professor Emeritus of Anesthesiology  
Bachelor of Arts, Princeton University, 1968  
Doctor of Medicine, Hahnemann University, 1972

**Katherine Jeanne Holzer, M.S., Ph.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Arts, Illinois Wesleyan University, 2010  
Master of Science, Washington University in St Louis, 2012  
Doctor of Philosophy, Saint Louis University, 2019

**Richard S Hotchkiss, M.D.**

Professor of Anesthesiology (primary appointment)  
Professor of Surgery (General Surgery)  
Professor of Developmental Biology  
Professor of Medicine  
Doctor of Medicine, University of Virginia, 1976

**Hawpeng Stephen Hsu, M.S., M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Taipei Medical University, 1983  
Bachelor of Arts, Georgia State University, 1991  
Master of Science, Emory University, 1993

**Hongzhen Hu, Ph.D.**

Professor of Anesthesiology (primary appointment)  
Professor of Medicine (Dermatology)  
Doctor of Philosophy, Ohio State University, 2004

**Rocco Hueneke, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
University, 1996

**I**

**Catherine Ifune, M.B.A., Ph.D., M.D.**

Professor of Anesthesiology (primary appointment)  
Bachelor of Science, California Institute Technology, 1985  
Doctor of Philosophy, Washington University in St Louis, 1990  
Doctor of Medicine, Washington University in St Louis, 1997  
Master of Business Administration, Washington University in St  
Louis, 2014

**Selma E.h.o. Ishag, Ph.D., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Khartoum, 1987  
Doctor of Philosophy, University of Khartoum, 1996

**J**

**Danish Jaffer, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Texas Austin, 2011  
Doctor of Medicine, University of Texas San Antonio, 2016

**Haowu Jiang, Ph.D.**

Instructor in Anesthesiology (primary appointment)  
Doctor of Philosophy, Peking Union Medical College, 2016

**York Jiao, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2009  
Doctor of Medicine, University of Connecticut, 2013

**Jonathan Jocum, M.D.**

Assistant Professor of Anesthesiology (primary appointment)

Doctor of Medicine, University of Cape Town, 2008

**Jessica Justmann, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of California Davis, 2005  
Doctor of Medicine, American University of the Caribbean, 2012

**K**

**Mohammadmehdi Kafashan, M.S., Ph.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Amirkabir University of Technology, 2008  
Master of Science, Sharif University of Technology, 2010  
Doctor of Philosophy, Washington University in St Louis, 2016

**Muthuraj Kanakaraj, M.D., MBBS**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Tirunelveli Medical College, 1995  
Doctor of Medicine, Madras Medical College, 2005

**Ivan M Kangrga, Ph.D., M.D.**

Professor of Anesthesiology (primary appointment)  
Vice Chair - Clinical Anesthesiology at BJH  
Doctor of Medicine, University of Belgrade, 1982  
Doctor of Philosophy, Iowa State University, 1991

**Thomas George Kannampallil, Ph.D.**

Associate Professor of Anesthesiology (primary appointment)  
Assistant Professor of Computer Science and Engineering  
Associate Professor of Medicine  
Bachelor of Science, University of Kerala, 1999  
Doctor of Philosophy, University of Illinois, 2018

**Menelaos Karanikolas, M.D.**

Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, National and Kapodistrian University of  
Athens, 1988

**Jan Kasal, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Medicine  
Doctor of Medicine, Charles University, 1993

**Monica Marie Keeline, M.D.**

Assistant Professor of Anesthesiology (Pending Executive  
Faculty Approval) (primary appointment)  
Bachelor of Arts, Tulane University, 2006  
Doctor of Medicine, Saint Louis University, 2010

**Rainer Kentner, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Tuebingen, 1987

**Paul William Kerby, MBBS**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Science, King's College London, 2001  
Foreign MD equivalent, King's College London, 2004

**Shahrdad Khodamoradi, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, Vanderbilt University, 1985

Doctor of Medicine, Washington University in St Louis, 1990

**Bryan James Kidd, M.S., M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Illinois, 2006  
Master of Science, University of Alabama, 2010  
Doctor of Medicine, Southern Illinois University, 2015

**Christopher Ryan King, Ph.D., M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
null, University of Chicago, 2012  
Doctor of Medicine, University of Chicago, 2014

**Tessa Marie King, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Kansas, 1997

**Justin Knittel, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Case Western Reserve University, 2009

**Ahalya Kodali, M.S., M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Boston University, 2010  
Master of Science, Boston University, 2012  
Doctor of Medicine, Boston University, 2015

**Helga Komen, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Zagreb, 1996

**Joseph F Kras, D.Dent., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Loyola University Chicago, 1977  
Doctor of Dentistry, Loyola University Chicago, 1982  
Doctor of Medicine, Hahnemann University, 1991

**Catherine P Krucylak, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, Rutgers University, 1982  
Doctor of Medicine, University of Medicine and Dental Of New Jersey, 1986

**L**

**Anand Lakshminarasimhachar, MBBS**

Associate Professor of Anesthesiology (primary appointment)  
Foreign MD equivalent, Bangalore University, 1994

**Demetrios G. Lappas, Ph.D., M.D.**

Professor Emeritus of Anesthesiology  
Bachelor of Science, Abet School, 1954  
Doctor of Medicine, Aristotle University (Duplicate of Aristotle University of Thessaloniki), 1961  
Doctor of Philosophy, Aristotle University (Duplicate of Aristotle University of Thessaloniki), 1966

**Chakrapol Lattanand, M.D.**

Professor of Anesthesiology (primary appointment)  
Division Chief - Progress West Anesthesiology Service

Doctor of Medicine, Hahnemann University, 2000

**Chris Cheng-Fu Lee, M.B.A., Ph.D., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Hubei Medical University, 1985  
Doctor of Philosophy, Beijing University, 1991  
Master of Business Administration, Washington University in St Louis, 2021

**Leander K Lee, M.B.A., M.D.**

Voluntary Clinical Instructor in Anesthesiology  
Doctor of Medicine, University of Nebraska, 1980  
Master of Business Administration, Washington University in St Louis, 1990

**Jun-Nan Li, Ph.D.**

Instructor in Anesthesiology (Pending Deans Approval) (primary appointment)  
Bachelor of Science, Harbin Medical University, 2010  
Doctor of Philosophy, Harbin Medical University, 2015

**Christopher J Lingle, Ph.D.**

Professor of Anesthesiology (primary appointment)  
Professor of Neuroscience  
Bachelor of Science, University of Oregon, 1972  
Doctor of Philosophy, University of Oregon, 1979

**Mingchun Liu, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, University of Alabama in Birmingham, 2013  
Doctor of Medicine, University of Alabama, 2017

**Qianjin Liu, Ph.D., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Nanjing Medical University, 1983  
Doctor of Philosophy, Saint Louis University, 1997

**Qin Liu, Ph.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Neuroscience  
Associate Professor of Ophthalmology and Visual Sciences  
Associate Professor of Medicine (Dermatology)  
Bachelor of Science, Wuhan University, 1998  
Doctor of Philosophy, Chinese Academy of Sciences, 2004

**Ellen Lockhart**

Voluntary Clinical Instructor in Anesthesiology

**George Alan Lodoly, M.D.**

Instructor in Clinical Anesthesiology  
Bachelor of Science, Saint Louis University, 1980  
Doctor of Medicine, Saint Louis University, 1984

**John Jacob Long, M.D.**

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, North Carolina State University, 1995  
Doctor of Medicine, Kirksville College of Osteopathic Medicine, 2003

**Sunny Shang Lou, Ph.D., M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Massachusetts Institute of Technology,  
2009  
Doctor of Philosophy, Stanford University, 2017  
Doctor of Medicine, Stanford University, 2017

**Thomas Lynch V, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Assistant Professor of Emergency Medicine  
Doctor of Medicine, St. George's University, 2011

**M**

**Jooyoung Maeng, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Cornell University, 2011  
Doctor of Medicine, Indiana University School of Medicine, 2017

**Susruta Majumdar, M.S., Ph.D.**

Adjunct Associate Professor of Anesthesiology  
Bachelor of Science, Delhi University, 1998  
Master of Science, Delhi University, 2000  
Doctor of Philosophy, University of Florida, 2006

**Bruno Maranhao, Ph.D., M.D.**

Assistant Professor of Anesthesiology (Pending Executive  
Faculty Approval) (primary appointment)  
Bachelor of Science, University of California Los Angeles, 2007  
Doctor of Philosophy, University of California San Diego, 2015  
Doctor of Medicine, University of California San Diego, 2016

**Scott David Markowitz, M.S., M.D.**

Professor of Anesthesiology (primary appointment)  
Vice Chair - Professional Development, Diversity, Equity and  
Inclusion  
Bachelor of Science, Boston University, 1989  
Doctor of Medicine, Washington University in St Louis, 1993  
null, Colorado State University, 2022

**Jackie Lee Martin, M.A., M.B.A., M.D.**

Adjunct Professor of Anesthesiology  
Bachelor of Arts, Howard University, 1976  
Master of Arts, Meharry Medical College, 1980  
Doctor of Medicine, Meharry Medical College, 1984  
Master of Business Administration, John Hopkins University  
(Duplicate of Johns Hopkins University), 2010

**John D McAllister, M.D.**

Professor of Anesthesiology (primary appointment)  
Professor of Pediatrics  
Doctor of Medicine, University of Manitoba, 1980  
Bachelor of Science, University of Manitoba, 1982

**Jordan Gary McCall, Ph.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2014

**Molly Ann McCormick, M.D.**

Assistant Professor of Anesthesiology (primary appointment)

Division Chief - Division of Anesthesiology, General  
Doctor of Medicine, University of Missouri Columbia, 1987

**Brennan Michael McMillan, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Arts, University of Colorado Boulder, 2012  
Doctor of Medicine, Albany Medical College, 2017

**Kathleen Williams Meacham, Ph.D., M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Carnegie Mellon University, 2001  
Doctor of Philosophy, Georgia Tech, 2008  
Doctor of Medicine, Emory University, 2008

**Bhavi Deepak Mehta, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 2010  
Doctor of Medicine, University of Missouri Kansas City, 2010

**Gregory Charles Miller, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, University of Missouri Kansas City, 2010  
Doctor of Medicine, University of Missouri Kansas City, 2016

**Allison Denise Mitchell, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Howard University, 2008  
Doctor of Medicine, University of Texas Health Sciences at San  
Antonio, 2012

**David Thomas Monks, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Birmingham Medical School, 2018

**Michael C. Montana, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, University of Virginia, 2003  
Doctor of Medicine, Washington University in St Louis, 2012

**John David Moore, M.D.**

Instructor in Anesthesiology (Pending Dean's Approval) (primary  
appointment)  
Doctor of Medicine, Universidad Autónoma de Centro América,  
2020

**David James Moquin, M.D.**

Instructor in Anesthesiology (primary appointment)  
Doctor of Medicine, University of Tennessee, 2017

**Rachel Willis Moquin, M.Ed., Ph.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, University of Mississippi, 2011  
Master of Education, University of Mississippi, 2013  
Doctor of Philosophy, Vanderbilt University, 2017

**Ehab Samir Morcos, M.D.**

Instructor in Clinical Anesthesiology  
Instructor in Clinical Anesthesiology  
Doctor of Medicine, Cairo University, 1991

**Jose Moron-Concepcion, Ph.D.**

Professor of Anesthesiology (primary appointment)  
Professor of Neuroscience  
Professor of Psychiatry  
Division Chief - Division of Anesthesiology, Research Unit  
Henry Elliot Mallinckrodt Professorship in Anesthesiology  
Doctor of Philosophy, University of Barcelona, 1998

**Jeremiah J Morrissey, Ph.D.**

Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, MacMurray College, 1969  
Doctor of Philosophy, Saint Louis University, 1974

**Jimmy Lewis Moss, M.D.**

Instr in Anesthesiology (Pending Dean's Approval) (primary appointment)  
Instructor in Clinical Anesthesiology  
Bachelor of Science, Florida State University, 2010  
Doctor of Medicine, Florida State University, 2015

**Christopher Marlowe Murphy, M.A., M.D.**

Instructor in Anesthesiology (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, University of Arkansas, 2010  
Master of Arts, University of Arkansas, 2012  
Doctor of Medicine, University of Arkansas, 2016

**Teresa Marie Murray-Torres, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Notre Dame, 2008  
Doctor of Medicine, University of Chicago, 2014

**Amjad Issam Musleh, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Assistant Professor of Emergency Medicine  
Bachelor of Science, University of New Mexico, 2008  
Doctor of Medicine, University of New Mexico, 2013

**N**

**Hadas Nahman-Averbuch, M.S., Ph.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Haifa University, 2005  
Master of Science, Israel Institute of Technology, 2009  
Doctor of Philosophy, Israel Institute of Technology, 2015

**Jessica Lauren Nelson, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Assistant Professor of Emergency Medicine  
Doctor of Medicine, University of Michigan, 2012  
Bachelor of Science, University of Wisconsin, 2018

**Joan M Niehoff, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 1982  
Doctor of Medicine, University of Missouri Columbia, 1982

**Daniel C Nieva, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Iowa, 1998

Doctor of Medicine, University of Iowa, 2003

**Dolores Benedicta Njoku, M.D.**

Professor of Anesthesiology (primary appointment)  
Division Chief of Pediatric Anesthesiology  
Rudolph L. and Mary Frances Wise Endowed Chair in Pediatric Anesthesiology  
Doctor of Medicine, University of Mississippi, 1987

**Aaron John Norris, Ph.D., M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Colorado State University, 2001  
Doctor of Philosophy, Washington University in St Louis, 2012  
Doctor of Medicine, Washington University in St Louis, 2012

**Sydney Marie Nykiel-Bailey, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Saint Louis University, 2001  
Doctor of Medicine, University of Missouri Kansas City, 2005

**O**

**Uchenna Ofoma, M.S., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Nigeria, 1998  
Master of Science, Pennsylvania State University, 2010

**Folasade Oladapo, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Medicine and Dental Of New Jersey, 2008

**Lawrence Osei, M.S., M.D.**

Instructor in Clinical Anesthesiology  
Bachelor of Science, University of Science & Techn, 1994  
Master of Science, University of Science & Techn, 1996  
Doctor of Medicine, University of Science & Techn, 1996

**William D Owens, M.D.**

Professor Emeritus of Anesthesiology  
Bachelor of Arts, Westminster College, 1961  
Doctor of Medicine, Davenport University, 1965

**P**

**Ben Julian Palanca, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Psychiatry  
Bachelor of Science, University of Washington, 1997  
Doctor of Medicine, Washington University in St Louis, 2005

**Arvind Palanisamy, Ph.D., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Obstetrics and Gynecology  
Division Chief - Division of Obstetrical Anesthesia  
Doctor of Medicine, Tamilnadu Medical University, 2000  
India Inst of Medical Sci, 2003

**Chris M Palmer, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Emergency Medicine



Bachelor of Science, Virginia Tech, 2004  
Empire State College, 2008

**Hess Amir Panjeton, M.D.**

Assistant Professor of Anesthesiology (Pending Executive  
Faculty Approval) (primary appointment)  
Bachelor of Science, University of Miami, 2003  
Doctor of Medicine, University of Miami, 2007

**Kyle Edward Parker, Ph.D.**

Instructor in Anesthesiology (primary appointment)  
Doctor of Philosophy, University of Missouri Columbia, 2013

**Jesus Ceferino Patino, M.D.**

Instructor in Clinical Anesthesiology  
Bachelor of Science, University of the Philippines, 1997  
Doctor of Medicine, University of the Philippines, 2002

**Giovanni Pauletti, M.S., Ph.D.**

Adjunct Professor of Anesthesiology  
Master of Science, Swiss Fed Inst Tech (EPFL), 1987  
Doctor of Philosophy, Swiss Fed Inst Tech (EPFL), 1994

**Patricia A. Penkoske, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Lindenwood University, 1969  
Doctor of Medicine, Washington University in St Louis, 1974

**Bethany Pennington, Pharm.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Pharmacy, Saint Louis College of Pharmacy, 2010

**John Albert Pieper, M.D.**

Adjunct Professor of Anesthesiology  
Bachelor of Science, University of Colorado Boulder, 1974  
Doctor of Medicine, State University of New York at Buffalo,  
1979

**Mitchell R Platin, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Kent State University, 1987

**Amynah Pradhan, Ph.D.**

Associate Professor of Anesthesiology (Pending Executive  
Faculty Approval) (primary appointment)  
null, McGill University, 1997  
null, McGill University, 2005

**Debra D Pulley, M.M.E., M.D.**

Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Vanderbilt University, 1978  
Master of Mechanical Engineering, University of Missouri  
Columbia, 1982  
Doctor of Medicine, Saint Louis University, 1987

**Laurie Jean Punch, M.D.**

Instructor in Clinical Anesthesiology  
Bachelor of Science, Yale University, 1997  
Doctor of Medicine, University of Connecticut, 2002

**R**

**Lesley Kathryn Rao, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Division Chief (Interim) - Division of Pain Management  
Doctor of Medicine, Saint Louis University, 2006

**Rashmi R Rathor, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Illinois, 2007

**Andrea Bulkley Reidy, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Illinois Wesleyan University, 2005  
Doctor of Medicine, Illinois Wesleyan University, 2010

**Eduardo Reina, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Illinois Chicago, 2011

**Clare H Ridley, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Surgery (Cardiothoracic Surgery)  
Bachelor of Arts, Columbia College of Physicians and Surgeons,  
2002  
Doctor of Medicine, Washington University in St Louis, 2008

**Isabella Rossi Riordan, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Interim Division Chief for the Progress West Division  
Doctor of Medicine, Loyola University Chicago, 2014

**Stephen L. Ristvedt, M.A., Ph.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Psychiatry  
Bachelor of Arts, University of Minnesota, 1981  
Master of Arts, University of Pennsylvania, 1983  
Doctor of Philosophy, University of Pennsylvania, 1989

**Charles M Robertson, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Arts, University of Virginia, 1997  
Doctor of Medicine, University of Virginia, 2003

**Evan Ward Roller, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Cincinnati, 2010

**S**

**Angela K Saettele, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Simpson College, 2004  
Doctor of Medicine, University of Missouri Columbia, 2008

**Monica Sala-Rabanal, Ph.D.**

Instructor in Anesthesiology (primary appointment)  
Instructor in Cell Biology and Physiology  
Bachelor of Science, University of Barcelona, 1997  
Doctor of Philosophy, University of Barcelona, 2003

**Emine Aysu Salviz, M.S., M.D.**

Instructor in Anesthesiology (primary appointment)  
Doctor of Medicine, Baskent University, 2004  
Master of Science, Ankara University, 2009

**Vijaya K Samineni, Ph.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Philosophy, Southern Illinois University, 2013

**Jessica Lauren Sanford, M.D.**

Instructor in Anesthesiology (primary appointment)  
null, Emory University, 2009  
Doctor of Medicine, University of Missouri Columbia, null

**Benjamin Sanofsky, M.Ed., M.D.**

Instructor in Anesthesiology (primary appointment)  
null, Colgate University, 2008  
null, CUNY Hunter College, 2012  
null, Stony Brook School of Medicine, 2016

**Matthew Stringfellow Sanzalone, M.D.**

Instructor in Anesthesiology (Pending Dean's Approval) (primary appointment)  
Doctor of Medicine, Louisiana State University, 2015

**Charles R Schrock, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Notre Dame, 1986  
Doctor of Medicine, University of Missouri Columbia, 1991

**Rajiv K Shah, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Rochester, 2010

**Nicole Jimin Shin, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2010  
Doctor of Medicine, Washington University in St Louis, 2015

**Preet Mohinder Singh, M.D., MBBS**

Assistant Professor of Anesthesiology (primary appointment)  
Foreign MD equivalent, Dayanand Medical College, 2007  
India Inst of Medical Sci, 2010

**Pratik Sinha, Ph.D., M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Manchester, 2001  
Doctor of Medicine, University of Manchester, 2002  
Doctor of Philosophy, Imperial College, 2013

**Sarah Kendall Smith, Ph.D., M.D.**

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, University of Kansas, 2004  
Doctor of Philosophy, University of Kansas Medical, 2011  
Doctor of Medicine, University of Kansas Medical, 2013

**Joshua Spiro, M.D.**

Instructor in Anesthesiology (primary appointment)  
Instructor in Anesthesiology (primary appointment)

null, New York University, 2013  
null, University of Arizona, 2017

**John Charles Spittler, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 1998  
Doctor of Medicine, University of Missouri Columbia, 2003

**Joseph H Steinbach, Ph.D.**

Professor Emeritus of Anesthesiology  
Bachelor of Arts, Reed College, 1968  
Doctor of Philosophy, University of California San Diego, 1973

**Tracey Wagner Stevens, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2008

**Sanjay Subramanian, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Associate Professor of Medicine  
Doctor of Medicine, Christian Medical College, 1994

**Robert A Swarm, M.D.**

Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, Oberlin College, 1978  
Doctor of Medicine, Washington University in St Louis, 1983

**T**

**Rene Tempelhoff**

Professor Emeritus of Anesthesiology

**Raghu P Terkonda, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 1983  
Doctor of Medicine, University of Missouri Columbia, 1987

**Loc Vinh Thang, Ph.D., M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Michigan State University, 2015  
null, Michigan State University, 2103

**Douglas Royce Thompson, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Vice Chair - Education  
Bachelor of Science, University of California San Diego, 1998  
Doctor of Medicine, University of California San Diego, 2003

**Silvestre A Tomeldan, M.D.**

Instructor Emeritus in Anesthesiology  
Doctor of Medicine, School Not Listed, 1970

**V**

**Swarup Varaday, MBBS**

Associate Professor of Anesthesiology (primary appointment)  
Foreign MD equivalent, Andhra University, 1989

**Anandhalakshmi Varadharajan, M.D., MBBS**

Voluntary Clinical Instructor in Anesthesiology  
Foreign MD equivalent, Sriramachandra Medical College, 2000

Doctor of Medicine, St. Lukes, 2007

**Gershon Ram Volotzky, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Aviv University, 1979

**W**

**Brian Louis Weber, J.D., M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, University of Missouri in St Louis, 2005  
Juris Doctor, Washington University in St Louis, 2008  
Doctor of Medicine, University of Missouri Kansas City, 2015

**Ashley Brooke Weinhold, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, University of Arkansas, 2011

**Brian T Wessman, M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Division Chief - Division of Critical Care Medicine  
Associate Professor of Emergency Medicine  
Associate Professor of Emergency Medicine  
Bachelor of Science, College of William and Mary, 2000  
Doctor of Medicine, Commonwealth College, 2005

**Troy S Wildes, M.D.**

Division Chief - Division of Perioperative Medicine  
Bachelor of Science, Illinois Wesleyan University, 1998  
Doctor of Medicine, Washington University in St Louis, 2002

**James Douglas Wirthlin, M.D.**

Instructor in Anesthesiology (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Brigham Young University, 2006  
Doctor of Medicine, Uniformed Services University of the Health Sciences, 2012

**Brett D Wolff, M.D.**

Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, Indiana University Bloomington, 1981  
Doctor of Medicine, Indiana University School of Medicine, 1985

**Maxim Wolfson, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2015

**X**

**Xiaoming Xia, M.S., Ph.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Fudan University, 1984  
Master of Science, Shanghai Jiao Tong University, 1987  
Doctor of Philosophy, Vollum Institute of Oregon Health and Science University, 1998

**Zili Xie, Ph.D.**

Instructor in Anesthesiology (Pending Dean's Approval) (primary appointment)  
Doctor of Philosophy, Wuhan University (#####), 2017

**Y**

**Branden Edward Yee, M.P.H., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Tufts University, 2004  
Doctor of Medicine, Tufts University, 2008  
null, Tufts University, 2008

**Xiaobin Yi, M.D.**

Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Hunan Medical University, 1985

**Alexander H Young, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Arts, University of Mississippi, 1986  
Doctor of Medicine, University of Arkansas, 1990

**Anna Rebecca Young, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, Asbury College, 2004  
Doctor of Medicine, University of Kentucky, 2008

**Z**

**Paul Battista Zanaboni, Ph.D., M.D.**

Associate Professor of Anesthesiology (primary appointment)  
Doctor of Philosophy, Saint Louis University, 1990  
Doctor of Medicine, Saint Louis University, 1992

**Jing Zhong, M.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Duke University, 2009  
Doctor of Medicine, University of North Carolina at Chapel Hill, 2017

**Yu Zhou, M.S., Ph.D.**

Instructor in Anesthesiology (primary appointment)  
Bachelor of Science, Wuhan University, 1996  
Master of Science, Zhejiang Medical University, 1999  
Doctor of Philosophy, State University of New York at Buffalo, 2005

**Anita Mathew Zimmerman, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Bachelor of Science, University of Illinois Chicago, 2010  
Doctor of Medicine, University of Illinois Chicago, 2014

**Jonathan Kramer Zoller, M.D.**

Assistant Professor of Anesthesiology (primary appointment)  
Doctor of Medicine, Tulane University, 2009

## Research Electives

### Anesthesiology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

Special electives in basic science research as it applies to anesthesiology can be arranged with the principal investigators in the Department of Anesthesiology (<http://anest.wustl.edu>); in the Division of Basic Research under the direction of Jose Moron-Concepcion, PhD; in the Washington University Pain Center under the direction of Rob Gereau, PhD; and in the Division of Clinical and Translational Research under the direction of Simon Haroutounian, PhD.

The basic science laboratories focus on various topics related to ion channel structure and function, molecular mechanisms of anesthetic action, sepsis, cellular and molecular mechanisms of reward and addiction, and the cellular and genetic basis of acute and chronic pain and itch. Arrangements for these special electives are made through the specific investigators: Zhou-Feng Chen, PhD; Meaghan Creed, PhD; Alex S. Evers, MD; Narasimhan Gautam, PhD; Robert W. Gereau, PhD; Richard S. Hotchkiss, MD; Hongzhen Hu, PhD; Christopher J. Lingle, PhD; Qin Liu, PhD; Jose Moron-Concepcion, PhD; or Arvind Palanisamy, MD. In addition, opportunities exist for clinical research under the direction of Joanna Abraham, PhD; Michael Avidan, MBBCh; Anne Drewry, MD; Brian Fuller, MD; Simon Haroutounian, PhD; Thomas Kannamapallil, PhD; Michael Montana, MD, PhD; Ben Palanca, MD, PhD; or Troy Wildes, MD.

## Courses

Visit online course listings to view offerings for M10 Anesth (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M10>).

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### M10 Anesth 805 Anesthesiology

This clinical elective is designed to familiarize the student with basic aspects of anesthesiology practice. The primary teaching method is patient care in a clinical setting (one-on-one). The student will learn the basics of preoperative evaluation of surgical patients, the use of intraoperative monitoring in patient management and postoperative care. In addition to perioperative care, the student will be exposed to other clinical areas which include our pain management clinic, regional anesthesia/acute pain management, cardiothoracic intensive care unit, labor and delivery, pediatric anesthesia, and the Center for Preoperative Assessment and Planning. During the four-week rotation, the student will learn airway management skills, practical perioperative fluid and electrolyte therapy, along with general and regional anesthetic techniques. As an integral part of the anesthesia care team, the student will participate actively in the anesthetic management of surgical patients. The student's specific requests to be assigned to certain types of cases will be honored as time and availability dictate. The rotation will include three clinical simulator sessions using a simulator mannequin for practical management of airway problems, resuscitation, and trauma emergencies. By the end of the rotation, the student should be able to independently (under supervision) provide anesthesia for uncomplicated surgical procedures.

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### M10 Anesth 811 Cardiothoracic Anesthesiology Subinternship

This clinical elective offers practical experience in the perioperative assessment and management of surgical patients undergoing cardiothoracic procedures. The student, as an integral part of the cardiothoracic anesthesia team that is composed of faculty members, fellows and residents, will learn basic principles of airway management and lung ventilation, essential aspects of pharmacologic treatment of hemodynamic abnormalities and cardiac dysrhythmias, and management of intraoperative coagulation disturbances. Emphasis will be placed on the interpretation of intraoperative hemodynamic data, echocardiographic finding (TEE), and laboratory results. During this rotation, the student will also gain practical experience in endotracheal intubation as well as the placement of intravenous lines and invasive monitoring lines, including radial artery and pulmonary artery catheters. Students will learn how to use these parameters in clinical decision making during anesthesia. At the conclusion of the rotation, the student will have a better understanding of invasive monitoring and data interpretation, as well as a more systematic approach to the management of intra- and post-operative hemodynamic, pulmonary and coagulation abnormalities. The students are expected to attend the didactic sessions of CTA and the Department of Anesthesiology. A presentation will be assigned.

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### M10 Anesth 812 Pediatric Anesthesiology

This clinical elective is designed to teach the theory and practice of pediatric anesthesiology and pain management. It features individualized instruction with faculty who specialize in the perioperative care of pediatric patients. The elective consists of active participation with pediatric anesthesiologists at St. Louis Children's Hospital and St. Louis Shriners Hospital learning pre-anesthetic assessment, the performance of routine anesthetics (which includes instruction and practice in pediatric airway skills), learning other technical skills such as intravenous line placement and the management of post-anesthesia care and pain therapies. The final week may be tailored to meet the student's individual interests, needs and career goals. Possibilities include exposure to sedation and anesthesia for procedures outside of the operating rooms, and to subspecialties including cardiovascular anesthesia, neurosurgical anesthesia, and acute and chronic pediatric pain management. Students also will have an opportunity to learn the management of some common medical emergencies in the Clinical Simulation Center.

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### M10 Anesth 819 Cardiothoracic Critical Care Subinternship

This clinical elective offers practical experience in the postoperative management of cardiothoracic patients. The student will be fully integrated into one of the intensive care teams and have the opportunity to contribute to the management of critically ill patients. Students will have the opportunity to follow specific patients over the course of their stay in the ICU, during which time they will gain insight into holistic management of patients with multi-organ dysfunction. The CTICU environment is both challenging and exciting. Students will gain unique insight into cardiorespiratory physiology and pharmacology which will be demonstrated at the patients' bedside, an invaluable and unforgettable learning experience. Students will have opportunities to learn and sometimes assist with procedures, such as central lines, chest tubes, bronchoscopy and pulmonary artery catheter insertion as well as bedside ultrasound including TTE and TEE. Principles of management and resuscitation of hemodynamically unstable patients following surgery will be emphasized as well as ventilator management. Students will

also see and help manage patients with unique physiology such as those patients on ventricular assist devices, and on ECMO. We also have a very busy and heart and lung transplantation program at the hospital - all of these patients are cared for in the CTICU. At the conclusion of the rotation, the student will have a better understanding of shock, sepsis, multi-organ failure, organ system support and compassionate withdrawal of life support. In addition to bedside teaching, there will be informal teaching sessions on a wide variety of topics as well as teaching on interpreting hemodynamic data and waveforms, and cardiac echo exams. Students will be encouraged to present on their patient at morning rounds, during which constructive feedback and interactive teaching will occur. Medical students will be asked to present a short discussion on a topic of their choice. This should be a short 20 - 30 minute presentation followed by a discussion on the topic which will be moderated by the attending. Discuss the time and topic of choice with the attending of service.

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#### **M10 Anesth 820 Critical Care Subinternship**

Students on this rotation are integral members of the multidisciplinary intensivist-led critical care team in the Surgical Intensive Care Unit (SICU). Students learn an organ systems-based approach for evaluation and management of critically ill and injured patients, and application of evidence-based principles in delivery of state-of-the-art critical care. Emphasis is placed on critical care knowledge and techniques used at the bedside in the clinical management of serious traumatic and surgical conditions. Students become familiar with resuscitation and cardiopulmonary support, including methods for non-invasive and invasive hemodynamic monitoring, and techniques for airway management and pulmonary support in respiratory failure. Basic knowledge and skills in the management of blunt and penetrating trauma, neurologic injuries, multi-system organ failure, and life-threatening infections in the surgical patient are also taught, as is the importance of treatments to alleviate anxiety and pain, maintain fluid and electrolyte balance, and providing adequate nutrition. Practical experience is gained in placement of vascular access devices, airway equipment, ultrasonography and its applications, interpretation of imaging and laboratory data, and use of guidelines, protocols and quality assurance tools in the management of critically ill patients.

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#### **M10 Anesth 821 Pain Management**

Acute pain is the most common symptom of medical illness and is ubiquitous after major surgery. Chronic pain is the leading cause of worker disability. Severe pain afflicts most people with advanced cancer. Learning the fundamentals of pharmacologic, interventional, and multidisciplinary pain management is important for all areas of clinical medicine.

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#### **M10 Anesth 822 Anesthesiology for Neurosurgery Subinternship**

Students will help care for patients having challenging neurosurgical procedures. Students will become familiar with complex procedures, brain monitoring, cardiovascular support and airway management and will be exposed to all kinds of neurosurgical pathology. Student must be prepared to participate in the intricate anesthetic management of patients undergoing surgery in our novel intraoperative MRI rooms. For those interested, clinical research projects are ongoing and student participation is encouraged.

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#### **M10 Anesth 823 Obstetrical Anesthesiology**

The medical students will learn the different analgesia/anesthetic options for the labor patient. They will also learn how the physiological adaptations of pregnancy influence anesthetic management. They will be actively involved in the parturient's management, i.e., starting an IV, placement of spinal, epidural or CSE (combined spinal epidural) anesthetics. They will also attend the OB anesthesia conferences and interview patients in labor (with an OB anesthesia attending).

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#### **M10 Anesth 900 Research Elective - Anesthesiology**

Research opportunities may be available. If interested, please contact the Department of Anesthesiology.

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## **Department of Biochemistry and Molecular Biophysics**

The faculty of the Department of Biochemistry and Molecular Biophysics perform research in a broad spectrum of biomedically relevant areas, including DNA and RNA structure and enzymology; protein folding, misfolding and aggregation; cellular mechanics; membrane receptor-mediated signaling; and hemostasis, thrombosis and vascular biology. The department offers training opportunities at the crossroads of biochemistry, biophysics, systems biology, proteomics, computational science and pharmacological sciences.

The department's approaches to research focus on understanding the energetics, structure and mechanisms of biological processes. Investigators employ a variety of experimental methods (e.g., X-ray crystallography, nuclear magnetic resonance, mass spectrometry, optical spectroscopy, thermodynamics, rapid kinetics) in combination with computational approaches to unravel the molecular underpinnings of processes of relevance to health and disease. Novel single-molecule methods are providing new insight into the molecular details of enzyme mechanisms and macromolecule dynamics. The high-throughput screening of chemical libraries and the use of synthetic medicinal chemistry to develop small-molecule probes of biological systems provide new avenues for translational research and the development of experimental therapeutics.

The faculty in the department organize and teach basic science courses in the medical school curriculum. In the Arts & Sciences curriculum, the faculty teach courses in Nucleic Acids & Protein Biosynthesis (Biol 548), Chemistry and Physics of Biomolecules (Biol 5357), and Macromolecular Interactions (Biol 5312). The overarching theme of these courses is to understand the principles of the molecular interactions that underlie the biological process of health and disease. Students in the School of Medicine and the School of Arts & Sciences are eligible for these courses and may elect to pursue biomedical research under the direction of our faculty. A full listing of advanced course topics (<https://biochem.wustl.edu/studentinfo/courses/>) can be found on our website.

Website: <http://biochem.wustl.edu>

## Faculty

**John A. Cooper, MD, PhD** (<https://biochem.wustl.edu/faculty/cooper/>)

Department Chair

Visit our website for more information about our faculty (<http://biochem.wustl.edu/faculty/>) and their appointments.

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### A

**Hema Adhikari**

Assistant Professor of Biochemistry & Molecular Biophysics  
(primary appointment)

### B

**Jacques Ulrich Baenziger, Ph.D., M.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics  
Bachelor of Arts, New College of Florida, 1969  
Doctor of Philosophy, Washington University in St Louis, 1975  
Doctor of Medicine, Washington University in St Louis, 1975

**Wayne Morris Barnes, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Bachelor of Arts, University of California Riverside, 1969  
Doctor of Philosophy, University of Wisconsin Madison, 1974

**Melissa Diane Stuchell Breton, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary  
appointment)  
Bachelor of Science, University of Missouri in St Louis, 2001  
Doctor of Philosophy, University of Utah, 2006

**Peter M Burgers, M.S., Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary  
appointment)  
Marvin A. Brennecke Professor of Biological Chemistry  
Bachelor of Science, Leiden University, 1969  
Master of Science, Leiden University, 1972  
Doctor of Philosophy, Leiden University, 1977

### C

**John A Cooper, Ph.D., M.D.**

Professor of Biochemistry and Molecular Biophysics (primary  
appointment)  
Professor of Cell Biology and Physiology  
Alan A. and Edith L. Wolff Professorship in Biochemistry and  
Molecular Biophysics  
Bachelor of Science, Brown University, 1977  
Doctor of Medicine, Johns Hopkins University, 1982  
Doctor of Philosophy, Johns Hopkins University, 1983

### D

**Gregory DeKoster, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary  
appointment)

Bachelor of Arts, Monmouth University, 1990

Doctor of Philosophy, University of Iowa, 1997

**Roland Ellwood Dolle, M.S., Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics  
(primary appointment)

Bachelor of Science, Arizona State University, 1978

Master of Science, State University of New York, 1980

Doctor of Philosophy, University of Pennsylvania, 1984

### E

**Elliot L Elson, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics  
Bachelor of Arts, Harvard University, 1959  
Doctor of Philosophy, Stanford University, 1966

### F

**William A Frazier, Ph.D.**

Emeritus Professor of Biochemistry and Molecular Biophysics  
Bachelor of Arts, Johns Hopkins University, 1969  
Doctor of Philosophy, Washington University in St Louis, 1973

**Carl Frieden, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary  
appointment)  
Bachelor of Arts, Carleton College, 1951  
Doctor of Philosophy, University of Wisconsin Madison, 1955

### G

**Eric A Galburt, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Doctor of Philosophy, University of Washington, 2002

**Roberto Galletto, M.S., Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Master of Science, University of Genova, 1996  
Doctor of Philosophy, University of Texas Galveston, 2002

**Benjamin Aaron Garcia, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary  
appointment)  
Head of the Department of Biochemistry and Molecular  
Biophysics  
Raymond H. Wittcoff Distinguished Professor of Biological  
Chemistry  
Doctor of Philosophy, University of Virginia, 2005

**Young Ah Goo, M.S.**

Professor of Biochemistry and Molecular Biophysics (primary  
appointment)  
Professor of Genetics  
null, Chonnan National University, 1990

Seattle Campus, 1994

**Lina Greenberg, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, Brandeis University, 2004

Doctor of Philosophy, Tufts University, 2010

**Michael Jonathan Greenberg, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, Brandeis University, 2004

Doctor of Philosophy, Boston University, 2010

**H**

**Kathleen Hall, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, University of Minnesota, 1974

Doctor of Philosophy, University of California Berkeley, 1985

**Alexander Steven Holehouse, Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Doctor of Philosophy, Washington University in St Louis, 2017

**William F Holmes, Ph.D.**

Associate Professor Emeritus of Biological Chemistry

Bachelor of Arts, Princeton University, 1953

Doctor of Philosophy, University of Pennsylvania, 1960

**I**

**Maxenia Garcia Ilagan, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Associate Professor of Developmental Biology

Doctor of Philosophy, University of Missouri Columbia, 2000

**J**

**James W Janetka, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)

Champaign, 1990

Doctor of Philosophy, University of Wisconsin Madison, 1996

**K**

**Yuriy Victorovich Kirichok, M.S., Ph.D.**

Professor of Biochemistry and Molecular Biophysics (Pending Executive Faculty Approval) (primary appointment)

null, Moscow Institute of Physics and Technology, null

null, Bogomoletz Institute of Physiology of NAS of Ukraine, null

**Alexander Kozlov, M.S., Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)

Master of Science, Moscow State University, 1983

Doctor of Philosophy, Moscow State University, 1994

**Andrzej Modest Krezel, M.S., Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (Pending Executive Faculty Approval) (primary appointment)

Master of Science, University of Warsaw, 1986

Doctor of Philosophy, University of Wisconsin Madison, 1991

**Shivesh Kumar**

Asst Prof of Biochemistry and Molecular Biophysics (primary appointment)

**L**

**Weikai Li, M.S., Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, East China Univ of Sci & Tech, 1993

Master of Science, University of Tennessee, 1998

Doctor of Philosophy, Yale University, 2004

**Timothy M Lohman, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)

Brennecke Professor of Biophysics in Biochemistry and Molecular Biophysics

Bachelor of Arts, Cornell University, 1973

Doctor of Philosophy, University of Wisconsin Madison, 1977

**M**

**John E Majors, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics

Bachelor of Science, University of Washington, 1970

Doctor of Philosophy, Harvard University, 1977

**Garland R Marshall, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics

Bachelor of Science, California Institute Technology (Duplicate of California Institute of Technology), 1962

Doctor of Philosophy, Rockefeller University, 1966

**F. Scott Mathews, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics

Bachelor of Science, University of California, 1955

Doctor of Philosophy, University of Minnesota, 1959

**Joseph B Monahan, Ph.D.**

Adjunct Assistant Professor of Biochemistry and Molecular Biophysics

Bachelor of Science, State University of New York at Buffalo, 1977

Doctor of Philosophy, University of South Carolina Columbia, 1983

**N**

**Natalie Marie Niemi, Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, University of Michigan, 2005  
Doctor of Philosophy, Van Andel Research Institute, 2012

## O

### Michael D Onken, Ph.D.

Associate Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1990  
Doctor of Philosophy, Washington University in St Louis, 2000

## P

### Linda J Pike, Ph.D.

Professor of Biochemistry and Molecular Biophysics (primary  
appointment)  
Alumni Endowed Professor of Biochemistry and Molecular  
Biophysics  
Bachelor of Science, University of Delaware, 1975  
Doctor of Philosophy, Duke University, 1980

## R

### Janice Lee Robertson, Ph.D.

Associate Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Bachelor of Science, University of Toronto, 2002  
Doctor of Philosophy, Cornell University, 2009

### Ana Maria Ruiz Manzano, Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Doctor of Philosophy, Universidad Autonomoma de Madrid, 2004

## S

### Andrea Soranno, M.S., Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Master of Science, University of Milan, 2005  
Doctor of Philosophy, University of Milan, 2008

## W

### Gabriel Waksman, M.S., Ph.D.

Adjunct Professor of Biochemistry and Molecular Biophysics  
Bachelor of Science, School Not Listed, 1979  
Master of Science, School Not Listed, 1980  
Doctor of Philosophy, School Not Listed, 1982

### Katherine Anne Henzler Wildman, Ph.D.

Adjunct Associate Professor of Biochemistry and Molecular  
Biophysics  
Bachelor of Science, Cornell University, 1998  
Doctor of Philosophy, University of Michigan (Duplicate of  
University of Michigan Ann Arbor), 2003

## Z

### Rui Zhang, Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics  
(primary appointment)  
Bachelor of Science, Nanjing University, 2005  
Doctor of Philosophy, Baylor University, 2010

## Research Electives

### Biochemistry and Molecular Biophysics Research Electives

During the fourth year, opportunities exist for many varieties of  
advanced clinical or research experiences.

---

### Wayne M. Barnes, PhD

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-3351

Inventing a new way to sequence DNA; PCR at one temp; RT-  
enabled Taq pol

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### Greg Bowman, PhD

South Building, 2nd Floor  
Phone: 314-362-7433

The Bowman lab seeks to understand how protein dynamics  
gives rise to functional processes like allosteric communication  
between distant sites and to exploit our insight into this shape-  
shifting to design new drugs and proteins.

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### Peter M.J. Burgers, PhD

South Building, 1st Floor  
Phone: 314-362-3872

Molecular biology of DNA replication and damage response in  
yeast and humans

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### John Cooper, MD, PhD

South Building, 2nd Floor  
Phone: 314-362-0287

Molecular mechanisms of cell motility and cytoskeleton assembly

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### Carl Frieden, PhD

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-3344

Protein folding, aggregation, intrinsically disordered proteins,  
fluorescence methods, ApoE lipoproteins and Alzheimer's  
disease

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### Eric A. Galburt, PhD

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-5201



Biophysical studies of transcription initiation in eukaryotes and mycobacterial tuberculosis

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**Roberto Galletto, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-4368

Mechanistic studies of DNA motor proteins

---

**Michael Greenberg, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-8670

Our lab is focused on cytoskeletal molecular motors in health and disease. We are currently studying the effects of mutations that cause heart disease.

---

**Kathleen Hall, PhD**

South Building, 2nd Floor  
Phone: 314-362-4196

We study RNA folding and RNA binding to proteins.

---

**Alex Holehouse, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-273-8371

Understand how function is encoded into disordered sequences using a combination of computational and experimental approaches

---

**Jim Janetka, PhD**

Cancer Research Building, 2nd Floor  
Phone: 314-362-0509

Rational structure-based drug design and synthesis for cancer and infectious disease

---

**Andrzej Krezel, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-8482

Structural biology of transcriptional regulation in the gastric pathogen *Helicobacter pylori*

---

**Weikai Li, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-8687

Structural and biochemical studies of membrane proteins supporting blood coagulation

---

**Timothy M. Lohman, PhD**

North Building, 2nd Floor  
Phone: 314-362-4393

Mechanisms of DNA-protein interactions; DNA motor proteins (helicases) and SSB proteins

---

**Garland R. Marshall, PhD**

Cancer Research Building, 2nd Floor  
Phone: 314-935-7911

A major focus is molecular recognition: the basis of intermolecular interactions and specificity seen in drug and hormone receptors and in antigen-antibody and substrate-enzyme systems.

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**Linda Pike, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-9502

Our focus is on the mechanisms of action of growth factors and polyphosphoinositide metabolism.

---

**Janice Robertson, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-273-7758

Our goal is to understand how and why membrane proteins fold, form stable complexes, and achieve conformational stability inside of the oil-filled cell membrane.

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**Andrea Soranno, PhD**

South Building, 2nd Floor  
Phone: 314-273-1632

Our main research interests are the physical principles and molecular mechanisms that determine biomolecular function.

---

**Rui Zhang, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-273-1663

We combine single-molecule fluorescence spectroscopy and concepts from polymer physics to investigate intrinsically disordered proteins. We also develop innovative methods to study macromolecular conformations and dynamics within cells and in membraneless organelles.

## Courses

The Department of Biochemistry and Molecular Biophysics also offers courses through the School of Arts & Sciences. For a full listing of courses offered, please visit the university's online course catalog (<https://courses.wustl.edu/CourseInfo.aspx?scl=L&dept=L41&crslvl=5:9>).

Visit online course listings to view offerings for M15 Biochem (<https://courses.wustl.edu/CourseInfo.aspx?scl=M&dept=M15>).

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### M15 Biochem 502 Molecular Foundations of Medicine

This course is designed primarily for medical students and will cover fundamental aspects of biochemistry and cell biology. The course begins with a treatment of protein structure and the function of proteins in the cytoskeleton and cell motility. The principles of enzyme kinetics and regulation are then discussed and basic pathways for the synthesis and metabolism of carbohydrates and lipids are introduced. This leads in to a discussion of membrane structure and the function cellular organelles in biological processes including energy production, protein degradation and protein trafficking. Small group case study sections serve to link the basic science to the clinic. Credit 46.5 units.

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### M15 Biochem 5068 Fundamentals of Molecular Cell Biology

Same as Arts and Sciences L41 5068.  
Credit 47 units.

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## Department of Cell Biology and Physiology

Cell biology is one of the primary disciplines in medical research, influencing all areas of basic and clinical investigation. The future holds great opportunities in cell biology research due to inventories of the genes and proteins from which cells are built, new experimental techniques and various model organisms. Further discoveries about the cell biology of human genes will continue to translate into therapeutics. Also on the horizon is a better understanding of how proteins and sets of proteins (e.g., macromolecular complexes) are assembled and integrated to produce function.

The Department of Cell Biology and Physiology (<http://cellbiology.wustl.edu>) is ranked among the top 10 cell biology departments in the country, and the research carried out by its faculty covers a broad range of fields within cellular physiology and molecular cell biology. A unifying theme is the study of fundamental processes and their regulation. These cellular processes include genome maintenance, apoptosis, cell cycle control, dynamic cell motility, angiogenesis, signal transduction and membrane trafficking, presynaptic processes, prion protein misfolding, RNA metabolism, and the structure and function of ion channels. The department's research activities provide a foundation for studies in cancer biology, immunobiology, developmental biology, neurobiology and vascular biology. Its

faculty use model organisms as well as human stem cells and a variety of techniques such as deep-etch electron and confocal microscopy to carry out their research. Cellular imaging is a particular strength of the department.

The Department of Cell Biology and Physiology oversees the physiology contents within the Washington University School of Medicine's Gateway curriculum, which is designed to provide first-year medical students with a foundation for their further study of clinical and applied physiology. The Molecular Cell Biology course for first-year graduate students conveys an understanding of fundamental cell biology research strategies and principles. In addition, advanced courses open to medical and graduate students provide for more detailed study of specific areas of cell biology, physiology and cellular biophysics.

Website: <http://cellbiology.wustl.edu>

## Faculty

**David W. Piston, PhD** ([http://cellbiology.wustl.edu/People/Faculty/piston\\_d/](http://cellbiology.wustl.edu/People/Faculty/piston_d/))

Department Head

Visit our website for more information about our faculty (<http://www.cellbiology.wustl.edu/faculty/>) and their appointments.

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### A

**Ghazaleh Ashrafi, Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Assistant Professor of Genetics

Doctor of Philosophy, Harvard University, 2020

### B

**Kendall Jay Blumer, Ph.D.**

Professor of Cell Biology and Physiology (primary appointment)

Bachelor of Arts, Rice University, 1977

Doctor of Philosophy, Duke University, 1986

### C

**Clair Lorraine Crewe, Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Assistant Professor of Medicine

Bachelor of Science, Oklahoma Christian University, 2009

Doctor of Philosophy, University of Oklahoma Health Sciences Center, 2015

### D

**Panyue Deng, M.S., Ph.D., M.D.**

Associate Professor of Cell Biology and Physiology (primary appointment)

Doctor of Medicine, Hunan Medical University, 1995

Master of Science, University of Science, Malaysia, 2001

Doctor of Philosophy, University of Science, Malaysia, 2004

**Lai Kuan Dionne, Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Doctor of Philosophy, University of Colorado, 2010

**Sergej Djuranovic, Ph.D.**

Associate Professor of Cell Biology and Physiology (primary appointment)

Doctor of Philosophy, Universität Tübingen, 2006

**G**

**Denis Goldfarb, Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Assistant Professor of Medicine

Bachelor of Science, Rensselaer Polytechnic Institute, 2010

Doctor of Philosophy, University of North Carolina at Chapel Hill, 2019

**Subhadra C Gunawardana, M.S., Ph.D.**

Associate Professor of Cell Biology and Physiology (primary appointment)

Master of Science, Iowa State University, 1995

Doctor of Philosophy, Cornell University, 2002

**H**

**Phyllis I Hanson, Ph.D., M.D.**

Adjunct Professor of Cell Biology and Physiology

Bachelor of Arts, Yale University, 1985

Doctor of Philosophy, Stanford University, 1993

Doctor of Medicine, Stanford University, 1993

**John E Heuser, M.D.**

Professor Emeritus of Cell Biology and Physiology

Bachelor of Science, Harvard University, 1964

Doctor of Medicine, Harvard University, 1969

**James E Huettner, Ph.D.**

Professor of Cell Biology and Physiology (primary appointment)

Professor of Biomedical Engineering

Bachelor of Science, Indiana University, 1980

Bachelor of Arts, Indiana University, 1981

Doctor of Philosophy, Harvard University, 1987

**J**

**Silvia Jansen, M.S., Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Master of Science, Katholieke Universiteit, 2003

Doctor of Philosophy, Katholieke Universiteit, 2007

**K**

**David John Edward Kast, M.S., Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Bachelor of Science, University of Minnesota, 2000

Master of Science, University of Minnesota, 2004

Doctor of Philosophy, University of Minnesota, 2018

**Vitaly A Klyachko, M.S., Ph.D.**

Professor of Cell Biology and Physiology (primary appointment)

Professor of Biomedical Engineering

Professor of Neuroscience

Bachelor of Science, Moscow State University, 1997

Master of Science, Moscow State University, 1998

Doctor of Philosophy, University of Wisconsin Madison, 2002

**L**

**Sun Joo Lee, M.S., Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Bachelor of Science, Handong Global University, 2000

Ju Inst. Of Sci & Tech, 2002

Doctor of Philosophy, Washington University in St Louis, 2010

**M**

**Michael Benjamin Major, Ph.D.**

Professor of Cell Biology and Physiology (primary appointment)

Professor of Otolaryngology

Alan A. and Edith L. Wolff Professorship in Cell Biology and Physiology

Bachelor of Science, Michigan State University, 1997

Doctor of Philosophy, University of Utah, 2004

**Grigory Makshev, M.S., Ph.D.**

Instructor in Cell Biology and Physiology (primary appointment)

Master of Science, Moscow Inst of Physics & Techn, 1998

Doctor of Philosophy, Moscow State University, 2002

**Dario Maschi, Ph.D.**

Assistant Professor of Cell Biology and Physiology (primary appointment)

Doctor of Philosophy, Universidad del Buenos Aires, 2012

**Robert Paul Mecham, Ph.D.**

Professor of Cell Biology and Physiology (primary appointment)

Professor of Biomedical Engineering

Professor of Medicine

Professor of Pediatrics

Alumni Endowed Professor of Cell Biology and Physiology

Bachelor of Science, University of Utah, 1973

Doctor of Philosophy, Boston University, 1977

**Robert W Mercer, Ph.D.**

Professor Emeritus of Cell Biology and Physiology

Bachelor of Arts, San Jose State University, 1974

Doctor of Philosophy, Syracuse University, 1980

**N**

**Colin G Nichols, Ph.D.**

Professor of Cell Biology and Physiology (primary appointment)

Carl F Cori Professor

Bachelor of Science, University of Leeds, 1982  
Doctor of Philosophy, University of Leeds, 1985

## P

### David James Pagliarini, Ph.D.

Professor of Cell Biology and Physiology (primary appointment)  
Professor of Biochemistry and Molecular Biophysics  
Professor of Genetics  
Hugo F. and Ina C. Urbauer Professorship  
Doctor of Philosophy, University of California San Diego, 2020

### Slavica Pavlovic Djuranovic, Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)  
Bachelor of Science, University of Belgrade, 1999  
Doctor of Philosophy, University of Tubingen, 2006

### David William Piston, M.S., Ph.D.

Professor of Cell Biology and Physiology (primary appointment)  
Head of the Department of Cell Biology and Physiology  
Edward Mallinckrodt, Jr. Professorship in Cell Biology and Physiology  
Bachelor of Science, Grinnell College, 1984  
Champaign, 1985  
Champaign, 1989

### Helen Pivnicka-Worms, Ph.D.

Adjunct Professor of Cell Biology and Physiology  
Bachelor of Arts, Saint Olaf College, 1979  
Doctor of Philosophy, Duke University, 1984

### Jasmina Profirovic, Ph.D.

Adjunct Assistant Professor of Cell Biology and Physiology  
Bachelor of Science, University of Belgrade, 1997  
Doctor of Philosophy, University of Illinois Chicago (Duplicate of University of Illinois at Chicago), 2005

## S

### Paul Henry Schlesinger, Ph.D., M.D.

Associate Professor of Cell Biology and Physiology (primary appointment)  
Bachelor of Science, University of Illinois, 1966  
Doctor of Medicine, University of Chicago, 1970  
Doctor of Philosophy, University of Chicago, 1973

### Philip Damien Stahl, Ph.D.

Edward Mallinckrodt Jr Professor Emeritus  
Bachelor of Science, West Liberty State College, 1964  
Doctor of Philosophy, West Virginia University, 1967

### Sheila Stewart-Wigglesworth, Ph.D.

Professor of Cell Biology and Physiology (primary appointment)  
Professor of Medicine  
Gerty Cori Professor of Cell Biology and Physiology  
Vice Chair - Cell Biology and Physiology  
Bachelor of Science, University of Minnesota, 1990  
Doctor of Philosophy, University of California Los Angeles, 1996

### Amber Nicole Stratman, Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)  
Assistant Professor of Developmental Biology  
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 2006  
Doctor of Philosophy, University of Missouri Columbia, 2010

## T

### Heather L. True, M.S., Ph.D.

Professor of Cell Biology and Physiology (primary appointment)  
Associate Director of the Division of Biology and Biomedical Sciences  
David English Smith Professorship in Medicine  
Bachelor of Science, University of Wisconsin Madison, 1992  
Master of Science, University of Illinois, 1995  
Doctor of Philosophy, University of Illinois, 1998

## W

### Shizhen Wang, Ph.D.

Adjunct Instructor in Cell Biology and Physiology  
Doctor of Philosophy, Tsinghua University, China (Duplicate of Tsinghua University (#####)), 2007

### Robert S Wilkinson, M.A., Ph.D.

Professor Emeritus of Cell Biology and Physiology  
Bachelor of Arts, Rice University, 1968  
Master of Arts, University of Texas Austin, 1970  
Doctor of Philosophy, University of Texas Austin, 1974

## Y

### Zhongsheng You, M.S., Ph.D.

Associate Professor of Cell Biology and Physiology (primary appointment)  
Associate Professor of Medicine  
Bachelor of Science, Zhejiang University (National Che Kiang University) (#####), 1994  
Master of Science, Shanghai Institute of Biochemistry and Cell Biology, 1997  
Doctor of Philosophy, University of California San Diego, 2002

### Peng Yuan, Ph.D.

Associate Professor of Cell Biology and Physiology (primary appointment)  
Bachelor of Science, University of Science and Technology of China (#####), 1997  
Doctor of Philosophy, University of Pennsylvania, 2008

## Z

### Emily Zarbock, Ph.D.

Instructor in Cell Biology and Physiology (primary appointment)  
Bachelor of Science, University of North Carolina, 2013  
Doctor of Philosophy, University of Wisconsin, 2017

## Research Electives

### Cell Biology and Physiology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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#### Ghazaleh Ashrafi, PhD

510 McDonnell Sciences Building  
Phone: 314-273-5518

Uncovering novel regulators of glycolytic and mitochondrial metabolism at the synapse and their role in the pathology of Alzheimer's disease.

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#### Kendall J. Blumer, PhD

506 McDonnell Sciences Building  
Phone: 314-362-1668

Signaling mechanisms in cardiovascular and neurological disorders.

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#### Sergej Djuranovic, PhD

514 McDonnell Sciences Building  
Phone: 314-362-9706

Molecular mechanisms of translational control; cellular processes regulated by changes in RNA metabolism.

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#### Denis Goldfarb, PhD

406 McDonnell Sciences Building  
Phone: 314-273-3669

Computational mass spectrometry, proteomics, and their applications in biology.

---

#### James E. Huettner, PhD

4929 South Building  
Phone: 314-362-6628

Excitatory amino acid receptors and synaptic transmission in the central nervous system; neural differentiation of embryonic stem cells.

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#### Silvia Jansen, PhD

4900 South Building  
Phone: 314-273-1853

This lab's focus is on elucidating the molecular mechanisms that regulate the architecture, dimensions and dynamics of actin filament networks and then tuning them to support essential cellular functions that range from cell migration and cytokinesis to neurogenesis.

---

#### David J. Kast, PhD

4900 South Building  
Phone: 314-273-1852

The long-term goal of this lab's research is to understand the fundamental cellular and molecular mechanisms that drive the biogenesis and dynamics of intracellular membrane compartments, including the endocytic vesicles, the endoplasmic reticulum, the Golgi apparatus and the mitochondria.

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#### Vitaly Klyachko, PhD

501 McDonnell Sciences Building  
Phone: 314-362-5517

Mechanisms and regulation of neurotransmitter release at individual synapses; functional roles of presynaptic processes in synaptic plasticity and information processing.

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#### Michael Benjamin Major, PhD

406 McDonnell Sciences Building  
Phone: 314-273-3669

The Major lab studies how perturbation of specific signal transduction pathways contributes to the initiation, progression and dissemination of cancer.

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#### Robert P. Mecham, PhD

4606 Cancer Research Building  
Phone: 314-362-2254

This lab strives to understand the complex process of extracellular matrix assembly and organization, including studying the intracellular pathways used to transport matrix components to the cell surface and identifying helper or accessory proteins that facilitate trafficking and matrix assembly. We also study cell-matrix interactions in development and cellular mechanisms associated with connective tissue remodeling in vascular disease and heritable diseases of the connective tissues.

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#### Colin G. Nichols, PhD

9611 BJC Institute of Health  
Phone: 314-362-6630

Ion channel biology; multiple levels of analysis from the molecular basis of channel function to in vivo physiology and disease.

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#### David J. Pagliarini, PhD

1127 Couch Building  
Phone: 314-273-2330

We are an interdisciplinary team of scientists driven to understand the biochemical underpinnings of mitochondrial dysfunction in human diseases. Together, we integrate large-scale methodologies with traditional biochemistry to investigate the modulation, adaptation, and basic metabolic function of mitochondria.

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**David W. Piston, PhD**

4912 South Building  
Phone: 314-362-9121

The intracellular and intercellular dynamics of cells within the islets of Langerhans play a key role in the regulation of blood glucose levels. The islets are made up of different cell types, but very little is known about the interplay between the different cell types and how this affects their secretion of various hormones. The islets' a-cells secrete insulin in response to increased blood sugar and also in response to neurotransmitters and hormones. Glucagon also plays a key role in blood glucose homeostasis, and it is secreted by the islets' a-cells. High glucose levels inhibit glucagon secretion from a-cells within the islets but not from dispersed a-cells, and the mechanism underlying this phenomenon has not been defined. We use quantitative live cell microscopy to measure single-cell parameters within intact islets held within microfluidic devices in order to expose them to spatially heterogeneous levels of various stimuli. The resulting data are fit using mathematical models of islet functional dynamics, which we are continually modifying to better fit the observed islet physiology.

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**Sheila A. Stewart, PhD**

7610 BJC Institute of Health  
Phone: 314-362-7437

Delineation of the molecular mechanisms by which aged stromal cells contribute to tumorigenesis and the molecular mechanisms that ensure high-fidelity telomere replication and genomic stability.

---

**Amber N. Stratman, PhD**

416 McDonnell Sciences Building  
Phone: 314-273-7928

Mechanisms regulating blood vessel formation, stabilization, and blood flow sensing during development and disease.

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**Heather L. True-Krob, PhD**

413 McDonnell Sciences Building  
Phone: 314-362-3934

Biological consequences of yeast prions, in both their capacity to function as novel epigenetic elements and their utility to serve as a tractable model for the analysis of protein misfolding and aggregation that occurs in several neurodegenerative disorders.

---

**Zhongsheng You, PhD**

514 McDonnell Sciences Building  
Phone: 314-362-9893

Studies of the cellular responses to DNA damage and their cancer relevance, focusing on the functional interplays between the DNA damage checkpoint, DNA repair and chromatin structure.

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**Peng Yuan, PhD**

9608 BJC Institute of Health  
Phone: 314-747-3793

The focus of this lab is on the structure and function of ion channels and transporters, which play essential roles in human physiology and disease. How do channels and transporters recognize their specific substrate ions? How do they respond to various stimuli, including chemical ligand, temperature, membrane voltage and mechanical force? How do they interact with the lipid membrane where they reside? To answer these fundamental questions, we use multidisciplinary approaches, including X-ray crystallography, biochemistry, biophysics and electrophysiology. Dysfunction of these membrane proteins could lead to a variety of diseases, such as asthma, hypertension, cancer, heart failure, diabetes, chronic pain and many more. The long-term goal is to provide a detailed mechanistic understanding of ion channels and transporters, which will offer novel strategies for drug development and better treatment of diseases.

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## Courses

The Department of Cell Biology and Physiology also offers courses through Arts & Sciences. For current courses, please visit the university's online course listings (<https://courses.wustl.edu/CourseInfo.aspx?sch=L&dept=L41&crslvl=5:9>).

Visit the online course listings to view offerings for M75 CellBio (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M75>).

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### M75 CellBio 900 Research Elective - Cell Biology and Physiology

Research opportunities may be available. If interested, please contact the Department of Cell Biology & Physiology.

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## Department of Developmental Biology

The principal research activities of the Department of Developmental Biology are focused on attaining a mechanistic understanding of animal development, encompassing the earliest cell fate specification and movement processes that

shape the early embryo, organogenesis, stem cell biology and engineering, tissue homeostasis and repair, and aging. Students and postdoctoral fellows work closely with faculty and staff on research projects and participate in weekly journal clubs and seminars at which recent literature and ongoing research are discussed.

The developmental biology faculty employ a variety of model organisms and cell-based systems to answer key outstanding questions about the fundamental mechanisms of development and to apply this knowledge to pathogenic mechanisms that lead to human birth defects and disease; they also use this knowledge to create improved future therapies. The department takes a broad view of developmental biology, with research groups studying diverse developmental processes (e.g., early embryogenesis, organogenesis, aging) and applying multidisciplinary approaches that include forward and reverse genetics, epigenetics, molecular and chemical methods, and computational methods. Embryogenesis is a fascinating process during which a fertilized egg undergoes divisions to form a mass of pluripotent cells that signal to one another to establish embryonic polarity, diverse cell types, and organs and that also undergo massive cell migrations and rearrangements to sculpt the embryonic body.

Research is also carried out on the processes involved in tissue degeneration, repair and regeneration, the biology of embryonic and adult stem cells, and cellular reprogramming. It is a particularly opportune time for developmental biology research, as recent technological breakthroughs in both animal model systems and genomics afford insights into developmental processes at the epigenetic, genetic and molecular levels and also enable the monitoring of cell behaviors in vivo. We are discovering the genes that are responsible for birth defects and defining connections between many adult human diseases and their origins during embryogenesis. The studies of stem cells, cellular reprogramming and regeneration are bringing us closer to curing human diseases, repairing damaged organs, and extending the boundaries of aging.

Website: <http://devbio.wustl.edu>

## Faculty

**Lilianna Solnica-Krezel, PhD** (<https://developmentalbiology.wustl.edu/people/lilianna-solnica-krezel/>)

Department Head

Visit our website for more information about our faculty (<http://devbio.wustl.edu/faculty/>) and their appointments.

---

### B

**Irving Boime, M.S., Ph.D.**

Professor of Developmental Biology (primary appointment)  
Professor of Reproductive Biology in Obstetrics and Gynecology

Bachelor of Science, Saint Louis College of Pharmacy, 1964  
Master of Science, Purdue University, 1966  
Doctor of Philosophy, Washington University in St Louis, 1970

**Angela N Bowman, Ph.D.**

Associate Professor of Developmental Biology (primary appointment)  
Bachelor of Arts, University of Pennsylvania, 2006  
Doctor of Philosophy, Stanford University, 2012

### C

**Douglas Floyd Covey, M.A., Ph.D.**

Professor of Pharmacology in Developmental Biology (primary appointment)  
Professor of Psychiatry  
Professor of Anesthesiology  
Andrew C and Barbara B Taylor Distinguished Professor of Psychiatry  
Master of Arts, Johns Hopkins University, 1969  
Doctor of Philosophy, Johns Hopkins University, 1973

### D

**Aaron DiAntonio, M.Phil., Ph.D., M.D.**

Professor of Developmental Biology (primary appointment)  
Alan A and Edith L Wolff Professor of Developmental Biology  
Bachelor of Arts, Harvard University, 1988  
Master of Philosophy, Cambridge University, 1989  
Doctor of Philosophy, Stanford University, 1995  
Doctor of Medicine, Stanford University, 1995

**Sabine Dietmann, M.S., Ph.D.**

Assistant Professor of Developmental Biology (primary appointment)  
Assistant Professor of Medicine  
Master of Science, Goethe University, 1994  
Doctor of Philosophy, Freie Universität Berlin, 1999

### G

**Geoffrey John Goodhill, Ph.D.**

Professor of Developmental Biology (primary appointment)  
Professor of Neuroscience  
Professor in Computer Science and Engineering  
Doctor of Philosophy, University of Sussex, 1992

### H

**Tracey O Hermanstye, Ph.D.**

Assistant Professor of Developmental Biology (primary appointment)  
Lecturer in the College of A&S  
Doctor of Philosophy, University of Maryland Baltimore, 2012

**Didier Hodzic, Ph.D.**

Associate Professor of Developmental Biology (primary appointment)  
Assistant Professor of Cell Biology and Physiology  
Bachelor of Science, University of Liege, 1991

Doctor of Philosophy, University of Liege, 1998

## I

### **Shin-Ichiro Imai, Ph.D., M.D.**

Professor of Developmental Biology (primary appointment)  
Professor of Medicine  
M and T Tanaka Family Distinguished Professorship in Aging  
Research  
Doctor of Medicine, Keio University, 1989  
Doctor of Philosophy, Keio University, 1995

## J

### **Aaron N Johnson, Ph.D.**

Assistant Professor of Developmental Biology (primary  
appointment)  
Bachelor of Arts, Arizona State University, 1998  
Doctor of Philosophy, Arizona State University, 2006

## K

### **Stephen K Kornfeld, Ph.D., M.D.**

Professor of Developmental Biology (primary appointment)  
Bachelor of Arts, Yale University, 1984  
Doctor of Philosophy, Stanford University, 1991  
Doctor of Medicine, Stanford University, 1991

### **Kristen Louise Kroll, Ph.D.**

Professor of Developmental Biology (primary appointment)  
Adjunct Instructor  
Bachelor of Arts, Northwestern University, 1988  
Doctor of Philosophy, University of California Berkeley, 1994

## L

### **Yangjian Liu, M.S., Ph.D.**

Instructor in Developmental Biology (primary appointment)  
Bachelor of Science, Nanjing University, 1998  
Master of Science, Chinese Academy of Sciences, 2002  
Doctor of Philosophy, John Hopkins University, 2006

## M

### **Helen McNeill, Ph.D.**

Professor of Developmental Biology (primary appointment)  
Larry J Shapiro and Carol-Ann Uetake-Shapiro Professor  
Bachelor of Science, Ramapo College, 1985  
Doctor of Philosophy, Stanford University, 1993

### **Craig Anthony Micchelli, Ph.D.**

Associate Professor of Developmental Biology (primary  
appointment)  
Bachelor of Science, University of Wisconsin Madison, 1993  
Doctor of Philosophy, University of Wisconsin Madison, 1999

### **Mayssa Mokalled, M.S., Ph.D.**

Assistant Professor of Developmental Biology (primary  
appointment)  
Bachelor of Science, American University of Beirut, 2003  
Master of Science, American University of Beirut, 2005

Doctor of Philosophy, University of Dallas, 2010

### **Samantha A Morris, Ph.D.**

Associate Professor of Developmental Biology (primary  
appointment)  
Associate Professor of Genetics  
Bachelor of Science, University of London, 2002  
Doctor of Philosophy, Cambridge University, 2007

## N

### **Philip Needleman, M.S., Ph.D.**

Adjunct Professor of Molecular Biology and Pharmacology  
Bachelor of Science, School Not Listed, 1960  
Master of Science, School Not Listed, 1962  
College Park), 1964

## O

### **David M Ornitz, Ph.D., M.D.**

Professor of Developmental Biology (primary appointment)  
Alumni Endowed Professor of Developmental Biology  
Bachelor of Science, University of California Davis, 1981  
Doctor of Philosophy, University of Washington, 1987  
Doctor of Medicine, University of Washington, 1988

## P

### **Debabrata Patra, M.S., Ph.D.**

Associate Professor of Developmental Biology (primary  
appointment)  
Bachelor of Science, University of Bombay, 1985  
Doctor of Philosophy, University of Pittsburgh, 1993  
Master of Science, University of Bombay, 2005

## R

### **John K. Russell**

Professor Emeritus of Developmental Biology

### **John Hall Russell, Ph.D.**

Professor Emeritus of Developmental Biology  
Bachelor of Science, Juniata College, 1968  
Doctor of Philosophy, Washington University in St Louis, 1974

## S

### **Diane S Sepich, Ph.D.**

Assistant Professor of Developmental Biology (primary  
appointment)  
Bachelor of Science, University of San Diego, 1981  
Doctor of Philosophy, University of Oregon, 1994

### **Jimann Shin, M.S., Ph.D.**

Instructor in Developmental Biology (primary appointment)  
Bachelor of Science, Kyung Pook National University, 2002  
Master of Science, Kyung Pook National University, 2004  
Doctor of Philosophy, Vanderbilt University, 2007

### **Lilianna Solnica-Krezel, M.S., Ph.D.**

Professor of Developmental Biology (primary appointment)



Head of the Department of Developmental Biology  
Alan A and Edith L Wolff Professor of Developmental Biology  
Master of Science, Medical University of Warsaw, 1985  
Doctor of Philosophy, University of Wisconsin Madison, 1991

## T

### **Thorold W Theunissen, M.A., Ph.D.**

Assistant Professor of Developmental Biology (primary appointment)  
Bachelor of Arts, Harvard, 2007  
Master of Arts, Cambridge University, 2008  
Doctor of Philosophy, Cambridge University, 2011

### **Yu-Chen Tony Tsai, Ph.D.**

Assistant Professor of Developmental Biology (primary appointment)  
Doctor of Philosophy, Stanford University, 2013

## W

### **Spencer Gaffney Willet, Ph.D.**

Instructor in Developmental Biology (primary appointment)  
Bachelor of Science, University of Tennessee, 2007  
Doctor of Philosophy, Vanderbilt University, 2014

## Y

### **Yongjun Yin, Ph.D.**

Instructor in Developmental Biology (primary appointment)  
Doctor of Philosophy, Hebrew University, 2004

### **Andrew Seungjo Yoo, M.S., Ph.D.**

Professor of Developmental Biology (primary appointment)  
Bachelor of Science, McGill University, 1995  
Master of Science, University of British Columbia, 1997  
Doctor of Philosophy, Columbia University, 2005

## Z

### **Bo Zhang, Ph.D.**

Associate Professor of Developmental Biology (primary appointment)  
Bachelor of Science, Inner Mongolia University (#####), 2004  
Doctor of Philosophy, Chinese Academy of Sciences, 2011

## Research Electives

### Developmental Biology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

Research in the Department of Developmental Biology occurs in a highly collegial atmosphere and involves interdisciplinary collaborations between the members of the department as well as among investigators from different departments and centers throughout the School of Medicine, the College of Arts & Sciences, and the McKelvey School of Engineering. Developmental biology faculty have leading roles in several

research centers, including the Center of Regenerative Medicine (<https://regenerativemedicine.wustl.edu/>), the Center for the Investigation of Membrane Excitability Diseases (<https://sites.wustl.edu/cimed/>), the Center for Cardiovascular Research (<https://cardiovascularresearch.wustl.edu/>), and the Hope Center (<https://hopecenter.wustl.edu/>). The department has a rich tradition of mentoring undergraduate, graduate and medical students as well as postdoctoral fellows. We are committed to creating a research environment in which our trainees reach their maximum scientific potential and career goals while addressing key outstanding questions and making important discoveries.

---

### **Douglas F. Covey, PhD**

355 McDonnell Medical Sciences Building  
Phone: 314-362-1726

Medicinal chemistry of steroids.

---

### **Aaron DiAntonio, MD, PhD**

6301 Couch Biomedical Research Building  
Phone: 314-362-9925

Neurodevelopment, neurodegeneration, and axon regeneration in *Drosophila* and mouse.

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### **Shin-ichiro Imai, MD, PhD**

362A McDonnell Medical Sciences Building  
Phone: 314-362-7228

Molecular mechanisms of aging and longevity in mammals, particularly focusing on the tissue-specific functions of the mammalian NAD-dependent deacetylase Sirt1 and the physiological significance of systemic NAD biosynthesis mediated by Nampt (nicotinamide phosphoribosyltransferase) in an intimate connection between metabolism and aging.

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### **Aaron N. Johnson, PhD**

3602 Cancer Research Building  
Phone: 314-273-1834

Molecular mechanisms of muscle development and regeneration.

---

### **Kerry Kornfeld, MD, PhD**

3607 Cancer Research Building  
Phone: 314-747-1480

Signal transduction during development; zinc metabolism; aging.

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### **Kristen Kroll, PhD**

320 McDonnell Medical Sciences Building  
Phone: 314-362-7045

Transcriptional networks that regulate the formation of neurons in early embryos and embryonic stem cells; role of chromatin regulatory complexes in controlling pluripotency and differentiation.

---

**Helen McNeill, PhD**

305 McDonnell Medical Sciences Building  
Phone: 314-273-3050

Our lab interests are focused on the cadherin family of molecules and their regulation of cellular polarity, growth, tissue organization and metabolism. The overall goal of our research is to understand how tissue growth and tissue organization are coordinately regulated. We are focusing on how Fat cadherins function in Hippo pathway-regulated growth control, planar cell polarity tissue organization, and metabolism in flies, mice and hydra. A second, new focus is studying how the nuclear envelope regulates gene expression and fertility.

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**Craig Micchelli, PhD**

328 McDonnell Medical Sciences Building  
Phone: 314-362-7036

Our lab studies the regulation of stem cell biology in development, homeostasis and disease.

---

**Mayssa Mokalled, PhD**

3601 Cancer Research Building  
Phone: 314-273-1835

Spinal cord injury, degeneration and regeneration in zebrafish and mouse.

---

**Samantha Morris, PhD**

3316 Couch Biomedical Research Building  
Phone: 314-747-8618

The focus of this lab is on stem cell and developmental biology. Our research focuses on dissecting the gene regulatory networks that define cell identity using the developing embryo and tissue regeneration as guides to engineer fate in vitro.

---

**Jeanne M. Nerbonne, PhD**

9900 Clinical Sciences Research Building  
Phone: 314-362-2564

Structure, function and regulation of voltage-dependent ion channels in the cardiovascular and nervous systems; regulation of membrane excitability in health and disease.

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**David M. Ornitz, MD, PhD**

3902 South Building  
Phone: 314-362-3908

Regulation of cardiovascular, lung, skeletal, and inner ear development, injury response, and regeneration by fibroblast growth factors.

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**Zachary Pincus, PhD**

5304 Couch Biomedical Research Building  
Phone: 314-747-5520

Interindividual variability in aging and lifespan; developmental origins of longevity and adult health; quantitative microscopy and image analysis of *C. elegans*.

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**Lila Solnica-Krezel, PhD**

3911A South Building  
Phone: 314-362-8768

Genetic regulation of vertebrate embryogenesis; genetic mechanisms that regulate cell fates and movements during early vertebrate development using forward and reverse genetics in the zebrafish model and human embryonic stem cells.

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**Thorold W. Theunissen, PhD**

3313 Couch Biomedical Research Building  
Phone: 314-362-8768

The Theunissen lab seeks to understand the molecular mechanisms that regulate pluripotent stem cell states and to develop optimal conditions for the derivation, maintenance and differentiation of human ESCs and iPSCs. We also explore whether naive pluripotent stem cells can be used to model early human development and disease.

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**Tony Tsai, PhD**

333 McDonnell Medical Sciences Building  
Phone: 314-362-7054

The Tsai lab is interested in control principles of tissue patterning and morphogenesis during embryo development. We seek to understand how cells integrate biochemical and mechanical inputs to make reliable decisions on what cell types they become, where they migrate, and what structure they collectively build.

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**Andrew Yoo, PhD**

361E McDonnell Medical Sciences Building  
Phone: 314-362-1811

Cell fate control by microRNAs; neuronal reprogramming to generate human neurons; chromatin controlling factors and genetic pathways that regulate neurogenesis.

## Courses

The Department of Developmental Biology also offers courses through the College of Arts & Sciences. For a full listing of current courses offered, please visit the Washington University online course listings (<https://courses.wustl.edu/CourseInfo.aspx?sch=L&dept=L41&crslvl=5:9>).

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### M04 FYSelect 500C Developmental Biology and Disease

Basic Science. Explores connections between basic research in developmental biology and disease. Students are expected to make a presentation based on current literature in the field and participate in class discussions.  
Credit 10 units.

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### M70 MolBio/Pha 900 Research Elective - Molecular Biology and Pharmacology

Research opportunities may be available. If interested, please contact the department of Developmental Biology.

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## James S. McDonnell Department of Genetics

The Department of Genetics (<http://genetics.wustl.edu>) is at the forefront of the rapidly developing field known as genomic (or personalized) medicine, in which genetic and epigenetic analysis coupled with clinical information enables treatments to be tailored specifically to the individual patient. The rapid evolution of sequencing technologies, genome engineering, automated cellular imaging and mass spectrometry methods to rapidly perform proteomic and metabolomics studies, coupled with powerful computational tools, is revolutionizing the biological sciences. Investigators in the department are developing new methods of genomic analysis — including technology and software, epigenomics and copy number variation as well as studies of disease pathways using model organisms — to identify and study the genes responsible for human disease and treatment responses.

The department supports a broad program of preclinical and graduate instruction in genetics, with research opportunities that include studies of transcriptional networks, population genetics, protein evolution, neurological disorders, developmental genetics, models of human disease, genome architecture, statistical genetics and computational biology, genome technologies and infertility.

A significant portion of the first-year course in basic medical sciences is devoted to human and clinical genetics, with emphasis on how genomic information will transform the practice of medicine. This includes specialized selective courses in addition to the core genetic curriculum. Advanced training in

clinical genetics and in genetic research is available from the faculty in the Department of Genetics and from geneticists with principal appointments in many other departments within the School of Medicine (<http://medicine.wustl.edu>).

Advanced courses and seminars are offered that focus on the genetics of complex disease, gene expression, genome engineering, induced pluripotent stem cells, single-cell genomics, molecular genetics, genetic epidemiology, computational biology, developmental genetics, microbial genetics, cancer genetics, and population and evolutionary genetics. Extraordinary opportunities for research training and experience are available in all of these areas and at all levels. The programs are tailored to meet the needs of medical students, graduate students, and both MD and PhD postdoctoral fellows pursuing advanced training in biomedical research.

Website: <http://genetics.wustl.edu>

## Faculty

### Jeffrey Milbrandt, MD, PhD (<http://milbrandt.wustl.edu/>)

James S. McDonnell Professor and Head of Genetics  
Executive Director, McDonnell Genome Institute  
Co-Director Needleman Center for Neurometabolism and Axonal Therapeutics

### Michael Province, PhD (<http://genetics.wustl.edu/staff-members/michael-province/>)

Director, Division of Statistical Genomics

### Rich Head, MS (<http://genetics.wustl.edu/staff-members/rich-head/>)

Director, Genome Technology Access Center at McDonnell Genome Institute (GTAC@MGI)

### Xiaoxia Cui, PhD (<http://genetics.wustl.edu/staff-members/xiaoxia-cui-phd-ms/>)

Director, Genome Engineering and iPSC Center

Visit our website for more information about our faculty (<http://genetics.wustl.edu/faculty/>) and their appointments.

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## A

### Lucinda L. Antonacci-Fulton, M.B.A., M.S.

Assistant Professor of Genetics (primary appointment)  
Bachelor of Science, Southern Illinois University Edwardsville, 1991  
Master of Science, Southern Illinois University Edwardsville, 1992  
null, Washington University in St Louis, 2022

## B

### Ruteja A. Barve, M.S., Ph.D.

Instructor in Genetics (primary appointment)  
Bachelor of Science, University of Pune, 1995  
Master of Science, Washington University in St Louis, 2008

Doctor of Philosophy, Washington University in St Louis, 2014

**John Rutledge Bermingham, Ph.D.**

Associate Professor of Genetics (primary appointment)  
Bachelor of Science, Yale University, 2016  
Doctor of Philosophy, University of Colorado Boulder, 2016

**Adam J. Bloom, Ph.D.**

Associate Professor of Genetics (primary appointment)  
Assistant Professor of Anesthesiology  
Bachelor of Science, University of California Berkeley, 1997  
Doctor of Philosophy, Washington University in St Louis, 2006

**Ingrid B Borecki, M.S., Ph.D.**

Adjunct Professor of Genetics  
Champaign), 1977  
Master of Science, University of Hawaii (Duplicate of University  
of Hawaii at Manoa), 1980  
Doctor of Philosophy, University of Hawaii (Duplicate of  
University of Hawaii at Manoa), 1981

**William James Buchser, Ph.D.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Music, University of Miami, 2002  
Doctor of Philosophy, University of Miami, 2009

**Thomas Patrick Burris, Ph.D.**

Adjunct Professor of Genetics  
Doctor of Philosophy, Florida State University, 1993

**C**

**Paul F Cliften, M.S., Ph.D.**

Associate Professor of Genetics (primary appointment)  
Bachelor of Science, Utah State University, 1992  
Master of Science, Utah State University, 1995  
Doctor of Philosophy, University of Colorado Health Science  
Center, 1999

**Barak Alon Cohen, Ph.D.**

Professor of Genetics (primary appointment)  
Alvin Goldfarb Distinguished Professor of Computational Biology  
Bachelor of Science, Cornell University, 1992  
Doctor of Philosophy, Harvard University, 1998

**Donald Franklin Conrad, M.S., Ph.D.**

Adjunct Associate Professor of Genetics  
Bachelor of Science, Dartmouth College, 1999  
Doctor of Philosophy, University of Chicago, 2007  
Master of Science, Stanford University, 2017

**Seth Daniel Crosby, M.D.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Science, University of California, 1984  
Doctor of Medicine, University of Texas San Antonio, 1989

**Xiaoxia Cui, M.S., Ph.D.**

Associate Professor of Genetics (primary appointment)  
Bachelor of Science, Nanjing University (#####), 1993  
Master of Science, University of Alabama in Birmingham, 2017

Doctor of Philosophy, University of Texas Austin, 2017

**D**

**Joseph D Dougherty, Ph.D.**

Professor of Genetics (primary appointment)  
Professor of Psychiatry  
Bachelor of Science, Truman State University, 1999  
Doctor of Philosophy, University of California, 2005

**Todd Druley, Ph.D., M.D.**

Associate Professor of Genetics  
Associate Professor of Developmental Biology  
Bachelor of Science, University of Illinois, 1994  
Doctor of Philosophy, University of Illinois Chicago, 2002  
Doctor of Medicine, University of Illinois Chicago, 2002

**Susan K. Dutcher, Ph.D.**

Professor of Genetics (primary appointment)  
Professor of Cell Biology and Physiology  
Bachelor of Arts, Colorado College, 1974  
Doctor of Philosophy, University of Washington, 1980

**F**

**Justin C. Fay, Ph.D.**

Adjunct Associate Professor of Genetics  
Doctor of Philosophy, University of Chicago, 2001

**Robert S. Fulton, M.S.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Arts, Southern Illinois University Edwardsville, 1990  
Master of Science, Southern Illinois University Edwardsville,  
1997

**H**

**Richard D Head, M.S.**

Professor of Genetics (primary appointment)  
Professor of Pathology and Immunology  
Master of Science, Southern Illinois University, 1992

**Paul Hime, Ph.D.**

Instructor in Genetics (Pending Dean's Approval) (primary  
appointment)  
Bachelor of Arts, Washington University in St Louis, 2004  
Doctor of Philosophy, University of Kentucky, 2017

**J**

**Sheng-Chih Jin, M.S., Ph.D.**

Assistant Professor of Genetics (primary appointment)  
Assistant Professor of Pediatrics  
Master of Science, Johns Hopkins University, 2008  
Doctor of Philosophy, Washington University in St Louis, 2014  
Bachelor of Science, National Chiao Tung University, 2019

**L**

**Haluk Lacin, Ph.D.**

Instructor in Genetics (primary appointment)

Bachelor of Science, Bogazici University, 2003  
Doctor of Philosophy, Washington University in St Louis, 2010

**Heather A Lawson, M.A., Ph.D.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Arts, University of Wisconsin Milwaukee, 2002  
Master of Arts, Pennsylvania State University, 2004  
Doctor of Philosophy, Pennsylvania State University, 2008

**Daofeng Li, Ph.D.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Science, China Agriculture University, 2005  
Doctor of Philosophy, China Agriculture University, 2011

**Tina Ann Lindsay, M.A.**

Instructor in Genetics (primary appointment)  
Bachelor of Science, Missouri State University (Formerly  
Southwest Missouri State), 1993  
Master of Arts, Southern Illinois University, 1996

**M**

**Xianrong Mao, M.S., Ph.D.**

Instructor in Genetics (primary appointment)  
Bachelor of Science, Lanzhou University (#####), 1993  
Master of Science, Chinese Academy of Sciences, 1996  
Doctor of Philosophy, University of Arkansas, 2001

**Brett Burkard Maricque, Ph.D.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Science, University of Wisconsin Madison, 2010  
Doctor of Philosophy, Washington University in St Louis, 2016

**James P Mc Carter, Ph.D., M.D.**

Adjunct Professor of Genetics  
Bachelor of Arts, Princeton University, 1989  
Doctor of Philosophy, Washington University in St Louis, 1998  
Doctor of Medicine, Washington University in St Louis, 1998

**Michael Meers, Ph.D.**

Assistant Professor of Genetics (primary appointment)  
null, Duke University, 2010  
null, University of North Carolina at Chapel Hill, null

**Jeffrey D Milbrandt, Ph.D., M.D.**

Professor of Genetics (primary appointment)  
Professor of Medicine  
Professor of Neurology  
Professor of Pathology and Immunology  
Head of the Department of Genetics  
Executive Director of the McDonnell Genome Institute  
James S McDonnell Professor of Genetics  
Bachelor of Science, University of Nebraska at Kearney, 1974  
Doctor of Medicine, Washington University in St Louis, 1978  
Doctor of Philosophy, University of Virginia, 1983

**Robi D. Mitra, Ph.D.**

Professor of Genetics (primary appointment)  
Alvin Goldfarb Distinguished Professor of Computational Biology

Doctor of Philosophy, Massachusetts Institute of Technology,  
2000

**Shamim Ara Mollah, Ph.D.**

Assistant Professor of Genetics (primary appointment)  
Doctor of Philosophy, University of California San Diego, 2019

**P**

**Zachary Scott Pincus, Ph.D.**

Voluntary Research Assistant Professor of Genetics  
Bachelor of Science, Stanford University, 2002  
Doctor of Philosophy, Stanford University, 2007

**Michael A Province, M.A., Ph.D.**

Professor of Genetics (primary appointment)  
Professor of Biostatistics  
Bachelor of Arts, University of Dallas, 1973  
Master of Arts, Washington University in St Louis, 1979  
Doctor of Philosophy, Washington University in St Louis, 1987

**S**

**Nancy L. Saccone, M.S., Ph.D.**

Associate Professor of Genetics (primary appointment)  
Associate Professor of Biostatistics  
Bachelor of Arts, University of California, 1988  
Master of Science, Brown University, 1990  
Doctor of Philosophy, Brown University, 1993

**Yo Sasaki, M.S., Ph.D.**

Professor of Genetics (primary appointment)  
Bachelor of Science, Tokyo University of Agriculture &  
Technology, 1991  
Master of Science, Tokyo University of Agriculture & Technology,  
1994  
Doctor of Philosophy, Gunma University, Med School, 1997

**Tim B Schedl, Ph.D.**

Professor of Genetics (primary appointment)  
Bachelor of Arts, Lawrence University, 1977  
Doctor of Philosophy, University of Wisconsin Madison, 1984

**Cherilynn Maria Reynolds Shadding, Ph.D.**

Adjunct Assistant Professor of Genetics  
Doctor of Philosophy, Meharry Medical College, 2002

**James B Skeath, Ph.D.**

Professor of Genetics (primary appointment)  
Bachelor of Arts, Haverford College, 1988  
Doctor of Philosophy, University of Wisconsin Madison, 1993

**Gary D Stormo, M.A., Ph.D.**

Professor of Genetics (primary appointment)  
Professor of Biomedical Engineering  
Professor of Computer Science  
Joseph Erlanger Professor  
Bachelor of Science, California Institute Technology, 1972  
Master of Arts, University of Colorado Boulder, 1975  
Doctor of Philosophy, University of Colorado Boulder, 1981

## T

### **Tychele Naomi Turner, Ph.D.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Science, Michigan State University, 2008  
Doctor of Philosophy, Johns Hopkins University, 2014

## W

### **Ting Wang, M.S., Ph.D.**

Professor of Genetics (primary appointment)  
Professor of Computer Science and Engineering  
Professor of Biostatistics  
Sanford and Karen Loewentheil Distinguished Professor of  
Medicine  
Master of Science, Washington University in St Louis, 2001  
Doctor of Philosophy, Washington University in St Louis, 2006

### **Michael Aaron White, M.S., Ph.D.**

Associate Professor of Genetics (primary appointment)  
Bachelor of Arts, Brigham Young University, 2000  
Master of Science, University of Rochester, 2004  
Doctor of Philosophy, University of Rochester, 2006

### **Mary Kaye Wojczynski, M.P.H., Ph.D.**

Associate Professor of Genetics (primary appointment)  
Bachelor of Science, University of Wisconsin Stevens Point,  
1995  
Master of Public Health, Emory University, 1999  
Doctor of Philosophy, University North Carolina, 2006

## Y

### **Jinsheng Yu, M.S., Ph.D., M.D.**

Assistant Professor of Genetics (primary appointment)  
Bachelor of Science, Tongji University, 1984  
Master of Science, Tongji University (#####), 1995  
Doctor of Philosophy, Tongji Medical College of Huazhong  
University of Science and Technology, 1998  
Doctor of Medicine, Tongji University, 1998

## Z

### **Xiaoyu Zhuo, Ph.D.**

Instructor in Genetics (primary appointment)  
Doctor of Philosophy, University of Utah, 2016

## Research Electives

### Genetics Research Electives

During the fourth year, opportunities exist for many varieties of  
advanced clinical or research experiences.

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### **Barak Cohen, PhD**

Couch Biomedical Research Building, Room 4308  
Phone: 314-362-3674  
cohen@wustl.edu

Functional genomics in yeast; gene regulatory networks,  
complex trait genetics, and synthetic biology studies of cis-  
regulation.

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### **Joseph Dougherty, PhD**

Couch Biomedical Research Building, Room 6316  
Phone: 314-286-0752  
jdougherty@wustl.edu

Our laboratory utilizes a variety of techniques spanning from  
human molecular genetics and informatics to mouse behavioral  
neuroscience and neuroanatomy. We develop and employ  
mouse models of psychiatric disorders, particularly those that  
mimic genetic variations that we have identified in human patient  
populations, with the goal of trying to understand the cellular and  
molecular underpinnings of these disorders.

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### **Susan K. Dutcher, PhD**

Couch Biomedical Research Building, Room 5301  
Phone: 314-362-2765  
dutcher@wustl.edu

Studies of the role of centrioles and basal bodies in ciliary  
signaling, assembly, and motility using molecular genetics and  
computational and biochemical approaches.

---

### **Sheng Chih (Peter) Jin, PhD**

Couch Biomedical Research Building, Room 5206  
jin810@wustl.edu  
Phone: 314-273-2710

We use human genetic, genomic, and bioinformatic approaches  
to identify mutations underlying human diseases and their  
molecular mechanisms.

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### **Tristan (Qingyun) Li, PhD**

McDonnell Medical Sciences Building, 8th Floor  
Phone: 314-273-1422  
qingyunli@wustl.edu

Our lab is broadly interested in neuroimmunology, with a focus  
on microglial biology. We combine cutting-edge, single-cell  
genomic technologies with in vitro and in vivo genetic, molecular,  
and cellular tools to investigate microglial functions in the  
establishment of the nervous system as well as how changes in  
these functions contribute to neurological diseases.

---

### **Jeffrey Milbrandt, MD, PhD**

Couch Biomedical Research Building, Room 6306  
Phone: 314-362-4651  
jmilbrandt@wustl.edu

We are performing Cas9/CRISPR activation and repression screens in iPSC-derived neurons together with single-cell transcriptomics analysis to evaluate the causal effects of genetic variants associated with neuropsychiatric diseases. We are also studying how metabolism influences the axonal/glia interactions important for proper nerve function. We use genetic and metabolomic analysis to identify molecular mechanisms of axonal degeneration, a self-destructive process that plays an important role in many neurodegenerative conditions, particularly motor neuron diseases like ALS and peripheral neuropathy.

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**Rob Mitra, PhD**

Couch Biomedical Research Building, Room 4301  
Phone: 314-362-2751  
rmitra@wustl.edu

Our focus is on systems biology, gene regulation and technology development. Projects in the lab fall into three general categories: (1) understanding the molecular logic of transcription factor cooperativity; (2) mapping the gene regulatory networks that control developmental processes and using this knowledge to reprogram fibroblasts into useful cell types; and (3) developing novel technologies to more efficiently achieve the first two aims.

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**Samantha Morris, PhD**

Couch Biomedical Research Building, Room 3316  
Phone: 314-747-8618  
s.morris@wustl.edu

This lab strives to engineer cell fate to generate clinically valuable cell populations via stem cell and developmental biology. Our research focuses on dissecting the gene regulatory networks that define cell identity, using the developing embryo and tissue regeneration as a guide to engineer fate in vitro. We apply insight from these analyses to generate clinically relevant populations by differentiating cells from a pluripotent state or by directly converting cells between mature fates. We employ a combination of computational, single-cell transcriptomics with cell and developmental biology approaches.

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**Michael A. Province, PhD**

Farrell Learning and Teaching Center (FLTC), 6th floor, Suite 605  
Phone: 314-362-3616  
mprovince@wustl.edu

Development and evaluation of novel statistical genetics methodology, especially as applied to genomic identification and validation of variants for human complex quantitative traits, such as heart disease, cancer, pulmonary function, diabetes, and human longevity.

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**Nancy L. Saccone, PhD**

Farrell Learning and Teaching Center (FLTC), 6th floor, Suite 606  
Phone: 314-747-3263  
nlism@wustl.edu (nlisms@wustl.edu)

Statistical genetics and psychiatric genetics; development and application of analysis methods for studying the genetics of human disease and complex traits.

---

**Tim Schedl, PhD**

Couch Biomedical Research Building, Room 5305  
Phone: 314-362-6162  
ts@wustl.edu

Our lab studies germ cell development in the model organism *Caenorhabditis elegans*. The major focuses are control of the decision to proliferate or enter the meiotic pathway, control and coordination of meiotic prophase progression and gametogenesis, and control of meiotic maturation and ovulation.

---

**James Skeath, PhD**

Couch Biomedical Research Building, Room 6315  
Phone: 314-362-0535  
jskeath@wustl.edu

Identification of the genes and the elucidation of the molecular mechanisms that regulate the early events of *Drosophila* central neurogenesis; illumination of the mechanisms that form, pattern and specify the individual identities of the progenitor cells of the *Drosophila* embryonic central nervous system.

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**Gary D. Stormo, PhD**

Couch Biomedical Research Building, Room 4208  
Phone: 314-747-5534  
stormo@wustl.edu

Computational biology of protein-DNA interactions, RNA folding, gene and promoter finding; biochemical analysis of DNA-protein interactions and gene regulation.

---

**Tychele Turner, PhD**

Couch Biomedical Research Building, Room 5302  
Phone: 314-273-8517  
tychele@wustl.edu

The focus of the Turner laboratory is the discovery and characterization of genetic etiological factors involved in neurodevelopmental disorders. We utilize both computational and experimental approaches to explore this genetic architecture.

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**Ting Wang, PhD**

Couch Biomedical Research Building, Room 5211  
Phone: 314-286-0865  
twang@wustl.edu

Our lab uses genomics and epigenomics approaches to investigate how epigenetic factors determine cell fate. We study cell fate in normal development, differentiation, and regeneration; cell fate in tumorigenesis and epigenetic therapy; and cell fate in evolution.

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## Courses

Visit online course listings to view offerings for M20 Genetics (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M20>).

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### M20 Genetics 511 Medical Genetics

Medical genetics is both a science and a clinical area or specialty of medicine, and the boundary between research and clinical application is increasingly blurred. The pace at which genomic and epigenomic tools are being developed is unprecedented. These tools result in continual conceptual advancements, which inevitably affect how we approach the study of disease risk, diagnosis and management in all areas of medicine, not just medical genetics. We are moving into a time when the interpretable data from the examination of individual genomes will be incorporated to all other clinical data to assess individual risks and guide clinical management and decision making. This course is intended as the first step toward life-long training in medical genetics and genomics. The course begins with a number of sessions devoted to basic principles of genetics. Drawing on this foundation, we move on to discuss genomic and epigenomic tools and to learn from leaders in their fields about the big questions in genetics and genomics (i.e., microbiome research, cancer genomics, current clinical uses of exome sequencing, and so) and how the tools are being used to answer these questions. Students are exposed to the use of genetic and genomic databases and information resources, which will allow them to keep up with new information and critically appraise validity and clinical utility. We begin to discuss the implication of this shift to the "genomic era," particularly regarding ethical aspects, regulatory aspects, equal access, healthcare costs and patient education. Clinical geneticists actively participate in the course and use a series of genetic disorders to help students apply their knowledge, focusing mainly on genetic etiology, pattern of inheritance, inheritance risk and molecular diagnostic testing. Frequent patient interviews further enhance the exposure to clinical genetics. Overall, the course aims to enhance genetic and genomic literacy, which is an essential first step in preparing students to participate in the multidisciplinary teams that effectively make cutting-edge genetic and genomic research results accessible to patients. This course is cross listed with L41 Biol 550.

Credit 34 units.

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### M20 Genetics 899 Special Study Genetics

Special study opportunities are available in the Department of Genetics. If interested, please contact the department for further information.

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## John T. Milliken Department of Medicine

Instruction in medicine is provided during all four years of the medical curriculum, beginning with Practice of Medicine I (Medicine 507) during the first year. Teaching during the second year has two main objectives: (1) the correlation of the basic sciences with clinical aspects of disease; and (2) training in the technical methods of physical examination and laboratory diagnosis. By the beginning of the third year, the student is ready for the supervised clinical study of individual patients. A clinical clerkship of 12 weeks, divided into three four-week periods, is served by third-year students on the medical services of the department. During the final year, students may select a sub-internship in general medicine and a series of elective courses in the medical specialties.

Website: <https://internalmedicine.wustl.edu>

## Faculty

The Department of Medicine's general medicine teaching services at Barnes-Jewish Hospital and the Veterans Administration Medical Center (St. Louis) are under the following directors:

**Victoria J. Fraser, MD (<https://infectiousdiseases.wustl.edu/faculty-staff/victoria-j-fraser/>)**

Adolphus Busch Professor of Medicine and Chair

**Jeffrey S. Crippin, MD (<https://profiles.wustl.edu/en/persons/jeffrey-crippin/>)**

Marilyn E. Bornefeld Chair in Gastrointestinal Research and Treatment  
Professor of Medicine  
Vice Chair of Clinical Programs

**Nancy K. Sweitzer, MD, PhD (<https://cardiology.wustl.edu/faculty/nancy-k-sweitzer-md-phd/>)**

Professor of Medicine  
Vice Chair of Clinical Research

**Abby L. Spencer, MD (<https://profiles.wustl.edu/en/persons/abby-spencer/>)**

Professor of Medicine  
Vice Chair of Education

**Angela L. Brown, MD (<https://profiles.wustl.edu/en/persons/angela-brown/>)**

Professor of Medicine  
Vice Chair of Education

**Thomas Ciesielski, MD (<https://profiles.wustl.edu/en/persons/thomas-ciesielski/>)**

Associate Professor of Medicine  
Vice Chair of Patient Safety



**Peggy L. Kendall, MD** (<https://allergy.wustl.edu/peggy-kendall-md/>)

Virginia Minnich Distinguished Professor of Medicine  
Chief, Division of Allergy and Immunology

**Richard W. Gross, MD, PhD** (<https://profiles.wustl.edu/en/persons/richard-gross/>)

Professor of Medicine  
Chief, Division of Bioorganic Chemistry and Pharmacology

**Roberto Civitelli, MD** (<https://profiles.wustl.edu/en/persons/roberto-civitelli/>)

Sydney M. & Stella H. Schoenberg Professor of Medicine  
Chief, Division of Bone and Mineral Diseases

**Sumanth Prabhu, MD** (<https://cardiology.wustl.edu/faculty/sumanth-d-prabhu-md/>)

Lewin Distinguished Professor of Cardiovascular Diseases  
Chief, Division of Cardiology/Cardiology Diseases

**Lynn A. Cornelius, MD** (<https://profiles.wustl.edu/en/persons/lynn-cornelius/>)

Winfred A. and Emma R. Showman Professor of Dermatology in Medicine  
Chief, Division of Dermatology

**Clay F. Semenkovich, MD** (<https://profiles.wustl.edu/en/persons/clay-semenkovich/>)

Irene E. and Michael M. Karl Professor of Endocrinology and Metabolism in Medicine  
Chief, Division of Endocrinology, Metabolism and Lipid Research

**Nicholas O. Davidson, MD** (<https://profiles.wustl.edu/en/persons/nicholas-davidson/>)

John E. and Adaline Simon Professor of Medicine  
Chief, Division of Gastroenterology

**Bradley A. Evanoff, MD, MPH** (<https://profiles.wustl.edu/en/persons/bradley-evanoff/>)

Richard A. and Elizabeth Henby Sutter Chair in Occupational, Industrial, and Environmental Medicine  
Chief, Division of General Medical Sciences

**Thomas M. De Fer, MD** (<https://profiles.wustl.edu/en/persons/tom-de-fer/>)

Carol & Jerome T. Loeb Professor of Medicine  
Associate Dean for Medical Student Education  
Chief, Division of General Medicine

**Samuel Klein, MD** (<https://profiles.wustl.edu/en/persons/samuel-klein/>)

William H. Danforth Professor of Medicine and Nutritional Science  
Chief, Division of Geriatrics and Nutritional Sciences

**Elaine M. Majerus, MD, PhD** (<https://profiles.wustl.edu/en/persons/elaine-majerus/>)

Professor of Medicine  
Co-Chief, Division of Hematology

**Stephen Oh, MD, PhD** ([https://oncology.wustl.edu/people/faculty/Oh/Oh\\_Bio.html](https://oncology.wustl.edu/people/faculty/Oh/Oh_Bio.html))

Associate Professor of Medicine  
Co-Chief, Division of Hematology

**Mark Williams, MD** (<https://hospitalist.wustl.edu/people/mark-williams-md-facp-mhm/>)

Professor of Medicine  
Chief, Division of Hospital Medicine

**Jennifer A. Philips, MD, PhD** (<https://profiles.wustl.edu/en/persons/jennifer-philips/>)

Theodore and Bertha Bryan Professorship in Environmental Medicine #1

Professor of Molecular Microbiology  
Co-Chief, Division of Infectious Diseases

**William G. Powderly, MD** (<https://profiles.wustl.edu/en/persons/bill-powderly/>)

Dr. J. William Campbell Professor of Medicine  
Co-Chief, Division of Infectious Diseases

**Benjamin D. Humphreys, MD, PhD** (<https://profiles.wustl.edu/en/persons/benjamin-humphreys/>)

Joseph P. Friedman Professor of Renal Diseases in Medicine  
Chief, Division of Nephrology

**John F. DiPersio, MD, PhD** (<https://profiles.wustl.edu/en/persons/john-dipersio/>)

Virginia E. and Sam J. Golman Professor of Medicine  
Chief, Division of Oncology

**Patrick H. White, MD** (<https://profiles.wustl.edu/en/persons/patrick-white/>)

The Stokes Family Endowed Chair in Palliative Medicine and Supportive Care Chair and Associate Professor of Medicine  
Chief, Division of Palliative Care Medicine

**Michael J. Holtzman, MD** (<https://profiles.wustl.edu/en/persons/michael-holtzman/>)

Selma and Herman Seldin Professor of Medicine  
Chief, Division of Pulmonary and Critical Care Medicine

**Christine Pham, MD** (<https://profiles.wustl.edu/en/persons/christine-pham/>)

Guy and Ella Mae Magness Professor of Medicine  
Chief, Division of Rheumatology

**Carlos Bernal-Mizrachi, MD** (<https://endocrinology.wustl.edu/people/carlos-bernal-mizrachi-md/>)

Philip E. & Carolyn E. Cryer Professor of Medicine  
Chief, Veteran's Administration

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Doctor of Medicine, University of Kansas Medical (Duplicate of University of Kansas Medical Center), 1982

**Erik Christian Stabell, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, New College California, 1976  
Doctor of Medicine, School Not Listed, 1983

**Paul M Stein, M.D.**

Professor of Clinical Medicine  
Bachelor of Arts, University of Rochester, 1967  
Doctor of Medicine, Saint Louis University, 1971

**Barbara B Sterkel**

Adjunct Associate Professor of Medicine

**James Andrew Stokes, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, Stanford University, 1976  
Doctor of Medicine, University of Missouri Columbia, 1984

**Michael Gary Stone, M.D.**

Instructor in Clinical Medicine  
Doctor of Medicine, Kansas City University of Medicine and Biosciences, 2008

**Hamsa Subramanian**

Instructor in Clinical Medicine  
Trichy, 1986

**William Craig Summers, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, University of Alabama (Duplicate of University of Alabama in Tuscaloosa), 1994  
Doctor of Medicine, University of Alabama in Birmingham, 1999

**Rudee Suwannasri, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, Chiang Mai University, 1971  
Doctor of Medicine, Chiang Mai University, 1973

**T**

**Mohammad Tahir, M.D.**

Instructor in Clinical Medicine  
Doctor of Medicine, Dow Medical College Karachi, 1976

**Kongsak Tanphaichitr, M.D.**

Professor of Clinical Medicine  
Doctor of Medicine, Siriraj Medical School, 1970

**Arnold S Tepper, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, School Not Listed, 1966  
Doctor of Medicine, University of Missouri Columbia, 1970

**Wanda T Terrell, M.D.**

Associate Professor of Clinical Medicine  
Bachelor of Arts, Washington University in St Louis, 1975  
Doctor of Medicine, Washington University in St Louis, 1979

**George K. Thampy, M.D.**

Instructor in Clinical Medicine  
Doctor of Medicine, Kerala University, 1977

**Shaukat Thanawalla**

Instructor in Clinical Medicine

**J. Allen Thiel, M.D.**

Associate Professor of Clinical Medicine  
Bachelor of Science, Rockhurst College (Duplicate of Rockhurst University), 1956  
Doctor of Medicine, Saint Louis University, 1960

**Erik P Thyssen, M.D.**

Assistant Professor of Clinical Medicine  
Bachelor of Science, University of Copenhagen, 1980  
Doctor of Medicine, University of Copenhagen, 1984

**Lawrence S Tierney, M.D.**

Associate Professor of Clinical Medicine  
Champaign, 1984  
Champaign, 1988

**Jeffrey P Tillinghast, M.D.**

Associate Professor of Clinical Medicine  
Bachelor of Science, State University of New York, 1976  
Doctor of Medicine, Washington University in St Louis, 1980

**Elizabeth A Tracy, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, Marquette University, 1982  
Doctor of Medicine, University of Wisconsin Milwaukee, 1986

**Thomas F Tse, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, University of Nebraska, 1972  
Doctor of Medicine, University of Nebraska at Omaha, 1976

**David J Tucker, M.D.**

Assistant Professor of Clinical Medicine  
Bachelor of Science, University of Notre Dame, 1977  
Doctor of Medicine, Saint Louis University, 1981

**Peter G Tuteur, M.D.**

Associate Professor Emeritus of Medicine  
Bachelor of Arts, Johns Hopkins University Medical (Duplicate of Johns Hopkins University), 1962  
Champaign, 1966

**U**

**Robert C. Uchiyama, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, Stanford University, 1976  
Doctor of Medicine, Saint Louis University, 1980

**V**

**Albert Lee Van Amburg, M.D.**

Assistant Professor of Clinical Medicine  
Bachelor of Arts, Washington University in St Louis, 1968  
Doctor of Medicine, Washington University in St Louis, 1972

**Gil M Vardi, M.D.**

Assistant Professor of Clinical Medicine  
Aviv University (Duplicate of Tel Aviv University), 1988

**Emmanuel A Venkatesan, MBBS**

Associate Professor of Clinical Medicine  
Foreign MD equivalent, CMC, Vellore, India, 1990

**Dennis T Villareal, M.D.**

Adjunct Associate Professor of Medicine  
Bachelor of Science, University of San Carlos, 1978  
Doctor of Medicine, CEBU Doctor's College of Med (Duplicate of  
Cebu Doctors' University (Cebu Doctors' College)), 1982

**Benjamin Allen Voss, M.D.**

Assistant Professor of Clinical Medicine  
Bachelor of Arts, Saint Louis University, 2003  
Doctor of Medicine, Creighton University, 2007

**Stanley G Vriezelaar, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, Simpson College, 1977  
Doctor of Medicine, University of Iowa, 1981

**W**

**Harry Lee Wadsworth, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, Texas Tech University, 1978  
Doctor of Medicine, Texas Tech University, 1983

**Stanley M Wald, M.D.**

Associate Professor of Clinical Medicine  
Doctor of Medicine, Washington University in St Louis, 1946

**David A Walls, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 1979  
Doctor of Medicine, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 1982

**Corinna Hendrell Warren, M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, Southern Illinois University Edwardsville,  
1990  
Doctor of Medicine, University of Illinois Chicago (Duplicate of  
University of Illinois at Chicago), 1994

**Scott P Wasserstrom, M.A., M.D.**

Instructor in Clinical Medicine  
Bachelor of Science, University of Illinois, 1990  
Master of Arts, Washington University in St Louis, 1995  
Doctor of Medicine, Washington University in St Louis, 1995

**Kevin D Weikart, M.D.**

Instructor in Clinical Medicine  
Doctor of Medicine, American University of the Caribbean, 1979

**Leonard B Weinstock, M.D.**

Associate Professor of Clinical Medicine

Assistant Professor of Clinical Surgery (General Surgery)  
Bachelor of Arts, University of Vermont, 1977  
Doctor of Medicine, University of Rochester, 1981

**Peter Douglas Weiss, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, Harvard University, 1975  
Doctor of Medicine, Case Western Reserve University, 1980

**Lynn Ellis Welling, M.D.**

Adjunct Associate Professor of Medicine  
Doctor of Medicine, Uniformed Services University of the Health  
Sciences, 1989

**Alvin S Weneker, M.D.**

Professor of Clinical Medicine  
Bachelor of Arts, Washington University in St Louis, 1949  
Doctor of Medicine, Washington University in St Louis, 1953

**Jennifer Marie Wessels, M.D.**

Instructor in Clinical Medicine  
Doctor of Medicine, Saint Louis University, 2009

**John F Wiedner, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, Knox College, 1982  
Doctor of Medicine, School Not Listed, 1985

**Deborah A Wienski, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, Smith College, 1979  
Doctor of Medicine, Tufts University, 1983

**George A Williams, M.A., M.D.**

Assistant Professor of Clinical Medicine  
Bachelor of Arts, University of Notre Dame, 1967  
Master of Arts, Columbia University, 1968  
Doctor of Medicine, University of Wisconsin Madison, 1972

**Nancy J Williams, M.D.**

Instructor in Clinical Medicine  
Bachelor of Arts, Dartmouth College, 1982  
Doctor of Medicine, University of Kansas, 1987

**R. Jerome Williams, M.D.**

Associate Professor of Clinical Medicine  
Bachelor of Arts, Harvard University, 1973  
Doctor of Medicine, Duke University, 1977

**Patrick H Win**

Instructor in Clinical Medicine

**Gerald Wolff, M.D.**

Assistant Professor of Clinical Medicine  
Bachelor of Arts, Harvard University, 1955  
Doctor of Medicine, Washington University in St Louis, 1961

**John A Wood, M.D.**

Associate Professor of Clinical Medicine  
Doctor of Medicine, University of Oklahoma, 1968

**Jeffrey M Wright, M.D.**

Assistant Professor of Clinical Medicine  
Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Vanderbilt University, 1975  
Doctor of Medicine, Washington University in St Louis, 1979

## Y

**Simon Yu, M.D.**  
Instructor in Clinical Medicine  
Doctor of Medicine, University of Missouri Columbia, 1984

## Z

**John F. Zalewski, M.D.**  
Instructor in Clinical Medicine  
Bachelor of Science, Clarkson University, 1973  
Doctor of Medicine, State University of New York at Buffalo,  
1980

**Jian Zhu, Ph.D.**  
Instructor in Medicine  
Doctor of Philosophy, Oklahoma State University, 2004

## Research Electives

### Medicine Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

For information about Primary Care Summer Preceptorships (p. 173), please refer to the information at the bottom of this section.

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**John P. Atkinson, MD**  
Clinical Sciences Research Building, 10th Floor  
Phone: 314-362-8391

A clinical research elective is offered in the evaluation of patients with complement deficiency or overactivity states and with undiagnosed rheumatic disease syndromes.

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**Roberto Civitelli, MD**  
BJC Institute of Health, 11th Floor, Musculoskeletal Research Center  
Phone: 314-454-8408

Biology of cell-cell interactions and communication in bone via gap junctions and cell adhesion molecules; function of connexins and cadherins in transcriptional control of osteoblast differentiation, osteoclastogenesis, and mechanotransduction; modulation of mesenchymal lineage allocation and osteogenic differentiation by cadherins and beta-catenin signaling.

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**Nicholas O. Davidson, MD**  
910 Clinical Sciences Research Building, North Tower  
Phone: 314-362-2027

Our focus is on the genetic pathways of nonalcoholic fatty liver disease (NAFLD) and colorectal cancer development. We have two major areas of research interest. Our laboratory is interested, first, in the molecular mechanisms of hepatic steatosis and the pathogenesis of NAFLD. This is the most prevalent liver disease in the United States, likely affecting a quarter of the population. We have generated genetically manipulated mouse strains that offer insights into the mechanisms of hepatic steatosis. The student would work as part of a team, designing and conducting experiments that will test hypotheses concerning the mechanisms and consequences of hepatic steatosis. These studies will primarily involve mouse genetics, examining the expression of candidate genes under a variety of nutritional and pharmacologic settings that modulate hepatic lipid metabolism. In addition, we are using microarrays to study the spectrum of genetic changes that may predict the extent of hepatic lipid accumulation in patients with steatohepatitis. Our goal is to test hypotheses using mouse genetics and to extend these studies to examine the same pathways in humans with NAFLD. Our second area of interest concerns the genetic pathways involved in colorectal cancer, the second leading cause of cancer-related deaths. We have developed a novel strain of mice in which the dominant effects of mutations in the APC tumor suppressor gene have been abrogated through deletion of an RNA binding protein, apobec-1. This deletion has a major effect on the expression of cox-2, abrogating the increase in expression seen in human colonic adenomas and wild-type mouse intestinal adenomas. These findings suggest that apobec-1 is a genetic modifier of colon cancer development. We will study the importance of apobec-1 expression in human colon cancer specimens and continue our murine genetic studies of this novel pathway for modulating colon cancer development and progression.

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**Bradley Evanoff, MD, MPH**  
Phone: 314-454-8638

Our primary interest is on occupational medicine epidemiology and intervention research. Our research involves the use of epidemiology methods to characterize associations between diseases and work-related exposures. We are also doing workplace intervention studies to prevent injuries and illnesses and to improve healthy diet and physical activity among working populations. During an elective in occupational medicine epidemiology research, students will learn how to use epidemiologic methods to investigate disease processes by working on a mutually agreed-on topic of interest related to occupational diseases. Other activities can include worksite visits and intervention projects as well as involvement with worksite health promotion and policy making. Elective length is variable, depending on individual circumstances. Please contact Dr. Evanoff to discuss this research.

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**Gregory I. Goldberg, PhD**

Wohl Clinic, 4th Floor

Phone: 314-362-8172

Role of secreted extracellular matrix metalloproteases in tissue remodeling; structure and function of the metalloproteases.

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**Richard W. Gross, MD, PhD**

4525 Scott Avenue, East Building

Phone: 314-362-2690

Lipid mediators of signal transduction in the cardiovascular system; characterization of regulatory mechanisms responsible for the liberation of lipid second messengers during cellular activation; roles of phospholipases in mediating the metabolic syndrome and end-organ tissue damage.

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**Stacey House, MD, PhD**

Phone: 314-362-8070

houses@wustl.edu

**Lisa Hayes**

Phone: 314-362-4362

hayesl@wustl.edu

Emergency medicine clinical research is the primary focus of this lab. This type of research involves the gamut of research designs, from retrospective cohort studies ("The Use of B Hydroxy Butyrate Point-of-Care Testing in Diabetic Ketoacidosis") to prospective clinical trials ("Biomarkers in Traumatic Brain Injury") to the evaluation of health care systems and emergency department processes ("Effects of a Triage Process Conversion on the Triage of High Risk Presentations") to the analysis of health policy issues ("Rate of Follow-up to a Primary Care Clinic and Subsequent Emergency Department Utilization among an Urban ED Population"). Students will learn the basic clinical research designs and will be able to articulate the benefits and drawbacks of each. They will be involved in hypothesis generation and study design for projects that are at that stage. For ongoing projects, they will learn about the informed consent process and be involved in screening for study subjects and subject selection and enrollment. They will be allowed to consent for studies judged to be of minimal risk. Students will be taught important rules regarding data acquisition and entry, particularly as these relate to standards that have been set forth in the medical literature. They will learn about bias and inter-rater reliability. Students will participate in data entry, data analysis, and subsequent abstract/manuscript preparation based on their level of interest and time commitment. Students will meet weekly with one of the course directors to discuss study progress and to identify any roadblocks to study completion.

These meetings will also serve as a forum for one-on-one education of the student regarding study methodology, ethical issues in research, and various resources available to the clinical researcher at Washington University.

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**Sandor J. Kovacs, MD, PhD**

9965 Clinical Sciences Research Building

Phone: 314-362-8901

This experience is geared toward students with math, physics and engineering backgrounds. The cardiovascular biophysics research elective concentrates on physiologic modeling and the comparison of model predictions to in vivo human data. The minimum elective time is eight weeks.

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**Marc S. Levin, MD, and Deborah C. Rubin, MD**

922/924 Clinical Sciences Research Building

Phone: 314-362-8933 or 314-362-8935

Students will be members of a collaborative research team headed by Drs. Levin and Rubin (Department of Medicine) investigating the mechanisms underlying the intestinal adaptive response that occurs to compensate for the loss of functional small intestine. A second project focuses on epithelial-mesenchymal interactions and their role in regulating gut epithelial proliferation carcinogenesis and the normal and cancer stem cell niche. Specific mechanisms under investigation include the function of an immediate early gene *Tis7* on gut adaptation after resection or injury. The role of myofibroblast protein epimorphin in regulating cell proliferation and colon carcinogenesis is being explored. The student will have the opportunity to learn basic molecular biology and physiology as they relate to small intestinal growth and function. Examples of techniques that are used in these studies include small animal surgery and colitis and cancer models (mice and rats), molecular biological techniques including PCR, Northern blotting, vector construction for the production of transgenic and knockout mouse models, in situ hybridization and immunohistochemistry.

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**Jason C. Mills, MD, PhD**

Clinical Sciences Research Building, North Tower, Room 1030

Phone: 314-362-4213

We investigate the differentiation of epithelial stem cells in the upper gastrointestinal tract. We study how genes regulate differentiation in mouse models and in vitro in tissue culture, and we correlate our findings with human tissue specimens. Specific projects include the following: (1) understanding how inflammation leads to aberrant differentiation (metaplasia), which is a precursor for cancer; (2) elucidating how master regulatory transcription factors like *Xbp1* and *Mist1* coordinate the massive cytoskeletal and organellar expansion of specialized secretory

cells as they differentiate from stem cells; and (3) understanding the mechanisms that regulate how differentiated cells can be reprogrammed into stem cells in gastrointestinal organs like the stomach and the pancreas.

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**Richard E. Ostlund, MD**

8804 Wohl Hospital  
Phone: 314-362-8286

Our laboratory focuses on the prevention and treatment of coronary heart disease by studying cholesterol absorption, detoxification and elimination from the body. Direct patient studies that use new stable isotopic cholesterol tracers and mass spectrometry techniques complement in vitro work on the biochemistry of cholesterol transport in cultured cells.

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**Russell Pachynski, MD**

BJC Institute of Health, 7th Floor  
Phone: 314-286-2341

Our lab focuses on several aspects of tumor immunology and translational immunotherapy. We utilize mouse tumor models, human tissues and samples, and advanced molecular and immunologic techniques to study leukocyte trafficking in the setting of tumor development and progression. We also have projects focusing on developing novel immunotherapeutics aimed at augmenting the recruitment of beneficial leukocyte subsets into the tumor microenvironment in order to suppress tumor growth. We are utilizing several approaches, such as nanoparticles, fusion proteins and viruses.

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**Katherine Ponder, MD**

8818 Cancer Science Research Building  
Phone: 314-362-5188  
kponder@wustl.edu

The focus of this lab is on gene therapy for lysosomal storage diseases such as mucopolysaccharidosis (MPS). We have developed a retroviral vector that can be efficiently delivered to the liver of mice and dogs and that results in expression sufficient to reduce many of the clinical manifestations of these genetic diseases. Current studies focus on assessing the therapeutic effect of gene therapy on sites that are affected in MPS (e.g., heart, aorta, bones, joints) and on developing vectors that might be translated into human patients. In addition, we are evaluating the pathogenesis of disease in MPS, which appears to involve the upregulation of destructive proteases in the aorta and possibly other sites. A better understanding of the pathogenesis of disease might result in additional therapies for MPS.

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**Clay F. Semenkovich, MD**

Southwest Tower, 8th Floor  
Phone: 314-362-4454

Fatty acid metabolism and its role in atherosclerosis, diabetes, hypertension and obesity; modulation of respiratory uncoupling for the treatment of aging, obesity and vascular disease.

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**Phyllis K. Stein, PhD**

Northwest Tower, Room 13116  
Phone: 314-286-1350  
pstein@wustl.edu

This lab's main focus is on the clinical significance of heart rate variability and ECG-derived waveform parameters obtained from continuous ambulatory monitoring. This elective affords the student the opportunity to perform research in heart rate variability or in other measurements, like QT variability or T-wave alternans that can be derived from continuous ECG monitoring from Holter recordings or polysomnography recordings in the sleep lab. One area of active research is the identification of heart rate patterns associated with obstructive and central sleep apneas and hypopneas and the relationship of previously unappreciated cycling heart rate patterns and outcomes. Data are also available from mice. Many possible projects are available using our many large existing datasets, using the thousands of stored studies in the sleep lab, or using de novo data collection in a clinical or animal population and in infants. Also, many possible directions for this research are available, from applying traditional and nonlinear HRV to different populations to developing methods to quantify ultradian heart rate variability patterns to developing novel ECG analysis techniques, among others. Also, we are involved with the Cardiovascular Health Study (CHS), a large population-based longitudinal study of risk factors for heart disease and stroke among community-dwelling people more than 65 years old. There is a subset of this population who had Holter recordings (~1400 at baseline, ~800 of the same people five years later, and ~370 minority subjects recorded at the same time as the second CHS recording). These recordings have already been analyzed by us, so there is a large amount of heart rate variability and heart rate pattern data available. There are also subsets of patients from the CHS and from another study (EPHESUS) who are known to have died suddenly, and we have developed a matched control group in order to examine ECG-based differences in those who died suddenly. We also have electronic sleep studies at two time points for about 300 of the CHS Holter participants who also participated in the Sleep Heart Health Study. We have analyzed an additional ~1500 sleep studies from CHS participants who did not have Holter recordings. Thus, there is also an opportunity in the CHS dataset for studies of the relationship of heart rate variability with changes in heart rate variability over time and with a huge number of clinical and demographic factors among the elderly. We also have data on the relationship of Holter-based HRV and sleep apnea patterns to the development of atrial fibrillation after cardiac surgery as well as data from a study of the treatment of depression in treatment-resistant depressed post-MI patients, a study of sickle cell patients, and a study of heart rate variability

and echo parameters in elderly African Americans. Currently, we are also analyzing HRV in premature infants as they mature and HRV as a predictor of response to treatment in babies in the NICU and PICU, using stored 24-hour bedside ECGs.

*Heart rate variability and clinical outcomes:* The student will be learning about HRV methods and will investigate the relationship of HRV and outcomes in one of our datasets. Because we have clinical and demographic data for about 20,000 subjects for whom continuous ECGs from Holter recordings, sleep studies, and ICU studies are available, as well as some mouse data, the student will be able to choose a project that may lead to a publishable result in an area of interest. The HRV Lab has enough computers and software to accommodate the needs of any interested students.

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**John Turk, MD, PhD**

Southwest Tower, 8th Floor  
Phone: 314-362-8190

Phospholipid signaling mechanisms in pancreatic islets is the main focus of this lab. Experience with the mass spectrometric analysis of complex lipids is available.

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**H.J. Wedner, MD**

5002 Steinberg Pavilion, Barnes-Jewish Hospital, North Campus  
Phone: 314-454-7937 or 314-454-7377

*Asthma care in the inner city:* Students will participate in ongoing studies of the delivery of asthma care to inner-city children and adults. The emphasis will be on direct contact between the asthmatic patients and the student, along with an asthma counselor.

*Biology of pollen and fungal allergens:* Our laboratory has been characterizing the important allergenic proteins from molds and pollen. The allergens are identified using skin-test-sensitive individuals, and the proteins are isolated and characterized by a combination of physicochemical and molecular biological techniques. These studies should lead to better forms of allergy immunotherapy. Students will participate in the isolation, characterization and modification of major allergens from a number of molds, including *Stachybotrys atra* and *Epicoccum nigrum*, and from several pollens, including those from white oak and *Parthenium hysterophoros*, a newly recognized allergen.

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## Primary Care Summer Preceptorships

Since 1996, the School of Medicine has sponsored a primary care preceptorship program for medical students during the summer between their first and second years of classes. Students select a preceptor in internal medicine, pediatrics or

family practice and spend up to eight weeks observing that physician's clinical practice. A stipend is provided to the student. Although many of the preceptors are in St. Louis, others — particularly alumni — are located in cities throughout the country.

## Courses

Courses include the following:

- M25 Medicine (p. 173)
- M27 Emergency Medicine (p. 181)

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## M25 Medicine

Visit online course listings to view offerings for M25 Medicine (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M25>).

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### M25 Medicine 507 Practice of Medicine I

POM I is a large course which spans all 3 blocks of the first year. It is composed of three content areas: 1. Clinical Skills 2. Patient, Physician, and Society 3. Clinical Knowledge Each of these three content areas has two or more sections, each run by a faculty section leader. POM I employs a variety of teaching techniques, instructors and venues. This includes lecture, small group discussions, panel sessions, one-on-one hospital interviews, standardized patient sessions, a patient home visit, and visits to both a primary care office and a city clinic. What are the educational goals of POM I? Students will learn to: 1. Perform a complete history and physical examination with thoroughness, accuracy, sensitivity and compassion. 2. Communicate effectively, efficiently and compassionately with patients, families and other health professionals. 3. Describe and analyze the statistical methodology of clinical studies and apply the results to individuals and groups of patients. 4. Identify and investigate ethical, cultural, socioeconomic and political factors relevant to medical interactions. 5. Examine and analyze personal and professional competencies, limitations and behaviors. How do we accomplish these goals? 1. Learning skills and techniques requires a cycle of steps: preparation, background reading, attempts at skill performance, analysis and reflection on performance, discussion of potential improvements and successive performance of the skill with advancement to a new level of expertise. 2. The focus is on learning skills. You practice each skill, such as interviewing, in a variety of venues and situations of varying complexity. This course is for learning about how to do things that you will use for taking care of patients and families. 3. You work in multiple learning environments. a. Academic environments: Small group sessions for discussion, small group practice sessions, peer learning, small group presentations, individual and group writing assignments, and reflections on experiences are the preferred learning locations. b. Clinical environments: Inpatient units with faculty and WUSM IV mentors, standardized patient experiences with videotape review, physicians' offices, patients' homes with and without home care professionals, and a city clinic. Credit 198.5 units.

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### M25 Medicine 605A Infectious Diseases

The Infectious Diseases course teaches both organism-specific and organ-specific approaches to disease caused by microbes. The course expands upon the material presented in the first year concerning bacteria, viruses, fungi and parasites and their involvement in causation of human disease. It explores the

complex interaction between microbes and host in the individual patient, and at the broader public health level. The course introduces the recognition and initial management of common infectious diseases. Educational methods include lecture, interactive in-class case discussions and review sessions, and student-led clinical case discussions in small groups. Credit 51 units.

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#### **M25 Medicine 606A Rheumatology**

A major focus of the course is teaching "how to think like a rheumatologist", emphasizing the concept of clinical diagnosis: the history and physical generate a clinical hypothesis, which is supported by laboratory tests. Inflammatory arthritis (rheumatoid arthritis, spondyloarthropathies, crystalline disorders, and infectious arthritis), classic "autoimmune diseases" (lupus, inflammatory myopathy, and scleroderma), and vasculitic syndromes are presented. A team based learning exercise on rheumatology lab tests gives students a chance to teach one another the details. Two separate sessions with four unknown patients gives students a chance to interview patients and try to make a diagnosis. Credit 17 units.

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#### **M25 Medicine 607 Practice of Medicine II**

The goal of The Practice of Medicine (POM) course is to provide students with the knowledge, skills and attitudes essential to patient care regardless of specialty. POM II is a continuation of POM I and will continue to address various interfaces between patients, physicians and society and will also introduce the advanced physical exam and approaches to clinical thinking and decision-making. The sections of POM II include Clinical Skills, Case Development, Communication Skills, Ophthalmology, Radiology, Community and Public Health, Ethics and Health Policy Humanities, and Scientific Methods. The learning objectives for each section of POM II emphasize topics and skills used in all fields of medicine, and the majority of the course work will be taught in small groups or through clinical experiences. Credit 89 units.

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#### **M25 Medicine 611B Cardiovascular Disease**

Cardiovascular disease remains the number one cause of death within the United States, although steady advances in the field have greatly reduced both its associated morbidity and mortality. This course provides a foundation for understanding the pathophysiology, diagnosis, and management of cardiovascular conditions commonly encountered in clinical practice, including hypertension, ischemic heart disease, heart failure, arrhythmias, valvular heart disease, pericardial diseases, aortic diseases, peripheral arterial disease, and venous disorders. An emphasis is placed on describing the current state of knowledge in cardiology while also including some of the exciting new developments that are revolutionizing patient care. The course includes lecture overviews of each topic along with small group and team-based learning sessions to solidify and apply knowledge of the material to patient case scenarios. In addition, "EKGs of the Week" allow students to practice a structured approach to the interpretation of EKGs. Credit 30 units.

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#### **M25 Medicine 612B Pulmonary Diseases**

The pulmonary pathophysiology course is designed to familiarize medical students with the pathophysiological mechanisms underlying diseases of the pulmonary system. The course begins with a brief review of pertinent pulmonary physiology and

pulmonary function, and then explores how pathologic disorders alter normal lung physiology resulting in the clinical presentation of disease. Major categories of clinical pulmonary diseases discussed include obstructive lung diseases, restrictive lung diseases, pulmonary vascular diseases and pleural disease. Educational methods include lectures, team based learning and review sessions. Credit 22.5 units.

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#### **M25 Medicine 613B Renal & Genitourinary Diseases**

This course focuses upon the wide variety of renal diseases. It will begin with a brief review of pertinent renal physiology, and then will explore disorders of fluids/electrolytes (abnormalities in plasma water/solute balance), patterns of acute and chronic kidney injury (including nephritic/nephrotic syndromes and renal involvement in systemic disorders), and finally the options available when end stage kidney disease is reached (hemodialysis, peritoneal dialysis, transplantation). The course contains a mixture of lecture, small group, team based learning, case-based presentations, and patient presentation. Credit 38 units.

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#### **M25 Medicine 614 Dermatology**

The dermatology second-year course is designed to provide medical students with a foundation in dermatology that will support future learning and improve diagnostic skills in general medicine and a wide variety of specialties. Medical students will learn how to describe skin lesions and the pathophysiological basis and clinical characteristics of major dermatologic diseases. Major categories of clinical skin diseases and their most prominent constituents will be discussed, including papulosquamous diseases, blistering diseases, infectious diseases, and benign and malignant neoplasms. Credit 8 units.

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#### **M25 Medicine 615A Endocrinology and Metabolism**

The endocrine pathophysiology course aims to provide an understanding of the pathophysiology and clinical manifestations of common endocrine disorders. Emphasis is placed upon relevant clinical history and physical examination as well as the interpretation of investigations for endocrine disorders. Basic principles of treatment of endocrine disorders will also be discussed. Lectures are supplemented by organ-specific clinical case discussions. Credit 31 units.

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#### **M25 Medicine 620A Gastroint. and Liver Diseases/Nutrition**

This course discusses the pathophysiological mechanisms underlying diseases of the gastrointestinal tract including esophagus, stomach, small and large intestines, liver, gall bladder and pancreas. A series of lectures related to nutrition and the impact of nutritional disorders on health and disease are also included. Lectures are supplemented by group seminars that include discussion of clinical case presentations. Credit 32 units.

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#### **M25 Medicine 625A Hematology and Oncology**

The hematology pathophysiology course exposes students to common hematologic disorders and hematologic malignancies. The course utilizes lectures, clinical case discussions and practical sessions involving microscopy. Credit 39 units.

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## M25 Medicine 705 WUMSCare

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### M25 Medicine 707 Practice of Medicine III

Objectives: 1. To review challenges and dilemmas relevant to the practice of clinical medicine. 2. To examine clinical experiences from a variety of perspectives. In this course, themes and topics relevant to students in their clinical stage of training are discussed. Session formats include lecture, panel discussion and/or small group. As students exchange problematic scenarios and questions, the group develops potential solutions and management schemes. \*Topics in the past have included: 1) Diversity 3.0 training 2) Business of medicine 3) Individualized Learning Objectives in clinical scenario 4) PSQI 5) Mock Deposition, Risk Management, and Adverse Patient Outcomes 6) Compassion Fatigue, Resilience, and Burnout Part 1 7) Compassion Fatigue, Resilience, and Burnout Part 2 8) Caring for Incendiary Patients 9) Diagnostic Error and Transitions of Care 10) Strategies for Effective Teaching and Mentoring Attendance at 8 out of 10 POM III sessions is required to pass this course. Students may use 2 absences for any reason and are recommended to save them for their ACES rotation, Labor & Deliver rotation, or an emergency.

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### M25 Medicine 710 Medicine Clerkship

The Medicine clerkship provides supervised study of patients in both inpatient and ambulatory settings. For the inpatient rotations, students are assigned as clinical clerks to patients admitted to the general medical teaching services of Barnes-Jewish Hospital and Veterans Administration Medical Center. For the outpatient rotations, students learn primary care in internal medicine and family medicine clinics at Barnes-Jewish hospital or community-based practices. Teaching is provided by the Chief of Service, attending Physicians, House Officers, consultants, Chief Residents and regularly scheduled conferences. Formal instruction is given regarding core internal medicine topics during the clerkship. A minimum of 8 weeks is required: 2 consecutive 4-week rotations.  
Credit 308 units.

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### M25 Medicine 714 Ambulatory Clerkship: Emergency Medicine

The Urgent Care area (UCA) serves as our site for the WUSM III Ambulatory Care Rotation. Three students at a time are assigned to this 4 week rotation. Students will spend their first day in an orientation session learning suturing, ECG interpretation and airway management (including intubation skills) in hands-on laboratories. They will also review pelvic examinations and view an education video on domestic violence. On day two, they begin primarily evaluating non-emergent patients in Urgent Care and report directly to an Emergency Medicine attending. There are 4 hours of conferences per week (8:00 - 10:00 AM on Tuesday and Wednesday mornings) - attendance is mandatory. Discussions are currently underway to allow students to participate in helicopter ride-alongs with ARCH Airmedical Services. Students can expect to gain a wide range of skills in evaluating uncomplicated upper respiratory infections, urinary tract infections, sexually transmitted diseases, lacerations, eye problems, rashes, simple extremity trauma-in general, "bread and butter" medical/surgical problems. Students do a case presentation (15 min) at the close of the block.  
Credit 154 units.

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### M25 Medicine 740 Dermatology Clerkship

The goal of the dermatology clerkship is to provide a guide for the student to appreciate dermatology within the broader perspectives of medicine and biology. The student will develop familiarity with dermatologic vocabulary, learn to recognize and initiate therapy of common dermatologic disorders and become cognizant of uncommon or complicated dermatologic problems that require specialty care. Emphasis will be placed on careful history taking and physical examination. Students will always work under the direction of the resident physician and the attending physicians in the clinic setting.  
Credit 77 units.

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### M25 Medicine 750 Geriatrics Clerkship

The primary goal of this rotation is for students to gain proficiency in the principles of geriatric evaluation and management, including the medical, psychological, social, and functional assessments of older adults. Students are expected to participate in the evaluation of three to five patients per week, in a variety of settings including the outpatient Geriatric Assessment Clinic, in-patient Geriatric Consult service, Parc Provence nursing home, and the Rehabilitation Institute of St. Louis (TRISL). Students will also have the opportunity to participate in hospice and home care visits, interdisciplinary team meetings, and observe an assessment at the WU Alzheimer's Disease Research Center. Students are expected to attend weekly conferences while on the rotation. The day normally begins at 8:30 a.m. and is usually finished by 5:30 p.m. There is no night or weekend call. Time is provided to read the detailed syllabus/bibliography. Many clinical activities are off-site from the medical campus. Students will be required to coordinate transportation to and from such sites. Students will be expected to give an oral presentation on a topic of their choice once during the rotation.  
Credit 77 units.

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### M25 Medicine 801 General Medicine Subinternship - BJH

The purpose of the General Medicine Subinternship is the development of expertise in the care of hospitalized patients in a well-supervised teaching environment. Subinterns act as their patients' interns under the supervision of residents and attending physicians. Subinterns have the same on-call and admitting schedules as the interns on their teams and are assigned up to two new patients on each admitting day. Subinterns are not required to spend call nights in the hospital. Except in emergencies, subinterns are the first individuals to evaluate patients admitted to medical service teams. A diagnostic and therapeutic approach to the patient is planned in consultation with the resident. Subinterns assume primary responsibility for the daily care of their patients, under the supervision of resident and attending physicians. This includes evaluation on daily rounds, scheduling and obtaining results of diagnostic studies, planning therapy, making arrangements for care after discharge and communicating with patients and their families. Subinterns attend the same conferences as the house staff.

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### M25 Medicine 805 Rheumatology

Students will be involved in the diagnostic work-up and management of patients with conditions such as: systemic lupus erythematosus, rheumatoid arthritis, scleroderma, vasculitis (ANCA-associated vasculitis, temporal arteritis, etc.), spondyloarthropathies (ankylosing spondylitis, psoriatic arthritis, reactive arthritis, etc.), and gout; there is less exposure to osteoarthritis and regional musculoskeletal problems. By working closely with a faculty member, fellows and medical



residents, students become integral and active members of the rheumatology service for inpatient consultations and outpatient clinics at Barnes-Jewish Hospital. An emphasis is placed on the physical examination of joints and the musculoskeletal system, synovial fluid analysis, and interpretation of diagnostic tests and radiographs. Students attend two rheumatology conferences held weekly. A rotation limited to outpatient rheumatology is possible by prior arrangement with the Course Director.

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#### **M25 Medicine 807 General Medicine Subinternship - VA**

The purpose of the General Medicine Subinternship at the VA Medical Center is to develop proficiency in the care of hospitalized patients on an internal medicine ward. Subinterns will have similar responsibilities as interns, with appropriate supervision by the attending and resident physicians. They have the same on-call/admitting schedules as the interns and participate in the same teaching conferences, but they do not take overnight call. Subinterns should admit at least two patients per call day, and they should be the first to evaluate the patients admitted to the medical service, except in emergencies. A diagnostic and therapeutic approach to evaluating each patient is planned in consultation with the resident. Subinterns assume primary responsibility for the daily care of their patients, including evaluating each patient daily, presenting on morning rounds entering orders (discussed with and co-signed by the resident), interpreting results of diagnostic studies, calling consults, collaborating with nurses and social work, organizing post-discharge care, and communicating with patients and their families. Subinterns also attend weekly small group learning sessions during which they discuss, diagnose, and treat patients using example cases. By the end of the VA General Medicine Subinternship, subinterns will be able to independently: - synthesize and succinctly present a patient's history, exam, diagnostic data, assessment, and plan of care. - support differential diagnoses and proposed care plans with clinical reasoning and evidence. - demonstrate how to correctly order diagnostic tests and medications that further patient care. - analyze complex patient cases during interactive small group learning sessions. - integrate feedback from patients, residents, and attending physicians, and formulate a plan for ongoing improvement as a clinician.

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#### **M25 Medicine 810 Geriatric Medicine**

The primary goal of this rotation is for students to gain proficiency in the principles of geriatric evaluation and management, including the medical, psychological, social, and functional assessments of older adults. Students are expected to participate in the evaluation of two to six patients per day, in a variety of settings including the outpatient Geriatric Assessment Clinics and Geriatric Medicine Primary Care clinics, inpatient Geriatric Medicine Consult service, Parc Provence Nursing Home, and The Rehabilitation Institute of St. Louis. Students will also have the opportunity to participate in hospice and home care visits, interdisciplinary team meetings, and observe assessments at the WU Memory Diagnostic Center (in Neurology). Students are expected to attend weekly conferences while on the rotation. The day normally begins at 8:30 am and is usually finished by 5:30 pm. There is no night or weekend call. Time is provided to read the detailed syllabus/bibliography. Many clinical activities are off-site from the medical campus; students will be required to coordinate transportation to and from such sites. Students will be expected to attend weekly educational conferences and give an oral presentation on a topic or journal article of their choice once during the rotation.

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#### **M25 Medicine 811 Hospitalist Subinternship**

This course allows the student to work one-on-one with hospitalist physicians on a patient care team. The student acts as the intern under the direct supervision of the attending physician. Daily responsibilities include admission history and physicals, daily notes and discharge summaries on assigned patients. S/he also will have the opportunity to perform indicated procedures on patients on this service. Students are encouraged to participate in Department of Medicine conferences.

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#### **M25 Medicine 811A Clinical Internal Medicine: Hospitalist**

This course allows the student to work one-on-one with hospitalist physicians on a patient care team. Daily responsibilities include admission history and physicals, daily notes, and discharge summaries for assigned patients. Students will also have the opportunity to perform indicated procedures on patients on this service. Students are encouraged to participate in Department of Medicine conferences.

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#### **M25 Medicine 821 Inpatient Cardiology**

Students will participate as members of the Barnes-Jewish Cardiology at Washington University Consultative Team. They will be part of a team composed of faculty members, fellows, residents, and nurse practitioners that sees a large population of cardiac patients and follows them through all aspects of their in-hospital care. Emphasis will be placed on physical examination and the interpretation of modern cardiac diagnostic tests including electrocardiograms, echocardiograms and coronary angiograms and their role in clinical decision making.

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#### **M25 Medicine 822 Cardiology Subinternship**

The structure and functioning of the Cardiology subinternship is very similar to the General Medicine Subinternship (M25 801 and M25 807). The basic purpose is to develop expertise in the care of hospitalized patients in a well-supervised teaching environment. The majority of patients admitted to the service will have a cardiology diagnosis as the main reason for admission. Some general medical problems will also be seen. All attendings on the service are cardiology subspecialists. Cardiology fellows act as the chief resident for the service on a monthly basis. Subinterns act as their patients' interns under the supervision of residents and attending physicians. Subinterns have the same on-call and admitting schedules as the interns on their teams and are assigned up to two new patients on each admitting day. Subinterns are not required to spend call nights in the hospital. Except in emergencies, subinterns are the first individuals to evaluate patients admitted to medical service teams. A diagnostic and therapeutic approach to the patient is planned in consultation with the resident. Subinterns assume primary responsibility for the daily care of their patients, under the supervision of resident and attending physicians. This includes evaluation on daily rounds, scheduling and obtaining results of diagnostic studies, planning therapy, making arrangements for care after discharge and communicating with patients and their families. Subinterns attend the same conferences as the internal medicine house staff. There are also several conferences specific to the cardiology service.

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#### **M25 Medicine 823 Clinical Cardiology - VA Hospital**

The major purpose of this elective in clinical cardiology at the John Cochran VA Hospital is to improve evaluation and management skills for diagnosis and treatment of important cardiovascular conditions such as coronary artery disease including acute myocardial infarction, congestive heart failure, hypertension, and valvular heart disease. The rotation is

designed to be flexible enough to accommodate a wide variety of course objectives but includes the opportunity to participate in 1-3 outpatient clinics per week; 1-4 weeks of inpatient intensive care, telemetry, or cardiology consultation rounds; and ECG, stress testing, nuclear imaging, or echocardiographic reading sessions, cardiac catheterization and electrophysiologic procedures. The emphasis will be on improvement of the ability to diagnose and treat cardiovascular disease on the basis of information obtained from a thorough history and physical examination that is integrated with data from appropriate highly targeted laboratory studies in a manner that optimizes patient outcome and minimizes risk and costs.

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#### **M25 Medicine 825 Cardiac Arrhythmias and Electrophysiology**

Students will be members of the Cardiac Electrophysiology Consultation Team, which includes faculty members, fellows, residents, and nurse practitioners. The student will serve as the primary assessor for consultations and will, in concert with the rest of the team, complete the patient's assessment and initiation recommendations and plan, as well as follow up. There is an emphasis on ECG evaluation and gaining familiarity with indications and details of arrhythmia therapeutics, including catheter ablation procedures, implantable device procedures, assessment, and programming, as well as antiarrhythmic drug therapy.

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#### **M25 Medicine 827 Heart Failure/Cardiac Transplantation**

This rotation is intended to provide trainees with a comprehensive experience managing patients with advanced heart failure. In addition to daily inpatient rounds, trainees are invited to attend both heart failure and transplant clinics. Further, the curriculum is supplemented by a syllabus that contains the critical literature pertinent to this patient population. The trainees will also have experience with the evaluation of patients for operative heart failure therapies and will have the opportunity to observe these surgical procedures.

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#### **M25 Medicine 830 Dermatology**

The aim of this elective is to provide a guide for students so they are able to appreciate dermatology within the broader perspectives of medicine and biology. Emphasis will be placed on the dermatologic variations encountered in a normal physical examination of the skin, the identification of common skin diseases, dermatologic clues to systemic disease, as well as those dermatologic conditions that are life-threatening. The student will participate in outpatient care in the Barnes-Jewish Hospital, VA, and affiliated clinics. Students will attend all clinical teaching rounds and conferences in addition to the basic science and cutaneous histopathology conferences.

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#### **M25 Medicine 831 Pediatric Dermatology**

This clinical rotation will be available to students interested in dermatology, pediatrics or both. Students will follow the dermatology rotation (M25 830) with an emphasis on pediatric dermatology by attending pediatric dermatology clinics, seeing consults, etc.

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#### **M25 Medicine 834A SNHC Clinical Mentoring**

This elective is designed to develop the teaching and mentoring skills of our fourth-year medical students through clinic sessions at the Saturday Neighborhood Clinic. In addition, the elective will develop the ability of our fourth-year students to productively engage and present complex social issues

through the development of a one-hour lecture. Three mentoring sessions will also occur. Each fourth-year student will pair with a preclinical (first- or second-year) student each session and then supervise that student throughout the clinic day. The fourth-year student will supervise and assist as the preclinical students complete the patient history and physical, presents the exam results to the physician, and writes the visit notes for multiple patients. The preclinical student will complete one patient note without assistance, which the fourth-year student will then thoroughly review, edit, and return to the preclinical student, along with constructive feedback regarding the preclinical student's general performance. The attending present at the SNHC will verify that the fourth-year mentor fulfilled the specified mentoring requirements. Additional practice sessions to review exam skills, note writing, and communication are optional and can be individually arranged between teams so the fourth-year mentor can assist the first-year student with personalized skills. Reading: (1 presentation) The fourth-years taking this elective will break into groups of 3-4. Each group will be responsible for presenting a 1-hour presentation on a topic related to "social determinants of health". There should be a case component to the presentation as well as a broader discussion. The presentations will be based on thorough research and should engage the broader context of the topic including the epidemiology, social and health ramifications, economics, interventions, et c. The presentation should include descriptions of potential solutions and innovation, where applicable.

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#### **M25 Medicine 836 Clinical Gastroenterology and Hepatology**

The GI Hepatology elective is integrated into a very active inpatient and endoscopy service at Barnes-Jewish Hospital. Students will participate in the evaluation of inpatients with a spectrum of gut and liver disorders, make patient rounds with the faculty and fellows, and have responsibility for patients on whom consultations have been requested. In addition, they will observe general endoscopic techniques and participate in GI conferences.

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#### **M25 Medicine 836A Treatment of Patients with Inflammatory Bowel Disease**

This elective will allow students to spend an intensive period of time learning about all aspects of the care of patients with IBD (surgical, endoscopic, and medical management). Although a predetermined schedule has been developed, it can be modified based on the student's interest. Alternative options include: - inpatient IBD care (Barnes-Jewish Hospital and Barnes West County) - wound clinic / stoma care - specialized endoscopy (chromoendoscopy, ERCP) - IBD / colorectal surgery - pathology

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#### **M25 Medicine 838 Medicine Consult Service**

The focus of the Medicine Consult Service elective is the evaluation and management of medically complex patients admitted to the hospital on non-medicine services. The issues involved with perioperative management are particularly stressed. The student will function as a member of the consult service team. Duties will include performing initial consultations and follow-up care under the supervision of a Hospital Medicine attending and a senior medical resident. Attendance at Department of Medicine and division conferences is encouraged.

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### **M25 Medicine 844 Hematology and Hemostasis**

Activities include work-up of patients at Barnes-Jewish Hospital under the supervision of the hematology fellow and faculty; attendance at daily clinical rounds for 1 - 1.5 hours per day. These are staffed by a senior faculty in the Division of Hematology. In addition to evaluation of patients with hematologic disorders, the student will gain additional analytic skills including: 1. Interpret and integrate laboratory data in the diagnosis of anemia and other cytopenias 2. Review peripheral blood and bone marrow morphology, 3. Analyze laboratory data for the diagnosis of thrombophilia and bleeding 4. Discern the principles of blood banking and pheresis The students will have the opportunity to follow patients with sickle cell disease and understand the treatment of this disorder. The student is expected to attend and participate in the weekly hematology conference.

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### **M25 Medicine 847 Bone and Mineral Diseases**

The course is designed to acquaint the student with the clinical, radiological and pathological manifestations and treatment of disorders of bone and mineral metabolism, including osteoporosis, Paget's disease of bone, hyperparathyroidism, osteomalacia, and more rare disorders of bone development and homeostasis. The student will rotate through clinics of the Division of Bone and Mineral Diseases, and see patients at Barnes-Jewish Hospital, Barnes-Jewish West County Hospital and Shriners Hospital for Children. Acquired and heritable bone diseases will be studied in the context of derangements of mineral homeostasis with emphasis on vitamin D and peptide hormone metabolism and skeletal formation and remodeling. The role of non-invasive methods for measuring bone mass in the diagnosis and management of skeletal diseases also will be stressed. Faculty and medical students will present interesting cases for discussion or the students can present a pertinent topic related to bone metabolism they have researched during their rotation.

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### **M25 Medicine 849 Sun Protection Outreach Teaching by Students (SPOTS)**

Students will teach public and private middle school and/or high school students in the St. Louis area about skin cancer and sun protection. SPOTS courses are taught in 60- to 90-minute sessions. The program involves delivering a PowerPoint presentation with a prewritten script, interactive games, a video, and hands-on demonstrations. The elective is open to students who are new to this program, as well as students who previously participated in the SPOTS first-year selective. Students new to SPOTS are required to attend two evening training sessions (2.5 hours each) to learn the content of the program, as well as teaching strategies. For students who have taught SPOTS before, only one evening session is required. Training sessions for all enrolled students occur in the fall. A winter training session can be added if needed. Students will teach 4 SPOTS session per week of elective credit (8 sessions total). Students participating in the elective need to arrange for their own transportation to teaching sessions. Sessions are typically taught by students in pairs. Learning objectives: 1. Demonstrate knowledge of basic principles of skin cancer, including how to detect skin cancer and how to decrease risk with photoprotection. 2. Effectively communicate this knowledge to children/adolescents. COVID UPDATE: Many schools are not allowing in-person visits and we have sent them the recorded materials but have not had medical students visit. If we have more interest by students than sessions, we may have to engage the medical students in other ways.

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### **M25 Medicine 853 Bone and Joint Infectious Diseases**

Study of infectious diseases of the bones and joints, including infections in both native and prosthetic joints. The elective is designed to teach students the fundamentals of evaluating clinical orthopedic infections and formulating plans for workup and therapy. Students see consultations in infectious diseases in every part of Barnes-Jewish Hospital under the supervision of a faculty member who rounds with them every day. They work closely with the infectious diseases attending and nurse practitioner, follow their own patients and play an important role in their management. They are expected to read the literature about their patients and participate in clinical conferences. They attend teaching rounds and conferences and lectures in infectious diseases. They also learn appropriate use of antibiotics and antifungal agents. The role of surgical and medical management is discussed, and the students will interact with surgical staff in understanding the risks and outcomes of these common infections. Two weeks of General Inpatient Infectious Disease are a prerequisite to this course.

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### **M25 Medicine 854 Transplant Infectious Diseases**

Study of infectious diseases in patients who have had bone marrow or solid organ transplants, or who have a hematologic malignancy. The elective is designed to teach students the fundamentals of evaluating clinical infections in these complex and interesting patients and formulating plans for workup and therapy. Students see consultations in every part of Barnes-Jewish Hospital under the supervision of a faculty member who rounds with them every day. They work closely with infectious disease fellows, follow their own patients and play an important role in their management. They are expected to read the literature about their patients and participate in clinical conferences. They attend teaching rounds and conferences and lectures in infectious diseases. They also learn appropriate use of antibiotics, antifungal and antiviral agents in this highly immune suppressed population. A wide distribution of infectious diseases is covered including management of neutropenic fever, invasive fungal infections in the transplant population, acute and chronic infections, infection prophylaxis and monitoring and interactions between immunosuppressive agents and antibiotics.

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### **M25 Medicine 858 Ambulatory Infectious Diseases**

The elective is designed to teach students the fundamentals of evaluating clinical infections in the outpatient setting. Students see patients under the supervision of a faculty member and interact with ID fellows and Internal medicine residents. Students will participate in the care of HIV-infected or otherwise immunosuppressed patients as well as general infectious disease patients. The clinic is the primary provider for many HIV-infected patients, and students will learn the pathogenesis of HIV, become familiar with most antiretroviral medications, and have the opportunity to learn about opportunistic infections and their prophylaxis. They will also have the opportunity to see patients with bone and joint infections, endovascular infections, endemic and opportunistic mycoses, mycobacterial infections, sexually transmitted diseases, and many other infections. Patients seen will have a wide range of acute and chronic infections, and will include indigent and insured patients across a wide range of ages. The students will play an important role in the management of these patients and will present their assessments and plans to the supervising attending. They are expected to write clinic notes, read the literature about their patients, and participate in clinical conferences.

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**M25 Medicine 859 General Inpatient Infectious Diseases**

This elective allows students to participate in the management of patients with a wide variety of infections in the inpatient setting. The elective is designed to teach students the fundamentals of evaluating clinical problems in infection and formulating plans for diagnosis and management. Students see consultations in infectious diseases in every part of Barnes-Jewish Hospital under the supervision of a faculty member who rounds with them every day. They work closely with medical residents and infectious disease fellows, follow their own patients and play an important role in their management. They are expected to read the literature about their patients and participate in clinical conferences. They attend teaching rounds, conferences, and lectures in infectious diseases. They see a wide variety of infection diseases including community acquired acute and chronic infections, surgical infections, opportunistic infections in HIV-infected patients and other immunocompromised hosts, hospital-acquired infections, and basic infection control practices. They also learn appropriate use of antibiotics, antifungal and antiviral agents.

**M25 Medicine 861 Oncology - Inpatient Consult Service**

Medical Oncology is a complex subspecialty that is undergoing a rapid evolution as a result of new systemic treatment approaches that stem from biological insights into the nature of cancer. During the course of the elective, medical students will be able to interact with attending physicians and patients for bed side teaching and attend tumor boards and lectures focused on the care of patients with solid tumors. At the end of the rotation, the students will appreciate the principles of our approach to cancer patients and should have gained insights into the evaluation and management of patients with newly diagnosed malignancies. The role of surgery, radiation, and systemic treatment will also be an important theme, as well as the conduct of clinical research in this patient population. Students will also learn to care for hospitalized patients suffering from complications from their cancer or from toxicities due to treatments. Oncologic emergencies will be covered. Issues such as palliative care treatment options and end-of-life decision making will be explored as well.

**M25 Medicine 867 Medical Intensive Care**

The Medical Intensive Care Unit Elective is designed to introduce senior medical students to cognitive and procedural aspects of critical care medicine. Students will be expected to learn the basic pathophysiology and treatment approaches to respiratory failure, shock states and metabolic derangements. Participation in procedures will be encouraged as available. Dynamics of difficult conversations with patients and family members will also be modeled and discussed. Clinical responsibilities will occur as a part of a team and students will be expected to participate in admissions and daily follow-up on assigned patients. Teaching will occur via didactic lectures on weekdays and formal patient discussions on rounds.

**M25 Medicine 869 Palliative Medicine**

The Palliative Medicine elective will focus on the care of patients with life-threatening or debilitating illness throughout the course of their care. Skills in symptom management, communication, and interdisciplinary team-based care will be the focus. Students will spend the majority of their time on the BJH Palliative Care Service. Based on the individual student's interest, there may also be opportunities to work with the BJC Hospice Team and the St. Louis Children's Hospital Pediatric Advance Care Team. Students wishing to work with either team should contact the

Course Director and Administrative Contact, as well as the Instructors of the appropriate team, with as much advance notice as possible as trainee spots are very limited for both. While in the hospital, students will be responsible for seeing patients upon initial assessment as well as delivering follow-up care with the team. Patients will be seen for both end-of-life care as well as symptom management. Students will learn to assess and treat refractory symptoms and participate in complicated advanced care planning. Students will attend interdisciplinary team meetings, and may participate in conversations about goals of care and coping with bad news. They may also make home visits with hospice care providers, if desired. Emphasis will be placed on observing and understanding the psychosocial and spiritual needs of the patients, as well as the impact of the burden on caregivers. In addition, students will be expected to participate in bi-weekly presentations/group discussions on selected aspects of Palliative Medicine with the BJH Palliative Care team. Students will also be required to give a 20-minute presentation to the BJH Palliative Care team at the end of their rotation.

**M25 Medicine 870 Endocrinology, Diabetes, and Metabolism**

In general, the four-week rotation will be divided into two weeks of general endocrinology and two weeks of diabetes. Students taking this elective will perform consultations with fellows and faculty on the inpatient services at Barnes-Jewish Hospital and will also see patients with endocrine and metabolic diseases in the Outpatient Consultation. They will present these cases daily on teaching rounds. They will also participate in case conferences and seminars on a weekly basis. Extensive interaction with patients with diabetes and a diabetes education program are included, as is involvement with patients with thyroid, pituitary, adrenal, gonad, metabolic bone disease, and lipid disorders. Ample opportunities will be provided for discussions of patient problems with the members of the division. A variety of outpatient clinics are offered in the division and interested students should speak with the fellows and faculty members to customize the learning experience to match his or her career goals. At the end of the rotation, it is expected that students will have the ability to initiate inpatient and outpatient management of diabetes including insulin dosing and glucose monitoring, as well as evaluate and treat a variety of endocrine disorders including but not limited to thyroid, pituitary, and adrenal disease. Students will learn to perform effective inpatient and outpatient consultations.

**M25 Medicine 871 Oncology - Outpatient**

Students will gain experience in the initial treatment of newly-diagnosed malignancies and the outpatient management of oncology patients. Participation in multidisciplinary tumor conferences will stress a combined-modality approach to management, incorporating chemotherapy, radiotherapy and surgery. Students will see patients with a variety of malignancies, including lymphoma, myeloma, and tumors of the lung, breast, and colon. Management of hypercalcemia and other paraneoplastic syndromes, as well as cancer pain management, will be covered. Students will have the opportunity to see how most oncologists spend 90% of their workday. They will observe different styles that oncologists use when presenting news about prognosis, treatment options, and other information to patients while they also learn about the molecular basis for cancer, the mechanisms of action for our therapies (particularly the newer agents which target specific molecular abnormalities), and the key studies that justify the use of therapies (e.g. randomized studies showing that after surgery, chemotherapy will reduce the risk of recurrence from a particular cancer with a particular

regimen). By spending time with clinicians, students will learn how to identify hereditary syndromes, use drugs for symptom relief, and also learn how radiographic and laboratory tests allow oncologists to care for patients.

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#### **M25 Medicine 877 Intensive ECG Interpretation**

During this two-week elective, students will read 20-25 ECGs obtained from the Barnes-Jewish Cardiac Diagnostic Laboratory, with an overread by an experienced electrocardiographer. There will also be didactic sessions covering infarction, ventricular hypertrophy, heart block, arrhythmias, and aberrant conduction.

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#### **M25 Medicine 879 Pulmonary Clinic for the Underserved**

Clinical setting: Outpatient Clinic dedicated to providing pulmonary specialty care to patients who are predominantly uninsured or who rely upon public assistance such as Medicaid. Student role: Students independently interview and examine patients and present findings to the attending, tests and imaging are reviewed, and provider and attending develop plan. Common problems/diseases: Asthma, COPD, sarcoidosis, lung cancer, and obstructive sleep apnea are commonly seen. Also, patients are referred for evaluation of abnormal x-rays and for symptoms such as dyspnea. Primary learning objectives: - to understand and practice important history and exam skills in pulmonary medicine: symptoms, smoking history, work and environmental exposures, and important pulmonary physical exam findings. - to understand the basics of pulmonary function tests, chest imaging, and methods for tissue sampling. - to understand the basis of treatment of common pulmonary disorders. Conferences: There is no conference associated with this clinic, but students may attend the usual Thursday morning Medicine Grand Rounds at 8:00 am and the Pulmonary Grand Rounds at 11:00 am if the subject matter is appropriate.

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#### **M25 Medicine 880 Pulmonary Medicine - Barnes-Jewish Hospital**

Students will acquire skills in the evaluation and management of patients with pulmonary diseases and in the interpretation of pulmonary function tests. They will gain experience in outpatient Lung Center and attend regular pulmonary and critical care medicine conferences.

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#### **M25 Medicine 884 Stem Cell Transplantation and Cellular Therapies**

This elective is designed to introduce students to the general inpatient, intensive care, and outpatient management of patients with multiple hematologic malignancies including leukemia, lymphoma, marrow failure states and myeloma. These patients will be treated with chemotherapy, targeted therapies and cellular immunotherapies including chimeric receptor T cells (CART), natural killer cells, bispecific antibody treatments and stem cell transplant (both autologous and allogeneic). As the primary team, the BMT service is responsible for diagnosing and treating all medical problems including many critical care issues that may occur in these patients. These complex patients are often severely immunocompromised, coagulopathic, and at high-risk of multi-organ complications from both their disease and their therapy. Students work closely with residents, fellows, and faculty to develop treatment plans for patients. Students participate in daily rounds discussing general inpatient and intensive care BMT patients and attend outpatient clinic 1 day/wk to see how BMT physicians approach patients faced with difficult decisions to make regarding their care. In addition to multiple weekly conferences, students also attend daily teaching rounds

led by faculty to learn the basic science of hematopoiesis, the genomics of leukemia, stem cell biology, gene therapy and cell therapy, transplantation immunology, graft vs host disease and infectious diseases seen in these immunocompromised patients. The average medical student will contribute to the care of inpatients (30-40 patients/day) and will be directly involved in the assessment and care of selected outpatients as well.

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#### **M25 Medicine 887 Clinical Cardiovascular Medicine**

This course involves clinical cardiology with some internal medicine in a rural setting. Topics include inpatient and outpatient care, diagnostic testing, device implants and follow-up care, cardiac catheterization, and peripheral vascular angiography and intervention.

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#### **M25 Medicine 890 Clinical Nephrology**

Students rotate through inpatient and outpatient experiences to gain exposure to all facets of nephrology. They will spend time the majority of their time on an inpatient consult service, gaining exposure to acute and chronic renal failure, glomerulonephritis, and electrolyte disorders. During this time, they will serve as a fully integrated member of the consult team, evaluating underlying causes of kidney disease, performing diagnostic procedures, formulating management plans, and engaging in decision-making discussions with primary services and families. In addition, students will have the opportunity to experience ICU nephrology, transplant nephrology, the various CKD clinics, and all modalities of dialysis, including in-center, home, and peritoneal dialysis.

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#### **M25 Medicine 890A Kidney Transplant**

Students participating in this elective will gain exposure to end-stage renal disease and the treatment options, examine kidney transplantation as the most valuable option, learn about immunosuppression, and gain exposure to infectious diseases like CMV, BK, and adenovirus that are commonly seen in patients who have had a kidney transplant (and not often seen otherwise).

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#### **M25 Medicine 893 Adult Allergy and Clinical Immunology**

Students will participate in the outpatient Allergy Clinics located in Barnes Jewish Hospital Center for Advanced Medicine, Barnes Jewish West County, and Center for Advanced Medicine South County. Students will participate in allergy skin testing, pulmonary function testing, and drug desensitization. They will have the opportunity to see patients with allergic rhinitis, asthma, hives, food allergy, immunodeficiency, eosinophilic esophagitis, hereditary angioedema, mastocytosis, contact allergic dermatitis, eczema, and more. They can attend allergy conferences on Thursday morning. Students have the option to follow a fellow and see inpatient consults at Barnes Jewish Hospital.

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#### **M25 Medicine 897 Complex Primary Care (ComPACT)**

ComPACT is an intensive primary care clinic. We work with veterans with multiple medical comorbidities and multiple hospitalizations. Frequently, they also have many social barriers to health care. Our goals are to reduce admissions and improve overall health and wellness. Students will be responsible for performing histories and physicals in the outpatient setting. In addition, when appropriate, students will round on hospitalized ComPACT patients with Drs. Rumora and McCarthy. Patient interactions will be face-to-face and electronic (phone, video). Students will gain experience with balancing the demands of competing medical issues. Many of our vets have heart failure,

diabetes, kidney disease, COPD, and other conditions. Students will also gain experience in identifying and working to mitigate social barriers to health. We have weekly staff "huddles" that we encourage students to attend. We also have a journal club approximately monthly. If this occurs during the student's time with us, we may ask them to present an appropriate paper.

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**M25 Medicine 900 Research Elective - Internal Medicine**

Research opportunities may be available. If interested, please contact the Department of Internal Medicine.

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**M27 Emergency Medicine**

Visit online course listings to view offerings for M27 Emergency Medicine (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M27>).

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**M27 EMED 714 Ambulatory Clerkship: Emergency Medicine**

The Urgent Care area (UCA) serves as our site for the WUSM III Ambulatory Care Rotation. Three students at a time are assigned to this two-week rotation. Students will spend their first day in an orientation session learning suturing, ECG interpretation, and airway management (including intubation skills) in hands-on laboratories. They will also review pelvic examinations and view an education video about domestic violence. On day two, they begin primarily evaluating non-emergent patients in Urgent Care and report directly to an Emergency Medicine attending. There are four hours of conferences per week (8-10 a.m. on Tuesday and Wednesday mornings), and attendance is mandatory. Discussions are currently underway to allow students to participate in helicopter ride-alongs with ARCH Airmedical Services. Students can expect to gain a wide range of skills in evaluating uncomplicated upper respiratory infections, urinary tract infections, sexually transmitted diseases, lacerations, eye problems, rashes, simple extremity trauma -- in general, the "bread and butter" medical/surgical problems. Students do a 15-minute case presentation at the close of the block.

Credit 77 units.

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**M27 EMED 800 Reading Elective - Emergency Medicine**

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**M27 EMED 801 Emergency Medicine Subinternship**

This rotation offers practical experience in the evaluation and management of acutely sick and injured patients. Students will function as subinterns, initially evaluating their assigned patients, and developing a plan for further diagnostic studies and therapy. They will report to a senior level resident or an attending physician. The student can expect the opportunity to perform or assist with a wide variety of procedural skills such as suturing, splinting, peripheral and central venous access, ultrasound, and cardiopulmonary resuscitation. Shifts will be eight hours and students will rotate between day, evening, and night shifts (including weekend shifts) to gain maximum exposure to all types of emergencies. The majority of shifts will occur at Barnes-Jewish Hospital; however, additional shifts may be scheduled at Barnes-Jewish West County Hospital, a community hospital approximately 14 miles away. If the student does not have transportation, other arrangements can be made. Students will also be expected to attend weekly grand rounds and student lectures covering aspects of the core content of Emergency Medicine as well as attend a departmental journal club and student simulation session. Students will gain an

understanding of other disciplines closely associated with Emergency Medicine by doing rotations with either social work, nursing, physical therapy, or respiratory therapy. Students will also gain knowledge of the triage system during their time in the department. If schedules allow, students interested in EM will be doing 1:1 shifts with a single attending during their last two weeks of the rotation as well as having a teaching shift with the education resident and fellow. Students desiring a Standard Letter of Evaluation (SLOE) should take this WUMS-IV Emergency Medicine Subinternship. Students will be scheduled for required weekend and overnight shifts and changes will not be allowed to the schedule unless approved prior to the start of the rotation by the course coordinator. Please be advised that there is a limit of days off while on this rotation during interview season; otherwise, students should arrange to take the elective at a different time during the year. Days off during the rest of the year will conform to university policy. Days off should be requested from the Course Coordinator at least two weeks prior to the beginning of the rotation for scheduling purposes.

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**M27 EMED 810 Medical Toxicology**

This rotation offers practical experience in the evaluation and management of the acutely ill, poisoned, or intoxicated patient. Students will function as subinterns and either report to the senior resident, fellow, or directly to the toxicology attending. Students will gain familiarity and experience evaluating and treating patients who have intentionally and unintentionally overdosed on medications or illicit drugs or have substance use disorders, been envenomated (such as by spiders, snakes, or other reptiles), or been exposed to toxic substances or chemicals. Students will also gain experience in administering antidotes and learning to properly decontaminate someone after an ingestion or exposure. There are no overnight or weekend shifts. While not required, students are welcome to come in off hours to see new consults and enhance their experience and learning. Daily activities start in the morning and are generally concluded by the early afternoon. A core content of lectures will be provided. The students will also be assigned small projects during their rotation that will enhance their experience particularly in environmental and occupational toxicology. Students will also be asked to complete SAMHSA approved training which will allow them to apply for DEA buprenorphine waivers upon obtaining their permanent medical license. Opportunities to increase their experience with occupational toxicology and addiction medicine also exist during this rotation; students will be able to rotate in the outpatient toxicology and addiction medicine clinic. Students will also have the opportunity to go to the Missouri Poison Center. Students desiring a letter of recommendation from one of the toxicology attendings (who are also Emergency Medicine attendings) or interested in Emergency Medicine or Medical Toxicology should take this elective. Also, students considering other specialties such as Pediatrics, Psychiatry, Neurology, or Internal Medicine should consider this rotation as they will be responsible for evaluating these patients as part of their inpatient or outpatient practice. Please be advised that there is a limit of days off while on this rotation during interview season; otherwise, students should arrange to take the elective at a different time during the year. Days off should be requested from the Course Coordinator at least two weeks prior to the beginning of the rotation for scheduling purposes.

### **M27 EMED 820 Emergency Ultrasound**

Point-of-care ultrasound has become an integral diagnostic and procedural tool for nearly every clinical specialty. Ultrasound examination at the bedside is noninvasive, painless, and repeatable, unlike many other common diagnostic tests. However, like all procedures, developing ultrasound skills takes a significant amount of practice and experience. This rotation will focus on clinical ultrasound image acquisition and interpretation at the bedside. Students will participate in the performance of bedside ultrasound of patients in the Emergency Department. Common applications of emergency ultrasound include the FAST exam, pelvic ultrasound, abdominal aortic aneurysm (AAA), vascular access, renal, ocular, cardiac ultrasound, and DVT. Students will be involved in direct patient care during this rotation as part of the ultrasound team in the Emergency Department. In general, the student will be in the Emergency Department during weekdays to perform these exams. In addition, the student will meet with the elective instructor approximately once per week to review images or for direct hands-on instruction. At the end of the rotation, the student should be able to obtain images for basic point-of-care ultrasound examinations and to interpret those images for diagnostic purposes. Students may also have opportunity to practice ultrasound-guided procedures during the rotation.

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### **M27 EMED 900 Emergency Medicine Research Elective**

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## **Department of Molecular Microbiology**

The Department of Molecular Microbiology teaches introductory courses in microbiology and pathogenic microorganisms for first-year medical students and graduate students. In conjunction with the Division of Biology & Biomedical Sciences (DBBS) (<http://www.dbbs.wustl.edu/Pages/>) program in Molecular Microbiology and Microbial Pathogenesis (<http://www.dbbs.wustl.edu/divprograms/micro/Pages/default.aspx>), the department also offers a number of advanced courses that are primarily designed for graduate students but also open to medical students. Advanced elective research activities are offered by faculty in the department.

Website: <http://www.microbiology.wustl.edu>

## **Faculty**

### **Sean P. J. Whelan, PhD**

Department Chair

### **Christina L. Stallings, PhD**

Program Director

Visit our website for more information about our faculty (<https://microbiology.wustl.edu/faculty/>) and their appointments.

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## **B**

### **Wandy L. Beatty, Ph.D.**

Associate Professor of Molecular Microbiology (primary appointment)

Bachelor of Science, Montana State University, 1989

Doctor of Philosophy, University of Wisconsin Madison, 1994

### **Douglas E Berg, Ph.D.**

Alumni Professor Emeritus of Molecular Microbiology

Bachelor of Science, Cornell University, 1964

Doctor of Philosophy, University of Washington, 1969

### **Stephen M Beverley, Ph.D.**

Professor of Molecular Microbiology (primary appointment)

Ernest St. John Simms Distinguished Professor of Molecular Microbiology

Bachelor of Science, California Institute Technology, 1973

Doctor of Philosophy, University of California, 1979

### **Tamara L. Brent, Ph.D., M.D.**

Professor of Molecular Microbiology (primary appointment)

Alumni Endowed Professor of Molecular Microbiology

Bachelor of Arts, Johns Hopkins University, 1983

Doctor of Philosophy, Johns Hopkins University Medical, 1991

Doctor of Medicine, Johns Hopkins University Medical, 1991

### **Anne Elizabeth Mayer Bridwell, D.V.M., Ph.D.**

Instructor in Molecular Microbiology (primary appointment)

Bachelor of Arts, Kenyon College, 2003

Doctor of Veterinary Medicine, Virginia Tech, 2009

Doctor of Philosophy, Wake Forest University, 2015

## **C**

### **Michael G Caparon, Ph.D.**

Professor of Molecular Microbiology (primary appointment)

Bachelor of Science, Michigan State University, 1981

Doctor of Philosophy, University of Iowa, 1985

## **D**

### **Gisela Andrea Di Venanzio, Ph.D.**

Instructor in Molecular Microbiology (primary appointment)

Doctor of Philosophy, Rosario National University, 2014

### **Siyuan Ding, Ph.D.**

Assistant Professor of Molecular Microbiology (primary appointment)

Bachelor of Science, Fudan University, 2009

Doctor of Philosophy, Yale University, 2014

### **Deborah E Dobson, Ph.D.**

Associate Professor of Molecular Microbiology (primary appointment)

Champaign, 1976

Doctor of Philosophy, University of California Berkeley, 1981

### **Karen W Dodson, Ph.D.**

Instructor in Molecular Microbiology (primary appointment)

Bachelor of Arts, University of Missouri Columbia, 1983

Doctor of Philosophy, Washington University in St Louis, 1990

## **F**

### **Mario Federico Feldman, Ph.D.**

Professor of Molecular Microbiology (primary appointment)  
Doctor of Philosophy, Universidad del Buenos Aires, 2004

**Julian B Fleischman, Ph.D.**

Associate Professor Emeritus of Molecular Microbiology  
Bachelor of Science, Yale University, 1955  
Doctor of Philosophy, Harvard University, 1960

**H**

**Henry V Huang, Ph.D.**

Associate Professor of Molecular Microbiology (primary appointment)  
Bachelor of Arts, Occidental College, 1972  
Doctor of Philosophy, California Institute Technology, 1977

**Scott James Hultgren, Ph.D.**

Professor of Molecular Microbiology (primary appointment)  
Helen L Stoever Professor of Molecular Microbiology  
Bachelor of Science, Indiana University Bloomington, 1981  
Doctor of Philosophy, Northwestern University, 1987

**K**

**Sebla Bulent Kutluay, Ph.D.**

Assistant Professor of Molecular Microbiology (primary appointment)  
Doctor of Philosophy, Michigan State University, 2009

**L**

**Michele LeRoux, Ph.D.**

Assistant Professor of Molecular Microbiology (primary appointment)  
null, Colgate University, 2007  
null, University of Washington, 2015

**Zhuoming Liu, Ph.D.**

Instructor in Molecular Microbiology (primary appointment)  
Doctor of Philosophy, University of Tokyo, 2015

**Jennifer K Lodge, Ph.D.**

Professor of Molecular Microbiology (primary appointment)  
Bachelor of Science, Oberlin College, 1979  
Doctor of Philosophy, Washington University in St Louis, 1988

**Carolina Beatriz Lopez, M.S., Ph.D.**

Professor of Molecular Microbiology (primary appointment)  
Bachelor of Science, Pontificia Universidad Catolica, 1992  
Master of Science, Pontificia Universidad Catolica, 1995  
Doctor of Philosophy, Mount Sinai School of Medicine, 2002

**O**

**Paul D Olivo, Ph.D., M.D.**

Adjunct Assistant Professor of Molecular Microbiology  
Bachelor of Arts, George Washington University, 1972  
Doctor of Medicine, University of Florida, 1981  
Doctor of Philosophy, University of Florida, 1982

**R**

**Charles M Rice, Ph.D.**

Adjunct Professor of Molecular Microbiology  
Bachelor of Science, University of California, 1974  
Doctor of Philosophy, California Institute Technology (Duplicate of California Institute of Technology), 1981

**S**

**Sondra Schlesinger, Ph.D.**

Professor Emerita of Molecular Microbiology  
Bachelor of Science, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1956  
Doctor of Philosophy, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1960

**Henry L Schreiber, M.S., Ph.D.**

Instructor in Molecular Microbiology (primary appointment)  
null, Tyler Junior College, 2004  
null, Tulane University, 2008  
null, University of Texas Tyler, 2011  
null, Washington University in St Louis, 2017

**Laurence David Sibley, Ph.D.**

Professor of Molecular Microbiology (primary appointment)  
Alan A and Edith L Wolff Distinguished Professor  
Bachelor of Arts, Oberlin College, 1978  
Doctor of Philosophy, Louisiana State University, 1985

**Asya Smirnov, D.V.M., Ph.D.**

Instructor in Molecular Microbiology (primary appointment)  
Doctor of Veterinary Medicine, Moscow Veterinary Academy, 1993  
Doctor of Philosophy, Hebrew University, 2005

**Christina Leigh Stallings, M.A., M.S., Ph.D.**

Professor of Molecular Microbiology (primary appointment)  
Bachelor of Science, Mary Washington College, 1999  
Master of Arts, Columbia University, 2001  
Master of Science, Columbia University, 2002  
Doctor of Philosophy, Columbia University, 2005

**Patrick Michael Stuart, M.S., Ph.D.**

Associate Professor of Molecular Microbiology  
Adjunct Instructor  
Lecturer  
Bachelor of Science, University of California, 1974  
Master of Science, California State University, 1980  
Doctor of Philosophy, Northwestern University, 1985

**T**

**Niraj Harish Tolia, Ph.D.**

Adjunct Associate Professor of Molecular Microbiology  
Bachelor of Science, Imperial College, 1999  
Doctor of Philosophy, Watson School of Biological Sciences, 2004



## V

### Joseph Paul Vogel, Ph.D.

Associate Professor of Molecular Microbiology (primary appointment)  
Bachelor of Science, Minnesota State University, 1986  
Doctor of Philosophy, Princeton University, 1993

## W

### David Wang, Ph.D.

Professor of Molecular Microbiology (primary appointment)  
Professor of Pathology and Immunology  
Bachelor of Science, Stanford University, 1992  
Doctor of Philosophy, Massachusetts Institute of Technology, 1998

### Sean P. J. Whelan, Ph.D.

Professor of Molecular Microbiology (primary appointment)  
Head of the Department of Molecular Microbiology  
Marvin A Brennecke Distinguished Professor of Molecular Microbiology  
Doctor of Philosophy, Reading University, 1993

## Research Electives

### Molecular Microbiology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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### Stephen M. Beverley, PhD

McDonnell Pediatric Research Building, 9th Floor  
Phone: 314-747-2630

Molecular genetics of protozoan parasites and tropical diseases; biosynthesis of the parasite surface, genomics, virulence and drug action or resistance.

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### Michael Caparon, PhD

McDonnell Pediatric Research Building, 10th Floor  
Phone: 314-362-1485

Molecular genetics and pathogenicity of the streptococci and other pathogenic gram-positive bacteria.

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### Siyuan Ding, PhD

McDonnell Pediatric Research Building, 9th Floor  
Phone: 314-273-3963

Molecular mechanisms of rotavirus replication and pathogenesis; virus-host interactions; innate immune signaling in the intestinal epithelium.

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### Tamara L. Doering, MD, PhD

McDonnell Pediatric Research Building, 10th Floor  
Phone: 314-747-5597

The Doering lab studies the opportunistic fungal pathogen *Cryptococcus neoformans*, with the dual motivations of elucidating basic biology and identifying potential drug targets. Projects include studies of the synthesis and regulation of the main cryptococcal virulence factor, its polysaccharide capsule, and host-fungal interactions. Current approaches include those of biochemistry, cell and molecular biology, and genetics; studies also include high-throughput analysis of host-pathogen interactions and computational approaches to reconstructing the capsule regulatory network.

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### Daniel Goldberg, MD, PhD

McDonnell Pediatric Research Building, 9th Floor  
Phone: 314-362-1514

Biochemistry of malaria.

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### Henry Huang, PhD

McDonnell Pediatric Research Building, 8th Floor  
Phone: 314-362-2755

RNA virus evolution; molecular biology of alphaviruses; alphavirus gene expression vectors; antiviral drug design.

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### Scott J. Hultgren, PhD

McDonnell Pediatric Research Building, 10th Floor  
Phone: 314-362-6772

Our focus is on the pathogenic mechanisms and disease outcomes in the urinary tract. Work in the Hultgren lab blends multiple scientific disciplines to elucidate bacterial and host mechanisms that determine the onset, course and outcome of interactions between a host mucosal surface and bacterial pathogens. Using genetics, genomics, biochemistry, structural biology, high-resolution imaging, animal models, clinical studies and combinatorial chemistry, we have illuminated new ways in which intracellular lifestyles and community behavior play critical roles in the pathogenesis of urinary tract infection. We have uncovered new principles of adhesive pili biogenesis in gram-negative bacteria by the chaperone/usher pathway, delineating the fine molecular details of a donor strand complementation and exchange mechanism by which the energy of final subunit folding is used to complete the assembly and extrusion of pili across the outer membrane. We revealed how uropathogenic *Escherichia coli* use type 1 pili to invade and establish biofilm-like intracellular bacterial communities within bladder cells as part of a mechanism that subverts host defenses and how quiescent intracellular reservoirs can seed recurrent infections. We have uncovered complex networks that govern mucosal epithelial response to infection, which we have shown

determines disease outcome. Further, we have made seminal contributions to our understanding of the pathogenesis and response to other uropathogens, polymicrobial infections and catheter-associated UTIs and to the mechanisms by which bacteria form a directed amyloid fiber, curli, which is important in biofilm formation. Together, this work is changing the way UTIs are evaluated, reshaping models of bacterial infections in general and spawning new technologies to design novel vaccines and antimicrobial therapeutics to diagnose, treat and/or prevent UTIs and their sequelae.

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**Christina L. Stallings, PhD**

McDonnell Pediatric Research Building, 8th Floor  
Phone: 314-286-0276

Our main focus is the molecular pathogenesis of mycobacteria. Our laboratory integrates in vivo disease modeling, molecular biology and biochemistry to provide answers to the fundamental biological questions regarding molecular pathogenesis and to yield therapeutic strategies for the treatment of mycobacterial infections.

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**Joseph P. Vogel, PhD**

McDonnell Pediatric Research Building, 10th Floor  
Phone: 314-747-1029

*Legionella pneumophila*, the causative agent of Legionnaires' pneumonia, replicates inside alveolar macrophages by preventing phagosome-lysosome fusion.

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**David Wang, PhD**

McDonnell Pediatric Research Building, 8th Floor  
Phone: 314-286-1123

Our work focuses on the discovery and characterization of novel viruses. We use functional genomic technologies to identify novel viruses from a variety of clinical samples from diseases of unexplained etiology. We then use epidemiologic, molecular and cellular strategies to define the relevance of newly identified viruses to human disease. A range of new viruses — including polyomaviruses, astroviruses and picornaviruses — are currently under investigation.

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**Sean P.J. Whelan, PhD**

McDonnell Pediatric Research Building, 9th Floor  
Phone: 314-286-1585

The Whelan Lab research focus is on the molecular mechanisms that underpin gene expression in nonsegmented negative-strand (NNS) RNA viruses — a group of viruses that includes some of the most significant human pathogens in existence (e.g., rabies, ebola, respiratory syncytial virus, measles, mumps, Nipah viruses). Vesicular stomatitis virus (VSV) has served as an important prototype of the NNS RNA viruses for more than 50 years, and Dr. Whelan has played a leading role in this field that

can be traced back to the recovery of infectious virus from cDNA. As independent investigators, Dr. Whelan and his colleagues have led the way to understanding the structure and function of the viral replication machinery. The goals of such studies have been to ultimately inform the development of inhibitors against this group of important pathogens and to advance the use of VSV as a vaccine vector, an oncolytic agent, and a neuronal tracer.

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## Courses

Visit online course listings to view offerings for M30 MoIMB (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M30>).

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### M30 MoIMB 526 Microbes and Pathogenesis

The course will familiarize the student with the diversity of pathogenic microbes and the different ways they can survive and cause disease. It is a concepts-based course, emphasizing the general principles of microbial pathogenesis. Selected pathogenic microbes are used as models to describe pathogen-host interactions in molecular detail. The laboratory will introduce the student to the principles and the basic techniques of diagnostic bacteriology.

Credit 30 units.

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### M30 MoIMB 900 Research Elective - Molecular Microbiology

Research opportunities may be available. If interested, please contact the Department of Molecular Microbiology.

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## Department of Neurology

Neurology concerns itself with the diseases of the brain, spinal cord, peripheral nerves and muscles. An introduction to the anatomy and physiology of the nervous system is presented in the first-year neuroscience course by faculty from the Department of Neuroscience (<http://neurosci.wustl.edu/>), with participation of faculty from the Department of Neurology (<http://neuro.wustl.edu/>). A first-year selective titled Clinical Correlations in Neurosciences (FYSelect 5017) is available, which is an opportunity for interested students to shadow physicians in neuro-related fields and to attend basic science or clinical conferences. During the second year, the Department of Neurology presents the course Diseases of the Nervous System (Neurol 632) in conjunction with the departments of Pathology & Immunology (<http://pathology.wustl.edu/>), Neurosurgery (<http://neurosurgery.wustl.edu/>) and Ophthalmology & Visual Sciences (<http://ophthalmology.wustl.edu/>). The course emphasizes the pathophysiology, pathology, clinical manifestations and treatment of the major neurological and neurosurgical diseases. The department also participates in the Practice of Medicine course, providing lectures, demonstrations and teaching exercises with patients in neurological physical diagnosis.

For more information about the Department of Neurology and its 13 divisions, please visit the department website.

Website: <https://neuro.wustl.edu/education>

## Faculty

**David Holtzman, MD** (<https://wuphysicians.wustl.edu/for-patients/find-a-physician/david-michael-holtzman/>)  
Department Chair

Visit our website for more information about our faculty (<https://neuro.wustl.edu/Faculty/>) and their appointments.

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### A

**Aninda Bhat Acharya, M.D.**  
Instructor in Clinical Neurology  
Bachelor of Science, University of Kansas, 1992  
Doctor of Medicine, University of Kansas, 1996

**Dusit Adstamongkonkul**  
Assistant Professor of Clinical Neurology

**Shannon Christine Agner, M.S., Ph.D., M.D.**  
Assistant Professor of Neurology (primary appointment)  
Bachelor of Arts, Dartmouth College, 2002  
Master of Science, University of Medicine and Dentistry of New Jersey, 2004  
Doctor of Philosophy, Rutgers University, 2011  
Doctor of Medicine, Rutgers University, 2013

**Muhammad Taher Al-Lozi, M.S., M.D.**  
Professor of Neurology (primary appointment)  
Section Chief - Section of Clinical Neurophysiology  
Bachelor of Arts, University of Panjab, 1976  
Doctor of Medicine, University of Panjab, 1980  
Master of Science, University of Jordan, 1985

**Asher Jefferson Albertson, M.S., Ph.D., M.D.**  
Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Wyoming, 2005  
Master of Science, University of Wyoming, 2007  
Doctor of Philosophy, University of Alabama in Birmingham, 2011  
Doctor of Medicine, University of Alabama in Birmingham, 2013

**Isabel Alfradique-Dunham, M.D.**  
Assistant Professor of Neurology (primary appointment)  
Doctor of Medicine, Universidade Federal Fluminens, 2008

**Lizette Alvarez-Montero, M.D.**  
Instructor in Clinical Neurology  
Bachelor of Arts, Washington University in St Louis, 1987  
Doctor of Medicine, School Not Listed, 1991

**Korina Anastasaki, M.S., Ph.D.**  
Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of York, 2006  
Master of Science, Edinburgh University, 2007  
Doctor of Philosophy, Edinburgh University, 2011

**Beau Mark Ances, M.S., Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Biomedical Engineering  
Professor of Radiology  
Vice Chair-Faculty Affairs  
Daniel J Brennan MD Professor of Neurology  
Bachelor of Science, University of Pennsylvania, 1993  
Master of Science, London School of Economics, 1994  
Doctor of Philosophy, University of Pennsylvania, 2000  
Doctor of Medicine, University of Pennsylvania, 2001

**Gabriel C Araujo, M.S., Ph.D.**  
Instructor in Clinical Neurology  
Bachelor of Arts, California State University, 2004  
Master of Science, Washington University in St Louis, 2007  
Doctor of Philosophy, Washington University in St Louis, 2011

**Bhooma R. Aravamuthan, Ph.D., M.D.**  
Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Section Chief - Section of Pediatric Movement/CP  
Bachelor of Science, Michigan State University, 2005  
Doctor of Philosophy, Oxford University, 2008  
Doctor of Medicine, Washington University in St Louis, 2012

**Baback Arshi, M.A., M.D.**  
Assistant Professor of Neurology (primary appointment)  
Bachelor of Arts, University of Southern California, 2004  
Master of Arts, Georgetown University, 2006  
Doctor of Medicine, Saint Louis University, 2010

**Andrew J Aschenbrenner, M.S., Ph.D.**  
Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Kansas, 2010  
Master of Science, Washington University in St Louis, 2013  
Doctor of Philosophy, Washington University in St Louis, 2016

**Rami-James Kazim Assadi, M.D.**  
Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Minnesota Twin Cities, 2007  
Doctor of Medicine, American University of Beirut, 2014

**Sylvia Awadalla, M.D.**  
Professor Emeritus of Neurology  
Main Campus), 1985

### B

**Ganesh M Babulal, M.S., Ph.D.**  
Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Minnesota, 2008  
Doctor of Philosophy, Washington University in St Louis, 2014  
Master of Science, Washington University in St Louis, 2015

**Joyce E Balls-Berry, M.S., Ph.D.**  
Associate Professor of Neurology (primary appointment)  
Bachelor of Science, Xavier University Louisiana, 1996  
Master of Science, Washington University in St Louis, 2001  
Doctor of Philosophy, University of Toledo, 2009

**Robert H Baloh, Ph.D., M.D.**

Adjunct Assistant Professor of Neurology  
Bachelor of Science, Brown University, 1995  
Doctor of Medicine, Washington University in St Louis, 2001  
Doctor of Philosophy, Washington University in St Louis, 2005

**Nicolas Regis Barthelemy, M.S., Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Paris Sud University, 2005  
Master of Science, Paris Sud University, 2007  
Doctor of Philosophy, Strasbourg University, 2011

**Randall John Bateman, M.D.**

Professor of Neurology (primary appointment)  
Charles F and Joanne Knight Distinguished Professor of  
Neurology  
Bachelor of Science, Washington University in St Louis, 1995  
Doctor of Medicine, Case Western Reserve University, 2000

**Sarah Louise Bauer Huang, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, Duke University, 2000  
Doctor of Philosophy, University of California San Francisco,  
2006  
Doctor of Medicine, Stanford University, 2012

**Max Prely Benzaquen**

Instructor in Clinical Neurology

**Mary Ellen Bertrand, M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Bachelor of Science, McKendree University, 1987  
Doctor of Medicine, Southern Illinois University, 1993

**Alan J Birtwistle**

Assistant Professor of Clinical Neurology

**Lynn Bennett Blackburn, M.A., Ph.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Science, University of Wisconsin Madison, 1968  
Master of Arts, Indiana University Bloomington, 1970  
Doctor of Philosophy, Indiana University Bloomington, 1972

**James Scott Bonner, M.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, Drury University, 1976  
Doctor of Medicine, University of Missouri Columbia, 1980

**Christopher C. Bosworth, Ph.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Arts, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 2002  
Doctor of Philosophy, University of Texas Southwest, 2014

**Matthew R. Brier, Ph.D., M.D.**

Instructor in Neurology (primary appointment)  
Instructor in Radiology  
Bachelor of Science, University of Texas Dallas, 2009  
Doctor of Philosophy, Washington University in St Louis, 2017

Doctor of Medicine, Washington University in St Louis, 2017

**Janice E Brunstrom-Hernandez, M.D.**

Adjunct Associate Professor of Neurology  
Doctor of Medicine, University of Virginia, 1987

**Robert Charles Bucelli, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Pathology and Immunology  
Vice Chair-Education Affairs  
Bachelor of Science, Canisius College, 2001  
Doctor of Philosophy, State University of New York at Buffalo,  
2007  
Doctor of Medicine, State University of New York at Buffalo,  
2007

**Michelle A. Burack, Ph.D., M.D.**

Adjunct Instructor in Neurology  
Bachelor of Science, Duke University, 1990  
Doctor of Philosophy, University of Virginia, 2000  
Doctor of Medicine, Washington University in St Louis, 2002

**Garrett C Burris, M.D.**

Associate Professor of Clinical Neurology  
Associate Professor of Clinical Pediatrics  
Bachelor of Science, School Not Listed, 1964  
Doctor of Medicine, Saint Louis University, 1968

**C**

**David J Callahan, M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Section Chief- Section of Pediatrics-General  
Bachelor of Science, University of Notre Dame, 1982  
Doctor of Medicine, Washington University in St Louis, 1986

**Meghan Clark Campbell, Ph.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Radiology  
Bachelor of Science, University of Illinois, 1999  
Doctor of Philosophy, Indiana University Bloomington, 2004

**Russell C. Cantrell, M.D.**

Instructor in Clinical Neurology  
Bachelor of Science, School Not Listed, 1985  
Doctor of Medicine, University of Tennessee, 1989

**David A Carpenter, M.D.**

Professor of Neurology (primary appointment)  
Bachelor of Science, Amherst College, 1979  
Doctor of Medicine, Washington University in St Louis, 1983

**Salim Chahin, M.S., M.D.**

Assistant Professor of Neurology (primary appointment)  
Doctor of Medicine, Damascus University, 2004  
Master of Science, University of Pennsylvania, 2014

**Yasheng Chen, M.A., Ph.D.**

Associate Professor of Neurology (primary appointment)

Bachelor of Arts, Fisher More College, 1993  
Master of Arts, Washington University in St Louis, 2002  
Doctor of Philosophy, Washington University in St Louis, 2002

**Luqi Chi, M.S., M.D.**

Professor of Neurology (primary appointment)  
Doctor of Medicine, Huabei Medical College for Coa, 1984  
Master of Science, University of Pennsylvania, 2009

**John R. Cirrito, Ph.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Arts, Boston College, 1998  
Doctor of Philosophy, Washington University in St Louis, 2004

**David B Clifford, M.D.**

Professor of Neurology (primary appointment)  
Professor of Medicine  
Section Chief - Section of Neuroinfectious Diseases  
Melba and Forest Seay Professor of Clinical Neuropharmacology  
in Neurology  
Bachelor of Arts, Southwestern University, 1971  
Doctor of Medicine, Washington University in St Louis, 1975

**Lawrence A Coben, M.A., M.D.**

Associate Professor Emeritus of Neurology  
Bachelor of Science, Case Western Reserve University, 1948  
Master of Arts, Northwestern University, 1951  
Doctor of Medicine, Case Western Reserve University, 1954

**Berdale S. Colorado, M.S., D.O.**

Associate Professor of Neurology  
Bachelor of Science, University of Iowa, 2004  
Master of Science, Des Moines University, 2009  
Doctor of Osteopathic Medicine, Des Moines University, 2009

**Maurizio Corbetta, M.D.**

Professor Emeritus of Neurology  
Doctor of Medicine, University of Pavia, 1985

**Dorothy Anne Cross, M.D.**

Professor of Neurology (primary appointment)  
Section Chief - Section of Neuroimmunology  
Manny and Rosalyn Rosenthal and Dr. John L. Trotter MS  
Center Chair in Neuroimmunology at Barnes-Jewish Hospital  
Bachelor of Science, University of South Alabama, 1976  
Doctor of Medicine, University of Alabama in Birmingham, 1980

**Nicole Cruz**

Instructor in Clinical Neurology

**D**

**Mai T Dang, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Champaign, 2006  
Doctor of Medicine, University of Illinois at Chicago, 2009

**Alisha J Daniels, M.H.A., M.D.**

Instructor in Neurology (Pending Dean's Approval) (primary appointment)

Bachelor of Science, Cardinal Stritch College, 2007  
Master of Science, Walden University, 2016  
Doctor of Medicine, American International College, 2016

**Rachel S Darken, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Section Chief - Section of General Neurology  
Bachelor of Arts, University of Texas Austin, 1996  
Doctor of Philosophy, Cornell University, 2003  
Doctor of Medicine, Cornell University, 2004

**Albert Augustus Davis, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Emory University, 2002  
Doctor of Philosophy, Emory University, 2009  
Doctor of Medicine, Vanderbilt University, 2011

**Brian Keith Day, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, Harvard University, 1997  
Doctor of Philosophy, University of Kentucky, 2005  
Doctor of Medicine, University of Kentucky, 2007

**Gabriela De Bruin, M.D.**

Professor of Neurology (primary appointment)  
Vice Chair - Clinical Operations  
Doctor of Medicine, Federal University of Ceara, 2005

**Andrea Denny, M.S.S.W., J.D.**

Instructor in Neurology (primary appointment)  
Bachelor of Arts, University of Virginia, 1990  
Master of Science in Social Work, University of Texas Austin,  
1993  
Juris Doctor, University of Texas Austin, 1998

**Amar Dhand, Ph.D., M.D.**

Adjunct Assistant Professor of Neurology  
Bachelor of Science, Dartmouth College, 2001  
Doctor of Philosophy, Oxford University (Duplicate of University  
of Oxford), 2006  
Doctor of Medicine, Harvard University, 2008

**Rajat Dhar, M.D.**

Professor of Neurology (primary appointment)  
Doctor of Medicine, McMaster University, 2000

**Marc I Diamond, M.D.**

Adjunct Professor of Neurology  
Bachelor of Science, Princeton University, 1987  
Doctor of Medicine, University of San Francisco, 1993

**Kalen R Dionne, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Arts, Colorado College, 2005  
Doctor of Philosophy, University of Colorado Aurora, 2012  
Doctor of Medicine, University of Colorado Aurora, 2015

**Michael N Diringer, M.A., M.D.**

Professor of Neurology (primary appointment)  
Professor of Neurological Surgery  
Professor of Anesthesiology  
Professor of Occupational Therapy  
Bachelor of Arts, State University of New York at Stonybrook,  
1974  
Master of Arts, University of Louisville, 1978  
Doctor of Medicine, University of Kentucky, 1982

**Jonathan Noel Dodd**

Instructor in Clinical Neurology

**William Edwin Dodson, M.D.**

Professor Emeritus of Neurology  
Professor Emeritus of Pediatrics  
Bachelor of Arts, Duke University, 1963  
Doctor of Medicine, Duke University, 1967

**Joseph M Dooley, M.D.**

Associate Professor of Clinical Neurology  
Bachelor of Science, Saint Louis University, 1954  
Doctor of Medicine, Saint Louis University, 1958

**Nico U. Dosenbach, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Biomedical Engineering  
Associate Professor of Pediatrics  
Associate Professor of Occupational Therapy  
Associate Professor of Radiology  
Associate Professor of Psychological & Brain Sciences  
Bachelor of Arts, Columbia University, 2000  
Doctor of Philosophy, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2008

**Alexander W Dromerick, M.D.**

Adjunct Professor of Neurology  
Adjunct Professor of Occupational Therapy  
Adjunct Professor of Physical Therapy  
Bachelor of Arts, University of Virginia, 1980  
College Park), 1986

**Steven Richard Dunham, M.S., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Wake Forest University, 2005  
Master of Science, University of South Florida, 2007  
Doctor of Medicine, St. George's University, 2011

**Casey Raymond Dunn, M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Notre Dame, 2005  
Doctor of Medicine, Tulane University, 2009

**E**

**Brendan Eby, M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Radiology  
Doctor of Medicine, University of Alabama in Birmingham, 2016

**Dorothy F Edwards, Ph.D.**

Adjunct Professor of Neurology  
Adjunct Professor of Occupational Therapy  
Bachelor of Arts, Loyola University (Duplicate of Loyola  
University New Orleans), 1972  
Doctor of Philosophy, Washington University in St Louis, 1980

**Lawrence N Eisenman, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Bachelor of Science, Johns Hopkins University, 1988  
Doctor of Philosophy, Northwestern University, 1997  
Doctor of Medicine, Northwestern University, 1997

**Sven Gustav Eliasson, M.L.A., Ph.D., M.D.**

Professor Emeritus of Neurology  
Bachelor of Science, University of Lund, 1949  
Doctor of Philosophy, School Not Listed, 1952  
Doctor of Medicine, School Not Listed, 1954  
Master of Liberal Arts, Washington University in St Louis, 1991

**Juan Escandon, M.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Science, School Not Listed, 1985  
Doctor of Medicine, School Not Listed, 1989

**Eugene Evra, M.D.**

Instructor in Clinical Neurology  
Doctor of Medicine, Smolensk State Medical Academy, 1996

**F**

**Andrew Ross Findlay, M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of California Santa Barbara,  
2007  
Doctor of Medicine, University of California Irvine, 2013

**Andria L Ford, M.D.**

Professor of Neurology (primary appointment)  
Professor of Radiology  
Bachelor of Science, Duke University, 1998  
Doctor of Medicine, University of Oklahoma, 2002

**Thomas Foutz, Ph.D., M.D.**

Instructor in Neurology (Pending Dean's Approval) (primary  
appointment)  
Bachelor of Arts, Johns Hopkins University, 2003  
Doctor of Philosophy, Case Western Reserve University, 2011  
Doctor of Medicine, Case Western Reserve University, 2013

**Bennett David Frank, Ph.D., M.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, Washington University in St Louis, 1982  
Doctor of Philosophy, Beaufort Technical College (Duplicate of  
Technical College of the Lowcountry), 1987  
Doctor of Medicine, Beaufort Technical College (Duplicate of  
Technical College of the Lowcountry), 1988

**Lindsay Michele Frerichs, M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Iowa State University, 2005

Doctor of Medicine, University of Texas Health Sciences at San Antonio, 2015

**Robert P. Fucetola, M.A., Ph.D.**

Professor of Neurology (primary appointment)  
Section Chief Rehab Department of Neurology  
Bachelor of Arts, Washington University in St Louis, 1991  
Master of Arts, Washington University in St Louis, 1993  
Doctor of Philosophy, Washington University in St Louis, 1997

**G**

**Maria Milagros Galardi, M.D.**

Assistant Professor of Neurology (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Medicine, Universidad de Buenos Aires, 2014

**Rafael Galindo, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of New Mexico, 1996  
Doctor of Philosophy, University of New Mexico, 2005  
Doctor of Medicine, University of New Mexico, 2007

**Gilbert Gallardo, M.S., Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Texas El Paso, 1999  
Master of Science, University of Texas San Antonio, 2002  
Doctor of Philosophy, University of Texas Southwest, 2008

**Stefanie Geisler, M.D.**

Assistant Professor of Neurology (primary appointment)  
Doctor of Medicine, Humboldt University, 2001

**Nupur Ghoshal, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Psychiatry  
Bachelor of Arts, Iowa State University, 1995  
Doctor of Philosophy, Northwestern University Medical, 2001  
Doctor of Medicine, Northwestern University Medical, 2003

**James Anthony Giles, Ph.D.**

Voluntary Research Assistant Professor of Neurology  
Doctor of Philosophy, University of Manchester, 2012  
Bachelor of Science, University of Manchester, 2013

**James M Goldring, Ph.D., M.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, Washington University in St Louis, 1971  
Doctor of Philosophy, Washington University in St Louis, 1977  
Doctor of Medicine, Washington University in St Louis, 1986

**Adam Seth Greenblatt, M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Brandeis University, null  
Doctor of Medicine, Technion Israel Institute of Technology, null

**Jennifer L. Griffith, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Arts, Indiana University Bloomington, 2004

Bachelor of Science, Indiana University Bloomington, 2004  
Doctor of Philosophy, Washington University in St Louis, 2012  
Doctor of Medicine, Washington University in St Louis, 2012

**Royal Gene Grueneich, Ph.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Arts, School Not Listed, 1973  
Doctor of Philosophy, University of Minnesota, 1979

**Rejean Michael Guerriero, D.O.**

Associate Professor of Neurology (primary appointment)  
Vice Chair - Division of Pediatric Neurology  
Bachelor of Science, Bates College, 2001  
Doctor of Medicine, University of New England, 2009

**Kristin Guilliams, M.S., M.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Pediatrics  
Associate Professor of Radiology  
Section Chief - Section of Pediatric Critical Care  
Bachelor of Science, Furman University, 2002  
Doctor of Medicine, University of Virginia, 2006  
null, Washington University in St Louis, 2016

**Christina A. Gurnett, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Orthopedic Surgery  
Professor of Pediatrics  
Division Chief - Division of Pediatric and Developmental Neurology  
A. Ernest and Jane G. Stein Professor of Developmental Neurology  
Bachelor of Science, University of Notre Dame, 1991  
Doctor of Philosophy, University of Iowa, 1998  
Doctor of Medicine, University of Iowa, 1998

**David H Gutmann, M.S., Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Professor of Genetics  
Professor of Neurological Surgery  
Director - Neurofibromatosis Center  
Donald O. Schnuck Family Professor of Neurology  
Bachelor of Science, University of Michigan Ann Arbor, 1979  
Master of Science, University of Michigan Ann Arbor, 1980  
Doctor of Philosophy, University of Michigan Ann Arbor, 1984  
Doctor of Medicine, University of Michigan Ann Arbor, 1986

**H**

**Jee-young Han, M.S., M.D.**

Assistant Professor of Neurology (primary appointment)  
Doctor of Medicine, Seoul National University, 2010  
Master of Science, Seoul National University, 2015

**Joseph Hanaway, M.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Arts, McGill University, 1956

Doctor of Medicine, McGill University, 1960

**William B Hardin, M.D.**

Assistant Professor Emeritus of Clinical Neurology  
Bachelor of Arts, Rice University, 1953  
Doctor of Medicine, University of Texas Austin, 1957

**Lisa Adel Harker**

Instructor in Clinical Neurology

**Jason J Hassenstab, M.S., Ph.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Psychological & Brain Sciences  
Bachelor of Music, New York University, 2002  
Master of Science, Fordham University, 2005  
Doctor of Philosophy, Fordham University, 2009

**J Michael Hatlelid, M.D.**

Associate Professor of Clinical Neurology  
Bachelor of Arts, Saint Johns University, 1970  
Doctor of Medicine, Washington University in St Louis, 1977

**Rachel Diane Hendrix, Ph.D.**

Instructor in Neurology (Pending Dean Approval) (primary appointment)  
Bachelor of Science, Northern Arizona University, 2012  
Doctor of Philosophy, University of Arkansas for Medical Sciences, 2018

**Kristin Hannah Hinrichs, Ph.D.**

Assistant Professor of Neurology (Pending Executive Faculty Approval) (primary appointment)  
null, Saint Louis University, 2014

**Robert Edward Hogan, M.D.**

Professor of Neurology (primary appointment)  
Section Chief - Section of Adult Epilepsy  
Bachelor of Arts, Augustana College, 1985  
Doctor of Medicine, University of Missouri Columbia, 1989

**Derek Lance Holder, M.S., M.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2007  
Master of Science, Rosalind Franklin University, 2008  
Doctor of Medicine, CHICAGO MEDICAL SCHOOL, 2012

**David Michael Holtzman, M.D.**

Professor of Neurology (primary appointment)  
Professor of Developmental Biology  
Director - Hope Center for Neurological Disorders  
Head of the Department of Neurology  
Barbara Burton and Reuben M Morriss III Distinguished Professorship  
Bachelor of Science, Northwestern University, 1983  
Doctor of Medicine, Northwestern University, 1985

**Terri L Hosto, M.S.W.**

Assistant Professor of Neurology (primary appointment)  
Master of Social Work, University of Michigan, 1986

**Chung Hsu, Ph.D., M.D.**

Adjunct Professor of Neurology  
Doctor of Medicine, National Taiwan University, 1970  
Doctor of Philosophy, University of Virginia, 1975

**Helen Hwang, Ph.D., M.D.**

Instructor in Neurology (primary appointment)  
null, University of California San Diego, 2005  
Champaign, 2013  
null, University of Illinois at Chicago, 2016

**Krzysztof L Hyrc, M.S., Ph.D.**

Associate Professor of Neurology (primary appointment)  
Master of Science, Jagiellonian University, 1981  
Doctor of Philosophy, Jagiellonian University, 1987

**I**

**Jill Christine Isenberg, M.S., Ph.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, Wake Forest University, 1998  
Master of Science, Wake Forest University, 2003  
Doctor of Philosophy, Wake Forest University, 2005

**J**

**Rachel Jensen**

Voluntary Clinical Assistant Professor of Neurology

**Eugene Malcolm Johnson, Ph.D.**

Professor Emeritus of Neurology  
College Park), 1966  
College Park), 1970

**Yo-Ei S Ju, M.D.**

Professor of Neurology (primary appointment)  
Barbara Burton and Reuben M Morriss III Professorship #2  
Bachelor of Science, Harvard University, 2001  
Doctor of Medicine, Columbia University, 2005

**K**

**Peter Kang, M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Geneseo College, 2008  
Doctor of Medicine, University of Pittsburgh, 2012

**Richard T. Katz, M.A., M.D.**

Professor of Clinical Neurology  
Bachelor of Arts, University of Rochester, 1977  
Master of Arts, Cleveland Institute of Music, 1979  
Doctor of Medicine, Case Western Reserve University, 1981

**Benjamin Kay, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Assistant Professor of Radiology  
Doctor of Philosophy, University of Cincinnati, 2013  
Doctor of Medicine, University of Cincinnati, 2015

**Marian Keglövits**



Instructor in Neurology  
Bachelor of Science, Colorado College, 2008

**Salah G. Keyrouz, M.D.**

Professor of Neurology (primary appointment)  
Professor of Neurological Surgery  
Section Chief - Section of Neurological Critical Care  
Doctor of Medicine, Lebanese Univ Med Science, 2000

**Syed Ahmed Khader, M.D.**

Instructor in Clinical Neurology  
Bachelor of Science, School Not Listed, 1989  
Doctor of Medicine, University of Madras, 1993

**Renatta Nakole Knox, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Arts, Harvard University, 2003  
Doctor of Philosophy, University of California San Francisco,  
2012  
Doctor of Medicine, University of California San Francisco, 2014

**Paul Thomas Kotzbauer, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Developmental Biology  
Bachelor of Science, Northwestern University, 1989  
Doctor of Philosophy, Washington University in St Louis, 1997  
Doctor of Medicine, Washington University in St Louis, 1997

**Geraldine J. Kress, Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2009

**Ashok Kumar, M.D.**

Assistant Professor of Clinical Neurology  
Doctor of Medicine, Dow Medical College Karachi, 1985

**Terrance T. Kummer, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, University of Minnesota, 1999  
Doctor of Philosophy, Washington University in St Louis, 2006  
Doctor of Medicine, Washington University in St Louis, 2006

**L**

**Eric Carl Landsness, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Madison, 2011  
Madison, 2013

**Douglas P. Larsen, M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Bachelor of Arts, Brigham Young University, 1999  
Doctor of Medicine, University of Utah, 2003

**Oswaldo Jose Laurido-Soto, M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University Puerto Rico Piedras, 2010  
Doctor of Medicine, Washington University in St Louis, 2014

**Jin-Moo Lee, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Radiology  
Head of the Department of Neurology  
Andrew B. and Gretchen P. Jones Professor of Neurology  
Bachelor of Arts, Yale University, 1985  
Doctor of Philosophy, Cornell University, 1992  
Doctor of Medicine, Weill Cornell Medical College, 1993

**Walter Lemann, M.D.**

Associate Professor of Clinical Neurology  
Bachelor of Science, Yale University, 1975  
Doctor of Medicine, Tulane University, 1979

**Alison M Leston, Ph.D., M.D.**

Assistant Professor of Clinical Neurology  
Champaign), 1990  
Doctor of Philosophy, University of Chicago, 2000  
Doctor of Medicine, Washington University in St Louis, 2001

**Ashley Levan**

Voluntary Clinical Assistant Professor of Neurology

**Mingjie Li, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Doctor of Medicine, Heilong jiang Coll of Trad Med, 1983  
Doctor of Philosophy, Kochi Medical School, 1989

**Yan Li, Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Huazhong Agricultural U, 2007  
Doctor of Philosophy, University of Alabama, 2017

**Amy K Licis, M.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, Rice University, 2000  
Doctor of Medicine, Washington University in St Louis, 2004

**Jorge Jesus Llibre-Guerra, M.S., M.D.**

Assistant Professor of Neurology (primary appointment)  
Doctor of Medicine, Havana University, 2012  
null, Havana University, 2014

**Oleg Viktorovich Lobanov, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, University of Texas Arlington, 2007  
Doctor of Philosophy, Wake Forest University, 2012  
Doctor of Medicine, Wake Forest University, 2014

**Justin Matthew Long, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Indiana University Bloomington, 2004  
Doctor of Philosophy, Indiana University Indianapolis, 2014  
Doctor of Medicine, Indiana University School of Medicine, 2014

**Brendan Patrick Lucey, M.S., M.D.**

Associate Professor of Neurology (primary appointment)  
Section Chief - Section of Sleep Medicine  
Bachelor of Arts, University of Vermont, 1999

Doctor of Medicine, Johns Hopkins University, 2003  
null, Washington University in St Louis, 2018

**Cindy Ly, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Texas Austin, 2000  
Doctor of Philosophy, Baylor College of Medicine, 2008  
Doctor of Medicine, Baylor College of Medicine, 2010

**M**

**Luigi Maccotta, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Radiology  
Bachelor of Science, Saint Peters College, 1994  
Doctor of Philosophy, Washington University in St Louis, 2005  
Doctor of Medicine, Washington University in St Louis, 2005

**Bajjayanta Maiti, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Doctor of Medicine, Calcutta University, 2003  
Doctor of Philosophy, University of Utah, 2010

**Raman Kant Malhotra, M.D.**

Professor of Neurology (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2000

**Soe S Mar, M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Doctor of Medicine, Institute of Medicine, 1987

**Robert P Margolis, M.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Arts, Kent State University, 1971  
Doctor of Medicine, Saint Louis University, 1975

**Kathryn Mary Marlow, M.D.**

Division Chief - Division of Neuro-Rehabilitation  
Bachelor of Science, State University of New York at Albany,  
2009  
Doctor of Medicine, SUNY Downstate Medical Center University  
Hospital in Brooklyn, 2013

**Eric Martin McDade, D.O.**

Professor of Neurology (primary appointment)  
Bachelor of Arts, Canisius College, 1998  
Doctor of Osteopathic Medicine, Chicago College of Osteopathic  
Medicine, 2004

**Karin Lynn Meeker, M.S., Ph.D.**

Instructor in Neurology (primary appointment)  
Bachelor of Arts, University of Missouri in St Louis, 2014  
Master of Science, Saint Louis University, 2018  
Doctor of Philosophy, Saint Louis University, 2019

**David F Mendelson, M.D.**

Assistant Professor Emeritus of Clinical Neurology  
Bachelor of Arts, University of California, 1946  
Doctor of Medicine, Indiana University Bloomington, 1948

**Peter R Millar, M.A., Ph.D.**

Instructor in Neurology (primary appointment)  
Bachelor of Science, Tufts University, 2010  
Master of Arts, Washington University in St Louis, 2016  
Doctor of Philosophy, Washington University in St Louis, 2020

**Timothy M Miller, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Vice Chair-Research  
Clayson Professor of Neurology  
Doctor of Philosophy, Washington University in St Louis, 1998  
Doctor of Medicine, Washington University in St Louis, 1998

**John Carl Morris, M.D.**

Professor of Neurology (primary appointment)  
Professor of Pathology and Immunology  
Professor of Physical Therapy  
Professor of Occupational Therapy  
Director - Knight Alzheimer's Disease Research Center  
Section Chief - Section of Aging and Dementia  
Harvey A and Dorismae Hacker Friedman Distinguished  
Professor of Neurology  
Bachelor of Arts, Ohio Wesleyan University, 1970  
Doctor of Medicine, University of Rochester, 1974

**Michael Justin Morrissey, Ph.D.**

Instructor in Clinical Neurology  
Doctor of Philosophy, Saint Louis University, 2005

**Krista L Moulder, Ph.D.**

Professor of Neurology (primary appointment)  
Bachelor of Arts, Northwestern University, 1993  
Doctor of Philosophy, Washington University in St Louis, 2001

**Soumya Mukherjee, M.S., Ph.D.**

Instructor in Neurology (primary appointment)  
Kharagpur, 2011  
Doctor of Philosophy, Calcutta University, 2018

**Erik S Musiek, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Charlotte and Paul Hagemann Professorship in Neurology  
Bachelor of Science, College of William and Mary, 1999  
Doctor of Philosophy, Vanderbilt University, 2005  
Doctor of Medicine, Vanderbilt University, 2007

**N**

**Robert T Naismith, M.D.**

Professor of Neurology (primary appointment)  
Bachelor of Science, Case Western Reserve University, 1994  
Doctor of Medicine, Case Western Reserve University, 1998

**Fabio Augusto Nascimento E Silva, M.D.**

Assistant Professor of Neurology (primary appointment)  
null, Universidade Federal do Paraná (UFPR), 2014

**Jeffrey J Neil, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics

Doctor of Philosophy, Washington University in St Louis, 1984  
Doctor of Medicine, Washington University in St Louis, 1984

**Susan Searles Nielsen, M.S., Ph.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Arts, Evergreen State College, 1992  
Master of Science, University of Washington, 2000  
Doctor of Philosophy, University of Washington, 2004

**Anne Fagan Niven, Ph.D.**

Professor of Neurology (primary appointment)  
Bachelor of Arts, Wellesley College, 1984  
Doctor of Philosophy, University of California San Diego, 1992

**Scott Norris, M.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Radiology  
Bachelor of Arts, Washington University in St Louis, 2000  
Doctor of Medicine, University of Missouri Columbia, 2008

**O**

**John Lawrence O'Donnell, M.S., Ph.D.**

Instructor in Neurology (primary appointment)  
Bachelor of Science, John Hopkins University, 2009  
Master of Science, University of Rochester, 2013  
Doctor of Philosophy, University of Rochester, 2017

**P**

**Sheel Jitendra Pathak, M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, University of Texas Austin, 2004  
Doctor of Medicine, University of Texas Galveston, 2008

**Robert Harris Paul, M.S., Ph.D.**

Adjunct Assistant Professor of Neurology  
(Long Beach), 1993  
Main Campus), 1995  
Main Campus), 1998

**Alan L Pearlman, M.D.**

Professor Emeritus of Neurology  
Bachelor of Arts, University of Iowa, 1958  
Doctor of Medicine, Washington University in St Louis, 1961

**David M Peeples, M.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, Vanderbilt University, 1982  
Doctor of Medicine, University of Chicago, 1986

**Lindsay M Peglar, M.S., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, Tulane University, 2008  
Master of Science, Tulane University, 2009  
Doctor of Medicine, University of Missouri Columbia, 2013

**Karen J Pentella, M.D.**

Assistant Professor of Clinical Neurology

Main Campus), 1975

Main Campus), 1979

**Emmanuel Perez Martinez, Ph.D., M.D.**

Instructor in Neurology (Pending Executive Faculty Approval)  
(primary appointment)  
Bachelor of Science, University of Puerto Rico Rio Piedras, 2010  
Doctor of Philosophy, University of Miami, 2016  
Doctor of Medicine, University of Miami, 2018

**Joel S Perlmutter, M.D.**

Professor of Neurology (primary appointment)  
Professor of Radiology  
Professor of Neuroscience  
Professor of Physical Therapy  
Professor of Occupational Therapy  
Section Chief - Section of Movement Disorders  
Elliot H. Stein Family Chair in Neurology at Barnes-Jewish  
Hospital  
Bachelor of Arts, Princeton University, 1975  
Doctor of Medicine, University of Missouri Columbia, 1979

**Alan Pestronk, M.D.**

Professor of Neurology (primary appointment)  
Professor of Pathology and Immunology  
Bachelor of Arts, Princeton University, 1966  
Doctor of Medicine, Johns Hopkins University Medical, 1970

**Steven E Petersen, Ph.D.**

Professor Emeritus of Neurology  
Bachelor of Arts, University of Montana Missoula, 1974  
Doctor of Philosophy, California Institute Technology (Duplicate  
of California Institute of Technology), 1982

**Daniel Phillips, M.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Science, Northwestern University, 1976  
Doctor of Medicine, Washington University in St Louis, 1980

**Chia Ling Phuah, M.S., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Cambridge University, 2003  
Doctor of Medicine, Cambridge University, 2006  
Master of Science, Cambridge University, 2007

**Laura Piccio, M.D.**

Professor of Neurology (primary appointment)  
Doctor of Medicine, University of Milan, 1997

**Stephanie K Powell, M.S., Ph.D.**

Instructor in Clinical Neurology  
Bachelor of Science, University of Notre Dame, 1994  
Master of Science, University of Wisconsin Milwaukee, 2000  
Doctor of Philosophy, University of Wisconsin Milwaukee, 2004

**William John Powers, M.D.**

Adjunct Professor of Neurology  
Bachelor of Arts, Dartmouth College, 1971  
Doctor of Medicine, Cornell University, 1975

**Arthur L Prensky, M.D.**

Professor Emeritus of Neurology  
Bachelor of Arts, Cornell University, 1951  
Doctor of Medicine, New York University, 1955

**R**

**Brad Alan Racette, M.D.**

Professor Emeritus of Neurology  
Bachelor of Arts, Princeton University, 1988  
Doctor of Medicine, Northwestern University, 1992

**David Martin Reisler, M.P.H., M.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Arts, Harvard University, 1957  
Doctor of Medicine, Washington University in St Louis, 1961  
Master of Public Health, Johns Hopkins University Medical  
(Duplicate of Johns Hopkins University), 1971

**Dave A Rengachary, M.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, Northwestern University, 1996  
Doctor of Medicine, Northwestern University, 2000

**James R Rohrbaugh, M.D.**

Associate Professor of Clinical Neurology  
Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Yale University, 1971  
Main Campus), 1974

**Robert John Rudock, M.B.A., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, John Hopkins University, 2006  
Master of Business Administration, University of Miami, 2011  
Doctor of Medicine, University of Miami, 2012

**Robin C Ryther, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 1998  
Doctor of Philosophy, Vanderbilt University, 2004  
Doctor of Medicine, Vanderbilt University, 2006

**S**

**Naresha Saligrama, M.S., Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pathology and Immunology  
Master of Science, Indian Vet Research Institute, 2006  
Doctor of Philosophy, University of Vermont, 2013

**Chihiro Sato, M.S., Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Tokyo, 2003  
Master of Science, University of Tokyo, 2005  
Doctor of Philosophy, University of Tokyo, 2008

**Andrew David Sauerbeck, Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, University of Kentucky, 2005

Doctor of Philosophy, University of Kentucky, 2011

**Anneliese M Schaefer, J.D., Ph.D.**

Professor of Neurology (primary appointment)  
Juris Doctor, Washington University in St Louis, 1988  
Doctor of Philosophy, Washington University in St Louis, 2001

**Suzanne E. Schindler, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, Millsaps College, 1999  
Doctor of Philosophy, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2008

**Bradley L Schlaggar, Ph.D., M.D.**

Adjunct Professor of Neurology  
Bachelor of Science, Brown University, 1986  
Doctor of Philosophy, Washington University in St Louis, 1994  
Doctor of Medicine, Washington University in St Louis, 1994

**Kathleen Marie Schoch, Ph.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Bradley University, 2007  
Doctor of Philosophy, University of Kentucky, 2013

**Earl R Schultz, M.D.**

Professor of Clinical Neurology  
Bachelor of Arts, Southeast Missouri State University, 1952  
Bachelor of Science, University of Missouri Columbia, 1953  
Doctor of Medicine, Washington University in St Louis, 1955

**Dong-oh Seo, M.A., Ph.D.**

Instructor in Neurology (primary appointment)  
Master of Science, Korea University, 2006  
Doctor of Philosophy, University of Texas Austin, 2015

**Christian T Sheline, Ph.D.**

Adjunct Research Associate Professor of Neurology  
Bachelor of Arts, Dartmouth College, 1983  
Doctor of Philosophy, University of California, 1989

**Todd B Silverman**

Instructor in Clinical Neurology

**Barry A. Singer**

Associate Professor of Clinical Neurology

**Alyssa Erin Smith, M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, Loyola University Chicago, 2010  
Doctor of Medicine, Rush University, 2014

**Sean E Smith, M.S., M.D.**

Instructor in Neurology (primary appointment)  
Bachelor of Science, University of Delaware, 2003  
Master of Science, State University of New York at Buffalo, 2009  
Doctor of Medicine, Saint Louis University, 2015

**Christopher D Smyser, M.D.**

Professor of Neurology (primary appointment)  
Professor of Radiology

Professor of Pediatrics  
Section Chief - Section of Pediatric Neonatal  
Bachelor of Science, University of Iowa, 1998  
Doctor of Medicine, University of Iowa, 2004

**Barbara Joy Snider, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Bachelor of Arts, Northwestern University, 1979  
Doctor of Philosophy, University of Texas Southwest, 1989  
Doctor of Medicine, University of Texas Southwest, 1989

**Michael Snyder, M.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Science, Iowa State University, 1997  
Doctor of Medicine, University of Iowa, 2002

**Richard S Sohn, M.D.**

Associate Professor Emeritus of Neurology  
Bachelor of Science, Brooklyn College (Duplicate of CUNY  
Brooklyn College), 1964  
Doctor of Medicine, University of Chicago, 1968

**Richard Brian Sommerville, M.D.**

Professor of Neurology (primary appointment)  
Bachelor of Science, Harvard University, 1999  
Doctor of Medicine, Columbia University, 2005

**Tara V. Spevack, M.S., Ph.D.**

Instructor in Clinical Neurology  
Bachelor of Science, McGill University, 1987  
Master of Science, University of Florida, 1994  
Doctor of Philosophy, University of Florida, 1997

**Katherine Caroline White Stenson, M.D.**

Associate Professor of Clinical Neurology  
Bachelor of Arts, Washington University in St Louis, 1994  
Doctor of Medicine, Northwestern University Medical (Duplicate  
of Northwestern University), 2018

**Jeremy Fuller Strain, Ph.D.**

Instructor in Neurology (Pending Dean's Approval) (primary  
appointment)  
Bachelor of Science, University of Texas Arlington, 2009  
Doctor of Philosophy, University of Texas Arlington, 2015

**In Sook Sunwoo, M.D.**

Instructor Emerita in Neurology  
Doctor of Medicine, School Not Listed, 1959

**Charlene Belle Supnet-Bell, Ph.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, University of Manitoba, 1999  
Doctor of Philosophy, University of Prince Edward Island, 2010

**T**

**Sandra L Tate, M.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, School Not Listed, 1900

Doctor of Medicine, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 1987

**Mengesha A Teshome, M.D.**

Assistant Professor of Neurology (primary appointment)  
Doctor of Medicine, Addis Ababa University, 1989

**Kwee L Thio, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Professor of Neuroscience  
Section Chief - Section of Pediatric Epilepsy  
Bachelor of Science, Brown University, 1984  
Doctor of Philosophy, Washington University in St Louis, 1992  
Doctor of Medicine, Washington University in St Louis, 1992

**Jeffrey B. Titus, M.A., Ph.D.**

Assistant Professor of Clinical Neurology  
Bachelor of Science, Evangel College (Duplicate of Evangel  
University), 1997  
Master of Arts, University of Northern Colorado, 1999  
Doctor of Philosophy, Ball State University, 2002

**Stuart Ramm Tomko, M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Davidson College, 2005  
Doctor of Medicine, Baylor College of Medicine, 2010

**Norman Edwin Trevathan, M.S., M.D.**

Adjunct Professor of Neurology  
Bachelor of Science, David Lipscomb University (Duplicate of  
Lipscomb University), 1977  
Master of Science, Emory University, 1982  
Doctor of Medicine, Emory University, 1982

**Angela M Tripp**

Assistant Professor of Clinical Neurology

**U**

**Keisuke Ueda, M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Doctor of Medicine, Keio University, 2006

**Jason Daniel Ulrich, Ph.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, Quincy College, 2004  
Doctor of Philosophy, University of Iowa, 2011

**Mwiza Ushe, M.S., M.D.**

Associate Professor of Neurology (primary appointment)  
Vice Chair-Diversity  
Bachelor of Science, University of Pittsburgh, 2000  
Master of Science, Washington University in St Louis, 2007  
Doctor of Medicine, Washington University in St Louis, 2007

**V**

**Renee Bailey Van Stavern, M.D.**

Professor of Neurology (primary appointment)

Bachelor of Arts, Texas A&M University, 1991  
Doctor of Medicine, University of Texas Health Science Center,  
1997

**Arun S. Varadhachary, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Section Chief - Neurohospitalist Section  
Doctor of Philosophy, Temple University, 2001  
Doctor of Medicine, Temple University, 2004

**Michele Renee Verda**

Voluntary Clinical Instructor of Neurology

**Amy Robichaux Viehoever, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Assistant Professor of Pediatrics  
Doctor of Philosophy, Vanderbilt University, 2004  
Doctor of Medicine, Vanderbilt University, 2006

**Oksana Volshteyn, M.D.**

Prof of Neurology  
Doctor of Medicine, Minsk State Medical Institute, 1976

## W

**Yan Wang, M.D.**

Instructor in Neurology (primary appointment)  
Doctor of Medicine, University of Chicago, 2016

**Andrew M. Wayne, M.D.**

Instructor in Clinical Neurology  
Bachelor of Science, University of California Riverside, 1989  
Doctor of Medicine, University of Missouri Columbia, 1993

**Ling Wei, M.D.**

Adjunct Assistant Professor of Neurology  
Doctor of Medicine, Beijing Medical University (Duplicate of  
Capital University of Medical Sciences (#####)), 1977

**Conrad Christian Weihl, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Section Chief - Section of Neuromuscular Diseases  
Bachelor of Science, University of Illinois, 1993  
Doctor of Philosophy, University of Chicago, 1998  
Doctor of Medicine, University of Chicago, 2001

**Judith L. Weisenberg, M.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, Barnard College, 1998  
Doctor of Medicine, University of Minnesota, 2002

**Howard I Weiss, M.D.**

Assistant Professor of Clinical Neurology  
Doctor of Medicine, Tulane University, 1972

**Nicole Joy Werner, M.S., Ph.D.**

Associate Professor of Neurology (primary appointment)  
Bachelor of Science, University of Minnesota Twin Cities, 1997  
Master of Science, Saint Louis University, 2000  
Doctor of Philosophy, Saint Louis University, 2004

**Emily Katherine White, M.A., Ph.D.**

Assistant Professor of Neurology (primary appointment)  
null, Washington University in St Louis, 2008  
null, University of Nevada Las Vegas, 2013  
Doctor of Philosophy, University of Nevada Las Vegas, 2016

**Robert L. White, Ph.D., M.D.**

Assistant Professor of Neurology (primary appointment)  
Bachelor of Science, Washington University in St Louis, 1999  
null, Washington University in St Louis, 2007  
null, Washington University in St Louis, 2007

**Jonathan Paul Williams, M.D.**

Instructor in Neurology (Pending Dean's Approval) (primary  
appointment)  
Bachelor of Arts, University of Florida, 2011  
Doctor of Medicine, Howard University, 2017

**Timothy J Wolf, O.T.D.**

Adjunct Associate Professor of Occupational Therapy  
Adjunct Associate Professor of Occupational Therapy  
Doctor of Occupational Therapy, Washington University in St  
Louis, 2007

**Kyle Byron Womack, M.S., M.D.**

Professor of Neurology (primary appointment)  
Bachelor of Science, Southern Methodist University, 1983  
Doctor of Medicine, University of Texas Southwest, 1987  
Master of Science, University of Texas Southwest, 2020

**Michael Wong, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Professor of Neuroscience  
Allen P and Josephine B Green Professor of Pediatric Neurology  
Bachelor of Arts, Princeton University, 1987  
Doctor of Philosophy, University of Texas Southwest, 1995  
Doctor of Medicine, University of Texas Southwest, 1995

**Gregory Frederick Wu, Ph.D., M.D.**

Associate Professor of Neurology (primary appointment)  
Associate Professor of Pathology and Immunology  
Bachelor of Science, Washington University in St Louis, 1993  
Doctor of Philosophy, University of Iowa, 2001  
Doctor of Medicine, University of Iowa, 2001

## Z

**Craig Mitchell Zaidman, M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Doctor of Medicine, University of Virginia, 2001

**Allyson R Zazulia, M.D.**

Professor of Neurology (primary appointment)  
Professor of Radiology  
Associate Dean for Continuing Medical Education  
Bachelor of Science, University of Maryland, 1990  
Doctor of Medicine, Georgetown University, 1994

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**John M Zempel, Ph.D., M.D.**

Professor of Neurology (primary appointment)  
Professor of Pediatrics  
Bachelor of Science, University of Wisconsin Madison, 1985  
Doctor of Philosophy, Washington University in St Louis, 1995  
Doctor of Medicine, Washington University in St Louis, 1995

**Lirong Zhu, Ph.D., M.D.**

Assistant Professor of Clinical Neurology  
Doctor of Medicine, Fudan University (Duplicate of Fudan  
University (####)), 2000  
Doctor of Philosophy, Baylor College of Medicine, 2006

## Research Electives

### Neurology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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**Beau Ances, MD**

Taylor Avenue Building Extension, 2nd Floor  
Phone: 314-747-8423

Neuroimaging of neurodegenerative disorders. Students can work in a neuroimaging laboratory that is focused on the translational discovery of neuroimaging biomarkers for neurodegenerative diseases. The laboratory focuses on the pathogenesis of Alzheimer's disease and HIV-associated neurocognitive disorders. We are investigating the effects of neurodegenerative diseases on the brain network level using functional (blood oxygen level dependent imaging, arterial spin labeling), structural (volumetrics, diffusion tensor imaging), and metabolic (PET amyloid and tau) methods. Multiple projects that involve bioengineering, neuroimaging and infectious disease are available, depending on the interest of the student.

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**Randall Bateman, MD**

Biotechnology Center, Room 304  
Phone: 314-747-7066

Central nervous system protein metabolism in aging and dementia. This research elective will expose the student to translational research in the study of Alzheimer's disease and other neurodegenerative diseases. The student will participate in multiple areas of the research, including participant recruitment, consent, enrollment and admission to a research hospital unit. Lumbar puncture for cerebrospinal fluid sample collection, blood collection and intravenous labeling methods will be demonstrated and taught. The student will participate in sample analysis, including processing for mass spectrometry quantitation, enzyme-linked immunosorbent assay and Western gel methods. Quantitation, analysis and modeling of the data will be taught in the context of data interpretation and study design.

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**Anne H. Cross, MD, and Laura Piccio, MD, PhD**

McMillan, 3rd Floor  
Phone: 314-747-4591 or 314-747-0405

Understanding interactions of the immune system with the central nervous system as it relates to multiple sclerosis and other neuroimmunological disorders. Our goal is to understand how immune cells cross the blood-brain barrier and initiate the cascade of events that leads to the lesions of multiple sclerosis. We are also funded to study the effects of diet and adipokines on neuroinflammation. Depending on the time commitment of the student and their individual interests and goals, they will either assist with ongoing projects or be given a laboratory project on which to work. Projects may involve animal models of multiple sclerosis, cell culture or studies of human samples (cerebrospinal fluid, blood or autopsied specimens). Interested students should contact Dr. Cross (crossa@neuro.wustl.edu) or Dr. Piccio (picciol@neuro.wustl.edu) several weeks in advance before signing up for this research to allow for sufficient planning.

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**Robert T. Naismith, MD**

McMillan, Room 310B  
Phone: 314-747-0432

Clinical imaging research in multiple sclerosis. The student will learn about neuroimaging, imaging analyses, data collection, data management and clinical study endpoints in multiple sclerosis. They will observe patient participants undergoing a detailed evaluation of disability measures, such as ambulation, symptom scales, cognition, vision, upper extremity function, and so on. They will witness the entire process of image acquisition, processing, analysis and data extraction. They will have the opportunity to interact with many people who are vital to the research, including research coordinators, imaging technologists, imaging physicists/chemists and specialized research clinicians (i.e., neurocognitive and physical therapy research specialists).

The student will assist with hands-on clinical investigative research. They will gain an excellent appreciation of multiple sclerosis, from its pathophysiology within the central nervous system to how it affects the neurological function of individuals. Through detailed and quantitative imaging analysis, the student will become very adept at analyzing brain MRI scans. They will mark and track lesions to determine their effects on clinical function and learn to identify normal-appearing white matter, cortex and gray-matter structures. They will become familiar with Amira Imaging Analysis Software, SPSS Statistical Analysis Software, SIENA Volume Analysis Software and Matlab Imaging Analysis Software.

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**Steven E. Petersen, PhD**

East Building, Room 2108  
Phone: 314-362-3319

This lab is interested in brain organization and function, particularly for language, attention and memory. Our main approach to these issues is through functional MRI and large-scale network analysis.

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**Joel S. Perlmutter, MD**

East Building, 2nd Floor  
Phone: 314-362-6026

Pathophysiology of movement disorders. The lab is primarily interested in the etiology, pathophysiology and treatment of basal ganglia disorders. We have several studies of Parkinson disease (PD). We investigate mechanisms of action of deep brain stimulation, which is a dramatic new treatment. These studies combine PET, cognitive testing and quantified measures of movement. We also test new drugs that might rescue injured nigrostriatal neurons (a model of PD). For these, we use PET to measure dopamine pathways and also to quantify motor behavior. We also have an active program developing and validating neuroimaging biomarkers for PD and for determining the integrity of the nigrostriatal pathway that includes studies in human and animal models of PD. We have an active program that combines a variety of approaches to developing biomarkers and investigating the pathophysiology of dementia associated with PD. We use PET to measure radioligand binding and sensorimotor processing in dystonia. We developed a new animal model of dystonia to investigate pharmacologic and physiologic changes. We use PET to investigate drug-mediated pathways in the brain and to parse out the effects of selective dopaminergic agonists. We are also working to develop MR-based methods including diffusion tensor imaging and resting-state functional connectivity to investigate the brain mechanisms underlying PD and dystonia.

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**Brad A. Racette, MD**

McMillan, 9th Floor  
Phone: 314-362-5291

Our lab is primarily interested in environmental risk factors associated with Parkinson's disease. We use a variety of techniques to study these risk factors, including traditional field epidemiology, in which we evaluate workers exposed to metals in the United States and residents living near a smelter in South Africa; neuroimaging, in which we study the pathophysiology of toxin-mediated parkinsonism; geographic information systems research, in which we associate environmental toxin exposures with the incidence and prevalence of Parkinson's disease in the United States and Finland; and neuropathologic studies, in which we evaluate manganese-exposed workers from South Africa. There are numerous opportunities available for students to be involved with any of these projects. Students will receive some clinical exposure as well to familiarize them with pertinent clinical syndromes.

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**Marcus E. Raichle, MD**

East Building, 2nd Floor  
Phone: 314-362-6907

This lab investigates in vivo brain hemodynamic, metabolic and functional studies of human cognition and emotion using cyclotron-produced isotopes and PET as well as fMRI in humans. Refer also to the listing on this page for Steven E. Petersen, PhD.

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**Gregory Wu, MD, PhD**

McMillan, 3rd Floor  
Phone: 314-362-3293

Understanding how immune responses are generated that target the central nervous system. Specifically, this lab studies antigen-presenting cell contributions to autoimmune animal models of multiple sclerosis. Our goal is to understand what cellular interactions are critical to the development of immune-mediated demyelination.

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## Courses

Visit online course listings to view offerings for M35 Neurol (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M35>).

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**M35 Neurol 632 Diseases of the Nervous System**

The goal of this course is to provide an introduction to the diseases of the central and peripheral nervous systems, including their clinical manifestations, pathology, pathophysiology and pharmacotherapy. The course includes reading assignments, lectures, laboratories, team activities, and clinical presentations.  
Credit 53 units.

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**M35 Neurol 720 Neurology Clerkship**

During the four week Neurology clerkship, students will gain proficiency in understanding diseases of the nervous system, the neurologic work-up, localization and differential diagnosis generation, and devising a treatment plan. A variety of settings are available, which could include adults or pediatric services, with both inpatient and outpatient experiences. Students will provide care for patients with neurologic problems under the supervision of residents, fellows, and attendings.  
Credit 154 units.

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**M35 Neurol 730 Physical Medicine and Rehabilitation Clerkship**

Clerkship in PM & R for 3-rd year medical students provides an opportunity to gain basic knowledge and clinical skills in evaluation and management of wide range of neurological and musculoskeletal diseases and conditions that require specialized rehabilitative medical and therapeutic care. Students spend time on Spinal Cord Injury Unit (SCI) and time on Brain Injury (BI) & Stroke Unit at The Rehabilitation Institute of St. Louis. Students are expected to be a part of the rehabilitation team, follow 2 to 3 patients, participate in daily morning rounds, participate in performing consults, attend team meetings and family



conferences. Students are required to attend several outpatient clinics such as SCI, BI, Amputee and Stroke. During the entire rotation, students work together with PM&R residents and fellows, and under direct guidance of the NeuroRehabilitation faculty. The usual duty hours are 7-7:30AM to 5PM during weekdays, and 8AM -12NN on Saturdays. There is no night call. Students are required to attend all PM&R curriculum lectures and conferences. On the first day of rotation, students meet with the PM&R program director to go over goals, objectives and schedules. Upon completion of the rotation students are required to fill out the evaluation form to provide feedback regarding rotation experience.

Credit 77 units.

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### **M35 Neurol 827 Neurology Subinternship for WUSM Students**

This four-week elective will be customized to include inpatient and outpatient experiences desired by WUSM students who have completed the WUSM Neurology Clerkship. Students may choose this elective to further improve their neurology knowledge and skills. Students considering neurology as a career may also desire additional exposure to supplement their prior clerkship experience. The elective is split into two two-week rotations, which may include the following: (1) Adult Inpatient General Service (with one clinic/week); (2) Adult Inpatient Stroke Service (with one clinic/week); (3) Adult Inpatient Consult Service (with one clinic/week); (4) Pediatric Neurology Consult Service (with one clinic/week); (5) Adult Neurology ICU (with one clinic/week); and (6) Outpatient Clinics (with eight to 10 clinics/week).

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### **M35 Neurol 827A Special Elective in Adult Inpatient Clinical Neurology**

Special Elective in Adult Inpatient Clinical Neurology

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### **M35 Neurol 828 Neurology Subinternship for Visiting Medical Students**

This four-week elective for fourth-year visiting students from a US medical school provides the option (space permitting) of four weeks of Adult Inpatient Service (Stroke for 2 weeks, General Neurology for 2 weeks), or two weeks on an Adult Inpatient Service and two weeks on the Adult Consult Service. Students on the inpatient service will function as a subintern under the supervision of their junior resident, chief resident, and attending physician. The student will also attend weekly clinical conferences and a weekly outpatient clinic experience. This elective is suitable for visiting fourth-year students interested in Neurology, who wish to improve their Neurology knowledge and skills.

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### **M35 Neurol 830 Neuro-Oncology**

This elective provides an outpatient-oriented pediatric and adult neuro-oncology experience for fourth-year medical students. Students will: - attend multidisciplinary adult and pediatric neuro-oncology clinics and case conferences (tumor boards), - attend adult and pediatric radiation oncology clinics, - attend neuropathology brain tumor review, - participate in subspecialty brain tumor clinics, and - attend monthly brain tumor research conferences.

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### **M35 Neurol 851 Clinical Aspects of Aging and Dementia**

This elective provides the opportunity to learn about clinical research and clinical care in healthy brain aging and dementia. Students are encouraged to contact the Course Directors (Dr. B. Joy Snider and/or Dr. John Morris) before the elective

begins to discuss their interests, as this elective is customized based on student interests. This can be a two-week or four-week elective. Students can gain proficiency in interviewing techniques and in the neurologic examination of the geriatric patient, and are introduced to neuropsychology, neuropathology, biomarkers, neuroimaging, genetics, and other biomedical procedures important in the diagnostic evaluation of older adults. The Knight ADRC is an interdisciplinary group, so students have the opportunity to interact with physicians, nurse clinicians, psychologists, and social workers, and to explore the neuropsychology, neuropathology, biomarkers, neuroimaging, genetics, and other biomedical procedures used in the diagnosis of dementing disorders such as Alzheimer's disease, dementia with Lewy bodies, frontotemporal dementias, cerebrovascular disorders, and affective disorders.

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### **M35 Neurol 859 Neonatal Neurology**

The Neonatal Neurology elective will consist of a combination of inpatient and outpatient experiences designed to provide medical students with comprehensive exposure to the field. Through the rotation, students will actively participate in all aspects of patient care, acquiring the knowledge and skill necessary to effectively evaluate infants with neurological disorders, including encephalopathy, stroke, seizures, hypotonia, intraventricular hemorrhage, and periventricular leukomalacia, among others. Clinical activities will be tailored to fit the interests and goals of the individual student and include a combination of inpatient and outpatient exposures. Inpatient activities will occur in the St. Louis Children's Hospital Neonatal Intensive Unit as part of the Neonatal Neurology Consultation service. Outpatient activities will occur in the St. Louis Children's Hospital Outpatient Clinics. Students will also attend educational conferences specific to the field during the rotation, including Neonatal Neurology Clinical Conference and Neonatal Neuroradiology Conference.

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### **M35 Neurol 860 Pediatric Neurology**

The senior elective experience in child neurology is designed to adapt to the individual goals and objectives of students. The elective takes place in one or two 2-week blocks that occur among five possible venues as chosen by the student: 1. Outpatient clinics, 2. Inpatient ward service, 3. Inpatient general consult service, 4. NICU consult service, and 5. Video EEG (VEEG) monitoring service. The combination of services and experiences will be arranged directly between the student and the Course Director prior to beginning the rotation. In the outpatient clinics, students will rotate between a variety of subspecialty clinics and work with a variety of attendings in order to experience the breadth of outpatient pediatric neurology. Students rotating on the inpatient ward service will have a different role than the third-year student on pediatrics. The fourth-year student will focus solely on neurology patients and work closely with the pediatric neurology resident to develop neurology-specific care plans. No call or weekend duties will be expected on this rotation. On the general consult services, students will work with the consult attending and pediatric neurology residents on that team to see consults in the PICU, CICU, ER, and other hospital floors. The NICU consult team focuses on infants in the NICU. Student rotating on the VEEG monitoring service will focus on learning the indications and uses of VEEG and basic EEG reading skills

**M35 Neurol 861 Neurointensive Care Unit**

The student will be integrated into the Critical Care Team that provides care in the Neurology/Neurosurgery ICU. Diseases frequently encountered include intracerebral hemorrhage, head trauma, subarachnoid hemorrhage, stroke, spinal cord disease, and neuromuscular disease. The student will follow patients, participate in rounds and pay participate in some procedures under supervision. Didactic sessions will be provided as conferences or lectures from the ICU attending and fellow.

**M35 Neurol 865 Adult and Pediatric Epilepsy**

Students will learn how epileptologists diagnose and manage epilepsy in adults and children. They will learn how to use the history and physical exam and laboratory studies such as EEG, MRI, PET, and SPECT to diagnose and manage patients with new onset epilepsy, established epilepsy, and medically intractable epilepsy. They will become familiar with the medical management of epilepsy as well as the treatment options for medically intractable epilepsy including surgery, the vagus nerve stimulator, and the ketogenic diet. They will also learn how to manage the co-morbid conditions that accompany epilepsy such as depression, behavioral problems, cognitive impairment, sleep disturbance, and non-epileptic events. Students will accomplish these goals by attending epilepsy clinics and rounding on the inpatient epilepsy service with the epilepsy team at Barnes-Jewish Hospital and St. Louis Children's Hospital. They will attend the Adult Epilepsy Conference, the Pediatric Epilepsy Conference, and Neurology Grand Rounds. Students will also have the opportunity to observe epilepsy surgery if they wish. They will have the option to present one 15-30 minute talk on a topic relevant to epilepsy.

**M35 Neurol 872 MS Center/Outpatient - Missouri Baptist**

Students will develop their skills in taking histories and performing neurological examinations on patients with multiple sclerosis under direct supervision of multiple sclerosis specialists. Localization of neurological findings and symptoms to the neuro-axis will be emphasized. A major goal for the students will to increase the understanding of comprehensive patient management including disease treatment, symptom management, adjunctive therapy services, and psychosocial issues. The outpatient rotation will be four weeks at The MS Center for Innovations in Care at Missouri Baptist Medical Center with Dr. Barry Singer and Dr. Mark Tullman. An additional goal for students will be to understand process of clinical research and translation into approved therapies. The center has been a leader in clinical trial development of therapeutics that have been or will soon be FDA-approved as new medications for multiple sclerosis.

**M35 Neurol 900 Research Elective - Neurology**

Research opportunities may be available. If interested, please contact the Department of Neurology.

## Department of Neuroscience

The Department of Neuroscience plays a key role in the development and teaching of basic sciences in the Medical School Gateway curriculum (<https://sites.wustl.edu/gatewaycurriculum/>), including human anatomy, histology, and neuroscience. In conjunction with the Division of Biology & Biomedical Sciences (DBBS) program in neuroscience,

the department also offers introductory graduate courses in cellular, molecular, and systems neuroscience (<http://neuroscienceprogram.wustl.edu/Program/-Curriculum/>). In addition, the department also offers a number of advanced courses that are primarily designed for graduate students but that are also open to students in the medical curriculum. Finally, advanced elective research activities are offered by faculty in the department.

Website: <http://neuroscience.wustl.edu>

## Faculty

**Linda J. Richards, AO, FAA, FAHMS, PhD** (<https://neuroscience.wustl.edu/people/linda-richards-phd/>)  
Department Chair

Visit our website for more information about our faculty (<http://neurosci.wustl.edu/People/Faculty/>) and their appointments.

### A

**Kari Leigh Allen, M.A., Ph.D.**

Assistant Professor of Anatomy (primary appointment)  
Assistant Professor of Anthropology (Courtesy)  
Bachelor of Arts, State University of New York at Potsdam, 2005  
Main Campus, 2008  
Doctor of Philosophy, Duke University, 2014

### B

**Amy Lynn Bauernfeind, M.Phil., Ph.D.**

Associate Professor of Anatomy (primary appointment)  
Associate Professor of Anthropology (Courtesy)  
Vice Chair Education Department of Neuroscience  
Bachelor of Science, Vanderbilt University, 2004  
Master of Philosophy, George Washington University, 2011  
Doctor of Philosophy, George Washington University, 2014

**Paul C Bridgman, M.S., Ph.D.**

Professor of Neuroscience (primary appointment)  
Associate Professor of Biomedical Engineering  
Bachelor of Arts, University of San Diego, 1974  
Master of Science, University of California San Diego, 1976  
Doctor of Philosophy, Purdue University, 1980

**Andreas H Burkhalter, M.S., Ph.D.**

Professor of Neuroscience (primary appointment)  
Associate Professor of Biomedical Engineering  
Associate Professor of Neurobiology in Neurological Surgery  
Master of Science, University of Zurich, 1973  
Doctor of Philosophy, University of Zurich, 1977

**Harold Burton, Ph.D.**

Professor of Neuroscience (primary appointment)  
Professor of Biomedical Engineering  
Professor of Radiology  
Professor of Cell Biology and Physiology  
Bachelor of Arts, University of Michigan, 1964

Doctor of Philosophy, University of Wisconsin Madison, 1968

## C

### **Valeria Cavalli, M.S., Ph.D.**

Professor of Neuroscience (primary appointment)  
Robert E. and Louise F. Dunn Professorship in Biomedical  
Research  
Bachelor of Science, University of Geneva, 1991  
Master of Science, University of Geneva, 1992  
Doctor of Philosophy, University of Geneva, 2000

### **Yao Chen, M.S., Ph.D.**

Assistant Professor of Neuroscience (primary appointment)  
Assistant Professor of Cell Biology and Physiology  
Bachelor of Science, Cambridge University, 2002  
Master of Science, Cambridge University, 2006  
Doctor of Philosophy, Harvard University, 2009

### **James M Cheverud, M.S., Ph.D.**

Professor Emeritus of Anatomy  
Bachelor of Arts, Northwestern University, 1975  
Master of Science, University of Wisconsin Madison, 1977  
Doctor of Philosophy, University of Wisconsin Madison, 1979

### **Glenn C Conroy, M.Phil., Ph.D.**

Professor Emeritus of Anatomy  
Bachelor of Arts, University of California Berkeley, 1970  
Master of Philosophy, Yale University, 1972  
Doctor of Philosophy, Yale University, 1974

## D

### **Krikor T Dikranian, Ph.D., M.D.**

Professor of Anatomy (primary appointment)  
Professor of Physical Therapy  
Varna, 1978  
Sofia, 1992

## F

### **Tom P Franken, M.S., Ph.D., M.D.**

Assistant Professor of Neuroscience (Pending Executive Faculty  
Approval) (primary appointment)  
null, Katholieke Universiteit Leuven, 2009  
null, Katholieke Universiteit Leuven, 2015  
null, Katholieke Universiteit Leuven, 2016

## G

### **Harrison W. Gabel, Ph.D.**

Associate Professor of Neuroscience (primary appointment)  
Baccalaureatus, Princeton University, 2001  
Doctor of Philosophy, Harvard University, 2008

### **David I Gottlieb, M.A., Ph.D.**

Emeritus Professor of Neurobiology  
Bachelor of Arts, Harpur College (Duplicate of Binghamton  
University), 1964  
Master of Arts, University of Wisconsin Madison, 1969

Doctor of Philosophy, Washington University in St Louis, 1971

## H

### **Edward B. Han, Ph.D.**

Assistant Professor of Neuroscience (primary appointment)  
Assistant Professor of Anesthesiology  
Bachelor of Science, Cornell University, 1995  
Doctor of Philosophy, University of California San Diego, 2004

### **Martha B. Han, Ph.D.**

Assistant Professor of Neuroscience (primary appointment)  
Bachelor of Science, Yale University, 2000  
Doctor of Philosophy, University of California San Diego, 2008

### **Timothy E. Holy, M.A., Ph.D.**

Professor of Neuroscience (primary appointment)  
Alan A and Edith L Wolff Professor of Neuroscience  
Bachelor of Arts, Rice University, 1991  
Master of Arts, Princeton University, 1992  
Doctor of Philosophy, Princeton University, 1997

## J

### **Ahmad Jezzini, M.S., Ph.D.**

Instructor in Neuroscience (primary appointment)  
Bachelor of Science, Université Libanaise (Lebanese University),  
2003  
Doctor of Philosophy, University of Parma, 2010

## K

### **Adam Kepecs, Ph.D.**

Professor of Neuroscience (primary appointment)  
Professor of Psychiatry  
Robert J Terry Professor of Neuroscience  
Bachelor of Science, Eotvos Lorand University (University of  
Budapest), 1997  
Doctor of Philosophy, Brandeis University, 2002

## L

### **Qingyun Li, Ph.D.**

Assistant Professor of Neuroscience (primary appointment)  
Assistant Professor of Genetics  
Bachelor of Science, China Agricultural University, 2006  
Doctor of Philosophy, Duke University, 2015

## M

### **David Norman Menton, Ph.D.**

Associate Professor Emeritus of Anatomy  
Mankato), 1959  
Doctor of Philosophy, Brown University, 1966

### **Ilya E. Monosov, M.S., Ph.D.**

Associate Professor of Neuroscience (primary appointment)  
Associate Professor of Neurological Surgery  
Associate Professor  
Bachelor of Science, University of California San Diego, 2004  
Master of Science, NewSchool Architecture & Design, 2005

Doctor of Philosophy, Brown University, 2009

**Ashley C. Morhardt, M.S., Ph.D.**

Assistant Professor of Anatomy (primary appointment)  
Master of Science, Western Illinois University, 2009  
Doctor of Philosophy, Ohio University, 2016  
Bachelor of Science, Illinois College, Jacksonville, 2006

**N**

**Michael L Nonet, Ph.D.**

Associate Professor of Neuroscience (primary appointment)  
Bachelor of Science, University of California Davis, 1984  
Doctor of Philosophy, Massachusetts Institute of Technology,  
1989

**O**

**Karen Laurel O'Malley, M.S., Ph.D.**

Professor of Neuroscience (primary appointment)  
Bachelor of Arts, Sonoma State University, 1971  
Master of Science, Portland State University, 1973  
Doctor of Philosophy, University of Texas Austin, 1980

**P**

**Camillo Padoa-Schioppa, M.S., Ph.D.**

Professor of Neuroscience (primary appointment)  
Professor of Economics (Courtesy)  
Professor of Biomedical Engineering  
Master of Science, La Sapienza University, 1996  
Doctor of Philosophy, Massachusetts Institute of Technology,  
2002

**Thomas J Papouin, M.S., Ph.D.**

Assistant Professor of Neuroscience (primary appointment)  
Bachelor of Science, École Normale Supérieure Paris, 2005  
Master of Science, École Normale Supérieure Paris, 2007  
Doctor of Philosophy, University of Bordeaux 2, 2011

**Jane Phillips Conroy, M.A., Ph.D.**

Professor Emeritus of Anatomy  
Bachelor of Arts, Brandeis University, 1969  
Master of Arts, New York University, 1973  
Doctor of Philosophy, New York University, 1978

**Joseph L Price, Ph.D.**

Professor Emeritus of Anatomy and Neurobiology  
Bachelor of Arts, Oxford University (Duplicate of University of  
Oxford), 1966  
Doctor of Philosophy, Oxford University (Duplicate of University  
of Oxford), 1969

**Kristen Alexandra Prufrock, M.S., Ph.D.**

Assistant Professor of Anatomy (primary appointment)  
Bachelor of Science, University of Toronto, 2012  
Master of Science, University of Toronto, 2014  
Doctor of Philosophy, Johns Hopkins University, 2020

**R**

**Linda J Richards, Ph.D.**

Professor of Neuroscience (primary appointment)  
Head of the Department of Neuroscience  
Director of McDonnell Center for Cellular and Molecular  
Neurobiology  
Edison Professor of Neuroscience  
Bachelor of Science, Walter & Eliza Hall Institute, 1990  
Doctor of Philosophy, Walter & Eliza Hall Institute, 1994

**S**

**Lawrence B Salkoff, Ph.D.**

Professor of Neuroscience (primary appointment)  
Professor of Genetics  
Bachelor of Arts, University of California Los Angeles, 1967  
Doctor of Philosophy, University of California Berkeley, 1979

**Paul Joseph Shaw, M.A., Ph.D.**

Professor of Neuroscience (primary appointment)  
Bachelor of Arts, Niagara University, 1985  
Master of Arts, San Jose State University, 1990  
Doctor of Philosophy, University of Chicago, 1996

**Lawrence H Snyder, M.S., Ph.D., M.D.**

Professor of Neuroscience (primary appointment)  
Professor of Psychological & Brain Sciences  
Baccalaureatus, Princeton University, 1982  
Master of Science, University of Rochester, 1992  
Doctor of Philosophy, University of Rochester, 1992  
Doctor of Medicine, University of Rochester, 1992

**T**

**Paul H Taghert, Ph.D.**

Professor of Neuroscience (primary appointment)  
Bachelor of Arts, Reed College, 1975  
Doctor of Philosophy, University of Washington, 1981

**Gaia Tavoni, M.S., Ph.D.**

Assistant Professor of Neuroscience (primary appointment)  
Assistant Professor of Medicine  
Assistant Professor of Electrical & Systems Engineering  
Assistant Professor of Computer Science and Engineering  
Bachelor of Science, Politecnico di Torino, 2010  
Master of Science, Politecnico di Torino, 2012  
Doctor of Philosophy, École Normale Supérieure Paris, 2015

**V**

**David C Van Essen, Ph.D.**

Professor of Neuroscience (primary appointment)  
Professor of Biomedical Engineering  
Alumni Endowed Professor of Neurobiology  
Bachelor of Science, California Institute Technology, 1967  
Doctor of Philosophy, Harvard University, 1971

## Y

### Jason Yi, Ph.D.

Assistant Professor of Neuroscience (primary appointment)  
Bachelor of Science, Dickinson College, 2001  
Doctor of Philosophy, Duke University, 2009

## Z

### Guoyan Zhao, Ph.D.

Assistant Professor of Neuroscience (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2003

## Research Electives

### Neuroscience Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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### Kari Allen, PhD

North Building, 3rd Floor  
Phone: 314-747-6572

Paleoanthropology and phylogenetic statistics; comparative analyses of primate craniodental morphology and the evolution of brain size

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### Martha Bagnall, PhD

McDonnell Medical Sciences Building, 4th Floor  
Phone: 314-362-9695

Molecular, electrophysiological, and behavioral analyses of neural circuits for vestibular control of spinal function

---

### Amy Bauernfeind, PhD

North Building, 3rd Floor  
Phone: 314-747-6566

Biological bases of human cognition; comparative neurobiology of primates

---

### Paul Bridgman, PhD

McDonnell Medical Sciences Building, 8th Floor  
Phone: 314-362-3449

Cell biology of the developing nervous system

---

### Andreas Burkhalter, PhD

North Building, 4th Floor  
Phone: 314-362-4068

Organization and function of neuronal circuits in mouse visual cortex

---

### Harold Burton, PhD

East McDonnell Building, 3rd Floor  
Phone: 314-362-3556

Cortical functional reorganization in response to sensory loss

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### Valeria Cavalli, PhD

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-362-3540

Cellular, molecular and epigenetic mechanisms controlling axon regeneration

---

### Yao Chen, PhD

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-273-7739

We aim to understand how the dynamics of neuromodulators and intracellular signals contribute to the function of neuromodulators, to learning, and to the function of sleep.

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### Krikor Dikranian, MD, PhD

North Building, 3rd Floor  
Phone: 314-362-3548

Cell death during the development of the mammalian central nervous system; traumatic brain injury in the infant

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### James Fitzpatrick, PhD

McKinley Research Building, Basement  
Phone: 314-747-0838

Optical and charged particle multiscale microscopy application method development

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### Tom Franken, MD, PhD

East McDonnell Building, 3rd Floor  
Phone: 314-362-3590

Neuronal mechanisms of perception

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### Harrison Gabel, PhD

McDonnell Medical Sciences Building, 8th Floor  
Phone: 314-362-9814

Gene regulation in the developing nervous system; molecular mechanisms of neurodevelopmental disorders

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### Geoffrey Goodhill, PhD (<https://neuroscience.wustl.edu/people/geoffrey-goodhill-phd/>)

McDonnell Medical Sciences Building, 9th Floor

Computational neuroscience; large-scale neural recording;  
development of behavior and neural coding in zebrafish; autism  
models

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**Edward Han, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-747-2505

Learning-related hippocampal network activation

---

**Timothy E. Holy, PhD**

North Building, 4th Floor  
Phone: 314-362-0086

Neural mechanisms of action of mammalian pheromones

---

**Adam Kepecs, PhD**

McDonnell Medical Sciences Building, 4th Floor  
Phone: 314-273-8523

Our long-term goal is to reverse engineer the computational and  
neurobiological processes underlying cognition and decision-  
making and apply these insights to biological psychiatry.

---

**Tristan (Qingyun) Li, PhD**

McDonnell Medical Sciences Building, 8th Floor  
Phone: 314-273-1422

My lab is broadly interested in neuroimmunology, with a  
focus on microglial biology. We combine cutting-edge, single-  
cell genomic technologies with in vitro and in vivo genetic,  
molecular, and cellular tools to investigate microglial functions  
in the establishment of the nervous system, and we study how  
changes in these functions contribute to neurological diseases.

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**Ilya Monosov, MS, PhD**

East McDonnell Building, 2nd Floor  
Phone: 314-362-3740

Neuronal mechanisms of voluntary behavior

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**Ashley Morhardt, PhD**

North Building, 3rd Floor  
Phone: 314-273-1859

Evolution of neural diversity within and across non-mammalian  
vertebrate clades, especially dinosaurs

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**Michael L. Nonet, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-747-1176

Molecular genetic analysis of synaptic development and function

---

**Karen L. O'Malley, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-362-7087

Molecular mechanisms underlying neurodegenerative  
processes; signaling mechanisms associated with intracellular  
receptors

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**Camillo Padoa Schioppa, PhD**

East McDonnell Building, 3rd Floor  
Phone: 314-747-2253

Neuronal bases of economic choice and decision making

---

**Thomas Papouin, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-273-7738

Role played by the 80% to 90% of non-neuronal cells (glial cells)  
in brain function

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**Linda J. Richards AO, FAA, FAHMS, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-362-3033

The Brain Development and Disorders Laboratory investigates  
how long-range neural circuits are established in the brain and  
how neural circuit plasticity affects the function of the cerebral  
cortex.

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**Lawrence B. Salkoff, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-362-3644

Roles of ion channels in neuronal long-term excitability changes

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**Paul J. Shaw, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-362-2703

Molecular genetics of sleep and circadian rhythms

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**Lawrence H. Snyder, MD, PhD**

East McDonnell Building, 3rd Floor  
Phone: 314-747-3530

Computational and cognitive issues in cortical control of eye and  
arm movement investigated via electrophysiology and imaging

---

**Paul H. Taghert, PhD**

McDonnell Medical Sciences Building, 9th Floor  
Phone: 314-362-3641

Neurobiology of circadian rhythms; neurobiology of peptidergic neurotransmission

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**Gaia Tavoni, PhD**

East McDonnell Building, 3rd Floor  
Phone: 314-362-3590

Applying concepts and methods from statistical mechanics, Bayesian theory, mathematics and biophysics to the study of the brain

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**David C. Van Essen, PhD**

East McDonnell Building, 2nd Floor  
Phone: 314-362-7043

Organization, function, and development of primate cerebral cortex, especially in humans; generation and utilization of neuroinformatics tools for data mining

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**Jason Yi, PhD**

McDonnell Medical Sciences Building, 8th Floor  
Phone: 314-273-1664

Molecular pathways shaping nervous system development and function

---

**Guoyan Zhao, PhD**

McDonnell Medical Sciences Building, 8th Floor  
Phone: 314-273-9045

My laboratory is interested in understanding the regulatory networks that control the development and proper function of mammalian brains in the context of human health and disease.

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## Courses

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**M05 Neurosci 810 Advanced Dissection**

Students will perform detailed dissections on a discrete region of the body of their choosing-i.e. head/neck, thorax, abdomen, pelvic cavity, or limbs. Students will compile a list of personal learning objectives with the approval of the course director(s). A minimum of 30hrs of self-paced individual dissection is required and may include practice of surgical approaches, and/or study of cross-sectional anatomy and medical imaging.

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**L41 Biol 5571 Cellular Neurobiology**

This course will present a fully integrated overview of nerve cell structure, function and development at the molecular and cellular level. Broad topics to be covered include gene structure and regulation in the nervous system, quantitative analysis of voltage- and chemically-gated ion channels, presynaptic and postsynaptic mechanisms of chemical neurotransmission, sensory transduction, neurogenesis and migration, axon guidance and synapse formation. Two lectures plus one hour of

discussion per week for 14 weeks. There will be three exams, as well as homework problems and summaries of discussion papers. Prerequisites: graduate standing or permission of the instructor.

Credit 6 units.

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**L41 Biol 5622 Cognitive, Computational, and Systems Neuroscience Project Building**

The goal of this course is to help students in the CCSN Pathway develop the critical thinking skills necessary to develop and implement high quality, interdisciplinary research projects. Throughout the course of the semester, each student will develop a research plan in their chosen area of interest. The plan will be developed in consultation with at least two faculty members (from at least two different subdisciplines within the pathway) as well as the other students and faculty participating in the course. The culmination of this course will be for each student to produce an NIH-style grant proposal on the research project of their choosing. For most students, this will serve either as their thesis proposal or a solid precursor to the thesis proposal. The course will be designed to help facilitate the development of such a research plan through didactic work, class presentations, class discussion, and constructive feedback on written work. The course will begin with a review of written examples of outstanding research proposals, primarily in the form of grant submissions similar to those that the students are expected to develop (i.e., NRSA style proposals, R03 proposals). Review of these proposals will serve as a stimulus to promote discussion about the critical elements of good research proposals and designs in different areas. Each student will be expected to give three presentations throughout the semester that will provide opportunities to receive constructive feedback on the development and implementation of research aims. The first presentation (towards the beginning of the semester) will involve presentation of the student's general topic of interest and preliminary formulation of research questions. Feedback will emphasize ways to focus and develop the research hypotheses into well-formulated questions and experiments. The second presentation will involve a more detailed presentation of specific research questions (along the lines of NIH-style Specific Aims) and an initial outline of research methods. The final presentation will involve a fuller presentation of research questions and proposed methods. Feedback, didactic work, and group discussion throughout the semester will include guidance on critical components of the development of a research plan, including how to perform literature searches, formulate testable hypotheses, write critical literature summaries, and design experiments and analyses. The course will meet once a week, with faculty members from different tracks within the Pathway present at each meeting. This will allow students to receive feedback from several perspectives. Prerequisite: Member of CCSN Pathway, permission of instructor.

Credit 3 units.

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**L41 Biol 5648 Coding and Statistical Thinking in the Neurosciences**

Students are introduced to scientific programming in Python. Students will learn common programming constructs and how to visualize and analyze data. Coding will be integrated into a statistics curriculum introducing summary statistics, probability distributions, simulation and hypothesis testing, and power analysis for experimental design.

Credit 1 unit.

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#### L41 Biol 5651 Neural Systems

The course will consist of lectures and discussions of the sensory, motor and integrative systems of the brain and spinal cord, together with a weekly lab. The lectures will present aspects of most neural systems, and will be given by faculty members who have specific expertise on each topic. The discussions will include faculty led group discussions and papers presented and discussed by students. The labs will include human brain dissections, examination of histological slides, physiological recordings, behavioral methods, computational modeling, and functional neural imaging.

Credit 4 units.

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#### L41 Biol 5989 Advanced Topics in Neuroscience

This course will expose upper-level and postdoctoral students to advanced topics and methods in neuroscience. The course will rapidly fill gaps in student knowledge in areas that may be relevant to new directions in thesis work or interest areas. Each section of the course will be offered asynchronously, sometimes in coordination with existing journal clubs and other seminars. Each section will meet for two hours per week for three weeks. Sections may start with a didactic component or a review paper, but they will quickly delve into the discussion of primary papers curated by faculty and covering a focused topic. It is expected that papers will cover both historical and current contexts. Some sections will focus on technique; others will be conceptually focused. Each section will be led by a faculty member drawn from the Neuroscience program in an area of their expertise. Objectives include deepening critical thinking, statistical knowledge, experimental design, and technical prowess.

Credit 0.5 units.

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## Department of Neurosurgery

Instruction in neurological surgery begins with an introduction to the anatomy and physiology of the nervous system presented in the first-year course in neural sciences directed by the Department of Neuroscience (<http://neurosci.wustl.edu/>), with the participation of the neurosurgery faculty. During the second year, the Department of Neurosurgery (<http://www.neurosurgery.wustl.edu>) presents the course in diseases of the nervous system in conjunction with the departments of Neurology, Pathology & Immunology, Molecular Microbiology, Medicine and Pediatrics. The course emphasizes how knowledge derived from basic or clinical investigations leads to improvements in clinical care. During the third year, students may elect to participate in a two- or four-week neurosurgery clerkship that introduces them to the clinical care of patients with diseases of the nervous system. Neurosurgical faculty members work with the neurologists to provide lectures, demonstrations and teaching exercises involving patients with neurological diagnoses as part of the clinical medicine course. Students may elect to fulfill their neurology requirement by rotating on the neurosurgery service. Students may also choose neurosurgery as part of the surgical specialty rotations. Neurosurgical diagnosis, critical care, operative treatment and ethical issues

in patient management are emphasized. During the fourth year, students may choose from several advanced electives, including clinical externships in neurosurgery and experiences in basic or clinical/translational research.

## Neurosurgical Specialties

As members of one of the most comprehensive neurosurgical programs in both the region and the nation, Washington University neurosurgeons offer exceptional care in a variety of specialties.

### Tumors

The Department of Neurosurgery at Washington University School of Medicine offers a comprehensive, multidisciplinary approach for the treatment of all types of neurological tumors, including brain tumors, inoperable tumors, pituitary tumors, skull-base tumors and spine tumors. Depending on the type of tumor, our multidisciplinary team comprises ophthalmologists, otolaryngologists, radiation oncologists, neuroradiologists, neuroanesthesiologists, medical oncologists and other specialists.

### Aneurysms and Cerebrovascular Disorders and Diseases

The multidisciplinary medical team focuses on the treatment of aneurysms, arteriovenous fistulas, arteriovenous malformations, carotid stenosis, cavernous malformations, moyamoya and stroke. It includes cerebrovascular surgeons, who perform microsurgical procedures, and interventional radiologists, who offer minimally invasive endovascular treatment options. We also have a team of critical care neurologists, who coordinate postprocedure care in a dedicated neurointensive care unit, as well as neurologists, who coordinate neurorehabilitation care at The Rehabilitation Institute of St. Louis.

### Spine Injuries and Disorders

Washington University spinal neurosurgeons are recognized as national leaders in the treatment of disorders of the spine, spinal cord and peripheral nervous system. We use a multidisciplinary approach to treating spinal diseases and disorders. The personalized care of each patient is emphasized. Where appropriate, spine patients receive comprehensive, collaborative care from both neurosurgeons and specialists in thoracic surgery; vascular surgery; ear, nose and throat surgery; medical oncology; radiation oncology; anesthesia; pain management; and psychiatry.



## Peripheral Nerves

Washington University neurosurgeons work with a multidisciplinary group of surgeons, neurologists and therapists to customize patient treatments to maximize functional outcomes. Washington University neurosurgeons have extensive expertise in advanced microsurgical reconstructive techniques and are on the forefront of new and innovative ways to improve patient outcomes.

## Pediatric Neurosurgery

The entire spectrum of neurosurgical disorders in children is treated by pediatric neurosurgeons and physicians in related disciplines. Our pediatric neurosurgeons are also part of multidisciplinary teams that provide care in several specialized pediatric centers, including the brachial plexus center, the center for cerebral palsy spasticity, the neurofibromatosis clinic, the pediatric epilepsy center, the pediatric gamma knife program, the pediatric neuro-oncology program, and the spina bifida clinic.

## Epilepsy

Our neurosurgeons are nationally recognized for their care of patients with epilepsy as well as research in this field. They are part of a multidisciplinary team that works together to develop the optimal plan to help patients control or minimize their seizures. The Department of Neurosurgery offers care for both adults and children with medically intractable seizures; it provides a full range of surgical options for intractable epilepsy, including implantable seizure-control devices, resection of seizure foci, and vagal nerve stimulation.

## Movement Disorders

The multidisciplinary team specializes in the treatment of movement disorders such as ataxia, catatonia, dystonia, essential tremor, Huntington's disease, myoclonus, Parkinson's disease, and Tourette's syndrome. For some patients with Parkinson's disease or essential tremor, medications are often inadequate to control disabling symptoms. These patients may benefit from stereotactic neurosurgical procedures to improve their function.

Website: <http://www.neurosurgery.wustl.edu>

## Faculty

**Ralph G. Dacey, MD** (<http://www.neurosurgery.wustl.edu/patient-care/find-a-physician/clinical-faculty/ralph-g-dacey-jr-md-229/>)

Department Head

Visit our website for more information about our faculty (<http://www.neurosurgery.wustl.edu/patient-care/find-a-physician/clinical-faculty-243/>) and their appointments.

## A

**Nitin Agarwal, M.D.**

Assistant Professor of Neurosurgery (Pending Executive Faculty Approval) (primary appointment)  
New Jersey Medical School, 2014

## B

**Peter Brunner, M.S., Ph.D.**

Associate Professor of Neurological Surgery (primary appointment)  
Associate Professor of Neurology  
Bachelor of Science, University of Graz, 2004  
Master of Science, University of Graz, 2005  
Doctor of Philosophy, University of Graz, 2013

## C

**Michael R Chicoine, M.D.**

Professor Emeritus of Neurological Surgery  
Champaign, 1985  
Doctor of Medicine, University of California, 1990

## D

**Ralph G Dacey, M.D.**

Professor of Neurological Surgery (primary appointment)  
Bachelor of Arts, Harvard University, 1970  
Doctor of Medicine, University of Virginia, 1974

**Deepti Diwan, M.S., Ph.D.**

Instructor in Neurosurgery (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Chaudhary Charan Singh Unvers, 2008  
Master of Science, Mody University, 2010  
Doctor of Philosophy, Saitama University, 2015

**Ian G Dorward, M.D.**

Associate Professor of Neurological Surgery (primary appointment)  
Associate Professor of Orthopedic Surgery  
Bachelor of Science, University of Colorado Boulder, 2000  
Doctor of Medicine, Washington University in St Louis, 2005

**Joshua L Dowling, M.D.**

Professor of Neurological Surgery (primary appointment)  
Bachelor of Arts, Yale University, 1985  
Doctor of Medicine, Tulane University, 1989

## H

**Daniel Michael Hafez**

Assistant Professor of Neurosurgery (Pending Executive Faculty Approval) (primary appointment)

**Gabriel E. Haller, Ph.D.**

Assistant Professor of Neurological Surgery (primary appointment)  
Assistant Professor of Neurology  
Assistant Professor of Genetics

Bachelor of Science, University of Chicago, 2008  
Doctor of Philosophy, Washington University in St Louis, 2013

## J

### **Deeptee Jain, M.D.**

Assistant Professor of Neurological Surgery  
Doctor of Medicine, Duke University, 2013

### **Muhammad Burhan Ud Din Janjua, M.D.**

Assistant Professor of Neurosurgery (Pending Executive Faculty  
Approval) (primary appointment)  
null, King Edward Medical University, 2002

## K

### **Michael Patrick Kelly, M.D.**

Associate Professor of Neurological Surgery  
Bachelor of Science, Boston College, 1999  
Doctor of Medicine, University of Massachusetts, 2005

### **Albert H Kim, M.A., Ph.D., M.D.**

Professor of Neurological Surgery (primary appointment)  
Professor of Neurology  
Professor of Developmental Biology  
Herbert Lourie Professor of Neurological Surgery  
Bachelor of Arts, Harvard University, 1994  
Master of Arts, Washington University in St Louis, 1999  
Doctor of Philosophy, New York University School of Medicine,  
2002  
Doctor of Medicine, New York University School of Medicine,  
2003

## L

### **Eric Claude Leuthardt, M.D.**

Professor of Neurological Surgery (primary appointment)  
Professor of Mechanical Engineering and Applied Science.  
Professor of Neuroscience  
Shi Hui Huang Professor of Neurological Surgery  
Bachelor of Science, Saint Louis University, 1995  
Doctor of Medicine, University of Pennsylvania, 1999

### **David D Limbrick, Ph.D., M.D.**

Professor of Neurological Surgery (primary appointment)  
Professor of Pediatrics  
Director - Division of Pediatric Neurosurgery  
T. S. Park, M.D., Chair in Pediatric Neurological Surgery  
Bachelor of Science, College of William and Mary, 1995  
Doctor of Philosophy, Virginia Commonwealth University, 2001  
Doctor of Medicine, Virginia Commonwealth University, 2001

## M

### **Matthew R. MacEwan, Ph.D.**

Assistant Professor of Neurological Surgery (primary  
appointment)  
Bachelor of Science, Case Western Reserve University, 2004  
Doctor of Philosophy, Washington University in St Louis, 2015

### **James Patterson McAllister, Ph.D.**

Professor of Neurological Surgery (primary appointment)  
Bachelor of Arts, Earlham College, 1970  
Doctor of Philosophy, Purdue University, 1976

### **Sean David McEvoy, M.H.S., M.D.**

Assistant Professor of Neurological Surgery (primary  
appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, University of Iowa, 2005  
Master of Health Science, Yale University, 2010  
Doctor of Medicine, Yale University, 2010

### **Jogender Mehla, M.S., Ph.D.**

Instructor in Neurosurgery (primary appointment)  
India Inst of Medical Sci, 2007  
India Inst of Medical Sci, 2013

### **Camilo Alejandro Molina, M.D.**

Assistant Professor of Neurological Surgery (primary  
appointment)  
Assistant Professor of Orthopedic Surgery  
Bachelor of Arts, Miami University, 2008  
Doctor of Medicine, Johns Hopkins University, 2013

## O

### **John Ogunlade, D.O.**

Assistant Professor of Neurosurgery (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Osteopathic Medicine, Nova Southeastern University,  
2014

### **Joshua William Osburn, M.D.**

Associate Professor of Neurological Surgery (primary  
appointment)  
Associate Professor of Neurology  
Associate Professor of Radiology  
Bachelor of Arts, Texas A&M University, 2002  
Doctor of Medicine, University of Texas Southwest, 2007

## P

### **Tae Sung Park, M.D.**

Professor of Neurological Surgery (primary appointment)  
Professor of Neuroscience  
Professor of Pediatrics  
Margery Campbell Fort Professor of Neurological Surgery  
Bachelor of Science, Yonsei University, 1967  
Doctor of Medicine, Yonsei University, 1971

### **Brenton Henry Pennicooke, M.S., M.D.**

Assistant Professor of Neurological Surgery (primary  
appointment)  
Assistant Professor of Orthopedic Surgery  
Bachelor of Science, Johns Hopkins University, 2008  
Master of Science, Johns Hopkins University, 2008  
Doctor of Medicine, Harvard University, 2012

## R

### **Wilson Z Ray, M.D.**

Professor of Neurological Surgery (primary appointment)  
Professor of Biomedical Engineering  
Professor of Orthopedic Surgery  
Henry G and Edith R Schwartz Professor of Neurological  
Surgery  
Doctor of Medicine, University of Iowa, 2004

### **Keith M Rich, M.D.**

Professor of Neurosurgery (Pending Executive Faculty Approval)  
Bachelor of Arts, Taylor University, 1974  
Doctor of Medicine, Indiana University Bloomington, 1977

### **Jarod Roland, M.D.**

Assistant Professor of Neurosurgery (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Medicine, Texas Tech University Health Sciences  
Center, 2009

## S

### **Paul Santiago, M.D.**

Professor of Neurological Surgery (primary appointment)  
Professor of Orthopedic Surgery  
Bachelor of Science, Stanford University, 1990  
Doctor of Medicine, Yale University, 1995

### **Alexander Stegh, M.A., Ph.D.**

Professor of Neurological Surgery (Pending Executive Faculty  
Approval) (primary appointment)  
Master of Arts, Medizinische Hochschule Hannover, 1998  
Doctor of Philosophy, Medizinische Hochschule Hannover, 2000

### **Jennifer Mae Strahle, M.D.**

Associate Professor of Neurological Surgery (primary  
appointment)  
Associate Professor of Pediatrics  
Associate Professor of Orthopedic Surgery  
Bachelor of Science, Bates College, 2002  
Doctor of Medicine, University of Minnesota, 2008

## V

### **Ananth Kesav Vellimana, MBBS**

Assistant Professor of Neurosurgery (Pending Executive Faculty  
Approval) (primary appointment)  
Foreign MD equivalent, All India Institute of Medical Sciences,  
2009

## W

### **Jon T. Willie, Ph.D., M.D.**

Associate Professor of Neurological Surgery (primary  
appointment)  
Associate Professor of Neuroscience  
Associate Professor Neurology  
Associate Professor of Psychiatry  
Bachelor of Arts, University of Texas Austin, 1996

Doctor of Philosophy, University of Texas Southwest, 2005  
Doctor of Medicine, University of Texas Southwest, 2005

## Y

### **Hiroko Yano, M.S., Ph.D.**

Associate Professor of Neurological Surgery (primary  
appointment)  
Associate Professor of Genetics  
Associate Professor of Neurology  
Bachelor of Science, Science University of Tokyo, 1991  
Master of Science, University of Tokyo, 1993  
Doctor of Philosophy, University of Tokyo, 1996

## Z

### **Gregory Joseph Zipfel, M.D.**

Professor of Neurological Surgery (primary appointment)  
Ralph G Dacey Distinguished Professorship of Neurological  
Surgery  
Head of the Department of Neurological Surgery  
Professor of Neurology  
Bachelor of Science, University of Illinois, 1991  
Doctor of Medicine, Northwestern University Medical, 1995

## Research Electives

### Neurosurgery Research Electives

During the fourth year, opportunities exist for many varieties of  
advanced clinical or research experiences.

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#### **Michael R. Chicoine, MD**

Phone: 314-747-6143

Our focus is on outcomes analysis for adult patients with brain  
tumors. Current clinical studies focus on the outcomes of  
patients with benign and malignant brain tumors utilizing a  
prospective brain tumor database. Particular emphasis includes  
the impact of intraoperative MRI (iMRI) on outcomes for patients  
with brain tumors and other diseases. We are establishing a  
multicenter database pooling data from multiple iMRI centers in  
North America.

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#### **Ian G. Dorward, MD**

Phone: 314-747-6142

Our research interests include outcomes analysis in spinal  
reconstruction surgery, including the impact of age, obesity,  
and other clinical variables on costs, complications, and patient  
satisfaction. Another area of interest is the evaluation of novel  
techniques in spinal deformity correction and minimally invasive  
spinal surgery. Additional work focuses on etiologic factors of  
spinal deformity in both adolescents and adults.

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#### **Gavin P. Dunn, MD, PhD**

Phone: 314-747-6141

Our studies focus on the examination of molecular mechanisms in the endothelial cells and smooth muscle cells in the intracerebral microcirculation and the contribution of glial cells to their impairment after hypoxia/reoxygenation. In vitro techniques for studying isolated perfused microvessels are used to examine questions centered on endothelial smooth muscle and glial cell integration of cerebral blood flow responses.

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**Ammar H. Hawasli, MD, PhD**

Phone: 314-747-6144

Our functional spinal neurosurgery research laboratory aims to understand the physiological and pathophysiological relationships between the spine and the brain. We study brain physiology and connectivity in spinal disorder patients, leveraging expertise in both spinal neurosurgery and brain physiology and a network of high-level collaborators at Washington University School of Medicine.

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**Albert H. Kim, MD, PhD**

Phone: 314-747-6141

I have laboratory and clinical research interests in the cancer stem cell state and the genetics of glioblastoma using human tumor specimens. I additionally have clinical projects examining patient outcomes for two common types of brain tumors: meningiomas and pituitary tumors.

---

**Eric C. Leuthardt, MD**

Phone: 314-747-6146

Our lab is pursuing research in the areas of neuroprosthetics, brain-computer interfaces (BCIs), and advanced imaging modalities. These include opportunities in basic neurophysiology, engineering for BCIs, and functional MRI imaging research for applications toward brain tumors.

---

**David D. Limbrick, MD, PhD**

Phone: 314-454-4630

Our lab investigates clinical and translational research into newborn brain injuries, including posthemorrhagic hydrocephalus. Our main research areas include cerebrospinal fluid protein markers of disease, MRI diffusion tensor imaging, and prospective clinical trials. In addition, multi-institutional clinical research opportunities exist for syringomyelia associated with Chiari I malformation.

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**T.S. Park, MD**

Phone: 314-454-2810

Our ongoing projects include outcome studies of selective dorsal rhizotomies for the treatment of spastic cerebral palsy in children and brachial plexus repair after birth injury. We are also involved in a multicenter outcome study of syringomyelia associated with Chiari I malformation in children.

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**Wilson Z. Ray, MD**

Phone: 314-362-3114

Clinical and translational research on peripheral nerve and spinal cord injuries; lab-based opportunities for longer research electives investigating peripheral nerve regeneration and peripheral neuroprosthetics incorporating transient electronics.

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**Keith M. Rich, MD**

Phone: 314-747-6142

Research on neuronal and glioma cellular apoptosis after treatment with DNA-damaging agents; techniques include growing human brain tumor cells in culture, bioassay for apoptosis with fluorescent staining, protein immunoblotting, and PCR.

---

**Matthew Smyth, MD**

Phone: 314-454-4454

Clinical outcomes studies for pediatric epilepsy surgery and craniostylosis surgery, basic and translational research in advanced clinical imaging, and translational research in the development of focal brain cooling devices for the treatment of epilepsy.

---

**Gregory J. Zipfel, MD**

Phone: 314-747-6141

My NIH-funded research program involves both basic and clinical research efforts focused on two main conditions: (1) cerebral amyloid angiopathy and its contribution to ischemic stroke, vascular dementia, and Alzheimer's disease; and (2) vasospasm-induced delayed cerebral ischemia and long-term cognitive deficits after aneurysmal subarachnoid hemorrhage. My work includes the following: basic experimental methods, including cell culture and ex vivo vascular techniques; in vivo studies utilizing animal models of ischemic stroke and subarachnoid hemorrhage and live animal epifluorescent and confocal imaging; and phase I clinical trials in patients.

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## Courses

Visit online course listings to view offerings for M40 NeurSurg (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M40>).

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## Clerkship Opportunities

Students may elect to obtain their neurology clerkship experience on the neurosurgery service, or they can choose neurosurgery as part of the surgical specialty rotations. Third-year students participate with the residents and attendings on hospital rounds, evaluate patients in the neurosurgery outpatient department and participate in the neurosurgical operating room. The main objectives of the rotation include: 1) the evaluation of comatose or head-injured patients; 2) clinical presentation, diagnostic work-up and treatment of cervical and lumbar disc disease; and 3) evaluation and treatment of patients with hemorrhagic and ischemic stroke.

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### M40 NeurSurg 805 Neurosurgery Subinternship

The goal of this elective is to provide an overview of neurological surgery, with most students planning to apply for neurosurgery residency in the next year. The fourth-year medical student will participate in patient work-ups, pre-, intra- and postoperative care, and diagnostic procedures. Students will also scrub in cases with senior level and chief residents assisting with neurosurgical procedures and observing the more critical portions of these procedures. It is expected that they will learn how to perform basic neurosurgical procedures such as lumbar punctures, ICP monitor placement, and ventricular drain placement. Fourth-year medical students are encouraged to participate in Grand Rounds, Neurosurgery Resident Curriculum conference, and Journal Club with the neurosurgery residents. At least one day/week is spent in an outpatient neurosurgery office setting. Students will be expected to take overnight call. A week spent on the pediatric service at St. Louis Children's Hospital is a component of this fourth-year elective.

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### M40 NeurSurg 900 Research Elective - Neurosurgery

Research opportunities may be available. If interested, please contact the Department of Neurosurgery.

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## Department of Obstetrics and Gynecology

The Department of Obstetrics and Gynecology (<http://www.obgyn.wustl.edu/>) has clinical teaching services located at Barnes-Jewish Hospital and Missouri Baptist Medical Center under the following director:

### Dineo Khabele, MD, FACOG, FACS

Mitchell and Elaine Yanow Professor  
and Head, Department of Obstetrics and Gynecology

In addition, for the purposes of teaching, clinical care and research, the Department of Obstetrics and Gynecology is divided into subspecialty divisions under the following directors:

### Gynecologic Oncology

Matthew A. Powell, MD

### Maternal-Fetal Medicine

Anthony O. Odibo, MD, MSCE

### Fetal Care Center

#### Imaging

Jeffrey M. Dicke, MD

#### Reproductive Endocrinology and Infertility

Kenan R. Omurtag, MD

#### General Obstetrics and Gynecology / Pediatric and Adolescent Gynecology

Eric A. Strand, MD

#### Female Pelvic Medicine and Reconstructive Surgery

(formerly Uro-Gynecology)

Jerry L. Lowder, MD, MSc

#### Family Planning

Tessa Madden, MD, MPH

#### Minimally Invasive Gynecologic Surgery

Scott W. Biest, MD

#### Research, Vice-Chair

Sarah K. England, PhD

#### Clinical Research Director

Ebony B. Carter, MD, MPH

#### Reproductive Health Sciences Center, Director

Sarah K. England, PhD

#### Residency Program Director

Shelby M. Dickison, MD

#### Residency Program Associate Director

Eric A. Strand, MD

#### Vice-Chair for Education

Tammy S. Sonn, MD

#### WUSM III Clerkship Director

Gillian M. Schivone, MD, MS

Website: <http://www.obgyn.wustl.edu>

## Faculty

### Dineo Khabele, MD, FACOG, FACS

Department Head

### Tammy Sonn, MD (<https://obgyn.wustl.edu/about/directory/tammy-i-sonn-md-facog/>)

OB-GYN Student Clerkship Director

Visit our website for the most updated information about our faculty ([http://www.obgyn.wustl.edu/content/199/faculty\\_listing.aspx](http://www.obgyn.wustl.edu/content/199/faculty_listing.aspx)) and their appointments.

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## A

### Ali Ahmady, M.S., Ph.D.

Associate Professor of Obstetrics and Gynecology (primary appointment)

null, Tehran University, 1988

null, National University of Singapore, 1995  
null, National University of Singapore, 1998

**Vinita M Alexander**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**John K Appelbaum, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, Saint Louis University, 1980  
Doctor of Medicine, Washington University in St Louis, 1984

**Tomas Ismael Aquino**

Assistant Professor of Clinical Obstetrics and Gynecology

**Jillian Mary Ashley-Martin, M.S., M.S.N., Ph.D.**

Adjunct Asst Professor of Ob & Gyn  
Bachelor of Science, Cornell University, 1996  
Master of Science in Nursing, Massachusetts General Hospital  
Institute of Health Professions, 2001  
Master of Science, Dalhousie University, 2006  
Doctor of Philosophy, Dalhousie University, 2015

**Lamia Atasi**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**B**

**Laura Alane Baalman, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Missouri Kansas City, 1991  
Doctor of Medicine, University of Missouri Kansas City, 1992

**Elise Cosette Bardawil, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Arts, University of Pennsylvania, 2007  
Doctor of Medicine, Drexel University, 2013

**James Allen Bartelsmeyer**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Margaret Elizabeth Baum, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Saint Louis University, 1997  
Doctor of Medicine, John Hopkins University (Duplicate of Johns  
Hopkins University), 2001

**Adriana Beatty**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Robert L Becker, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, Cornell University, 1965  
Doctor of Medicine, Washington University in St Louis, 1969

**James E Belcher, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of Texas Austin, 1972  
Doctor of Medicine, Washington University in St Louis, 1976

**Joe E Belew, M.D.**

Associate Professor of Clinical Obstetrics and Gynecology

Bachelor of Arts, Central Methodist College (Duplicate of Central  
Methodist University), 1953  
Doctor of Medicine, Saint Louis University, 1957

**Scott W Biest, M.D.**

Professor of Obstetrics & Gynecology (primary appointment)  
Division Chief - Division of Minimally Invasive Surgery  
Bachelor of Science, University of Missouri Kansas City, 1985  
Doctor of Medicine, University of Missouri Kansas City, 1989

**Katherine H Bligard, M.A., M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Arts, Louisiana State University, 2010  
Master of Science, Washington University in St Louis, 2015  
Doctor of Medicine, Washington University in St Louis, 2015

**Jeffrey D Bloss**

Adjunct Associate Professor of Obstetrics and Gynecology

**Richard Gerald Bolanos**

Instructor in Clinical Obstetrics and Gynecology

**Lawrence V Boveri, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Doctor of Medicine, University of Missouri Columbia, 1988

**Craig William Boyd**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Robert J Brown, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Science, Saint Peters College, 1977  
Doctor of Medicine, Washington University in St Louis, 1983

**Bruce L Bryan, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Doctor of Medicine, School Not Listed, 1900

**Robert Burstein, M.D.**

Professor Emeritus of Clinical Obstetrics and Gynecology  
Doctor of Medicine, Washington University in St Louis, 1948

**C**

**Ebony Boyce Carter, M.P.H., M.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Associate Professor of Surgery (Public Health Sciences)  
Interim Division Chief - Division of Ob/Gyn Clinical Research  
Associate Professor of Social Work  
Bachelor of Science, Stanford University, 2000  
Master of Public Health, University of Michigan, 2002  
Doctor of Medicine, Duke University, 2006

**Emma Elizabeth Cermak, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Pennsylvania, 2005  
Doctor of Medicine, Case Western Reserve University, 2010

**Michael B Chen**

Assistant Professor of Clinical Obstetrics and Gynecology

**Octavio Robert Chirino**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Ronald J Chod, M.D.**

Adjunct Associate Professor of Obstetrics and Gynecology  
Bachelor of Arts, University of Texas Austin, 1978  
Doctor of Medicine, Southwestern University, 1983

**Vicente M Colon-Alcaraz, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Puerto Rico (Duplicate of  
University of Puerto Rico), 1978  
Doctor of Medicine, School Not Listed, 1982

**D**

**Tara Nicole Banaszek Daming**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Molina Dayal**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Katherine Mary de Souza, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
College Park, 2006  
Doctor of Medicine, Virginia Commonwealth University, 2013

**Jessica Despotovic**

Instructor in Clinical Obstetrics and Gynecology

**Michelle R Devera, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Washington University in St Louis, 1985  
Doctor of Medicine, Washington University in St Louis, 1993

**Jeffrey M Dicke, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Vice Chair - Imaging  
Bachelor of Arts, University of Toledo, 1975  
Doctor of Medicine, Ohio State University, 1978

**Shelby Marie Dickison, M.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, University of Missouri in St Louis, 2004  
Doctor of Medicine, University of Missouri Columbia, 2011

**Justin T Diedrich, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Case Western Reserve University, 2004  
Doctor of Medicine, Case Western Reserve University, 2008

**Russell B Dieterich, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Knox College, 1965  
Champaign), 1970

**Kinsey Dinnel**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Michael Mckinley Dombrowski, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Assistant Professor of Anesthesiology  
Bachelor of Science, University of Michigan, 2006  
Doctor of Medicine, Wayne State University, 2011

**E**

**David Louis Eisenberg, M.P.H., M.D.**

Professor of Obstetrics & Gynecology (primary appointment)  
Bachelor of Science, University of Pittsburgh, 1999  
Doctor of Medicine, University of Alabama at Birmingham School  
of Medicine, 2003  
Master of Public Health, Northwestern University, 2009

**Josiah O. Ekunno, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, School Not Listed, 1965  
Doctor of Medicine, School Not Listed, 1974

**Mechelle Elosiebo**

Instructor in Clinical Obstetrics and Gynecology

**Sarah K England, Ph.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Professor of Cell Biology and Physiology  
Alan A and Edith L Wolff Professor of Medicine  
Vice Chair - Basic Research  
Bachelor of Arts, Carleton College, 1988  
Doctor of Philosophy, Medical College of Wisconsin, 1993

**Renee D Ewing, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Missouri in St Louis, 1979  
Doctor of Medicine, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 1984

**F**

**Cathleen Rae Faris, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Kansas, 1977  
Doctor of Medicine, University of Kansas, 1982

**Asal Fathian**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Laurel D Fendrich**

Instructor in Clinical Obstetrics and Gynecology

**Andrew R Fisher, M.S., M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of Pennsylvania, 2007  
Master of Science, University of Pennsylvania, 2014  
Doctor of Medicine, University of Pennsylvania, 2014

**Ernst R Friedrich, M.S., M.D.**

Professor Emeritus of Obstetrics and Gynecology

Master of Science, School Not Listed, 1951  
Doctor of Medicine, Heidelberg University, 1954

**Antonina I Frolova, Ph.D., M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, University of Illinois at Urbana–Champaign, 2005  
Doctor of Philosophy, Washington University in St Louis, 2013  
Doctor of Medicine, Washington University in St Louis, 2013

**G**

**Andrew E Galakatos, M.D.**

Professor of Clinical Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, Saint Louis College of Pharmacy, 1960  
Doctor of Medicine, University of Missouri Columbia, 1965

**Chiara G.I. Ghetti, M.D.**

Associate Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Arts, Cornell University, 1992  
Doctor of Medicine, Indiana University Indianapolis, 1997

**Diana Lee Gray, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Professor of Radiology  
Champaign, 1977  
Doctor of Medicine, University of Illinois, 1981

**Margaret Rosanna Gray-Swain, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Doctor of Medicine, Washington University in St Louis, 2002

**Molly M Greenwade**

Voluntary Research Assistant Professor of Obstetrics & Gynecology

**H**

**Andrea Ruth Hagemann, M.D.**

Associate Professor of Obstetrics and Gynecology (primary appointment)  
Baccalaureatus, Princeton University, 2000  
Doctor of Medicine, Washington University in St Louis, 2004

**Kallie Louise Harrison**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Richard Alan Hartman, M.D.**

Associate Professor of Clinical Obstetrics and Gynecology  
Bachelor of Science, Massachusetts Institute of Technology, 1974  
Doctor of Medicine, University of Missouri Columbia, 1978

**Kenneth Edmond Hemba, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Doctor of Medicine, Jefferson Medical College, 2011

**Godofredo M Herzog, M.D.**

Associate Professor Emeritus of Clinical Obstetrics and Gynecology  
Bachelor of Science, Louisiana State University, 1953  
Doctor of Medicine, Washington University in St Louis, 1957

**Holly R Hoefgen, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, Southern Illinois University Edwardsville, 2002  
Doctor of Medicine, Southern Illinois University, 2008

**Kathleen M Hogan, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Westminster College, 1985  
Doctor of Medicine, University of Missouri Columbia, 1989

**J**

**Sherri Jackson, M.P.H., M.D.**

Associate Professor of Obstetrics and Gynecology (primary appointment)  
null, University of Missouri Kansas City, 2004  
null, University of California Los Angeles, 2010

**Saji Jacob, M.S., M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Master of Science, Kerala University, 1989  
Doctor of Medicine, School Not Listed, 1993

**Kathleen E Jaeger, Ph.D., M.D.**

Instructor in Clinical Obstetrics and Gynecology (Oxford), 2007  
Doctor of Philosophy, Loyola University Chicago, 2014  
Doctor of Medicine, Loyola University Chicago, 2014

**Patricia T. Jimenez, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Arts, Rice University, 2001  
Doctor of Medicine, University of Texas Southwestern Medical Center at Dallas, 2005

**Michael K Johnson, M.D.**

Instructor in Clinical Obstetrics and Gynecology (Main Campus), 1970  
Doctor of Medicine, Saint Louis University, 1975

**Sandy Lynn Jost**

Adjunct Instructor in Obstetrics and Gynecology

**Mark J Jostes, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Science, Rockhurst College (Duplicate of Rockhurst University), 1976  
Doctor of Medicine, University of Missouri Columbia, 1981

**Jamie Christine Joyce**

Voluntary Clinical Instructor in Obstetrics and Gynecology



## K

### **Mary Bridget Keegan, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Northwestern University, 2004  
Doctor of Medicine, University of Missouri Columbia, 2010

### **Sarah Lynn Keller, M.D.**

Associate Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Arts, University of Notre Dame, 1985  
Doctor of Medicine, Southern Illinois University, 1989

### **Jeannie Chen Kelly, M.S., M.D.**

Associate Professor of Obstetrics and Gynecology (primary appointment)  
Baccalaureatus, Duke University, 2005  
Doctor of Medicine, Columbia University, 2009  
Master of Science, Tufts University, 2017  
Bachelor of Science, Duke University, 2020

### **Dineo Khabele, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Head of the Department of Obstetrics and Gynecology  
Professor of Biochemistry and Molecular Biophysics  
Mitchell and Elaine Yanow Professor of Obstetrics and Gynecology  
Bachelor of Science, Columbia University, 1989  
Doctor of Medicine, Columbia University, 1994

### **Erin L King, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Stanford University, 1997  
Doctor of Medicine, Washington University in St Louis, 2003

### **Phillip Lee Kintner, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Doctor of Medicine, Southern Illinois University (Duplicate of Southern Illinois University Carbondale), 1986

### **Asko I Kivikoski, D.Sc., M.D.**

Associate Professor Emeritus of Obstetrics and Gynecology  
Bachelor of Arts, School Not Listed, 1954  
Doctor of Medicine, School Not Listed, 1958  
Doctor of Science, School Not Listed, 1967

### **Laurie Klabi, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Missouri Columbia, 1987  
Doctor of Medicine, University of Missouri Columbia, 1991

### **Jacob Klein, M.D.**

Professor of Clinical Obstetrics and Gynecology  
Bachelor of Science, Muhlenberg College, 1964  
Doctor of Medicine, School Not Listed, 1968

### **Violet Klenov**

Voluntary Clinical Instructor in Obstetrics and Gynecology

### **Rachel Yoon Kmetz**

Voluntary Clinical Instructor in Obstetrics and Gynecology

### **Holly H Kodner, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of Missouri Kansas City, 2001  
Doctor of Medicine, University of Missouri Kansas City, 2001

### **Yosuke Komatsu**

Instructor in Clinical Obstetrics and Gynecology

### **Claudia Krasnoff, M.A., M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Goucher College, 1986  
Master of Arts, Johns Hopkins University, 1990  
College Park), 1994

### **Kelli Ann Kreher**

Voluntary Clinical Instructor in Obstetrics and Gynecology

### **Lindsay M Kuroki, M.D.**

Associate Professor of Obstetrics and Gynecology (primary appointment)  
Associate Division Director Gyn Oncology  
Bachelor of Science, Brown University, 2004  
Doctor of Medicine, Brown University, 2009

## L

### **Christine Marie Ladd, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Saint Louis University, 1986  
Doctor of Medicine, University of Missouri Columbia, 1990

### **Bobbi Omori Lakin, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Oklahoma, 2010  
Doctor of Medicine, University of Oklahoma Health Sciences (Duplicate of University of Oklahoma Health Sciences Center), 2015

### **Megan Leigh Lawlor, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, University of Michigan Ann Arbor, 2010  
Doctor of Medicine, University of Toledo, 2014

### **Patricia Lazaroff, M.S.N.**

Adjunct Instructor in Obstetrics and Gynecology  
Master of Science in Nursing, Saint Louis University, 1974

### **Dan Israel Lebovic, M.A., M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Baccalaureatus, University of California Berkeley, 1987  
Master of Arts, University of California Berkeley, 1988  
Doctor of Medicine, George Washington University, 1992

### **David Jay Levine**

Voluntary Clinical Instructor in Obstetrics and Gynecology

### **Edward S Levy, M.D.**

Instructor in Clinical Obstetrics and Gynecology

Bachelor of Arts, Duke University, 1987  
Doctor of Medicine, Washington University in St Louis, 1991

**Heather Nicole Lopez**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Jerry L Lowder, M.S., M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Director, Division of Female Pelvic Medicine and Reconstructive  
Surgery  
Professor of Surgery (Public Health Sciences)  
Bachelor of Science, University of North Carolina, 1995  
Doctor of Medicine, East Carolina University, 1999  
Master of Science, University of Pittsburgh, 2006

**Kerith Lucia Lucco**

Instructor in Clinical Obstetrics and Gynecology

**Marc Andrew Luckett, M.B.A., M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of Alabama (Duplicate of  
University of Alabama in Tuscaloosa), 1986  
Doctor of Medicine, Saint Louis University, 1995  
Master of Business Administration, University of Saint Mary,  
2014

**M**

**Tessa E Madden, M.P.H., M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Division Chief - Division of Family Planning  
Bachelor of Science, Smith College, 1995  
Doctor of Medicine, Washington University in St Louis, 2001  
Master of Public Health, Johns Hopkins University Medical, 2006

**Madhavi Manyam**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Carolyn Marie Martin, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, Lindenwood University, 1970  
Doctor of Medicine, Washington University in St Louis, 1976

**John Barlow Martin, M.D.**

Associate Professor Emeritus of Clinical Obstetrics and  
Gynecology  
Bachelor of Arts, Amherst College, 1951  
Doctor of Medicine, Washington University in St Louis, 1955

**Katherine Mae Massa, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, Northwestern University, 2008  
Doctor of Medicine, Temple University, 2013

**Leslie Stewart Massad, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, Williams College, 1980  
Doctor of Medicine, Duke University, 1984

**Andrew Dean Mayo**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Rebecca P McAlister, M.D.**

Professor Emeritus of Obstetrics and Gynecology  
Bachelor of Science, University of Kentucky, 1977  
Doctor of Medicine, University of Kentucky, 1979

**Jennifer Ann McCabe, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, Saint Louis University, 2001  
Doctor of Medicine, Saint Louis University, 2005

**Carolyn Kay McCourt, M.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, Creighton University, 1997  
Doctor of Medicine, Creighton University, 2001

**Daniel S McDonald, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, Yale University, 1984  
Doctor of Medicine, University of Missouri Columbia, 1989

**Colleen Patricia McNicholas, D.O.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, Benedictine University, 2003  
Doctor of Osteopathic Medicine, Kirksville College of  
Osteopathic Medicine (Duplicate of A T Still University of Health  
Sciences), 2007

**Denise Andrea Meckler, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Duke University, 1988  
Main Campus), 1992

**Theodore Merrims, M.D.**

Instructor Emeritus in Clinical Obstetrics and Gynecology  
Bachelor of Science, Washington University in St Louis, 1949  
Doctor of Medicine, Washington University in St Louis, 1954

**Diane F Merritt, M.D.**

Professor Emeritus of Obstetrics and Gynecology  
Oxford), 1971  
Doctor of Medicine, New York University, 1975

**Jerry N Middleton, M.D.**

Instructor Emeritus in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Westminster College, 1959  
Doctor of Medicine, Washington University in St Louis, 1963

**Cory Scott Miller, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, University of Missouri Columbia, 2006  
Doctor of Medicine, Saint Louis University, 2010

**Jennifer Mitchell, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)

Bachelor of Science, Missouri State University (Formerly  
Southwest Missouri State), 2014  
Doctor of Medicine, Saint Louis University, 2018

**Kelle Harbert Moley, M.D.**

Adjunct Professor of Obstetrics and Gynecology  
Bachelor of Arts, Wellesley College, 1984  
Doctor of Medicine, Yale University, 1988

**Sue Deiter Moore**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Jeffrey Stuart Mormal**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, Indiana University Bloomington, 1986

**Mary Margaret Mullen, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, University of Notre Dame, 2010  
Doctor of Medicine, Saint Louis University, 2014

**Nathaniel H Murdock, M.D.**

Associate Professor of Clinical Obstetrics and Gynecology  
Bachelor of Science, Howard University, 1958  
Doctor of Medicine, Meharry Medical College, 1963

**Helen I-Yun Mussemann, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Rice University, 1992  
Doctor of Medicine, Beaufort Technical College (Duplicate of  
Technical College of the Lowcountry), 1996

**David G Mutch, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Vice Chair - Gynecologic Oncology  
Ira C and Judith Gall Professor of Obstetrics and Gynecology  
Bachelor of Arts, Carleton College, 1976  
Doctor of Medicine, Washington University in St Louis, 1980

**Indira U Mysorekar, M.S., Ph.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, University of Lund, 1994  
Master of Science, University of Lund, 1995  
Doctor of Philosophy, Washington University in St Louis, 2002

**N**

**Donald Michael Nelson, Ph.D., M.D.**

Professor Emeritus of Obstetrics and Gynecology  
Bachelor of Arts, Cornell College, 1971  
Doctor of Philosophy, Washington University in St Louis, 1977  
Doctor of Medicine, Washington University in St Louis, 1977

**Jessica A Norton, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Yale University, 2011  
Doctor of Medicine, Boston University, 2015

**O**

**Suzanne Leigh O'Nan, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
null, Western Kentucky University, 2014  
null, University of Louisville, 2018

**Micaela E O'Neil, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of Wisconsin Madison, 2006  
Doctor of Medicine, University of Wisconsin Madison, 2010

**Randall Odem, M.D.**

Professor Emeritus of Obstetrics and Gynecology  
Bachelor of Arts, University of Iowa, 1978  
Doctor of Medicine, University of Iowa, 1981

**Anthony O Odibo, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Virginia S Lang Professor of Obstetrics and Gynecology  
Vice Chair - Division of Maternal/Fetal Medicine  
Division Chief, Maternal Fetal Medicine and Ultrasound  
Doctor of Medicine, University of Benin, 1986

**Kenan Rifat Omurtag, M.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Division Chief, Reproductive Endocrinology and Infertility  
Bachelor of Arts, University of Missouri Kansas City, 2006  
Doctor of Medicine, University of Missouri Kansas City, 2006

**Margaret McCarthy Ormonde**

Instructor in Clinical Obstetrics and Gynecology  
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**P**

**Jay Lawrence Padratzik**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Meera Raman Patel, M.D.**

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Bachelor of Arts, University of Missouri Kansas City, 1995  
Doctor of Medicine, University of Missouri Kansas City, 1996

**Timothy Charles Philpott, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, Carleton College, 1987  
Doctor of Medicine, Washington University in St Louis, 1994

**Aaron Juan Pile, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Norfolk State University, 1980  
Doctor of Medicine, School Not Listed, 1983

**Jorge Pineda, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Doctor of Medicine, School Not Listed, 1972

**Matthew A Powell, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Division Chief - Division of Gynecologic Oncology  
Bachelor of Science, Washington State University, 1990  
Doctor of Medicine, Michigan State University, 1995

**Mackenzie Phyllice Purdy**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**R**

**Janet Sue Rader, M.D.**

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Doctor of Medicine, University of Missouri Columbia, 1983

**Nandini Raghuraman, M.S., M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, University of Alabama in Birmingham, 2007  
Master of Science, University of Alabama in Birmingham, 2007  
Doctor of Medicine, University of Alabama, 2011

**Jodie Rai, M.D.**

Associate Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, Harvard University, 1983  
Champaign), 1988

**Roxane M. Rampersad, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, Emory University, 1994  
Doctor of Medicine, Emory University, 1998

**Valerie Ratts, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Associate Dean for Admissions  
Bachelor of Science, University of Illinois, 1983  
Doctor of Medicine, Johns Hopkins University Medical, 1987

**Jennifer Ann Reeves, M.P.H., M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2013  
Bachelor of Arts, Washington University in St Louis, null  
Master of Public Health, Emory University, null

**Angela Mary Reining**

Instructor in Clinical Obstetrics and Gynecology

**Erin Lynn Reini, Ph.D.**

Instructor in Obstetrics and Gynecology (primary appointment)  
null, Saint Norbert College, 2009  
null, Washington University in St Louis, 2016

**Marvin Rennard, M.A., M.D.**

Professor Emeritus of Clinical Obstetrics and Gynecology  
Bachelor of Arts, Washington University in St Louis, 1947  
Bachelor of Science, University of Missouri Columbia, 1950  
Master of Arts, University of Missouri Columbia, 1950  
Doctor of Medicine, Washington University in St Louis, 1952

**Julie S Rhee**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Lee A Rigg, Ph.D., M.D.**

Associate Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, Arizona State University, 1961  
Doctor of Philosophy, University of Colorado Boulder, 1965  
Doctor of Medicine, Washington University in St Louis, 1971

**Ann Marie Rockamann, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Saint Louis University, 1987  
Doctor of Medicine, Saint Louis University, 1991

**Chinda Vanasin Rojanasathit, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Doctor of Medicine, School Not Listed, 1967

**Joshua Isaac Rosenbloom, M.D.**

Instructor in Obstetrics and Gynecology (primary appointment)  
Doctor of Medicine, Harvard University, 2012

**Whitney T Ross, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Arts, East Tennessee State University, 2010  
Bachelor of Science, East Tennessee State University, 2010  
Doctor of Medicine, East Tennessee State University, 2014

**Sharman M Russell, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Associate Residency Director of Obstetrics and Gynecology  
Doctor of Medicine, CHICAGO MEDICAL SCHOOL, 2010

**Bridget Scheve Rutledge**

Instructor in Clinical Obstetrics and Gynecology

**S**

**Jerome D Sachar, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Doctor of Medicine, University of Missouri Columbia, 1979  
Bachelor of Arts, Amherst College, 2000

**Celia Maria Santi Grau Perez, Ph.D., M.D.**

Associate Professor of Obstetrics and Gynecology (primary appointment)  
Associate Professor of Neuroscience  
Bachelor of Science, Instituto de Montevideo, 1979  
Doctor of Medicine, Instituto de Montevideo, 1992  
Doctor of Philosophy, National Autonomous U of Mex, 1998

**Gillian Brit Schivone, M.S., M.D.**

Assistant Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Arts, Boston University, 2005  
Doctor of Medicine, University of Minnesota, 2011  
Master of Science, Stanford University, 2017

**James R Schreiber, M.D.**

Professor Emeritus of Obstetrics and Gynecology

Bachelor of Arts, Rice University, 1968  
Doctor of Medicine, Johns Hopkins University, 1972

**Maureen Margaret Schulte**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Leslie A Scott**

Instructor in Clinical Obstetrics and Gynecology

**Donna Nicole Senciboy, M.H.A., D.O.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of Missouri Columbia, 2002  
Master of Health Administration, University of Missouri Columbia,  
2004  
Doctor of Osteopathic Medicine, Kirksville College of  
Osteopathic Medicine, 2008

**Anne R Seyer, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Saint Louis University, 2002  
Doctor of Medicine, Saint Louis University, 2006

**Michelle Silasi**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Clayton D. Skaggs, D.C.**

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Bachelor of Science, Missouri State University (Formerly  
Southwest Missouri State), 1984  
Doctor of Chiropractic, Logan College of Chiropractic, 1987

**Jennifer H. Smith, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of California, 1995  
Doctor of Medicine, Washington University in St Louis, 1999

**Tammy Shim Sonn, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Vice Chair - Education  
Bachelor of Science, University of Chicago, 1999  
Doctor of Medicine, Rush University, 2004

**Chotchai Srisuro, M.D.**

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Doctor of Medicine, School Not Listed, 1967

**Andrea L Stephens, M.S., M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of California San Diego, 1982  
Master of Science, University of California Los Angeles, 1983  
Doctor of Medicine, University of California Los Angeles, 1987

**John A Stoppie, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Grinnell College, 1962  
Doctor of Medicine, University of Wisconsin Madison, 1969

**Eric A Strand, M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Division Chief - Division of Gynecology  
Doctor of Medicine, Johns Hopkins University, 1995

**Abbe L Sudvarg**

Instructor in Clinical Obstetrics and Gynecology

**T**

**Melissa Dawn Tepe, M.S., M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, Yale University, 1999  
Master of Science, Columbia University, 2004  
Doctor of Medicine, Albert Einstein College of Medicine, 2005

**Premal H Thaker, M.S., M.D.**

Professor of Obstetrics and Gynecology (primary appointment)  
Bachelor of Arts, Villanova University, 1995  
Doctor of Medicine, Allegheny College, 1997  
Master of Science, University of Texas Houston, 2004

**Jean Alfred Thomas, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Doctor of Medicine, School Not Listed, 1972

**Jeffrey Bryant Thompson, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, Vanderbilt University, 1989  
Doctor of Medicine, University of Missouri Columbia, 1994

**M. Bryant Thompson, M.D.**

Associate Professor of Clinical Obstetrics and Gynecology  
Main Campus), 1957  
Doctor of Medicine, University of California, 1961

**Albro C Tobey, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Science, Butler University, 1965  
Doctor of Medicine, School Not Listed, 1972

**Randall W Tobler, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Missouri Columbia, 1980  
Doctor of Medicine, Washington University in St Louis, 1984

**Stephanie Marie Tsai**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)

**Jacqueline Sue Turner, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Massachusetts Institute of Technology, 1979  
Doctor of Medicine, Tulane University, 1983

**Kanika A Turner**

Instructor in Clinical Obstetrics and Gynecology

**V**

**Ashley Veade, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Doctor of Medicine, Louisiana Health Sciences Cent, 2014  
Bachelor of Science, Louisiana State University, Co, 2010

**Dionysios K Veronikis**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Juliana Carmi Verticchio, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, Saint Louis University, 2007  
Doctor of Medicine, Loyola University Chicago, 2011

**Zevidah Vickery, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Doctor of Medicine, Ben Gurion University of the Negev, 2005

## W

**Corey Allen Wagner**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Daniel G Wagner, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, Holy Cross College, 1985  
Doctor of Medicine, Saint Louis University, 1989

**J. Leslie Walker, M.D.**

Assistant Professor Emeritus of Clinical Obstetrics and  
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Bachelor of Arts, Vanderbilt University, 1957  
Doctor of Medicine, University of Tennessee, 1960

**Yong Wang, Ph.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Associate Professor of Radiology  
Associate Professor of Electrical & Systems Engineering  
Doctor of Philosophy, Washington University in St Louis, 2009

**Gary Michael Wasserman, M.D.**

Assistant Professor of Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Missouri Kansas City, 1978  
Doctor of Medicine, University of Missouri Columbia, 1980

**Mark S Wasserman, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Science, University of Missouri Columbia, 1900  
Bachelor of Arts, University of Missouri Columbia, 1980  
Doctor of Medicine, University of Missouri Columbia, 1984

**David L Weinstein, M.D.**

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Bachelor of Science, University of Michigan (Duplicate of  
University of Michigan Ann Arbor), 1981  
Doctor of Medicine, Saint Louis University, 1985

**Zichao Wen, Ph.D.**

Instructor in Obstetrics and Gynecology (primary appointment)  
Bachelor of Science, Beijing University of Posts and  
Telecommunications (#####), 2011  
Doctor of Philosophy, Chinese Academy of Sciences, 2017

**Thomas Robert Whalen**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Taryn Marie White**

Voluntary Clinical Instructor in Obstetrics & Gynecology

**Walter G Wiest, M.S., Ph.D.**

Professor Emeritus of Biochemistry in Obstetrics and  
Gynecology  
Bachelor of Arts, Brigham Young University, 1948  
Master of Science, University of Wisconsin Madison, 1951  
Doctor of Philosophy, University of Wisconsin Madison, 1952

**Denise Michelle Willers, M.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, Drake University, 1996  
Doctor of Medicine, Southern Illinois University, 2000

**Makeba Williams, M.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Vice Chair for Professional Development and Wellness  
null, Vanderbilt University, 1998  
null, Meharry Medical College, 2004

**Sara C Wood**

Voluntary Clinical Instructor in Obstetrics and Gynecology

**Candice Woolfolk, M.P.H., Ph.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, University of Missouri Columbia, 2008  
Master of Public Health, Saint Louis University, 2012  
Doctor of Philosophy, Saint Louis University, 2019

**Holly L Wright, M.D.**

Associate Professor of Obstetrics and Gynecology (primary  
appointment)  
Bachelor of Science, Southern Illinois University Edwardsville,  
2005  
Doctor of Medicine, Southern Illinois University, 2009

**Heather E. Wuebker, M.D.**

Instructor in Clinical Obstetrics and Gynecology  
Bachelor of Arts, University of Missouri Kansas City, 1996  
Doctor of Medicine, University of Missouri Kansas City, 1998

## Z

**Sandra G.H. Zakroff**

Instructor in Clinical Obstetrics and Gynecology

**Peinan Zhao, M.S., Ph.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)  
Doctor of Philosophy, Wuhan University, 2011  
Master of Science, University of Missouri Columbia, 2016

**Darryl Thomas Zinck**

Instructor in Clinical Obstetrics and Gynecology

**Amanda Zofkie, M.D.**

Assistant Professor of Obstetrics and Gynecology (primary  
appointment)

Main Campus, 2014

## Research Electives

### Obstetrics and Gynecology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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**Sarah England, PhD**  
**Indira Mysorekar, PhD**  
**Celia Santi, PhD**  
**Ramakrishna Kommagani, PhD**  
**Katherine Fuh, MD, PhD**

BJC Institute of Health, 10th Floor  
Phone: 314-286-1775

During this six-week elective, students will have the opportunity to immerse themselves in bench research in reproductive science.

- Dr. England's laboratory focuses on uterine contractility and ion channels in the uterine myometrium.
- The Mysorekar lab studies the dynamics of tissue regeneration in the adult mammalian urinary bladder, the pathogenesis of a common infectious disease in women (namely, recurrent urinary tract infections), and the potential infectious etiology of preterm birth in pregnant women.
- Dr. Santi's work focuses on ion channels in mouse and human sperm.
- Dr. Fuh investigates cell signaling in ovarian cancer and the biology of ovarian cancer metastasis.

The main criteria for this rotation is that the student must have prior experience as an undergraduate or postgraduate in a laboratory, not including course work. This rotation is designed for the student who is planning a career in academic medicine as a physician-scientist and who is interested in considering reproductive science as a field. Prior to signing up for this course, the student must contact Dr. England to discuss the schedule and expectations of the rotation.

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## Courses

Visit online course listings to view offerings for M45 ObGyn (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M45>).

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### M45 ObGyn 730 OB/GYN Clerkship

All third-year medical students participate in a five-week clinical clerkship in Obstetrics and Gynecology. This is divided into components of outpatient OB/GYN, inpatient obstetrics and inpatient gynecology. Comprehensive study of the reproductive health needs of women in both the office setting and the surgical setting is the focus of the curriculum. Students are actively involved in all settings of health care delivery: outpatient

faculty clinics within all specialties, resident ambulatory clinics, operating rooms for all obstetric or gynecologic cases, inpatient floors of L&D and Gynecology, and the emergency department/hospital inpatient consults. Faculty, fellows, residents, and nurse practitioners provide teaching for this rotation. Student-directed didactics include the faculty and chief resident lecture series, procedural skill station session and faculty-assigned preceptor groups that meet throughout their five-week rotation. Credit 192 units.

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### M45 ObGyn 804 OB/GYN Generalist Outpatient Care Subinternship

This experience is designed to primarily acquaint the student with the diagnosis and care of outpatients. Students will work one-on-one with attending staff, to focus on an overview of evaluation, diagnosis, and treatment of common obstetric and gynecologic concerns. The subintern will spend the majority of time attending half day clinics and private offices. Overnight OB call is required (approximately 2 evening shifts) to acquaint the student with the house staff and hospital, providing opportunity to participate in deliveries. If desired, additional time can be arranged to participate in/observe outpatient surgical procedures. A 30-45 minute presentation to attendings and house staff will culminate the rotation on a selected OB/GYN topic.

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### M45 ObGyn 810 OB/GYN Reproductive Endocrinology & Infertility Subinternship

The subintern will participate (in the office and hospital) in the study and treatment of women with reproductive endocrine disorders and infertility. The student will attend and present in conferences, attend surgery, observe assisted reproductive technology procedures, have assigned reading and be an integral part of the reproductive endocrine service. Opportunities for clinical research projects in reproductive endocrinology are also available.

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### M45 ObGyn 830 Gynecologic Oncology Subinternship

The subintern will take part in the work-up of tumor patients prior to surgery and/or radiotherapy, assist in pelvic operations, help render perioperative care, and review pathology specimens and slides. The student will participate in GYN Tumor Clinic sessions, make hospital rounds with house staff, accompany chief residents on consultations, and attend OB/GYN conferences. Opportunities for clinical or basic research projects in gynecologic malignancy are also available.

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### M45 ObGyn 833 Special Topics in Reproductive Health

Students will attend a variety of outpatient clinics to interact with patients seeking different reproductive health services. These topics include family planning and abortion services at the Hope Clinic and BJH; general gynecology services at our faculty practice GYN clinic (WHC) and OB/GYN resident clinic (COH 3); specialized reproductive health services including STI testing and contraception at the St. Louis STD clinic, the SPOT, and C3 Clinic; and OB and pregnancy centering clinics at the Center for Outpatient Health and Affinia. There may also be an opportunity to attend an adolescent and pediatric gynecology clinic, a women's cardiology clinic, and an adult transgender care clinic. Clinical experiences will be mainly ambulatory, but there is potential to work with the Family Planning faculty physicians in the operating room at Barnes Jewish Hospital. The student will prepare a 15-20 minute presentation on a reproductive health topic of their choice to present at the end of the rotation.

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**M45 ObGyn 843 Maternal-Fetal Medicine Outpatient Care Subinternship**

Students will see a variety of high-risk obstetrical patients in the outpatient setting in the Center for Outpatient Health. The student will evaluate various types of reproductive-age patients with medical or obstetrical complications, including preconception consultations, prenatal care consultations, and initial prenatal visits. The student will also see return patients to experience the continuity of prenatal care. Students will participate in antenatal testing and learn basic ultrasonography skills. The student will be responsible for one presentation to be given to the OB teams at the end of the rotation. Students are provided independent study time to put together the presentation, which should be created in PowerPoint and on a topic of their choice, inspired by a patient-related clinical condition that piqued their interest during the block. In addition, the student will have the option to take overnight call or call in the Pregnancy Assessment Center in order to gain more hands-on experience with inpatient obstetrics; this is voluntary and not a requirement.

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**M45 ObGyn 844 Maternal-Fetal Medicine Inpatient (Antepartum) Subinternship**

Areas of patient care will include the Women's Assessment Center (WAC), the Antepartum Unit, and Labor & Delivery. The primary team will be the Antepartum Team, which includes a second-year and third-year OB/GYN resident, an MFM fellow, and the MFM attending. Students are expected to become functioning members of the antepartum team, with their own patients whom they will be responsible for rounding on and completing day-to-day tasks. Our patients include those who are admitted to the Antepartum Unit, various intensive care units, and other services with complications in pregnancy. The student will prepare a brief talk on a topic of their interest during the course of the rotation.

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**M45 ObGyn 856 OB/GYN Ultrasound: Genetics**

Working with the attending physicians in the Ultrasound Units at the Center for Outpatient Health and the Center for Women's Wellness at Missouri Baptist Medical Center, the student will learn the principles and techniques of non-invasive screening for fetal disorders and observe the performance of invasive prenatal diagnostic procedures. The student will also learn the standards and guidelines for performance of the antepartum obstetrical ultrasound examination and female pelvic examination. Normal and abnormal fetal and gynecologic anatomy will be reviewed. Experience will be gained in pedigree analysis and familial risk factor assessment by working with genetic counselors. One day is spent in the Cytogenetics Laboratory observing the preparation of prenatal specimens for karyotype analysis. Opportunities for participation in clinical research are also available.

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**M45 ObGyn 870 Pediatric & Adolescent Gynecology Subinternship**

Students will be working with two attendings, a fellow, and residents in both the inpatient and outpatient settings. They will largely be following this team from the outpatient offices located at COH 7, South County, Missouri Baptist & St. Louis Children's Hospital. In addition, OR experiences are located at both Parkview Tower 3 and Children's. The range of topics likely encountered will include gynecologic care in children and young adults, including menstrual and pubertal concerns;

sexual health and contraception; vulvar vaginal irritation and labial adhesions; adolescent breast disorders; ovarian pathology and torsion; genital trauma; adolescent PCOS; pelvic pain and endometriosis; and the diagnosis and management of congenital gynecologic abnormalities and fertility preservation. Students will be involved in general pediatric and adolescent gynecology clinics as well specialty clinics (Disorders of Sexual Difference and Fertility Preservation/Gynecologic Late-Effects), and they will assist with inpatient and emergency room consultations and scheduled and emergent surgical cases as available. Subinterns will be required to give a presentation on a PAG topic of their choice by the end of the rotation, and they will have the option to participate in PAG research.

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**M45 ObGyn 875 Affinia Ambulatory OB/GYN Subinternship**

Subinterns will be working one-on-one with a small subset of Affinia OB/GYN physicians at their office locations spread throughout St. Louis city. These federally-qualified health center sites will allow for a broad array of outpatient obstetrical and gynecologic exposures. Beyond general OB/GYN practice, this rotation will lend more perspective on access to care challenges and various aspects of health inequities.

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**M45 ObGyn 880 Family Planning Ambulatory Subinternship**

Subinterns will work in small groups typically comprised of the attending, fellow, and resident within the office setting. The array of encounters will vary between ambulatory gynecology and family planning consultations. Topics specific to family planning include more complicated contraceptive counseling and treatment options in addition to providing treatment options for first- and second-trimester abortions, whether elective, due to lethal anomalies, or for maternal health concerns. Exposures to office-based procedures will include manual vacuum aspiration usage, laminaria placement, familiarity with medication usage (e.g., mifepristone), and other general gynecologic procedures (e.g., colposcopies, biopsy samplings, contraceptive placements).

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**M45 ObGyn 900 Research Elective - Obstetrics and Gynecology**

Research opportunities may be available. If interested, please contact the Department of Obstetrics and Gynecology.

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**John F. Hardesty, MD,  
Department of Ophthalmology  
and Visual Sciences**

The John F. Hardesty, MD, Department of Ophthalmology and Visual Sciences has a strong legacy and is a national leader in clinical ophthalmology and research. It is ranked among the top ten best overall programs in the United States, and it is also considered one of the top ten best research programs by *U.S. News & World Report*. Our ophthalmology department is fourth in National Institutes of Health funding for research and has one of the nation's largest ophthalmology research faculty. The department's mission is as follows: "As world leaders in patient care, teaching and research, we strive to



touch lives and preserve and restore vision through innovation and compassionate service." We hope that students will join us to enrich their medical education and to experience the collaborative culture of ophthalmology.

Although only a small percentage of physicians in the United States specialize in ophthalmology, there is no doubt that all physicians need a basic understanding of the eye and what it can reveal about a patient's condition. In a recent article published in the journal *Ophthalmology*, it was stated that "ophthalmology-related issues arise in the diagnosis and treatment of inpatients and outpatients on internal medicine, pediatrics, trauma surgery, neurology, endocrinology, neurosurgery, otolaryngology, dermatology, oncology, and rheumatology services."<sup>1</sup>

The article went on to state that "[m]ost primary care program directors believe fewer than 50% of incoming residents have sufficient ophthalmology skills when entering the internship period of medical education. Ophthalmoscopy is one of many ophthalmic skills in which there seems to be a gap in the training of medical students. [A study] demonstrated that emergency medicine physicians often do not perform an ophthalmoscopic examination when it is indicated, and when they do, they are unlikely to detect abnormal findings. This presents a serious issue, because patients with visual impairments are more likely to be hospitalized, and from 2006 through 2011, there were 12 million eye-related emergency department visits nationwide. If they are unable to view or interpret fundus findings with either an ophthalmoscope or fundus photography, the students must know when it is necessary to refer their patients to an ophthalmologist for further evaluation." In other words, even if a physician does not plan to make ophthalmology their career, deepening their knowledge of this field will enhance their skills as a physician in any field.

At Washington University School of Medicine, medical students under the Legacy Curriculum begin ophthalmology-based instruction during the first year with examination of the eye and a lecture on various aspects of ocular disease. During the second year, students receive a refresher lecture and lab on direct ophthalmoscopy as well as a lecture on ophthalmic manifestations of systemic disease and primary ocular disease. During the third year, students are given the opportunity during the surgery clerkship to spend four weeks on the ophthalmology services; in addition, there are lectures given to students during the Internal Medicine rotations. During the fourth year, a four-week intensive clinical rotation is tailored to students interested in pursuing ophthalmology as a career. Research electives are available under the guidance of numerous ophthalmology faculty members for fourth-year students. Newer medical students under the Gateway Curriculum have the option of choosing ophthalmology for a three-week-long clinical experience during their first-year Procedural Immersion. More intensive clinical rotations will be available in later phases of the new curriculum.

<sup>1</sup> Graubart EB, Waxman EL, Forster SH, Giaconi JA, Rosenberg JB, Sankar PS, Goyal A, Mirza RG. Ophthalmology objectives for medical students: revisiting what every graduating medical student should know. *Ophthalmology*, December 2018; 125(12):1842-1843.

Website: <http://ophthalmology.wustl.edu>

## Faculty

Our staff includes full-time university attending physicians for all subspecialties in ophthalmology, including ocular tumors, oculoplastics and uveitis. We have a very healthy mix of senior established faculty and junior members.

**Todd Margolis, MD, PhD** (<https://ophthalmology.wustl.edu/people/todd-margolis-md-phd/>)

Alan A. and Edith Wolff Distinguished Professor and Chairman

**Kevin Ko, MBA** (<https://ophthalmology.wustl.edu/people/kevin-ko-mba/>)

Executive Director of Business Affairs

**P. Kumar Rao, MD, MBA** (<https://physicians.wustl.edu/people/p-kumar-rao-md/>)

Professor and Vice Chair for Clinical Affairs

**Daniel Kerschensteiner, MD** (<https://kerschensteinerlab.wustl.edu/>)

Bernard Becker Professor of Ophthalmology and Visual Sciences

Vice Chair for Research

Co-Director of the Neuroscience PhD Program

**Rajendra S. Apte, MD, PhD** (<https://physicians.wustl.edu/people/rajendra-s-apte-md-phd/>)

Paul A. Cibis Distinguished Professor of Ophthalmology and Visual Sciences

Vice Chair for Innovation and Translation

**Carla Siegfried, MD** (<https://physicians.wustl.edu/people/carla-j-siegfried-md/>)

Jacquelyn E. and Allan E. Kolker, MD, Distinguished Professor of Ophthalmology and Visual Sciences

Vice Chair for Diversity, Equity and Professionalism

**R. Lawrence Tychsen, MD** (<https://wuphysicians.wustl.edu/for-patients/find-a-physician/lawrence-tychsen/>)

Pediatric Ophthalmology Director

Visit our website for more information about our faculty (<https://ophthalmology.wustl.edu/contact-us/department-contacts/>) and their appointments.

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## A

**Henry W Allhoff, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences

Bachelor of Arts, University of Missouri Columbia, 1976  
Doctor of Optometry, Illinois College of Optometry, 1981

**Shilpa S Amin, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Missouri Kansas City, 1994  
Doctor of Medicine, University of Missouri Kansas City, 1994

**Rajendra Apte, Ph.D., M.D.**

Professor of Ophthalmology and Visual Sciences (primary appointment)  
Professor of Developmental Biology  
Professor of Medicine  
Vice Chair - Translation and Innovation  
Paul A. Cibis Distinguished Professor of Ophthalmology and Visual Sciences  
Doctor of Medicine, University of Bombay, 1993  
Doctor of Philosophy, University of Texas Southwest, 1997

**Neva P Arribas, M.D.**

Associate Professor Emerita of Clinical Ophthalmology and Visual Sciences  
Associate of Arts, School Not Listed, 1949  
Doctor of Medicine, School Not Listed, 1954

**B**

**Steven Bassnett, Ph.D.**

Professor of Ophthalmology and Visual Sciences (primary appointment)  
Professor of Cell Biology and Physiology  
Grace Nelson Lacy Distinguished Professorship in Ophthalmology  
Bachelor of Science, University of Wales, 1982  
Doctor of Philosophy, University of East Anglia, 1987

**Paul Douglas Becherer, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, Southern Illinois University (Duplicate of Southern Illinois University Carbondale), 1971  
Doctor of Optometry, School Not Listed, 1975

**Stanley C Becker, M.A., Ph.D., M.D.**

Assistant Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Washington University in St Louis, 1948  
Master of Arts, Washington University in St Louis, 1950  
Doctor of Philosophy, Washington University in St Louis, 1951  
Doctor of Medicine, University of Chicago, 1955

**William L Becker, M.A., M.D.**

Assistant Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Earlham College, 1982  
Master of Arts, Washington University in St Louis, 1987  
Doctor of Medicine, Washington University in St Louis, 1987

**Gregg Jonathan Berdy, M.D.**

Voluntary Clinical Associate Professor of Ophthalmology and Visual Sciences

Bachelor of Arts, Duke University, 1979  
Doctor of Medicine, Saint Louis University, 1983

**Paul M Bernier, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Indiana State University, 1983  
Doctor of Optometry, University of Missouri Columbia, 1987

**Anjali Maruti Bhorade, M.D.**

Associate Professor of Ophthalmology and Visual Sciences (primary appointment)  
Associate Professor of Occupational Therapy  
Doctor of Medicine, University of Chicago, 1999

**Frank Joseph Bier, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, University of Missouri Columbia, 1979  
Doctor of Optometry, University of Missouri in St Louis, 1984

**Ronald C Bilchik, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, University of Toledo, 1963  
Doctor of Medicine, Washington University in St Louis, 1967

**Mark Gerald Birkmann, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Missouri Columbia, 1988  
Doctor of Optometry, University of Missouri Columbia, 1992

**Andrew N Blatt, M.A., M.D.**

Assistant Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Duke University, 1987  
Master of Arts, Washington University in St Louis, 1991  
Doctor of Medicine, Washington University in St Louis, 1992

**Kevin Jay Blinder, M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Doctor of Medicine, University of Missouri Kansas City, 1985

**James C Bobrow, M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Yale University, 1966  
Doctor of Medicine, Johns Hopkins University Medical (Duplicate of Johns Hopkins University), 1970

**George M Bohigian, M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Washington University in St Louis, 1961  
Doctor of Medicine, Saint Louis University, 1965

**Bernita Born-Wolf, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, University of Missouri in St Louis, 1987

**Paul J Botelho, M.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences

Bachelor of Arts, Holy Cross College, 1988  
Doctor of Medicine, Boston University, 1992

**Rebekah Arletta Braslow, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, Stanford University, 1981  
Doctor of Medicine, Yale University, 1987

**Sean Michael Breit, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Main Campus), 2002

**Larry G Brokering, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, Illinois College of Optometry, 1972

**Marc Richard Brown, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Missouri Columbia, 1974  
Doctor of Optometry, School Not Listed, 1980

**Nancy M Buchser, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Doctor of Medicine, University of Miami, 2007

**Dean B Burgess, M.D.**

Professor Emeritus of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Arts, Occidental College, 1963  
Doctor of Medicine, University of California, 1967

**C**

**Carmen F Castellano, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Missouri in St Louis, 1977  
Bachelor of Science, Illinois College of Optometry, 1980  
Doctor of Optometry, Illinois College of Optometry, 1982

**Earl S Changar, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, School Not Listed, 1957

**Shiming Chen, M.S., Ph.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Professor of Developmental Biology  
Bernard Becker and Janet R Becker Distinguished Professorship  
in Ophthalmology  
Bachelor of Science, Capital Normal University (#####), 1981  
Master of Science, Beijing Medical University, 1984  
Doctor of Philosophy, State University of New York, 1992

**Brian Stewart Clark, Ph.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Assistant Professor of Developmental Biology  
Doctor of Philosophy, Medical College of Wisconsin, 2013

**Bruce H Cohen, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences

Bachelor of Arts, Harvard University, 1976  
Doctor of Medicine, Johns Hopkins University, 1980

**Nicholas J Colosi, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Arts, La Salle University, 1964  
Doctor of Medicine, Saint Louis University, 1968

**Pamela Ann Coslick-Fada, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, University of Missouri Columbia, 1987

**Steven Michael Couch, M.D.**

Associate Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Patient Safety Officer (Adult) - Clinical Adult Division  
Doctor of Medicine, University of Missouri Kansas City, 2006

**John Bruce Crane, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, William Jewell College, 1987  
Doctor of Optometry, University of Missouri in St Louis, 1991

**Philip L Custer, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Bachelor of Science, Vanderbilt University, 1974  
Doctor of Medicine, Vanderbilt University, 1978

**D**

**David L Davidson, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, School Not Listed, 1964

**John James Deguire, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Washington University in St Louis, 1983  
Champaign), 1988

**Angela Demetrulias, O.D.**

Instructor in Ophthalmology and Visual Sciences (primary  
appointment)  
Bachelor of Arts, Anderson University, 2007  
Doctor of Optometry, Indiana University Bloomington, 2011

**Paul E Diehl, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, Illinois College of Optometry, 1959

**Kyle Dohrman, O.D.**

Instructor in Ophthalmology and Visual Sciences (primary  
appointment)  
Champaign, 2007  
Doctor of Optometry, Southern College of Optometry, 2011

## E

### **John Robert Eigenbrodt, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Southern Illinois University Edwardsville,  
1985

Doctor of Optometry, University of Missouri Columbia, 1988

### **Lawrence W Ernst, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, University of Missouri Columbia, 1990

## F

### **Raymond F Fada, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, University of Michigan (Duplicate of  
University of Michigan Ann Arbor), 1984  
Doctor of Optometry, University of Missouri Columbia, 1989

### **Adam Ross Fedyk**

Instructor in Clinical of Ophthalmology & Visual Sciences

### **Robert M Feibel, M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Johns Hopkins University, 1965  
Doctor of Medicine, Harvard University, 1969

### **Thomas A Ferguson, M.S., Ph.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Associate Professor of Pathology and Immunology  
Bachelor of Arts, Kent State University, 1974  
Master of Science, Kent State University, 1976  
Doctor of Philosophy, University of Cincinnati, 1982

### **Kurt W Finklang, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, University of Missouri Columbia, 1977  
Doctor of Optometry, State University of New York, 1981

### **Frank Donald Fontana, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, Illinois College of Optometry, 1950

### **Bruce S Frank, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Science, Massachusetts Institute of Technology,  
1972  
Doctor of Medicine, Washington University in St Louis, 1976

## G

### **Carrie S Gaines, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, University of Missouri Columbia, 1984  
Doctor of Optometry, University of Missouri Columbia, 1988

### **Lawrence A Gans, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences

Bachelor of Arts, Columbia University, 1972

Doctor of Medicine, Case Western Reserve University, 1977

### **Stephen M Garnett, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Indiana University Bloomington, 1978  
Doctor of Optometry, Indiana University Bloomington, 1980

### **James M Gordon, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences

Bachelor of Arts, University of Minnesota, 1962

Doctor of Medicine, University of Minnesota, 1966

### **Mae Etsuko Gordon, M.S., Ph.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)

Professor of Biostatistics

Bachelor of Arts, Portland State University, 1967

Master of Science, University of Wisconsin Madison, 1970

Doctor of Philosophy, University of Wisconsin Madison, 1979

### **Kenneth O Green, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences

Bachelor of Science, Saint Louis University, 1956

Doctor of Medicine, University of Missouri Columbia, 1960

### **Wesley C Green, M.S., M.D.**

Instructor in Ophthalmology and Visual Sciences (primary  
appointment)

Bachelor of Science, University of Wisconsin La Crosse, 2007

Master of Science, State University of New York, 2009

Doctor of Medicine, Rosalind Franklin University, 2013

### **Kevin William Greulich, M.D.**

Instructor in Ophthalmology and Visual Sciences (primary  
appointment)

Bachelor of Science, University of Notre Dame, 1995

Doctor of Medicine, University of Michigan, 1999

### **Steven J Grondalski, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences

Bachelor of Arts, Saint Louis University, 1983

Doctor of Optometry, Pennsylvania College of Optometry, 1987

## H

### **George J Harocopus, M.D.**

Associate Professor of Ophthalmology and Visual Sciences  
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Assistant Professor of Pathology and Immunology

Bachelor of Arts, Harvard University, 1995

Doctor of Medicine, University of Virginia, 2000

### **Alexander D Harris, M.A., O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Evansville, 1969

Master of Arts, Washington University in St Louis, 1972  
Doctor of Optometry, University of Missouri Columbia, 1986

**Charles R Harris, Ph.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, University of Missouri Columbia, 1970  
Doctor of Philosophy, University of Missouri Columbia, 1971

**William M Hart, Ph.D., M.D.**

Professor Emeritus of Ophthalmology and Visual Sciences  
Bachelor of Arts, Dartmouth College, 1963  
College Park), 1970  
College Park), 1970

**Lynn M Hassman, Ph.D., M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Bachelor of Science, Evangel University, 2002  
Doctor of Philosophy, University of Virginia, 2010  
Doctor of Medicine, University of Virginia, 2012

**William L Herbold, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, School Not Listed, 1967  
Doctor of Optometry, School Not Listed, 1967

**James R Hoekel, O.D.**

Instructor in Ophthalmology and Visual Sciences (primary  
appointment)  
Bachelor of Science, University of Missouri Columbia, 1990  
Doctor of Optometry, University of Missouri in St Louis, 1994

**Augustine Richard Hong, M.D.**

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Bachelor of Arts, University of Illinois, 2004  
Doctor of Medicine, University of Illinois Chicago, 2009

**Jing-Wei Huang, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Doctor of Medicine, National Taiwan University, 1981

**Douglas Lee Huff, O.D.**

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Bachelor of Science, School Not Listed, 1980  
Doctor of Optometry, Southern California College of Optometry,  
1981

**I**

**Michael J Isserman, M.D.**

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Bachelor of Arts, Harvard University, 1971  
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**J**

**Jeffrey H Jacob, O.D.**

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Bachelor of Arts, University of Missouri Columbia, 1975  
Bachelor of Science, Southern California College of Optometry,  
1978

Doctor of Optometry, Southern California College of Optometry,  
1980

**Sharon Leslie Jick**

Instructor in Clinical Ophthalmology and Visual Sciences

**William Steven Joffe, M.D.**

Assistant Professor Emeritus of Clinical Ophthalmology and  
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Bachelor of Arts, Washington University in St Louis, 1959  
Doctor of Medicine, Washington University in St Louis, 1963

**Glen P Johnston, M.D.**

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Bachelor of Arts, Washington University in St Louis, 1953  
Doctor of Medicine, Washington University in St Louis, 1956

**K**

**Stephen A Kamenetzky, M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Washington University in St Louis, 1967  
Doctor of Medicine, School Not Listed, 1970

**Michael A Kass, M.S., M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Senior Associate Dean for Human Research Protection  
Bernard Becker Professor of Ophthalmology and Visual  
Sciences  
Bachelor of Science, Northwestern University, 1963  
Master of Science, Northwestern University Medical, 1966  
Doctor of Medicine, Northwestern University, 1966

**Deborah Lynn Kerber, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Southeast Missouri State University, 1986  
Doctor of Optometry, University of Missouri Columbia, 1992

**Daniel Kerschensteiner, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Professor of Biomedical Engineering (Courtesy)  
Professor of Neuroscience  
Vice Chair - Research Division  
Janet and Bernard Becker Professor of Ophthalmology  
Doctor of Medicine, Georg August University, 2004

**Sangeeta Khanna**

Instructor in Clinical Ophthalmology and Visual Sciences

**William F Kiefer, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, Princeton University, 1967  
Bachelor of Science, Illinois College of Optometry, 1973

Doctor of Optometry, Illinois College of Optometry, 1975

**Mark Alan Kleindorfer, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Indiana University Bloomington, 1977  
Doctor of Optometry, Indiana University Bloomington, 1979

**Vivian Marie Kloke, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, McKendree University, 1986  
Doctor of Optometry, University of Missouri Columbia, 1990

**Harry L Knopf, M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Harvard University, 1963  
Doctor of Medicine, Harvard University, 1967

**Ronald Joseph Knox, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, School Not Listed, 1956

**Thomas Errol Kraemer, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, Millikin University, 1968  
Bachelor of Science, Indiana University Bloomington, 1970  
Doctor of Optometry, Indiana University Bloomington, 1972

**L**

**Robert Louis Lamberg, M.D.**

Associate Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Science, University of Missouri in St Louis, 1972  
Doctor of Medicine, Washington University in St Louis, 1976

**Paul Arthur Lapoint, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Stowe State University), 1959  
Bachelor of Science, School Not Listed, 1963  
Doctor of Optometry, School Not Listed, 1963

**Andrew R. Lee, M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(Pending Executive Faculty Approval) (primary appointment)  
Director - Medical Student Education  
Director - Clinical Pediatric Division  
null, Duke University, 2009  
Doctor of Medicine, Washington University in St Louis, 2013

**Steven F Lee, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
College Park), 1983  
College Park), 1987

**Scott W Lewis, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Southern California College of Optometry,  
1975  
Doctor of Optometry, Southern California College of Optometry,  
1977

**James Walter Lieber, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Wayne State University, 1976  
Doctor of Optometry, Illinois College of Optometry, 1981

**James Liu, M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2015

**Anthony J Lubniewski, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Bachelor of Science, University of Florida, 1980  
Doctor of Medicine, University of Florida, 1985

**Gregg T Lueder, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Professor of Pediatrics  
Bachelor of Science, Iowa State University, 1981  
Doctor of Medicine, University of Iowa, 1985

**M**

**Robi N Maamari, M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Doctor of Medicine, University of California Irvine, 2014

**Lisa Marie Mackey, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Kansas, 1989  
Doctor of Optometry, University of Missouri Columbia, 1993

**Todd P Margolis, Ph.D., M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Head of the Department of Ophthalmology and Visual Sciences  
Alan A and Edith L Wolff Distinguished Professor  
Bachelor of Science, Stanford University, 1977  
Doctor of Philosophy, University of California San Francisco,  
1983  
Doctor of Medicine, University of California San Francisco, 1984

**Barry David Milder, M.D.**

Associate Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Science, Massachusetts Institute of Technology,  
1969  
Doctor of Medicine, Washington University in St Louis, 1973

**Benjamin Milder, M.D.**

Professor Emeritus of Clinical Ophthalmology and Visual  
Sciences  
Doctor of Medicine, Washington University in St Louis, 1939

**James E Miller, M.D.**

Professor Emeritus of Clinical Ophthalmology and Visual  
Sciences

Bachelor of Science, Tulane University, 1946  
Doctor of Medicine, University of Alabama (Duplicate of  
University of Alabama in Tuscaloosa), 1949

**Duane L Mitzel, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences  
Doctor of Medicine, Washington University in St Louis, 1977  
Bachelor of Science, University of California, 2000

**Eugene James Mobley, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, Northern Illinois University, 1950

**Robert L Mobley, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, Illinois College of Optometry, 1958

**Cynthia L. Montana, Ph.D., M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Bachelor of Science, University of Virginia, 2005  
Doctor of Philosophy, Washington University in St Louis, 2014  
Doctor of Medicine, Washington University in St Louis, 2014

**Joshua L. Morgan, Ph.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Assistant Professor of Neuroscience  
Bachelor of Arts, New College of Florida, 2001  
Doctor of Philosophy, Washington University in St Louis, 2007

**Robert F Munsch, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Colorado Boulder, 1974  
Doctor of Medicine, Saint Louis University, 1977

**Raymond I Myers, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, University of Notre Dame, 1966  
Doctor of Optometry, Indiana University Bloomington, 1970

**N**

**Randall Earl Nacke**

Instructor in Clinical Ophthalmology and Visual Sciences

**Matthew Newman, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Arts, Vanderbilt University, 1956  
Doctor of Medicine, Columbia University, 1959

**Paul F Nichols, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Arts, University of California, 1978  
Doctor of Medicine, University of California, 1982

**O**

**Judith Mosinger Ogilvie, M.A., Ph.D.**

Adjunct Assistant Professor of Ophthalmology and Visual  
Sciences  
Bachelor of Science, Brown University, 1976  
Master of Arts, Harvard University, 1978  
Doctor of Philosophy, Harvard University, 1983

**F. Thomas Ott, M.D.**

Assistant Professor Emeritus of Clinical Ophthalmology and  
Visual Sciences  
Bachelor of Arts, Southern Methodist University, 1963  
Doctor of Medicine, Washington University in St Louis, 1965

**P**

**Jeffrey Robert Padousis, M.D.**

Instructor in Clinical Ophthalmology and Visual Science  
Bachelor of Arts, Vanderbilt University, 1995  
Doctor of Medicine, Saint Louis University, 2000

**Anjali K Pathak, M.D.**

Associate Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Bachelor of Arts, West Virginia University, 1993  
Bachelor of Science, West Virginia University, 1993  
Doctor of Medicine, West Virginia University, 1997

**John Craig Perlmutter, M.D.**

Associate Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Arts, Queens College, 1967  
Doctor of Medicine, Cornell University, 1971

**Kisha Deslee Piggott, Ph.D., M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Co-Director - Residency Program  
Bachelor of Science, Spelman College, 2003  
Doctor of Philosophy, Emory University, 2009  
Doctor of Medicine, Emory University, 2011

**R**

**Rithwick Rajagopal, Ph.D., M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
null, New York University, 2006  
Doctor of Medicine, New York University, 2007

**Mark S Rallo, O.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Director of Pediatric Optometry PD  
Bachelor of Science, Saint Louis University, 1986  
Doctor of Optometry, University of Missouri Columbia, 1990

**Prabakar Kumar Rao, M.D.**

Professor of Ophthalmology and Visual Sciences (primary appointment)  
Vice Chair - Clinical Operations  
Bachelor of Arts, University of California San Diego, 1991  
Doctor of Medicine, University of Southern California, 1995

**Margaret Mary McGlynn Reynolds, M.D.**

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)  
Bachelor of Science, Creighton University, 2010  
Doctor of Medicine, Cornell University, 2014

**Juan Gomez Rodriguez**

Adjunct Assistant Professor of Ophthalmology

**Michael Dennis Rohde, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Valparaiso University (Duplicate of Valparaiso University), 1983  
Doctor of Optometry, University of Missouri Columbia, 1987

**Louis J Rosenbaum, M.D.**

Associate Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1959  
Doctor of Medicine, Washington University in St Louis, 1963

**Mark A Rothstein, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Williams College, 1986  
Doctor of Medicine, University of Utah, 1991

**Michael B Rumelt, M.D.**

Assistant Professor Emeritus of Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, Lamar University, 1962  
Doctor of Medicine, Washington University in St Louis, 1966

**Philip A Ruzycski, Ph.D.**

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)  
Assistant Professor of Genetics  
Bachelor of Science, Davidson College, 2008  
Doctor of Philosophy, Washington University in St Louis, 2018

**S**

**Scott Geoffrey Sagett**

Instructor in Clinical Ophthalmology and Visual Sciences

**Mickey L Salmon, M.D.**

Instructor Emeritus in Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, Centenary College, 1955  
Doctor of Medicine, Louisiana State University, 1959

**Matthew Correia Santos, M.D.**

Instructor in Ophthalmology & Visual Sciences (Pending Dean's Approval) (primary appointment)  
null, Providence College, 2014  
null, Brown University, 2018

**Jonathan C Schell, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, Saint Louis University, 2001  
Doctor of Medicine, Saint Louis University, 2005

**Frederick W Schwagger, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Illinois College of Optometry, 1957  
Doctor of Optometry, Illinois College of Optometry, 1957

**Christopher G Seep, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Missouri Columbia, 1971  
Doctor of Optometry, University of Missouri in St Louis, 1984

**David Brian Seibel, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, University of Missouri Columbia, 1987

**James Banks Shepherd, M.D.**

Associate Professor of Ophthalmology and Visual Sciences (primary appointment)  
Bachelor of Arts, Amherst College, 1992  
Doctor of Medicine, Columbia University, 1997

**Priya Saigal Shetty, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Doctor of Medicine, University of Michigan (Duplicate of University of Michigan Ann Arbor), 2007

**Arsham Sheybani, M.D.**

Associate Professor of Ophthalmology and Visual Sciences (primary appointment)  
Director - Residency Program  
Doctor of Medicine, Washington University in St Louis, 2008

**Steven M Shields, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, Washington University in St Louis, 1981  
Doctor of Medicine, Washington University in St Louis, 1986

**Alan Shiels, Ph.D.**

Professor of Ophthalmology and Visual Sciences (primary appointment)  
Professor of Genetics  
Doctor of Philosophy, University of London, 1983

**Howard Newton Short, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Washington University in St Louis, 1974  
Doctor of Medicine, Saint Louis University, 1978

**Erin Gwen Sieck, M.D.**



Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)

Bachelor of Arts, University of Missouri Kansas City, 2013  
Doctor of Medicine, University of Missouri Kansas City, 2015

**Carla J Siegfried, M.D.**

Professor of Ophthalmology (primary appointment)  
Vice Chair - Diversity, Equity and Professionalism  
Jacquelyn E and Allan E Kolker M.D. Distinguished Professor of  
Ophthalmology

Bachelor of Arts, University of Missouri Kansas City, 1989  
Doctor of Medicine, University of Missouri Kansas City, 1989

**Charles D Signorelli, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, School Not Listed, 1957  
Doctor of Optometry, School Not Listed, 1957

**Morton Edward Smith, M.D.**

Professor Emeritus of Ophthalmology and Visual Sciences  
Associate Dean Emeritus for Post-Graduate Education  
(College Park), 1956  
(College Park), 1960

**Claud Randall Snowden, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, Illinois College of Optometry, 1972  
Doctor of Optometry, Illinois College of Optometry, 1974

**Craig H Sorce, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 1988  
Doctor of Optometry, University of Missouri Columbia, 1992

**Florentina Soto Lucas, Ph.D.**

Associate Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Doctor of Philosophy, University of Alicante, 1992

**Mark H Spurrier, M.D.**

Instructor in Clinical Ophthalmology and Visual Sciences  
Bachelor of Arts, Kansas State University, 1976  
Doctor of Medicine, Washington University in St Louis, 1980

**Joseph Steska, O.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Doctor of Optometry, Illinois College of Optometry, 2009

**Arthur Waldo Stickle, M.D.**

Assistant Professor Emeritus of Clinical Ophthalmology and  
Visual Sciences  
Doctor of Medicine, University of Oklahoma, 1943

**Michael Vincent Stock, M.D.**

Instructor in Ophthalmology and Visual Sciences (primary  
appointment)  
Doctor of Medicine, Washington University in St Louis, 2012

**James F Strieter, M.B.A., O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, School Not Listed, 1953  
Doctor of Optometry, School Not Listed, 1954  
Master of Business Administration, Southern Illinois University  
Edwardsville, 1988

**Leanne Denise Stunkel, M.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Assistant Professor of Neurology  
Bachelor of Arts, Johns Hopkins University, 2008  
Doctor of Medicine, Cornell University, 2014

**Brian Patrick Sumner, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Doctor of Optometry, Illinois College of Optometry, 1978

**Kenneth V Swanson**

Instructor in Clinical Ophthalmology and Visual Sciences

**T**

**Paul M Tesser, Ph.D., M.D.**

Associate Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Science, Massachusetts Institute of Technology,  
1981  
Doctor of Philosophy, State University of New York at  
Stonybrook, 1990  
Doctor of Medicine, State University of New York at Stonybrook,  
1991

**Matthew A Thomas, M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Bachelor of Science, Harvard University, 1977  
Doctor of Medicine, Harvard University, 1991

**Linda Mei-Lin Tsai, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Bachelor of Arts, Northwestern University, 1990  
Doctor of Medicine, Northwestern University, 1995

**Robert Lawrence Tychsen, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Professor of Neuroscience  
Professor of Ophthalmology and Visual Sciences in Pediatrics  
John F Hardesty MD Distinguished Professor of Ophthalmology  
and Visual Sciences  
Bachelor of Science, Georgetown University, 1975  
Doctor of Medicine, Georgetown University, 1979

**V**

**Gregory Paul Van Stavern, M.D.**

Professor of Ophthalmology and Visual Sciences (primary  
appointment)  
Professor of Neurology

Robert C. Drews Distinguished Professor in Ophthalmology  
Bachelor of Science, La Salle University, 1989  
Doctor of Medicine, Pennsylvania State University, 1993

**Gary Lee Vogel, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, University of Iowa, 1970  
Main Campus), 1977

**W**

**James J Wachter, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Arts, Saint Louis University, 1987  
Bachelor of Science, Illinois College of Optometry, 1990  
Doctor of Optometry, Illinois College of Optometry, 1991

**Donald E Walter, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, University of Houston, 1971  
Doctor of Optometry, University of Houston, 1972

**William Lee Walter, M.D.**

Assistant Professor of Clinical Ophthalmology and Visual  
Sciences  
Bachelor of Arts, De Paul University, 1950  
Main Campus), 1954

**Stephen R Waltman, M.B.A., M.D.**

Professor of Clinical Ophthalmology and Visual Sciences  
Master of Business Administration, Washington University in St  
Louis, 1900  
Bachelor of Science, Massachusetts Institute of Technology,  
1961  
Doctor of Medicine, Yale University, 1964

**Daniel Joseph Watson, M.D.**

Instructor in Ophthalmology and Visual Sciences (primary  
appointment)  
null, Saint Louis University, 2010  
null, Loyola University Chicago, 2014

**Stephen Alan Wexler, M.D.**

Professor of Ophthalmology and Visual Sciences (Pending  
Executive Faculty Approval) (primary appointment)  
Bachelor of Science, University of Michigan Ann Arbor, 1977  
Doctor of Medicine, University of Michigan Ann Arbor, 1982

**Richard Harris Wieder, M.D.**

Associate Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Bachelor of Science, University of Illinois, 1982  
Doctor of Medicine, University of Illinois at Chicago, 1986

**Philip Raymond Williams, Ph.D.**

Assistant Professor of Ophthalmology and Visual Sciences  
(primary appointment)  
Assistant Professor of Neuroscience  
Doctor of Philosophy, Washington University in St Louis, 2009

**Michael L Wolf, O.D.**

Adjunct Instructor in Ophthalmology and Visual Sciences  
Bachelor of Science, University of Missouri Columbia, 1979  
Doctor of Optometry, University of Missouri Columbia, 1987

**Ming-Fong Agnes Wong, Ph.D., M.D.**

Adjunct Professor of Ophthalmology and Visual Sciences  
Bachelor of Arts, Boston University, 1990  
Doctor of Medicine, McGill University, 1994  
Doctor of Philosophy, University of Toronto, 2001

**Y**

**Takeshi Yoshimatsu, M.S., Ph.D.**

Assistant Professor of Ophthalmology & Visual Sciences  
(Pending Executive Faculty Approval) (primary appointment)  
null, University of Tokyo, 2001  
null, University of Tokyo, 2003  
null, University of Tokyo, 2006

## Research Electives

### Ophthalmology and Visual Sciences Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences. Below is a list of faculty that have ongoing research projects that involve medical students. If a student is interested in working with a faculty member that is not listed below, they can contact the faculty directly to see if there are any research opportunities in their lab.

All residents are encouraged to pursue projects in laboratory or clinical investigation. Research familiarizes the resident with the limitations of laboratory methodology, provides a background for evaluating the literature, helps to develop critical thinking, and allows for a better informed choice for career goals. The type of project is the choice of the resident, and a wide range of opportunities are available. An annual Rosenbaum Research Award of \$1,000 is presented to the resident who performs the most exciting research. The department emphasizes basic science research as well as clinical research. Basic science research currently involves five principal areas: Neurobiology, Immunology, Molecular Biology, Pharmacology/Physiology, and Clinical Studies and Outcomes Research. There are many opportunities for research in clinical areas as well.

Further descriptions of our research labs can be found on the Research Opportunities page (<https://ophthalmology.wustl.edu/research-opportunities/>) of the Department of Ophthalmology & Visual Sciences website.

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## Basic Science Research

- Dr. Steven Bassnett (<https://ophthalmology.wustl.edu/items/bassnett-lab/>): Pseudoexfoliation syndrome and glaucoma; refractive development; mouse models of ectopia lentis
- Dr. Shiming Chen (<https://ophthalmology.wustl.edu/items/chen-lab/>): Bedside to bench: phenotype-genotype correlations of CRX retinopathies
- Dr. Mae Gordon (<https://ophthalmology.wustl.edu/items/gordon-lab/>) and Dr. Philip Ruzycski (<https://ophthalmology.wustl.edu/people/philip-ruzycki-phd/>): Microbiome assays of normal eyes and eyes presenting with conjunctivitis
- Dr. Lynn Hassman (<https://physicians.wustl.edu/people/lynn-m-hassman-md-phd/>): Single-cell transcriptomics of ocular inflammatory cells in uveitis
- Dr. Todd Margolis (<https://ophthalmology.wustl.edu/items/margolis-lab/>): Regulation of latent infection with herpes simplex virus
- Dr. Joshua Morgan (<https://sites.wustl.edu/morganlab/>): Downstream circuit degeneration in a mouse glaucoma model
- Dr. Philip Williams (<https://sites.wustl.edu/williams/home/>): Retinal ganglion cell degeneration and axon regeneration in mouse glaucoma
- Dr. Alan Shiels (<https://ophthalmology.wustl.edu/people/alan-shiels-phd/>): Molecular genetics of pediatric cataracts and associated eye disorders
- Dr. Carla Siegfried (<https://ophthalmology.wustl.edu/people/carla-siegfried-md/>): Differential gene expression and mitochondrial function studies of trabecular meshwork cells; racial disparities of open-angle glaucoma
- Dr. Margaret Reynolds (<https://ophthalmology.wustl.edu/people/margaret-reynolds-md/>): Occupational therapy interventions for patients with low vision; inherited eye diseases; retinopathy of prematurity; refractive surgery; autism spectrum disorder

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## Clinical Research

- Dr. Steven Couch (<https://ophthalmology.wustl.edu/people/steven-couch-md/>): Genetic correlates of extrascleral extension in intraocular melanomas
- Dr. Andrew Lee (<https://physicians.wustl.edu/people/andrew-r-lee-md/>): Strabismus outcomes; retinopathy of prematurity; health care disparities in pediatric ophthalmology
- Dr. Todd Margolis (<https://ophthalmology.wustl.edu/people/todd-margolis-md-phd/>): Clinical studies of patients with ocular graft-versus-host disease and superior limbic keratoconjunctivitis, including role of the ocular surface microbiome; pathology studies of autonomic innervation of corneal buttons from patients with herpes simplex virus and herpes zoster ophthalmicus

- Dr. P. Kumar Rao (<https://physicians.wustl.edu/people/p-kumar-rao-md/>): Vitreous proteomics
- Dr. Lawrence Tychsen (<https://ophthalmology.wustl.edu/items/tychsen-lab/>): Amblyopia; eye movements; pediatric refractive surgery
- Dr. Gregory P. Van Stavern (<https://ophthalmology.wustl.edu/people/gregory-van-stavern-md/>): Opportunities in neuro-ophthalmology
- Dr. Carla Siegfried (<https://ophthalmology.wustl.edu/people/carla-siegfried-md/>): Ethical issues in patient care; outcomes in glaucoma care
- Dr. Leanne Stunkel (<https://ophthalmology.wustl.edu/people/leanne-stunkel-md/>): Opportunities in neuro-ophthalmology; diagnostic errors in medicine

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## Quality Improvement Research

- Dr. Phil Custer (<https://ophthalmology.wustl.edu/people/philip-custer-md-facs/>): Resident-initiated patient safety and quality improvement projects

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## Translational Research

- Dr. Robi Maamari (<https://ophthalmology.wustl.edu/people/robi-maamari-md/>): Translational research opportunities for those interested in the development of ophthalmic diagnostic devices (i.e., image-based diagnostics)

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## Courses

Curriculum courses (p. 235) for Ophthalmology and Visual Sciences are listed below.

Visit online course listings to view offerings for M50 Ophth (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M50>).

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## Gateway Curriculum

Under the new Gateway Curriculum, medical students spend their four years split among three phases. Phase 1 involves the first 16 months of medical school. During Phase 1, students participate in three Procedural Immersions, which are three-week-long clinical and surgical experiences. The primary goals of the Procedural Immersions are to socialize the student to different clinical settings, to hone their clinical skills, and to allow them to explore the impact of society and health systems on an individual patient's health. This 360-degree approach to early clinical exposure allows students to view practicing medicine through physician, patient, and systems lenses. In these rotations, medical students will often focus on longitudinal patient care by following a specific patient from the time they arrive until they leave and seeing how all health care team members are involved in that patient's visit. During the Ophthalmology Procedural Immersion, students spend time in the University

Eye Clinic and in the pediatric and adult subspecialty clinics and operating rooms, and they attend rounds with an inpatient consult team. This early exposure to clinical experience helps students to contextualize the classroom and clinical learning that they continue with over the next two phases.

The basic and clinical science of ophthalmology is taught in Phase 1 during Module 7: Brain and Behavior. During this module, the students will spend time learning about eye anatomy and physiology, the visual pathways in the brain, and the mechanisms of extraocular movements. The students participate in interactive case sessions that reinforce the material and encourage students to practice their critical thinking and eye examination skills.

During Phase 3, medical students will have opportunities to participate in electives in ophthalmology and advanced clinical rotations in ophthalmology. These will allow students to obtain further experience in clinical ophthalmology to strengthen their clinical knowledge and examination skills. The students will work closely with the ophthalmology residents and review the differential diagnosis of the "red eye," the interpretation of an ophthalmologic consult note, and the handling of ocular emergencies. During this rotation, there is again emphasis on the use of the ophthalmoscope. Additional clinical skills introduced to rotating students include the use of the slit lamp and indirect ophthalmoscopy.

## Legacy Curriculum: Fourth Year

The Ophthalmology Sub-Internship Rotation occurs during this time. During the month of June during their fourth year, students interested in pursuing a career in ophthalmology are encouraged to complete this intensive four-week rotation. Students will have personal indirect ophthalmoscopy lenses available for use on the rotation. Formal didactic sessions and workshops will be used to teach students how to perform a detailed ophthalmic history and exam, including the mastery of advanced slit lamp techniques and indirect funduscopy. Students present a case at the department's grand rounds. By the end of the rotation, students will be expected to function at the level of a first-year ophthalmology resident.

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## Curriculum Courses

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### M50 Ophth 801 Ophthalmology Subinternship

This elective is for senior students who plan to apply for a residency in Ophthalmology. In accordance with any subinternship, medical students will be expected to function at the level of a beginning first-year ophthalmology resident on this rotation. The students will rotate through the resident eye clinic and the subspecialty clinics of the full time faculty of the Washington University Medical School Department of Ophthalmology and Visual Sciences (e.g., neuro-ophthalmology service, cornea/external disease service, etc.). Students may opt to check out indirect ophthalmoscopy lenses that may be used for the month to facilitate the acquisition of funduscopy skills. During the rotation, the student's responsibilities range from

observation to working at a resident level and completing full eye examinations. There will be a rigorous academic curriculum for the rotation, including a weekly case presentation, weekly attendance at grand rounds, and a mix of medical student-oriented and resident-oriented conferences. On day one, students will receive a rotating call schedule for the entire month. A medical student is expected to be present at all times to assist the primary call ophthalmology resident during the rotation. By the end of the four-week rotation, the student is expected to be proficient in taking an ocular history and performing a complete eye exam including slit lamp biomicroscopy and indirect ophthalmoscopy. All students interested in this senior elective must contact Course Director in March of year WUMS-III. The final grade of the student is determined by input from the director of the particular service(s) through which the student rotated, plus the case presentations.

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### M50 Ophth 805 Ophthalmology

The Ophthalmology elective is designed to provide a foundational experience in clinical and surgical ophthalmology for medical students. Time will be divided between the University Eye Service clinic, adult inpatient consults, pediatric ophthalmology, and other ophthalmology subspecialties ophthalmology (e.g. Glaucoma, Cornea, or Retina). The amount of time at each location will depend on length of the rotation and the student's specific interests. There are didactic sessions with Dr. Andrew Lee and Dr. Cynthia Montana during which the students present their own cases. In addition, there are continuing opportunities to attend educational conferences. At the end of the experience, the student is expected to be familiar with the routine eye exam, common eye conditions and their treatment, and the use of the slit lamp and ophthalmoscope.

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### M50 Ophth 816 Away Rotation in Ophthalmology

This four-week elective is for senior students from medical schools across the United States who are in good standing at their home institution and who are planning to apply for a residency in ophthalmology. To enroll in this elective, students must first apply online for the elective via the visiting student application service (VSAS). These applications will be reviewed and invitations will then be sent to individuals to enroll in the elective. Due to large demand, not all eligible away students will be accepted for the rotation. The dates for this elective are not flexible. The students will rotate through the resident eye clinic and the subspecialty clinics of the full time faculty of the Washington University Medical School Department of Ophthalmology and Visual Sciences (e.g., neuro-ophthalmology service, cornea/external disease service, etc.). In exchange for a refundable deposit, students may opt to check-out indirect ophthalmoscopy lenses that may be used for the month to facilitate the acquisition of funduscopy skills. During the rotation, the student's responsibilities range from observation (including observing surgery) to working at a resident level and completing full eye examinations. Didactics will include weekly case presentation sessions, weekly attendance at grand rounds, and a mix of medical student-oriented and resident-oriented conferences. Also, there will be medical student-oriented workshops to learn the basics of the slit lamp and indirect ophthalmoscopy. On day one, students will receive a schedule of conferences that they are expected to attend during the month. By the end of the four-week rotation, the student is expected to be proficient in taking an ocular history and performing a complete eye exam including slit lamp biomicroscopy and indirect ophthalmoscopy.

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**M50 Ophth 900 Research Elective - Ophthalmology**

Research opportunities may be available. If interested, please contact the Department of Ophthalmology.

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## Department of Orthopaedic Surgery

Orthopaedic surgery is concerned with the injuries, diseases and conditions of the musculoskeletal system. The WUSM III rotation in Musculoskeletal Surgery & Medicine exposes the student to multiple aspects of orthopaedic surgery, including caring for patients in the emergency department and the operating room as well as clinical practice in the emergency department and the outpatient and inpatient wards.

Website: <http://www.ortho.wustl.edu>

### Faculty

**Regis O'Keefe, MD, PhD** (<https://www.ortho.wustl.edu/content/Patient-Care/3683/FIND-A-PHYSICIAN/Physician-Directory/Regis-OKeefe-MD/Bio.aspx>)  
Department Chair

Visit our website for more information about our faculty (<http://www.ortho.wustl.edu/content/Patient-Care/2295/Find-a-Physician/Physician-Directory.aspx>) and their appointments.

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### A

**Yousef Abu-Amer, M.S., Ph.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Cell Biology and Physiology  
Dr J Albert Key Professor of Orthopedic Surgery  
Bachelor of Science, Hebrew University, 1985  
Master of Science, Hebrew University, 1987  
Doctor of Philosophy, Hebrew University, 1993

**Alexander William Aleem, M.S., M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, Johns Hopkins University, 2006  
Doctor of Medicine, Washington University in St Louis, 2010  
null, Washington University in St Louis, 2019

### B

**Jonathon David Backus, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, University of Illinois at Urbana-Champaign, 2005  
Doctor of Medicine, Duke University, 2010

**Robert L Barrack, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Charles F and Joanne Knight Distinguished Professor of Orthopedic Surgery

Doctor of Medicine, Vanderbilt University, 1980

**Kimberly Ann Bartosiak, M.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Medicine, Loyola University Chicago, 2015

**Donald R Bassman, M.D.**

Instructor in Clinical Orthopedic Surgery  
Bachelor of Arts, Washington University in St Louis, 1971  
Doctor of Medicine, Washington University in St Louis, 1975

**Ilya Bendich, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Dartmouth College, 2015

**Marschall Brantling Berkes, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Vanderbilt University, 2008

**Terra Rupert Blatnik, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, Allegheny College, 2003  
Doctor of Medicine, Case Western Reserve University, 2007

**Michael Anthony Boeving, M.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)  
null, University of Oklahoma, 2018

**Martin I Boyer, M.S., M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Carol B and Jerome T Loeb Professor of Orthopedic Surgery  
Doctor of Medicine, University of Toronto, 1988  
Master of Science, University of Toronto, 1993

**Keith Happ Bridwell, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Neurological Surgery  
J Albert Key Distinguished Professor of Orthopedic Surgery  
Bachelor of Arts, Washington University in St Louis, 1973  
Doctor of Medicine, Washington University in St Louis, 1977

**David Micah Brogan, M.S., M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Associate Professor of Neurological Surgery  
Master of Science, University of London, 2005  
Doctor of Medicine, Washington University in St Louis, 2009

**Robert Henry Brophy, M.S., M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, Stanford University, 1994  
Bachelor of Science, Stanford University, 1994  
Master of Science, Stanford University, 1995  
Doctor of Medicine, Washington University in St Louis, 2001

**Jacob M Buchowski, M.S., M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Neurological Surgery

Division Chief - Division of Spine  
Vice Chair - Department of Orthopedic Surgery  
Lawrence G and Elizabeth A Lenke Distinguished Professor of  
Orthopedic Surgery  
Bachelor of Science, Yale University, 1996  
Master of Science, Yale University, 1996  
Doctor of Medicine, Johns Hopkins University, 2000

## C

**Ryan Patrick Calfee, M.D.**  
Professor of Orthopedic Surgery (primary appointment)  
Division Chief - Division of Hand and Wrist  
Bachelor of Science, University of Virginia, 1997  
Doctor of Medicine, Washington University in St Louis, 2001

**Alejandra Camacho-Soto, M.D.**  
Assistant Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, Georgetown University, 2005  
Doctor of Medicine, University of Pittsburgh, 2011

**Eric Ward Carson, M.D.**  
Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, Tufts University, 1982  
Doctor of Medicine, University of Illinois Chicago, 1989

**Alexandre Carter, Ph.D., M.D.**  
Associate Professor of Orthopedic Surgery (primary  
appointment)  
Associate Professor of Occupational Therapy  
Associate Professor of Neurology  
Bachelor of Science, Brandeis University, 1991  
Doctor of Philosophy, Harvard University, 2003  
Doctor of Medicine, Harvard University, 2003

**Aaron Mark Chamberlain, M.D.**  
Associate Professor of Orthopedic Surgery (primary  
appointment)  
Adjunct Lecturer  
Bachelor of Music, University of Utah, 2002  
Doctor of Medicine, University of California San Francisco, 2006

**Abby Ling Lee Cheng, M.D.**  
Assistant Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Neurology  
Assistant Professor of Surgery (Public Health Sciences)  
Doctor of Medicine, Washington University in St Louis, 2013

**John C Clohisy, M.D.**  
Professor of Orthopedic Surgery (primary appointment)  
Vice Chair - Department of Orthopedic Surgery  
Daniel C. and Betty B. Viehmann Distinguished Professor of  
Orthopedic Surgery  
Bachelor of Arts, Northwestern University, 1985  
Doctor of Medicine, Northwestern University, 1989

**Kelsey Helen-Marie Collins, Ph.D.**  
Instructor in Orthopedic Surgery (primary appointment)  
Bachelor of Arts, University of California Davis, 2011

Doctor of Philosophy, University of Calgary, 2017

## D

**Kayla E Daniel, M.D.**  
Assistant Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 2011  
Doctor of Medicine, RUSH MEDICAL COLLEGE, 2016

**Gregory M Decker, M.D.**  
Assistant Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Neurology  
Doctor of Medicine, American University of the Caribbean, 2014

**Christopher J. Dy, M.P.H., M.D.**  
Associate Professor of Orthopedic Surgery (primary  
appointment)  
Associate Professor of Surgery (Public Health Sciences)  
Bachelor of Science, University of Miami, 2004  
Master of Public Health, University of Miami, 2008  
Doctor of Medicine, University of Miami, 2008

## E

**Dennis Ian English, M.A., M.D.**  
Assistant Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 2008  
Doctor of Medicine, Loyola University Chicago, 2014  
Master of Arts, Loyola University Chicago, null

**Lawrence Glennon Evans**  
Instructor in Clinical Orthopedic Surgery

## F

**Roberta Faccio, Ph.D.**  
Professor of Orthopedic Surgery (primary appointment)  
Professor of Cell Biology and Physiology  
Doctor of Philosophy, University of Bari, 2000

## G

**Richard H Gelberman, M.D.**  
Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, University of North Carolina, 1965  
Doctor of Medicine, University of Tennessee, 1969

**Charles A Goldfarb, M.D.**  
Professor of Orthopedic Surgery (primary appointment)  
Division Chief - Division of Pediatric Orthopedics  
Executive Vice Chair - Department of Orthopedic Surgery  
Bachelor of Arts, Williams College, 1992  
Doctor of Medicine, University of Alabama, 1996

**Matthew Lawrence Goodwin, M.D.**  
Assistant Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Neurological Surgery  
Doctor of Medicine, Cornell University, 2013

**J. Eric Gordon, M.D.**  
Professor of Orthopedic Surgery (primary appointment)

Bachelor of Science, University of California, 1983  
Doctor of Medicine, University of California Davis, 1988

**Prateek Grover, M.H.A., Ph.D., MBBS**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Foreign MD equivalent, Mahatma Gandhi University, 2002  
Doctor of Philosophy, Marquette University, 2012  
null, Missouri State University (Formerly Southwest Missouri State), 2019

**Farshid Guilak, M.P.H., M.S., Ph.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Biomedical Engineering  
Professor of Mechanical Engineering and Materials Science  
Professor of Developmental Biology  
Mildred B. Simon Research Professorship in Orthopaedic Surgery  
Bachelor of Science, Rensselaer Polytechnic Institute, 1985  
Master of Science, Rensselaer Polytechnic Institute, 1987  
Master of Public Health, Columbia University, 1990  
Doctor of Philosophy, Columbia University, 1992

**Munish C Gupta, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Mildred B. Simon Distinguished Professor of Orthopedic Surgery  
Bachelor of Science, Northwestern University, 1982  
Doctor of Medicine, Northwestern University Medical, 1986

**H**

**Mark E. Halstead, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Pediatrics  
Bachelor of Science, University of Wisconsin Madison, 1994  
Doctor of Medicine, University of Wisconsin Madison, 1998

**Charles Patrick Hannon, M.B.A., M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Georgetown University, 2015  
Bachelor of Science, Villanova University, null  
Master of Business Administration, University of Chicago, null

**Natalia Sara Harasymowicz, M.S., Ph.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Bachelor of Science, Jagiellonian University, 2010  
Master of Science, Jagiellonian University, 2012  
Doctor of Philosophy, Edinburgh University, 2016

**Jeremy A Hartman, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Saint Louis University, 2013

**Damon Joseph Louis Hays, M.D.**

Instructor in Clinical Orthopedic Surgery  
Bachelor of Science, Truman State University (Duplicate of Truman State University (Formerly Northeast Missouri State University)), 1998  
Main Campus, 2003

**Pooya Hosseinzadeh, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Isfahan U of Medical Sciences, 2004

**Devyani M. Hunt, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Neurology  
Division Chief - Division of Physical Medicine & Rehabilitation  
Bachelor of Science, University of Texas Austin, 1995  
Doctor of Medicine, University of Texas Houston, 2000

**Thy N Huskey, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, Northwestern University, 1993  
Doctor of Medicine, Northwestern University Medical, 1996

**J**

**Sindhu Saji Jacob, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Kottayam Medical College, 1994

**Kirsten A Jansen, M.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2011

**Jeffrey E Johnson, M.D.**

Professor Emeritus of Orthopedic Surgery  
Bachelor of Arts, Duke University, 1976  
Doctor of Medicine, Georgetown University, 1980

**Neringa Juknis, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Kaunas Medical Institute, 1989

**K**

**Jay Donovan Keener, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Division Chief - Division of Shoulder and Elbow  
Vice Chair - Department of Orthopedic Surgery  
Bachelor of Science, West Virginia University, 1991  
Doctor of Medicine, West Virginia University, 1998

**Brian Adams Kelly, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Neurological Surgery  
Bachelor of Arts, Williams College, 2002  
Doctor of Medicine, Columbia University, 2009

**Derrick Michael Knapik, M.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)  
Main Campus, 2014

**Robert S Kramer, M.D.**

Instructor in Clinical Orthopedic Surgery  
Bachelor of Arts, Harvard University, 1979

Doctor of Medicine, Washington University in St Louis, 1983

**Robert E Kuhlman, M.D.**

Assistant Professor Emeritus of Clinical Orthopedic Surgery  
Bachelor of Arts, Washington University in St Louis, 1953  
Doctor of Medicine, Washington University in St Louis, 1956

**L**

**Adam J. LaBore, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Division Chief - Division of Orthopedic Injury Clinic  
Professor of Neurology  
Bachelor of Science, Louisiana College, 1994  
Doctor of Medicine, Loyola University Chicago, 1998

**Scott J Luhmann, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Neurological Surgery  
Bachelor of Arts, Gustavus Adolphus College, 1986  
Doctor of Medicine, University of Minnesota, 1991

**Paul Sherman Lux, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Tulane University, 1983

**M**

**Matthew J Matava, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Physical Therapy  
Division Chief - Division of Sports Medicine  
Bachelor of Arts, University of Missouri Kansas City, 1986  
Doctor of Medicine, University of Missouri Kansas City, 1987

**Audrey McAlinden, Ph.D.**

Professor of Orthopedic Surgery (primary appointment)  
Professor of Cell Biology and Physiology  
Doctor of Philosophy, University of London, 1998

**Christopher M McAndrew, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, University of Tennessee, 2004

**Sarah Howe McBride, M.S., Ph.D.**

Adjunct Instructor in Orthopedic Surgery  
Bachelor of Science, Clemson University, 2004  
Master of Science, Case Western Reserve University, 2008  
Doctor of Philosophy, Case Western Reserve University, 2011

**Jeremy James McCormick, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Division Chief - Division of Foot and Ankle  
Bachelor of Science, Dartmouth College, 1999  
Doctor of Medicine, Loyola University Chicago, 2003

**Douglas J. McDonald, M.D.**

Professor Emeritus Orthopaedic Surgery

Bachelor of Science, Saint Johns University, 1978  
Doctor of Medicine, University of Minnesota, 1982

**Maria Isabel Menendez Montes**

Instructor in Orthopedic Surgery (Pending Dean's Approval)  
(primary appointment)

**John P Metzler, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Associate Professor of Neurology  
Bachelor of Science, Texas A&M University, 1991  
Doctor of Medicine, University of Texas Galveston, 1995

**Zachary Isaac Meyer, M.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2015

**Laura L Meyers, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, Washington University in St Louis, 1988  
Doctor of Medicine, Vanderbilt University, 1993

**Anna Noel Miller, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Division Chief - Division of Orthopedic Trauma  
Vice Chair - Department of Orthopedic Surgery  
Bachelor of Arts, Rice University, 2001  
Doctor of Medicine, Baylor College of Medicine, 2005

**Gary Arthur Miller, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, University of Chicago, 1973  
Doctor of Medicine, Jefferson Medical College, 1977

**Mark L. Miller, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Other bachelor's degree, Stanford University, 2004  
Doctor of Medicine, Harvard University, 2008

**Marie Theresa Morris, M.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)  
null, University of Arkansas Main Campus, 2012  
null, Washington University in St Louis, 2016

**N**

**Jeffrey Jerome Nepple, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, Truman State University, 2003  
Doctor of Medicine, Washington University in St Louis, 2007

**Brian J. Neuman, M.D.**



Associate Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)  
null, Thomas Jefferson University, 2007

**Robert John Nims, M.S., Ph.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Bachelor of Science, Boston University, 2010  
Master of Science, Columbia University, 2012  
Doctor of Philosophy, Columbia University, 2017

**Ryan M. Nunley, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, Vanderbilt University, 1998  
Doctor of Medicine, University of North Carolina, 2002

**O**

**Regis James O'Keefe, Ph.D., M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Head of the Department of Orthopedic Surgery  
Fred C Reynolds Professor of Orthopedic Surgery  
Bachelor of Arts, Yale University, 1981  
Doctor of Medicine, Harvard University, 1985  
Doctor of Philosophy, University of Rochester, 2000

**Arin D Oestreich, Ph.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Doctor of Philosophy, University of Missouri Columbia, 2015

**Nathan P Olafsen, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Neurology  
Doctor of Medicine, University of Missouri Columbia, 2012

**P**

**Nicholas Pallotta, M.S., M.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)  
Assistant Professor of Neurological Surgery  
Bachelor of Science, Rensselaer Polytechnic Institute, 2007  
Master of Science, Rensselaer Polytechnic Institute, 2009  
Doctor of Medicine, Stony Brook School of Medicine, 2013

**Julia Partin, D.P.M.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, University of Missouri in St Louis, 1997  
Doctor of Podiatric Medicine, Kent State University, 2001

**Cecilia Pascual Garrido, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Universidad del Buenos Aires, 2000

**Terrence L Piper, M.D.**

Assistant Professor of Clinical Orthopedic Surgery  
Bachelor of Arts, Saint Louis University, 1971  
Doctor of Medicine, Saint Louis University, 1975

**Q**

**Feini Qu, Ph.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Bachelor of Science, University of Pennsylvania, 2009

**R**

**Muhammad Farooq Rai, Ph.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Philosophy, Freie University, 2008

**Elizabeth Yanik Rowlands, Sc.M., Ph.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, University of Maryland, 2007  
Master of Science, Johns Hopkins University, 2009  
Doctor of Philosophy, University of North Carolina, 2013

**Rimma Ruvinskaya, M.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Leningrad Inst of Peds Med, 1985

**S**

**Linda J Sandell, M.S., Ph.D.**

Professor Emeritus of Orthopedic Surgery  
Bachelor of Arts, University of Denver, 1969  
Master of Science, University of Denver, 1971  
Doctor of Philosophy, Northwestern University, 1980

**Perry Lee Schoenecker, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, University of Wisconsin Madison, 1964  
Doctor of Medicine, University of Wisconsin Madison, 1968

**Girdhar G Sharma, M.S., Ph.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Bachelor of Science, Banaras Hindu University, 1990  
Master of Science, Banaras Hindu University, 1992  
Doctor of Philosophy, Banaras Hindu University, 2000

**Hua Shen, M.S., Ph.D., M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Capital U of Medical Sciences, 1991  
Master of Science, Chinese Academy of Med Science, 1996  
Doctor of Philosophy, University of Konstanz, 2002

**Jie Shen, M.S., Ph.D.**

Associate Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Science, Nanjing University, 2005  
Master of Science, University of Rochester, 2011  
Doctor of Philosophy, University of Rochester, 2012

**Matthew J Silva, M.Eng., Ph.D.**

Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Biomedical Engineering  
Professor of Mechanical Engineering and Materials Science  
Vice Chair - Research, Department of Orthopedic Surgery

Julia and Walter R Peterson Professor of Orthopedic Research  
Bachelor of Science, Cornell University, 1982  
Master of Engineering, Cornell University, 1984  
Doctor of Philosophy, Massachusetts Institute of Technology,  
1996

**Scott A. Simpson, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Arts, Columbia University, 2005  
Doctor of Medicine, University of Rochester, 2010

**Matthew Vernon Smith, M.D.**

Associate Professor of Orthopedic Surgery (primary  
appointment)  
Doctor of Medicine, Virginia Commonwealth University, 2002

**Michael F Sookchohoff, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, University of Wisconsin Madison, 2016

**Gaurav Swarnkar, Ph.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Doctor of Philosophy, Jawaharlal Nehru University, 2012

**T**

**Chi-Tsai Tang, M.D.**

Associate Professor of Orthopedic Surgery (primary  
appointment)  
Associate Professor of Neurology  
Doctor of Medicine, University North Carolina, 2004

**Simon Tang, M.S., Ph.D.**

Associate Professor of Orthopedic Surgery (primary  
appointment)  
Associate Professor of Mechanical Engineering and Materials  
Science  
Bachelor of Science, University of California Berkeley, 2003  
Master of Science, Rensselaer Polytechnic Institute, 2005  
Doctor of Philosophy, Rensselaer Polytechnic Institute, 2007

**Lauren MacCormick Tatman, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Ohio State University, 2014

**Susan Thapa, M.P.H., Ph.D.**

Instructor in Orthopedic Surgery (primary appointment)  
Instructor in Surgery (Public Health Sciences)  
Bachelor of Science, Dhaka University, 2009  
Doctor of Philosophy, University of Arkansas for Medical  
Sciences, 2018  
Master of Public Health, University of Arkansas for Medical  
Sciences, null

**Andrew Paul Thome, M.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive  
Faculty Approval) (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 2013

Doctor of Medicine, University of Missouri Kansas City, 2015

**Jonathan Bryan Tiu, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Arts, New York University, 2006  
Doctor of Medicine, Tulane University, 2015

**W**

**Lindley Bevelle Wall, M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Division Chief - Division of Pediatrics  
Bachelor of Science, Duke University, 2002  
Doctor of Medicine, Washington University in St Louis, 2006

**Cuicui Wang, M.S., Ph.D.**

Assistant Professor of Orthopedic Surgery (Pending Executive  
Faculty Approval) (primary appointment)  
null, Soochow University (#####), 2005  
null, Nanjing University, 2008  
null, University of Rochester, 2014  
null, Goldfarb School of Nursing, 2020

**Rick Wayne Wright, M.D.**

Adjunct Professor of Orthopedic Surgery  
Bachelor of Science, University of Missouri Columbia, 1984  
Doctor of Medicine, University of Missouri Columbia, 1988

**Y**

**Ken Yamaguchi, M.S., M.D.**

Professor of Orthopedic Surgery (primary appointment)  
Bachelor of Arts, University of California, 1983  
Master of Science, University of California, 1985  
Doctor of Medicine, George Washington University, 1989

**Z**

**Benjamin Matthew Zmistowski, M.D.**

Assistant Professor of Orthopedic Surgery (primary appointment)  
Doctor of Medicine, Jefferson Medical College, 2014

## Research Electives

### Orthopaedic Surgery Research Electives

During the fourth year, opportunities exist for many varieties of  
advanced clinical or research experiences.

Various orthopaedic surgery research opportunities are available  
with the following faculty attendings. If interested, please contact  
the Education Office at 314-747-2543, email the orthopaedic  
surgery department (orthsurg@wudosis.wustl.edu), or contact  
the faculty member directly.

- Yousef Abu-Amer, PhD
- Alexander Aleem, MD
- Robert L. Barrack, MD
- Robert Brophy, MD
- Jacob M. Buchowski, MD, MS
- Ryan Calfee, MD
- Aaron Chamberlain, MD
- Cara A. Cipriano, MD
- John Clohisy, MD
- Matthew Dobbs, MD
- Charles A. Goldfarb, MD
- Farshid Guilak, PhD
- Munish Gupta, MD
- Pooya Hosseinzadeh, MD
- Deeptee Jain, MD
- Michael Kelly, MD
- Sandra Klein, MD
- Charles Lawrie, MD
- Scott J. Luhmann, MD
- Matthew J. Matava, MD
- Audrey McAlinden, PhD
- Chris McAndrew, MD
- Mark Miller, MD
- Jeff Nepple, MD
- Regis O'Keefe, MD
- Nathan Olafsen, MD
- Linda Sandell, PhD
- Perry Schoenecker, MD
- Matt Silva, PhD
- Matthew Smith, MD
- Lindley B. Wall, MD

## Courses

Visit online course listings to view offerings for M96 Ortho  
(<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M96>).

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### M96 Ortho 801A Orthopedic Surgery Subinternship: Sports

This clinical elective is available for four weeks during which the student participates in orthopedic conferences, outpatient clinics, surgical cases, and patient rounds on the Sports Medicine service.

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### M96 Ortho 801B Orthopedic Surgery Subinternship: Sports

This clinical elective is available for four weeks during which the student participates in orthopedic conferences, outpatient clinics, surgical cases, and patient rounds on the Sports Medicine service.

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### M96 Ortho 801C Orthopedic Surgery Subinternship: Sports

This clinical elective is available for four weeks during which the student participates in orthopedic conferences, outpatient clinics, surgical cases, and patient rounds on the Sports Medicine service.

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### M96 Ortho 810A Orthopedic Surgery Subinternship: Foot/Ankle

This four-week clinical elective is available to medical students looking to further their knowledge/experience in orthopedics, specifically foot and ankle surgery. Students will participate in surgical cases, outpatient clinics, inpatient care and weekly didactic sessions/conferences. At the completion of the elective, students should have gained a basic knowledge of foot and ankle problems as well as their operative and nonoperative care.

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### M96 Ortho 820A Orthopedic Surgery Subinternship: Hand

Clinical elective available, during which time the student will work with attending surgeons primarily at Chesterfield and Center for Advanced Medicine. The service includes care of adult patients with traumatic, sports (arthroscopy), nerve, and degenerative disease. Activities will include participation in outpatient procedures, attendance at faculty clinic office hours, and attendance at orthopedic conferences.

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### M96 Ortho 820B Orthopedic Surgery Subinternship: Hand

This is a clinical elective during which the student will work with the attending surgeon primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopedic conferences, and dissection of upper-extremity anatomical specimens.

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### M96 Ortho 823A Orthopedic Surgery Subinternship: Hand/Pediatric Hand

Clinical elective available during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital, St Louis Children's Hospital, and Shriner's Hospital. The service includes care of adult and pediatric patients with congenital, traumatic, sports (arthroscopy), nerve, and degenerative disease. Activities will include participation in outpatient procedures, attendance at faculty clinic office hours, attendance at orthopedic conferences, and dissection of upper-extremity anatomical specimens.

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### M96 Ortho 823B Orthopedic Surgery Subinternship: Hand/Pediatric Hand

Clinical elective available during which time the student will work with attending surgeons primarily at St. Louis Children's Hospital, Shriner's Hospital, Chesterfield, Center for Advanced Medicine and St. Louis Children's Specialty Care Center. The service includes care of adult and pediatric patients with congenital, traumatic, sports (arthroscopy), nerve, and degenerative disease. Activities will include participation in outpatient procedures, attendance at faculty clinic office hours, attendance at orthopedic conferences, and dissection of upper-extremity anatomical specimens.

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**M96 Ortho 825A Orthopedic Surgery Subinternship: Hand/  
Nerve**

Clinical elective available during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital, St. Louis Children's Hospital, Washington University Orthopedics at Center for Advanced Medicine and South County. The service includes care of adult and pediatric patients with traumatic, sports (arthroscopy), nerve, and degenerative disease. The rotation will cover general hand surgery as well as brachial plexus and peripheral nerve surgery. Activities will include participation in outpatient procedures, attendance at faculty clinic office hours, and attendance at orthopedic conferences.

**M96 Ortho 827A Orthopedic Surgery Subinternship: Hand/  
Microsurgery**

Clinical elective available during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital, Center for Advanced Medicine and the Chesterfield office. The service includes care of adult and pediatric patients with traumatic, sports (arthroscopy), nerve, and degenerative disease. Activities will include participation in outpatient procedures, attendance at faculty clinic office hours, and attendance at orthopedic conferences.

**M96 Ortho 830A Orthopedic Surgery Subinternship:  
Shoulder/Elbow**

Clinical elective available during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopedic conferences, and dissection of upper-extremity anatomical specimens.

**M96 Ortho 840A Orthopedic Surgery Subinternship: Trauma**

Clinical elective available for a four-week period during which time the student will work in orthopedic trauma at Barnes-Jewish Hospital. The student will work with a team of attendings, residents, PAs, and NPs to provide care for orthopedic trauma patients. Activities include participation in the care of hospitalized inpatients, inpatient surgical procedures, outpatient office visits and daily conferences.

**M96 Ortho 840B Orthopedic Surgery Subinternship: Trauma**

Clinical elective available for a four-week period during which time the student will work in orthopedic trauma at Barnes-Jewish Hospital. The student will work with a team of attendings, residents, PAs, and NPs to provide care for orthopedic trauma patients. Activities include participation in the care of hospitalized inpatients, inpatient surgical procedures, outpatient office visits and daily conferences.

**M96 Ortho 840C Orthopedic Surgery Subinternship: Trauma**

This is a clinical elective available for a four-week period during which time the student will work in orthopedics trauma at Barnes-Jewish Hospital. The student will work with a team of attending, residents, PAs, and NPs to provide care for orthopedic trauma patients. Activities include participation in the care of hospitalized inpatients, inpatient surgical procedures, outpatient office visits, and daily conferences.

**M96 Ortho 850A Orthopedic Surgery Subinternship:  
Pediatrics**

Clinical elective available for four weeks during which time the student will work with the attending surgeon primarily at St. Louis Children's Hospital observing and assisting in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly pediatric orthopedic conference activities required.

**M96 Ortho 850B Orthopedic Surgery Subinternship:  
Pediatrics**

Clinical elective available for four weeks during which time the student will work with the attending surgeon primarily at St. Louis Children's Hospital observing and assisting in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly pediatric orthopedic conference activities required.

**M96 Ortho 850C Orthopedic Surgery Subinternship  
Pediatrics**

Orthopedic Surgery Subinternship - Pediatrics

**M96 Ortho 860A Orthopedic Surgery Subinternship: Spine**

This clinical elective is available for four weeks during which time the student will work with the attending surgeon primarily at Barnes-Jewish Hospital observing and assisting, when appropriate, in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly orthopedic conference activities is required. The spine fellow assigned to this service will serve as a primary contributor to the student's education experience on this rotation.

**M96 Ortho 860B Orthopedic Surgery Subinternship: Spine**

This clinical elective is available for four weeks during which time the student will work with the attending surgeon primarily at Barnes-Jewish Hospital observing and assisting, when appropriate, in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly orthopedic conference activities is required. The spine fellow assigned to this service will serve as a primary contributor to the student's education experience on this rotation.

**M96 Ortho 860C Orthopedic Surgery Subinternship: Spine**

This clinical elective is available for four weeks during which the student will work with the attending surgeon primarily at Barnes-Jewish Hospital, Barnes-Jewish West County Hospital, and Washington University Orthopedics - Center for Advanced Medicine observing and assisting, when appropriate in outpatient and inpatient care. To be included are activities in the OR, ED, and outpatient clinics. Attendance at and participation in the weekly orthopedic conference activities is required. The spine fellow assigned to this service will serve as a primary contributor to the student's education experience on this rotation.

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**M96 Ortho 863A Orthopedic Surgery Subinternship:**

**Pediatric Spine**

Clinical elective available for four weeks during which time the student will work with the attending surgeon primarily at St. Louis Children's Hospital observing and assisting in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly pediatric orthopedic conference activities required.

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**M96 Ortho 863B Orthopedic Surgery Subinternship:**

**Pediatric Spine**

Clinical elective available for four weeks during which time the student will work with the attending surgeon primarily at St. Louis Children's Hospital observing and assisting in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly pediatric orthopedic conference activities required.

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**M96 Ortho 870A Orthopedic Surgery Subinternship: Joint Preservation & Reconstruction**

Clinical elective available, during which time the student will work with the attending physician on the Adult Reconstruction and Joint Preservation/Replacement service. This rotation is primarily centered at Barnes-Jewish Hospital and includes care of hospitalized inpatients, participant in inpatient and outpatient procedures, attendance at designated office hours, and attendance at and participation in orthopedic educational conferences and anatomy sessions.

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**M96 Ortho 870B Orthopedic Surgery Subinternship: Joint Preservation & Reconstruction**

Clinical elective available, during which time the student will work with the attending physician on the Adult Reconstruction and Joint Preservation/Replacement service. This rotation is primarily centered at Barnes-Jewish Hospital and includes care of young patients with hip impingement pathology and older patients with end stage joint arthritis, hospitalized inpatients, participant in inpatient and outpatient procedures, attendance at designated office hours, and attendance at and participation in orthopedic educational conferences and anatomy sessions.

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**M96 Ortho 870C Orthopedic Surgery Subinternship: Joint Preservation & Reconstruction**

Clinical elective available, during which time the student will work with the attending physician on the Adult Reconstruction and Joint Preservation/Replacement service. This rotation is primarily centered at Barnes-Jewish Hospital and includes care of young patients with hip impingement pathology and older patients with end stage joint arthritis, hospitalized inpatients, participant in inpatient and outpatient procedures, attendance at designated office hours, and attendance at and participation in orthopedic educational conferences and anatomy sessions.

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**M96 Ortho 875A Orthopedic Surgery Subinternship: Joint Reconstruction**

Clinical elective available, during which time the student will work with the attending physician on the Adult Reconstruction and Joint Preservation/Replacement service. This rotation is primarily centered at Barnes-Jewish Hospital and includes care of hospitalized inpatients, participant in inpatient and outpatient procedures, attendance at designated office hours, and attendance at and participation in orthopedic educational conferences and anatomy sessions.

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**M96 Ortho 880A Orthopedic Surgery Subinternship: Oncology/Joint Reconstruction**

Clinical elective available for four weeks, during which time the student will work with the attending physicians on the Musculoskeletal Oncology service. The student will participate in orthopedic conferences, outpatient clinics, surgical cases and patient rounds.

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**M96 Ortho 880B Orthopedic Surgery Subinternship: Oncology/Joint Reconstruction**

Clinical elective available for four weeks, during which time the student will work with the attending physicians on the Musculoskeletal Oncology service. The student will participate in orthopedic conferences, outpatient clinics, surgical cases and patient rounds.

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**M96 Ortho 890 Orthopedic Surgery Externship**

Students rotate on orthopedic services in four-week blocks. During their rotations, students are assigned to two different services for two weeks each. Students may rotate on a variety of subspecialties, including trauma sports medicine, hand and upper extremity, foot and ankle, musculoskeletal oncology, adult reconstructive surgery, pediatric orthopaedics, shoulder and elbow, and spine. For more information about the Orthopedic Surgery Externship Program, visit <https://www.ortho.wustl.edu/content/Education/2905/Training-Programs/Med-Student-Programs/Externship-Program/Overview.aspx>.

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**M96 Ortho 899 Special Study Elective: Orthopedic Surgery**

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**M96 Ortho 899C Clinical Special Study Elective: Ortho**

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**M96 Ortho 900 Research Elective: Orthopedic Surgery**

Research opportunities may be available. Contact the Department of Orthopedic Surgery for additional information.

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## Department of Otolaryngology

The Department of Otolaryngology–Head & Neck Surgery (<http://oto.wustl.edu/>) at Washington University in St. Louis has a rich, 130-year history of leadership in our field that is built on the foundations of academic medicine: patient care, research, training and service. Our past leaders include luminaries in the field of otolaryngology, such as John Blasdel Shapleigh, MD; Greenfield Sluder, MD; Lee Wallace Dean, MD; Theodore Walsh, MD; Joseph Ogura, MD; John Fredrickson, MD; Richard A. Chole, MD, PhD; and, presently, Craig A. Buchman, MD, FACS. Even from our earliest days — prior to the inception of the McMillan Eye, Ear, Nose and Throat Hospital (circa 1943) — excellence has been an integral part of the department's fabric. A look at former faculty and program graduates reveals many of the true innovators in our field. While we remain humbled by our beginnings and past achievements, we choose not to rest on our laurels. Rather, we aspire to further our commitment to improving patients' lives by leading our field and its clinical application.

Today, more than ever, we are driven to provide highest-quality, cutting-edge patient care that is both safe and effective. Our Washington University physicians and team, together with our Honor Roll Award-winning hospital, Barnes-Jewish Hospital (*U.S. News*, 2020-21), are second to none when it comes to tackling the full spectrum of conditions involving the ear, nose, throat, head and neck. Our basic, translational and clinical research programs are remarkable, providing answers to a variety of relevant questions that build on our foundations of knowledge, lay the groundwork for future clinical trials, and provide state-of-the-art patient solutions. Our educational programs for medical and graduate students, physicians in training, and established practitioners are committed to creating a culture of lifelong learning that firmly establishes our next generation of leaders in the field. Our residency program is highly rated by all metrics, providing balanced training across the clinical subspecialties and unique opportunities for growth and development as clinician-scientists (T32 training grant) and educators. We are most proud that these activities are ongoing in a work culture that values collegiality, inclusiveness, diversity and mutual respect. The Department of Otolaryngology–Head & Neck Surgery at Washington University in St. Louis is a truly outstanding place!

## CID at Washington University School of Medicine

The consortium of graduate education, research and clinical programs known today as CID at Washington University School of Medicine was born out of the pioneering efforts of St. Louis physician Max Goldstein, MD. In 1914, he founded the Central Institute for the Deaf (CID), where doctors and teachers worked together to help deaf people. When CID's school building opened two years later, its auditory/oral methods for instructing deaf children were groundbreaking.

Washington University and CID first joined forces in 1931, when CID's established teacher training program became the first deaf education undergraduate program to affiliate with a university. Graduate programs in deaf education, audiology, and speech and hearing sciences soon followed.

Beginning in the 1930s, CID's research efforts involved the study of the anatomy and science of hearing. During World War II, CID's research on hearing loss in military personnel laid the foundation for the field of audiology. CID also pioneered hearing testing and hearing aids, and it opened the country's first hearing aid clinic in 1941. In September 2003, a new affiliation transferred CID's graduate degree programs, research programs and adult audiology clinic — along with its building — to Washington University School of Medicine. The CID school continues to operate on the School of Medicine campus as CID — Central Institute for the Deaf.

Today, these programs continue to work together to fulfill a shared mission to serve people with hearing loss.

Website: <http://oto.wustl.edu>

## Faculty

**Craig A. Buchman, MD, FACS** (<https://oto.wustl.edu/people/craig-a-buchman-md/>)

Department Head

Visit our website for more information about our faculty (<http://oto.wustl.edu/About-Us/Faculty-Physicians/>) and their appointments.

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### A

**Azadeh Afshari, M.S., D.Dent.**

Instructor in Clinical Otolaryngology

Bachelor of Science, West Virginia University, 2004

Master of Science, University of Texas Medical School Houston, 2013

Doctor of Dentistry, University of Texas Medical School Houston, 2014

### B

**Sean B Bailey, M.S., M.D.**

Instructor in Clinical Otolaryngology

Bachelor of Science, Tulane University, 1981

Doctor of Medicine, Tulane University, 1987

Master of Science, Tulane University, 1988

**Jianxin Bao, Ph.D.**

Adjunct Associate Professor of Otolaryngology

Doctor of Philosophy, University of Florida, 1992

**Lynda Cheryl Berkowitz, M.S.**

Instructor in Otolaryngology (primary appointment)

Instructor in Audiology and Communication Sciences

Bachelor of Science, University of Illinois, 1981

Master of Science, Washington University in St Louis, 1983

**Andrew E Bluher, M.D.**

Assistant Professor of Otolaryngology (primary appointment)

Bachelor of Science, Princeton University, 2009

Doctor of Medicine, University of Maryland Baltimore, 2014

**Gregory Harris Branham, M.D.**

Professor of Otolaryngology (primary appointment)

Bachelor of Science, University of South Carolina, 1979

Doctor of Medicine, University of South Carolina, 1983

**Jennifer Brinkmeier, M.D.**

Associate Professor of Otolaryngology (primary appointment)

null, Williams College, 2002

null, Ohio State University College of Medicine, 2007

**Craig Alan Buchman, M.D.**

Professor of Otolaryngology (primary appointment)

Head of the Department of Otolaryngology

Lindburg Professor of Otolaryngology

Bachelor of Arts, University of Georgia, 1986

Doctor of Medicine, University of Florida, 1990

## C

### **John Jeonhwan Chi, M.A., M.D.**

Associate Professor of Otolaryngology (primary appointment)  
Division Chief - Facial Plastic & Reconstructive Surgery  
Bachelor of Science, Columbia University, 2001  
Master of Science, City College, 2003  
Doctor of Medicine, SUNY Downstate Medical Center University  
Hospital in Brooklyn, 2007

### **John N Chiapel**

Instructor in Clinical Otolaryngology

### **Richard A Chole, Ph.D., M.D.**

Emeritus Professor of Otolaryngology  
Doctor of Medicine, University of Southern California, 1969  
Doctor of Philosophy, University of Minnesota, 1977

### **William W. Clark, M.S., Ph.D.**

Professor Emeritus of Otolaryngology  
Bachelor of Arts, University of Michigan (Duplicate of University  
of Michigan Ann Arbor), 1969  
Master of Science, University of Michigan (Duplicate of  
University of Michigan Ann Arbor), 1973  
Doctor of Philosophy, University of Michigan (Duplicate of  
University of Michigan Ann Arbor), 1975

### **Sheldon C Cohen, D.Dent.**

Instructor in Clinical Otolaryngology  
Bachelor of Science, Washington University in St Louis, 1973  
Doctor of Dentistry, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 1976

### **Brandon Joseph Crivello, D.Dent.**

Instructor in Clinical Otolaryngology  
Bachelor of Science, Southern Illinois University Edwardsville,  
2012  
Doctor of Dentistry, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 2016

## D

### **Rajan Paul Dang, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Vanderbilt University, 2011  
Doctor of Medicine, Mount Sinai School of Medicine, 2016

### **Lisa S. Davidson, M.S., Ph.D.**

Associate Professor of Otolaryngology (primary appointment)  
Associate Professor of Audiology and Communication Sciences  
Bachelor of Science, East Tennessee State University, 1985  
Master of Science, Washington University in St Louis, 1987  
Doctor of Philosophy, Washington University in St Louis, 2003

### **Sheldon L Davis**

Assistant Professor of Clinical Otolaryngology

### **Andrew J. Drescher, M.D.**

Associate Professor of Otolaryngology (primary appointment)

Bachelor of Science, Yale University, 1998  
Doctor of Medicine, University of Michigan, 2002

### **Norman Steven Druck, M.D.**

Assistant Professor of Clinical Otolaryngology  
Bachelor of Arts, Washington University in St Louis, 1967  
Champaign), 1970

### **Katherine Dunsky, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Doctor of Medicine, Saint Louis University, 2010

### **Nedim Durakovic, M.A., M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Arts, Brown University, 2007  
Master of Arts, Brown University, 2012  
Doctor of Medicine, Brown University, 2012

## F

### **Nyssa F Farrell, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Science, University of South Carolina, 2010  
Doctor of Medicine, University of South Carolina, 2014

### **Charles Coleman Finley**

Adjunct Research Associate Professor of Otolaryngology

### **Jill B Firszt, M.S., Ph.D.**

Professor of Otolaryngology (primary appointment)  
Professor of Audiology and Communication Sciences  
Bachelor of Science, University of Illinois, 1978  
Master of Science, University of Illinois, 1982  
Doctor of Philosophy, University of Illinois, 1998

## G

### **William D Gay, D.Dent.**

Associate Professor Emeritus of Otolaryngology  
Doctor of Dentistry, University of Tennessee, 1966

### **Joel Goebel, M.D.**

Professor Emeritus of Otolaryngology  
Bachelor of Science, University of Notre Dame, 1976  
Doctor of Medicine, Washington University in St Louis, 1980

### **James Dean Gould, M.D.**

Instructor in Clinical Otolaryngology  
Bachelor of Arts, University of Virginia, 1989  
Doctor of Medicine, University of Virginia, 1993

### **Heather Jean Grantham, M.Ed., Ph.D.**

Associate Professor of Otolaryngology (primary appointment)  
Associate Professor of Audiology and Communication Sciences  
Bachelor of Arts, Emory University, 1995  
Master of Education, Smith College, 2005  
Doctor of Philosophy, Washington University in St Louis, 2009

### **Matthew David Greaves, M.S., D.Dent.**

Instructor in Clinical Otolaryngology  
Bachelor of Science, Westminster College, 2010

Doctor of Dentistry, University of Missouri Kansas City, 2014  
Master of Science, University of Minnesota, 2018

**Christine Hilleary Gustus, M.S.**

Instructor in Otolaryngology (primary appointment)  
Instructor in Audiology and Communication Sciences  
Bachelor of Science, Purdue University, 1973  
Master of Science, Washington University in St Louis, 1975

**H**

**Jason M. Hanson, M.D.**

Instructor in Clinical Otolaryngology  
Bachelor of Arts, Johns Hopkins University, 1988  
Doctor of Medicine, Northwestern University, 1992

**Eugenio Guidote Herbosa**

Instructor in Clinical Otolaryngology

**Jacques A Herzog, M.D.**

Professor of Otolaryngology (primary appointment)  
Bachelor of Arts, University of Missouri Columbia, 1980  
Doctor of Medicine, University of Missouri Kansas City, 1980

**Keiko Hirose, M.D.**

Professor of Otolaryngology (primary appointment)  
Professor of Audiology and Communication Sciences  
Professor of Pediatrics  
Doctor of Medicine, Harvard University, 1993

**Lawrence M Hoffman, D.Dent.**

Instructor in Clinical Otolaryngology (DMD)  
Bachelor of Arts, Indiana University Bloomington, 1972  
Doctor of Dentistry, Washington University in St Louis, 1976

**Dee Jay Hubbard, M.A., Ph.D.**

Adjunct Assistant Professor of Otolaryngology (Speech  
Pathology)  
Bachelor of Science, Kansas State University, 1962  
Master of Arts, University of Iowa, 1965  
Doctor of Philosophy, University of Iowa, 1967

**Margaret Naunheim Huston, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Division Chief of Laryngology  
Bachelor of Arts, Duke University, 2009  
Doctor of Medicine, University of Chicago, 2013

**J**

**Ryan Scott Jackson, M.D.**

Associate Professor of Otolaryngology (primary appointment)  
Bachelor of Arts, Saint Louis University, 2004  
Doctor of Medicine, Saint Louis University, 2009

**Arnold Scott Jacobson, M.S., D.Dent.**

Instructor in Clinical Otolaryngology (DMD)  
Bachelor of Arts, University of Missouri Columbia, 1970  
Doctor of Dentistry, Washington University in St Louis, 1976  
Master of Science, University of Missouri Columbia, 1977

**K**

**Dorina Kallogjeri, M.P.H., M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Doctor of Medicine, University of Tirana, 1997  
Master of Public Health, Saint Louis University, 2007

**Eugenia Kardaris**

Instructor in Clinical Otolaryngology (DDS)

**Andrew M Kim, M.S., D.Dent.**

Instructor in Clinical Otolaryngology  
Assistant Professor of Clinical Surgery (Plastic and  
Reconstructive Surgery)  
Bachelor of Arts, California State University, 1978  
Doctor of Dentistry, Washington University in St Louis, 1984  
Main Campus), 1987

**Prashanth Konatham Haribabu**

Instructor in Clinical Otolaryngology

**L**

**Carl Wesley Lee, M.D.**

Instructor in Clinical Otolaryngology  
Doctor of Medicine, Case Western Reserve University, 1992  
Bachelor of Arts, Stanford University, 1998

**David Seamus Leonard, M.H.A., MB.ChB.**

Associate Professor of Otolaryngology (primary appointment)  
Vice Chair - Division of Pediatric Otolaryngology  
Division Chief for Pediatric Otolaryngology  
Bachelor of Arts, Dartmouth College, 1995  
Foreign MD equivalent, National University of Ireland, 2000  
Master of Health Administration, Harvard University, 2012

**Judith E Lieu, M.D.**

Professor of Otolaryngology (primary appointment)  
Vice Chair Education Department of Otolaryngology  
Vice Chair - Education  
Bachelor of Science, University of California Davis, 1988  
Doctor of Medicine, Washington University in St Louis, 1992

**Miranda R Lindburg, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
null, Washington University in St Louis, 2010  
null, Washington University in St Louis, 2017

**M**

**Richard W Maack, M.D.**

Instructor in Clinical Otolaryngology  
Bachelor of Science, Muhlenberg College, 1981  
College Park), 1985

**Angela Liu Mazul, M.S., Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Assistant Professor of Surgery (Public Health Sciences)  
Bachelor of Science, Georgia Tech, 2009  
Master of Science, Tulane University, 2010



Doctor of Philosophy, University of North Carolina, 2016

**Katrina Sue McClannahan, Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Science, University of Minnesota, 2002  
Doctor of Philosophy, University of Washington, 2017

**Murray D McGrady, M.D.**

Instructor in Clinical Otolaryngology  
Bachelor of Science, University of Illinois, 1982  
Doctor of Medicine, University of Illinois, 1986

**Dwight McLeod**

Voluntary Instructor in Clinical Otolaryngology

**Maithilee D Menezes, M.D.**

Associate Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Grinnell College, 1997  
Doctor of Medicine, Grinnell College, 2002

**David W. Molter, M.D.**

Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Duke University, 1980  
Doctor of Medicine, Duke University, 1988

**Nancy Tye Murray, M.S., Ph.D.**

Professor of Otolaryngology (primary appointment)  
Professor of Audiology and Communication Sciences  
Bachelor of Science, Texas Christian University, 1977  
Master of Science, University of Iowa, 1979  
Doctor of Philosophy, University of Iowa, 1984

## N

**Frank Russell Newman**

Instructor in Clinical Otolaryngology

## O

**Margaret A Ogden, M.D.**

Professor of Otolaryngology (primary appointment)  
Vice Chair for Clinical Operations Dept of Otolaryngology  
Vice Chair - Clinical Operations  
Bachelor of Arts, Amherst College, 1997  
Doctor of Medicine, Washington University in St Louis, 2002

**Kevin Kenneth Ohlemiller, Ph.D.**

Professor of Otolaryngology (primary appointment)  
Professor of Audiology and Communication Sciences  
Bachelor of Science, Indiana University Bloomington, 1983  
Doctor of Philosophy, Northwestern University, 1990

**Amanda J Ortmann, M.S., Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Director - Audiology Studies in Audiology and Communication  
Sciences  
Bachelor of Science, Missouri Baptist College, 2001  
Master of Science, Washington University in St Louis, 2003  
Doctor of Philosophy, University of Pittsburgh, 2012

## P

**Randal C Paniello, M.B.A., M.S., M.D.**

Professor of Otolaryngology (primary appointment)  
Christy J. and Richard S. Hawes III Professorship  
Bachelor of Science, University of Illinois, 1979  
Master of Science, University of Illinois, 1980  
Doctor of Medicine, University of Illinois, 1984  
Master of Business Administration, Washington University in St  
Louis, 1999

**Jay Francis Piccirillo, M.D.**

Professor of Otolaryngology (primary appointment)  
Professor of Medicine  
Professor of Occupational Therapy  
Professor of Biostatistics  
Vice Chair - Research  
Bachelor of Arts, University of Vermont, 1979  
Doctor of Medicine, University of Vermont, 1985

**Patrik Pipkorn, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Doctor of Medicine, University of Gothenburg, 2007

**Lisa Gayle Potts, M.S., Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Assistant Professor of Audiology and Communication Sciences  
Bachelor of Science, Southern Illinois University, 1988  
Master of Science, Washington University in St Louis, 1991  
Doctor of Philosophy, Washington University in St Louis, 2006

**Sidharth Venkata Puram, Ph.D., M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Division Chief - Head and Neck Surgery  
Bachelor of Science, Massachusetts Institute of Technology,  
2005  
Doctor of Philosophy, Harvard University, 2011  
Doctor of Medicine, Harvard University, 2013

## R

**Casey Krauss Reimer, Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2019

**Jason T. Rich, M.D.**

Associate Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Brigham Young University, 2000  
Doctor of Medicine, Ohio State University, 2004

**Matthew Rohlfig, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Wake Forest University, 2012  
Doctor of Medicine, Wake Forest University, 2016

**Lauren Tashima Roland, M.S., M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
null, Massachusetts Institute of Technology, 2007  
College of Medicine, 2011

null, Washington University in St Louis, 2015

**Mark A Rutherford, Ph.D.**

Associate Professor of Otolaryngology (primary appointment)  
Bachelor of Science, University of Missouri in St Louis, 1999  
Doctor of Philosophy, University of Oregon, 2005

**S**

**Thomas Schiff, D.Dent.**

Professor Emeritus of Diagnostic Services  
Doctor of Dentistry, University of Alabama (Duplicate of  
University of Alabama in Tuscaloosa), 1961

**Robert James Schmidt**

Instructor in Clinical Otolaryngology

**John Stone Schneider, M.P.P., M.D.**

Associate Professor of Otolaryngology (primary appointment)  
Division Chief - Rhinology  
Master of Public Policy, University of Chicago, 2007  
Doctor of Medicine, University of Chicago, 2007

**Donald G Sessions, M.D.**

Professor Emeritus of Otolaryngology  
Bachelor of Arts, Princeton University, 1958  
Doctor of Medicine, Washington University in St Louis, 1962

**Karl Shanker, D.Dent.**

Instructor in Clinical Otolaryngology (DDS)  
Bachelor of Arts, Washington University in St Louis, 1975  
Doctor of Dentistry, University of Missouri Columbia, 1978

**Lavinia Sheets, Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Assistant Professor of Developmental Biology  
Bachelor of Science, Pacific University, 1996  
Doctor of Philosophy, Oregon Health Science University, 2007

**Matthew Shew, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Bowdoin College, 2009  
Doctor of Medicine, Indiana University Purdue, 2014

**Emily A. Spataro, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Duke University, 2007  
Doctor of Medicine, Washington University in St Louis, 2012

**Gershon J Spector, M.D.**

Professor Emeritus of Otolaryngology  
Bachelor of Arts, Johns Hopkins University Medical (Duplicate of  
Johns Hopkins University), 1960  
College Park), 1964

**Malcolm H Stroud, M.D.**

Professor Emeritus of Otolaryngology  
Doctor of Medicine, University of Birmingham, 1945

**T**

**Isolde E Thalmann, M.A., Ph.D.**

Professor Emeritus of Otolaryngology

Bachelor of Science, Washington University in St Louis, 1968  
Master of Arts, Washington University in St Louis, 1973  
Doctor of Philosophy, California Western (Duplicate of California  
Western School of Law), 1982

**U**

**Rosalie May Uchanski, M.S., Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Assistant Professor of Audiology and Communication Sciences  
Bachelor of Science, University of Illinois Chicago, 1978  
Master of Science, Massachusetts Institute of Technology, 1981  
Doctor of Philosophy, Massachusetts Institute of Technology,  
1988

**V**

**Michael Valente, M.S., Ph.D.**

Professor Emeritus of Otolaryngology (Audiology)  
Bachelor of Arts, Adelphi University, 1970  
Master of Science, Adelphi University, 1972  
Champaign), 1975

**W**

**Mark Edward Warchol, Ph.D.**

Professor of Otolaryngology (primary appointment)  
Professor of Audiology and Communication Sciences  
Professor of Neuroscience  
Bachelor of Science, University of Washington, 1981  
Doctor of Philosophy, Northwestern University, 1989

**Cameron Connelly Wick, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Science, Washington and Lee University, 2006  
Main Campus, 2010

**June Kleinfeld Wouff, D.Dent.**

Instructor in Clinical Otolaryngology  
Doctor of Dentistry, Washington University in St Louis, 1985

**Y**

**Tatyana Aleksandrovna Yakusheva, M.S., Ph.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Master of Science, Saratov State University, 1997  
Doctor of Philosophy, Russian U of Friendship of Ppl, 2002

**Z**

**Paul Zolkind, M.D.**

Assistant Professor of Otolaryngology (primary appointment)  
Bachelor of Arts, Northwestern University, 2009  
Doctor of Medicine, SUNY Downstate Health Sciences  
University, 2013

## Research Electives

### Otolaryngology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

The type of research will depend upon the current phase of the research program in each laboratory. Students should contact the director of each laboratory to negotiate.

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#### Tatyana Yakusheva, PhD

East McDonnell Science Building  
4566 Scott Avenue  
Phone: 314-362-1013

This lab studies the role of the vestibulocerebellum and its target nuclei for eye movement control and spatial orientation. We use a range of methodologies, including single and multiunit recordings, electrical brain stimulation, computational methods, pharmacology and behavioral studies. Our main lines of research are as follows: (1) signal transformations carried out by the the vestibulocerebellum during visual and vestibular stimulation; (2) neuronal computations performed by the anterior and posterior cerebellar vermis for spatial navigation in mice; and (3) the role of the cerebellum-brainstem loop in motor learning in the vestibulo-ocular reflex.

Students will be instructed in one or several techniques and are expected to contribute significantly to the development of specific lab projects.

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#### Judith E.C. Lieu, MD, MSPH

3S35 Children's Hospital and McMillan, 9th Floor  
Phone: 314-747-8205

The focus of the Lieu Lab is clinical outcomes research in pediatric otolaryngology. The techniques and methodologies of clinical epidemiology and health services research are applied to investigate clinical problems in children. Projects currently underway include the evaluation of the quality of life of young children with hearing loss, the evaluation of hearing loss on the perception of fatigue in children, and the evaluation of fatigue experienced in children with hearing loss compared with those who have sleep apnea. Potential studies include evaluating changes in the quality of life of children who begin using hearing amplification devices. Other projects of the student's choosing that would utilize these research techniques may also be pursued.

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#### Kevin K. Ohlemiller, PhD

2205 Central Institute for the Deaf  
Phone: 314-747-7179

The focus of this lab is on gene–environment interactions in cochlear injury. We study the interaction of genes and environment that increase cochlear injury due to noise and ototoxic exposure, with an emphasis on how these may yield apparent presbycusis. Because cochlear function and injury is the same in mice and humans and governed by the same genes, we use mostly mouse models. Methods employed include standard auditory brainstem response assessment and intracochlear recording, quantitative light microscopy, immunocytochemistry, and Western blots. We and our collaborators have identified specific genes and inbred strains of mice that mimic the three major forms of human presbycusis (sensory, neural and strial). Sensory presbycusis appears to be promoted by alleles and mutations that impair protective factors (e.g., antioxidant enzymes) or that impair ion homeostasis. These may enhance cochlear injury from noise and ototoxins.

Neural presbycusis can be modeled in part by mutations that impair inner hair cell/afferent synaptic function. Although it is not yet clear what types of genes and mutations can lead to strial presbycusis, we have discovered multiple mouse strains that show age-related endocochlear potential reduction along with distinctive strial pathology that includes fewer marginal cells as well as fewer and larger strial capillaries.

We have also published quantitative trait loci that impact the qualitative character of cochlear noise injury. Important implications of our findings are (1) that there exists no single "mammalian" archetype of cochlear noise injury and (2) that noise injury to the organ of Corti in young adult animals depends in part on the status of the cochlear lateral wall. The latter relation appears to be genetically linked and appears not to apply to older adults.

We collaborate widely, both within the School of Medicine and nationally. Our research is eminently adaptable in difficulty and scale to students' schedules and other requirements. Students may expect to learn the full range of methods we employ, including physiology, immunocytochemistry, histopathology and cellular/molecular techniques.

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#### Jay F. Piccirillo, MD

McMillan, 9th Floor  
Phone: 314-362-8641

The Clinical Outcomes Research Office performs clinical epidemiology and health services research. Clinical epidemiology is the study of diagnosis, prognosis and the evaluation of treatment. Health service research is the study of the delivery of health care. The scientific methodology of clinical epidemiology is based on the architecture of clinical research, biostatistics and data processing. Current projects include studying the impact of comorbidities on the treatment and outcomes of patients with cancer. We also conduct research into the neurobiology, treatment and outcomes of patients with tinnitus. One method that we employ is the use of smartphone technology to capture ecological momentary assessments of

tinnitus. Additional projects include exploiting neuroplasticity as part of olfactory training for patients with anosmia. With the use of clinical epidemiology methodology, we can also study a variety of other diseases.

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## Courses

Visit online course listings to view offerings for M55 Oto (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M55>).

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### M55 Oto 660B Clinical Topics In Otolaryngology

This course consists of nine introductory lectures on common diseases of the head and neck, including voice disorders, head and neck cancer, hearing loss, management of vertigo, pediatric otolaryngology, salivary gland disorders, sinusitis, otolaryngologic emergencies and facial trauma. Additionally, there is a case-based roundtable focusing on otolaryngology disorders affecting the geriatric population and the involvement of allied health care disciplines in the evaluation and management of these patients. Each lecture is highlighted by case presentations and treatment options in addition to pathophysiology. This course follows the physical examination practicum given earlier in the academic year.  
Credit 9 units.

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### M55 Oto 801 Otolaryngology Subinternship

Four-week rotation includes evaluation of ENT problems presented to specialist for diagnosis and treatment. The student participates in the clinic, hospital, and operating room. This may also include time on the Pediatric ENT Service, Audiology, Voice Laboratory, and Vestibular Evaluation Laboratory. Option of rotation on the ENT Service at VAMC is possible.

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### M55 Oto 803 Pediatric Otolaryngology

The student will actively participate in the clinical office, inpatient consultations, and surgery with the attending staff at St. Louis Children's Hospital. Care would be taken to provide experience in the common problems one would see in primary care pediatrics or family practice. Participation in sub-specialty/multidisciplinary clinics such as the Cleft and Craniofacial clinic is encouraged. Opportunity will be provided to learn the fundamentals of audiological evaluation. Students participating in this elective will attend academic conferences in both the pediatric and adult divisions.

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### M55 Oto 831 Neurotology

Students will actively participate in the physical examination, advanced testing, and management of patients with balance dysfunction. Students will attend the patient clinic on Monday and Friday. They will also participate in VOG, rotary chair, VEMP, vHIT, and computerized platform testing three days a week. Research participation is possible with prior arrangements.

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### M55 Oto 833 Ambulatory Otolaryngology for the Primary Care Physician

This course offers a four-week exposure to ambulatory care of patients with diseases of the head and neck. Eight half-day sessions per week will be offered in attending clinics for general otolaryngology, head and neck cancer, otology, and pediatric otolaryngology. Two half-day sessions are reserved

for audiology, vestibular lab, and voice lab experience. Surgical exposure is available for selected cases as identified by the student and attending physician, but the main goal of this rotation is outpatient diagnosis and management.

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### M55 Oto 900 Research Elective - Otolaryngology

Research opportunities may be available. If interested, please contact the Department of Otolaryngology.

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## Department of Pathology & Immunology

The Department of Pathology & Immunology (<http://pathology.wustl.edu/>) is involved in the clinical diagnosis and monitoring of disease, in the teaching of pathology and immunology, and in research on the molecular basis of disease and immunology.

The department is responsible through its divisions for studying the pathogenesis and the biochemical and anatomical basis of diseases. Pathologists do research on disease processes using molecular, genetic and structural analysis. Pathologists have the responsibility for the cytological and anatomical diagnosis of diseases and for developing novel structural and molecular approaches for the analysis of them, particularly cancers and infectious diseases. The divisions of Anatomic and Molecular Pathology (<https://pathology.wustl.edu/divisions/amp/>), Immunobiology (<https://pathology.wustl.edu/divisions/immunobiology/>), Laboratory and Genomic Medicine (<http://pathology.wustl.edu/divisions/lgm/>) and Neuropathology (<http://pathology.wustl.edu/divisions/neuropathology/>) have faculty involved in teaching, clinical service and research. Prominent areas of research include experimental diabetes, hematology, bone pathophysiology, cancer, and gastrointestinal and vascular pathology.

The department teaches an extensive course during the second year of the curriculum and presents a number of conferences that third- and fourth-year students can attend. The department also offers a number of clerkships. The course director of the second-year Pathology course is Erika C. Crouch, PhD, MD. Students can take clerkships in Autopsy Pathology, Surgical Pathology or Laboratory Medicine, or they may participate in the research activities of the faculty.

The Division of Immunobiology (<https://pathology.wustl.edu/divisions/immunobiology/>) integrates immunobiology activities at the school. It is responsible for the teaching of immunology during the first year of the curriculum (Brian T. Edelson, MD, PhD, is the course director) and for conducting basic research in immunobiology and in the immunological basis of disease.

Many faculty in the department are involved in graduate teaching and participate in the various programs offered by the Division of Biology and Biomedical Sciences (<http://dbbs.wustl.edu/Pages/>). The department has strong participation in the Immunology graduate program.

Website: <https://pathology.wustl.edu>

## Faculty

**Joseph Gaut, MD, PhD** (<https://pathology.wustl.edu/people/joseph-gaut-md-phd/>)

Anatomic and Molecular Pathology Division Head

**Robert Schreiber, PhD** (<https://pathology.wustl.edu/people/robert-schreiber-phd/>)

Immunobiology Division Head

**Charles Eby, MD** (<https://pathology.wustl.edu/people/charles-eby-md/>)

Laboratory and Genomic Medicine Division Head

**Robert E. Schmidt, MD, PhD** (<https://pathology.wustl.edu/people/robert-schmidt-md-phd/>)

Neuropathology Division Head

Visit our website for more information about our faculty (<https://pathology.wustl.edu/people/>) and their appointments.

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### A

**Sarah DeGenova Ackerman, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

null, The College of New Jersey, 2011

null, Washington University in St Louis, 2016

**Paul M Allen, M.S., Ph.D.**

Professor Emeritus of Pathology and Immunology

Bachelor of Science, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1974

Master of Science, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1977

Doctor of Philosophy, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1981

**Gaya K Amarasinghe, Ph.D.**

Professor of Pathology and Immunology (primary appointment)

Professor of Biochemistry and Molecular Biophysics

Professor of Molecular Microbiology

Alumni Professorship - Pathology and Immunology #2

Bachelor of Science, City College, 1997

Doctor of Philosophy, University of Maryland Baltimore County, 2001

**Neil William Anderson, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Associate Professor of Pediatrics

Madison, 2005

Madison, 2009

**Maksym Artomov, M.S., Ph.D.**

Professor of Pathology and Immunology (primary appointment)

Alumni Endowed Professor of Pathology and Immunology

Master of Science, University of Chicago, 2005

Doctor of Philosophy, Massachusetts Institute of Technology, 2009

### B

**Samuel James Ballentine, M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Medicine, New York University School of Medicine, 2013

**Michael James Barratt, Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, Kings College London, 1994

**Cory Thomas Bernadt, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Nebraska Wesleyan University, 1998

Doctor of Philosophy, University of Nebraska, 2004

Doctor of Medicine, University of Nebraska, 2006

**Deeptha Bhattacharya, Ph.D.**

Adjunct Associate Professor of Pathology and Immunology

Bachelor of Science, Indiana University Bloomington, 1996

Doctor of Philosophy, University of California Berkeley, 2001

**Fouad Ismat Boulos, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, American University of Beirut, 1996

Doctor of Medicine, American University of Beirut, 2001

**Kevin Bowling, Ph.D.**

Associate Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)

Doctor of Philosophy, University of Alabama in Tuscaloosa, 2008

**Simone Brioschi, M.S., Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)

Master of Science, University of Milan, 2010

Doctor of Philosophy, University of Freiberg, 2018

**Victor Borisovich Brodsky, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Boston University, 2001

Doctor of Medicine, Boston University, 2005

**Elizabeth M Brunt, M.D.**

Professor Emeritus of Pathology and Immunology

Bachelor of Science, Georgetown University, 1974  
Doctor of Medicine, University of Texas Galveston, 1981

**Carey-Ann Dawn Burnham, Ph.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Pediatrics  
Professor of Molecular Microbiology  
Professor of Medicine  
Vice Chair - Faculty Development  
Bachelor of Science, University of Alberta, 2002  
Doctor of Philosophy, University of Alberta, 2007

**Kathleen Byrnes, M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2008  
Doctor of Medicine, Tulane University, 2013

**C**

**Yang Cao, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)  
Doctor of Philosophy, University of Wisconsin Madison, 2014

**Marina Cella, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Doctor of Medicine, University of Genova, 1989

**Jiye Cheng, M.S., Ph.D.**

Instructor in Pathology and Immunology (primary appointment)  
Master of Science, Ohio State University, 2010  
Main Campus, 2011

**Rebecca D Chernock, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Otolaryngology  
Bachelor of Science, Brown University, 1999  
Doctor of Medicine, University of Pennsylvania, 2004

**Kyunghee Choi, M.S., Ph.D.**

Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Seoul National University, 1982  
Master of Science, Seoul National University, 1984  
Doctor of Philosophy, University of Illinois, 1988

**John Spellman Aranake Chrisinger, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 2004  
Doctor of Medicine, Washington University in St Louis, 2012

**Marco Colonna, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Medicine  
Robert Rock Belliveau MD Professor of Pathology  
Doctor of Medicine, Parma University, 1983

**Leigh Anne Compton, Ph.D., M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Centenary College Louisiana, 1998  
Doctor of Philosophy, Vanderbilt University, 2005  
Doctor of Medicine, Vanderbilt University, 2008

**Joseph C. Corbo, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Genetics  
Professor of Ophthalmology and Visual Sciences  
Baccalaureatus, Stanford University, 1990  
Bachelor of Science, Stanford University, 1990  
Doctor of Philosophy, University of California, 1997  
Doctor of Medicine, University of California, 1999

**Richard James Cote, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Head of the Department of Pathology and Immunology  
Edward Mallinckrodt Professorship in Pathology  
Doctor of Medicine, University of Chicago, 1980

**Bridgit Crews, Ph.D.**

Associate Professor of Pathology & Immunology (primary appointment)  
null, University of California Santa Barbara, 2006

**Erika C Crouch, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)  
Vice Chair - Education  
Doctor of Philosophy, University of Washington, 1978  
Doctor of Medicine, University of Washington, 1979

**D**

**Sonika M Dahiya, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Doctor of Medicine, Kasturba Medical College, 2000

**Gautam Dantas, Ph.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Biomedical Engineering  
Professor of Molecular Microbiology  
Division Chief  
Professor of Pediatrics  
Bachelor of Science, Macalester College, 2000  
Doctor of Philosophy, University of Washington, 2005

**Louis P Dehner, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Pathology in Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1962  
Doctor of Medicine, Washington University in St Louis, 1966

**George J Despotis, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Associate Professor of Anesthesiology  
Bachelor of Arts, Greenville College, 1981  
Doctor of Medicine, Saint Louis University, 1985

**Dennis J. Dietzen, Ph.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Pediatrics  
Bachelor of Science, Marian College, 1986  
Doctor of Philosophy, Indiana University Bloomington, 1992

**Rebekah Dumm, Ph.D.**

Assistant Professor of Pathology & Immunology (primary appointment)  
Bachelor of Science, University of Delaware, null  
Doctor of Philosophy, Duke University, null

**Eric James Duncavage, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Vanderbilt University, 1998  
Doctor of Medicine, University of Tennessee, 2004

**Gavin P. Dunn, Ph.D., M.D.**

Associate Professor of Pathology and Immunology  
Associate Professor of Neurology  
Bachelor of Arts, Princeton University, 1998  
Doctor of Philosophy, Washington University in St Louis, 2006  
Doctor of Medicine, Washington University in St Louis, 2006

**William Michael Dunne, Ph.D.**

Adjunct Professor of Pathology and Immunology  
Bachelor of Science, University of Wisconsin Madison, 1975  
Doctor of Philosophy, University of Wisconsin Madison, 1981

**E**

**Allison Rae Eberly, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Chestnut Hill College, 2014  
Doctor of Philosophy, Vanderbilt University, 2019

**Charles S Eby, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Medicine  
Bachelor of Science, Duke University, 1977  
Doctor of Medicine, Vanderbilt University, 1981

**Brian T. Edelson, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 1995  
Doctor of Medicine, Washington University in St Louis, 2004

**Takeshi Egawa, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Doctor of Medicine, Osaka University, 1994  
Doctor of Philosophy, Osaka University, 2002

**David Eisenstein, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Doctor of Medicine, University of Cincinnati, 1989

**Ali Hassan Ellebedy, Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Associate Professor of Medicine  
Associate Professor of Molecular Microbiology  
Bachelor of Science, Cairo University, 2004  
Doctor of Philosophy, University of Tennessee Health Science Center, 2011

**F**

**Christopher William Farnsworth, Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Roberts Wesleyan College, 2009  
Doctor of Philosophy, University of Rochester, 2017

**John Lawrence Frater, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, University of Notre Dame, 1992  
Doctor of Medicine, Medical College of Ohio, 1996

**Daved H Fremont, Ph.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Biochemistry and Molecular Biophysics  
Professor of Molecular Microbiology  
Bachelor of Science, University of Wisconsin Madison, 1986  
Doctor of Philosophy, University of California San Diego, 1993

**G**

**Joseph P. Gaut, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Medicine  
Division Chief - Division of Anatomic and Molecular Pathology  
Ladenson Professorship in Pathology  
Bachelor of Arts, Washington University in St Louis, 1996  
Doctor of Philosophy, Washington University in St Louis, 2004  
Doctor of Medicine, Washington University in St Louis, 2004

**Rongbin Ge, Ph.D., M.D.**

Assistant Professor of Pathology & Immunology (primary appointment)  
null, Shanghai Jiao Tong University (#####), 2000  
null, Karolinska Institute, 2007

**Susan Gilfillan, Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Bachelor of Arts, University of Denver, 1982  
Doctor of Philosophy, Stanford University, 1990

**Misty Lynn Good, M.D.**

Assistant Professor of Pathology and Immunology  
Bachelor of Science, University of Southern California, 2001  
Doctor of Medicine, American University of the Caribbean School of Medicine, 2005

**Jeffrey I Gordon, M.D.**

Professor of Pathology and Immunology (primary appointment)

Professor of Developmental Biology  
Dr Robert J Glaser Distinguished University Professor  
Director - Center for Genome Sciences  
Professor of Medicine  
Professor of Molecular Microbiology  
Bachelor of Arts, Oberlin College, 1969  
Doctor of Medicine, University of Chicago, 1973

**Gary E. Grajales-Reyes, Ph.D., M.D.**  
Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, University of Puerto Rico Rio Piedras, 2010  
Doctor of Philosophy, Washington University in St Louis, 2016  
Doctor of Medicine, Washington University in St Louis, 2018

**Ann Marie Gronowski, M.S., Ph.D.**  
Professor of Pathology and Immunology (primary appointment)  
Professor of Obstetrics and Gynecology  
Co-Division Chief - Division of Laboratory and Genomic Medicine  
Bachelor of Science, University of Illinois, 1985  
Master of Science, Iowa State University, 1988  
Doctor of Philosophy, University of Wisconsin Madison, 1992

**Brenda Jean Grossman, M.S., M.D.**  
Professor of Pathology and Immunology (primary appointment)  
Professor of Medicine  
Bachelor of Science, Ohio University, 1976  
Doctor of Medicine, Medical College Georgia, 1980  
Master of Science, Saint Louis University, 2003

## H

**Ian Sean Hagemann, Ph.D., M.D.**  
Associate Professor of Pathology and Immunology (primary appointment)  
Assistant Dean for Admissions  
Bachelor of Arts, Princeton University, 2000  
Doctor of Philosophy, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2008

**Scott A Handley, Ph.D.**  
Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Missouri State University (Formerly Southwest Missouri State), 1998  
Doctor of Philosophy, Washington University in St Louis, 2006

**Thomas Joseph Hannan, D.V.M.**  
Instructor in Pathology and Immunology (primary appointment)  
Bachelor of Arts, Georgetown University, 1989  
Doctor of Veterinary Medicine, Tufts University, 1995

**Ted H Hansen, M.S., Ph.D.**  
Professor Emeritus of Pathology and Immunology  
Bachelor of Science, Michigan State University, 1970  
Master of Science, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1972  
Doctor of Philosophy, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1975

**Anjum Hassan, M.D.**  
Associate Professor of Pathology and Immunology (primary appointment)  
Doctor of Medicine, Aga Khan University, 1989

**Mai He, Ph.D., M.D.**  
Professor of Pathology and Immunology (primary appointment)  
Doctor of Medicine, Fudan University, 1993  
Doctor of Philosophy, Rutgers University, 2001

**Jasmin Herz, M.S., Ph.D.**  
Assistant Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, University of Cologne (Koln), 2000  
Master of Science, University of Cologne (Koln), 2004  
Doctor of Philosophy, University of Cologne (Koln), 2008

**Jonathan W Heusel, Ph.D., M.D.**  
Professor of Pathology and Immunology (primary appointment)  
Professor of Genetics  
Doctor of Philosophy, Washington University in St Louis, 1995  
Doctor of Medicine, Washington University in St Louis, 1995

**Matthew Charles Hibberd, Ph.D.**  
Assistant Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Lincoln School of Commerce, 2007  
Doctor of Philosophy, Washington University in St Louis, 2016

**Dana Ashley Hill**  
Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)

## J

**Ronald R Jackups, Ph.D., M.D.**  
Associate Professor of Pathology and Immunology (primary appointment)  
Associate Professor of Pediatrics  
Bachelor of Science, Washington University in St Louis, 2000  
Doctor of Philosophy, University of Illinois Chicago, 2008  
Doctor of Medicine, University of Illinois Chicago, 2008

**Umang Jain, M.S., Ph.D.**  
Instructor in Pathology and Immunology (primary appointment)  
Bachelor of Science, Manipal University, 2007  
Master of Science, Manipal University, 2009  
Doctor of Philosophy, Dalhousie University, 2015

## K

**Jonathan Kipnis, M.S., Ph.D.**  
Professor of Pathology and Immunology (primary appointment)  
Professor of Neurology  
Professor of Neuroscience  
Professor of Neurological Surgery  
Alan A and Edith L Wolff Distinguished Professor  
Aviv University, 1998  
Master of Science, Weizmann Institute of Science, 1999



Doctor of Philosophy, Weizmann Institute of Science, 2004

**Eynav Yafit Klechevsky, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, Technion Israel Institute of Technology, 2007

**Hannah Rachel Krigman, M.D.**

Professor of Pathology and Immunology (primary appointment)

Bachelor of Arts, Amherst College, 1983

Doctor of Medicine, University of North Carolina, 1988

**Kilannin Cathleen Krysiak, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Champaign, 2006

Doctor of Philosophy, Washington University in St Louis, 2014

**Michael Kyriakos, M.D.**

Professor Emeritus of Pathology and Immunology

Bachelor of Science, City College, 1958

Doctor of Medicine, Albert Einstein College of Medicine, 1962

**L**

**Jack H Ladenson, Ph.D.**

Professor of Pathology and Immunology (primary appointment)

Professor of Clinical Chemistry in Medicine

Oree M Carroll and Lillian B Ladenson Professor of Clinical

Chemistry in Pathology and Immunology

Bachelor of Science, Pennsylvania State University, 1964

Doctor of Philosophy, University of Maryland, 1971

**Yi-Shan Lee, Ph.D., M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Medicine, National Taiwan University, 2000

Doctor of Philosophy, Duke University, 2008

**Cheryl Faye Lichti, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Other bachelor's degree, Hendrix College, 1988

Doctor of Science, Duke University, 1993

**Chieh-Yu Lin, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Doctor of Medicine, National Taiwan University, 2009

**Chang Liu, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Doctor of Medicine, Peking Union Medical College, 2004

Doctor of Philosophy, Oregon Health Science University, 2010

**Ta-Chiang Liu, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Ming University, 1997

Doctor of Philosophy, Imperial College, 2003

**Xiuli Liu, Ph.D.**

Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, University of Arkansas for Medical Sciences, 2002

**Ulrike Lorenz, Ph.D.**

Professor of Pathology & Immunology (primary appointment)

null, Freie Universität Berlin, 1989

**M**

**Changqing Ma, Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Health System, 2005

**Mena Magdi Zaki Mansour, M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Medicine, Alexandria University, 2005

**Nidia Messias, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Doctor of Medicine, Faculdade Medicina Estadual (ISEP), 1998

**Martina Molgora, M.S., Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)

Bachelor of Science, University of Milan, 2011

Master of Science, University of Milan, 2013

Doctor of Philosophy, Open University, 2018

**Nima Mosammaparast, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)

Professor of Medicine

Bachelor of Science, University of Rochester, 1998

Doctor of Philosophy, University of Virginia, 2005

Doctor of Medicine, University of Virginia, 2006

**Kenneth M Murphy, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)

Eugene Opie First Centennial Professor of Pathology and

Immunology

Doctor of Philosophy, Johns Hopkins University, 1984

Doctor of Medicine, Johns Hopkins University, 1984

**Theresa L Murphy, Ph.D.**

Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, University of Arizona, 1978

Doctor of Philosophy, Johns Hopkins University, 1983

**N**

**Rakesh Nagarajan, Ph.D., M.D.**

Adjunct Associate Professor of Pathology and Immunology

Bachelor of Arts, University of Virginia, 1994

Doctor of Philosophy, Washington University in St Louis, 2002

Doctor of Medicine, Washington University in St Louis, 2002

**Pooja P Navale, M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Medicine, Tata Inst of Fundamental Resch, 2013

**Julie Ann Neidich, M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Associate Professor of Pediatrics

Doctor of Medicine, George Washington University, 1983

**Christopher A Nelson, Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, University of Wisconsin Madison, 1985

Doctor of Philosophy, Washington University in St Louis, 1995

**O**

**Eugene Merle Oltz, Ph.D.**

Adjunct Professor of Pathology and Immunology

Bachelor of Science, Cornell University, 1982

Doctor of Philosophy, Columbia University, 1987

**P**

**Vijayalakshmi Padmanabhan, M.P.H., MBBS**

Professor of Pathology and Immunology (primary appointment)

Foreign MD equivalent, Kasturba Medical College, 1988

Master of Public Health, Dartmouth College, 2015

**Bijal A. Parikh, Ph.D., M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, Rutgers University, 2004

Doctor of Medicine, University of Medicine and Dental Of New Jersey, 2006

**Jonathan Robert Brestoff Parker, M.S., Ph.D., M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Skidmore College, 2008

Master of Science, University College Cork, 2010

Doctor of Philosophy, University of Pennsylvania, 2015

Doctor of Medicine, University of Pennsylvania, 2016

**Jacqueline Elise Payton, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Bradley University, 1996

Doctor of Philosophy, University of Illinois, 2002

Doctor of Medicine, University of Illinois, 2004

**Richard J. Perrin, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Yale University, 1992

Doctor of Philosophy, University of Illinois, 2001

Doctor of Medicine, University of Illinois at Chicago, 2004

**Stephen P. Persaud, Ph.D., M.D.**

Instructor in Pathology and Immunology (primary appointment)

Bachelor of Science, Cornell University, 2005

Doctor of Philosophy, Washington University in St Louis, 2015

Doctor of Medicine, Washington University in St Louis, 2015

**John David Pfeifer, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)

Professor of Obstetrics and Gynecology

Bachelor of Arts, University of California, 1981

Doctor of Philosophy, University of California, 1987

Doctor of Medicine, University of California, 1988

**Q**

**Abraham Jaleel Qavi, Ph.D., M.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)

Champaign, 2012

Bachelor of Science, University of California Irvine, 2016

Doctor of Medicine, University of Illinois, 2016

**R**

**Gwendalyn Jan Randolph, Ph.D.**

Professor of Pathology and Immunology (primary appointment)

Professor of Medicine

Unanue Distinguished Professor of Immunology

Bachelor of Science, Temple University, 1991

Doctor of Philosophy, State University of New York, 1995

**Kodi S. Ravichandran, Ph.D.**

Professor of Pathology and Immunology (primary appointment)

Robert L. Kroc Professor of Pathology and Immunology

Division Chief of IMM

null, University of Massachusetts Amherst, 1992

**Alejandro Reyes**

Adjunct Assistant Professor of Pathology and Immunology

**Jon H Ritter, M.D.**

Professor of Pathology and Immunology (primary appointment)

Mankato, 1983

Doctor of Medicine, University of Minnesota, 1988

**Nidhi Rohatgi, Ph.D.**

Instructor in Pathology and Immunology (primary appointment)

India Inst of Medical Sci, 2005

**Stephen Matthew Roper, M.S., Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Texas Tech University, 2004

Master of Science, Texas Tech University, 2007

Doctor of Philosophy, Medical University of South Carolina, 2015

**Marianna B Ruzinova, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, Cornell University, 2004  
Doctor of Medicine, Cornell University, 2005

## S

### **Rafael Sanguinetti Czepielewski, M.S., Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)  
RS), 2008  
RS), 2011  
RS), 2016

### **Robert Edward Schmidt, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)  
Division Chief - Division of Neuropathology  
Bachelor of Arts, Washington University in St Louis, 1969  
Doctor of Philosophy, Washington University in St Louis, 1976  
Doctor of Medicine, Washington University in St Louis, 1976

### **Robert D Schreiber, Ph.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Molecular Microbiology  
Andrew M Bursky and Jane M Bursky Distinguished Professor  
Bachelor of Arts, State University of New York, 1968  
Doctor of Philosophy, State University of New York, 1973

### **Molly Schroeder, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Saint Louis University, 2006  
Doctor of Philosophy, Baylor College of Medicine, 2012

### **Katherine Elizabeth Schweteye, M.S., Ph.D., M.D.**

Associate Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2002  
Master of Science, Washington University in St Louis, 2005  
Doctor of Philosophy, Washington University in St Louis, 2011  
Doctor of Medicine, Washington University in St Louis, 2011

### **Andrey S Shaw, M.D.**

Adjunct Professor of Pathology and Immunology  
Bachelor of Arts, Columbia University, 1979  
Doctor of Medicine, Columbia University, 1984

### **Kathleen C Sheehan, Ph.D.**

Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, University of Notre Dame, 1980  
Doctor of Philosophy, Saint Louis University, 1986

### **Cara L Shirai, M.S., Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Southeast Missouri State University, 2002  
Master of Science, Southeast Missouri State University, 2005  
Doctor of Philosophy, Saint Louis University, 2010

### **Igor Smirnov, D.V.M.**

Associate Professor of Pathology and Immunology (primary appointment)

Doctor of Veterinary Medicine, Moscow Veterinary Academy, 1993

### **Lulu Sun, Ph.D., M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, McGill University, 2007  
Doctor of Philosophy, Washington University in St Louis, 2016  
Doctor of Medicine, Washington University in St Louis, 2016

### **Sanjay Joshua Swamidass, M.A., Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Associate Professor of Biomedical Engineering  
Bachelor of Science, University of California, 2000  
Master of Arts, University of California, 2006  
Doctor of Philosophy, University of California, 2007  
Doctor of Medicine, University of California, 2009

## T

### **Mei San Tang, M.D.**

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)  
null, Monash University Malaysia Campus, 2013

### **Steven L Teitelbaum, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Professor of Medicine  
Messing Professor of Pathology and Immunology  
Bachelor of Arts, Columbia University, 1960  
Doctor of Medicine, Washington University in St Louis, 1964

### **Suzanne Renee Thibodeaux, Ph.D., M.D.**

Associate Professor of Pathology and Immunology (primary appointment)  
Bachelor of Science, Tulane University, 2005  
Doctor of Philosophy, University of Texas Health Sciences at San Antonio, 2011  
Doctor of Medicine, University of Texas Health Sciences at San Antonio, 2013

### **Ning Tsao, Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)  
Doctor of Philosophy, National Taiwan University, 2015

### **Jackson S Turner, Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, University of Tulsa, 2011  
null, University of Michigan Ann Arbor, 2017

## U

### **Emil Raphael Unanue, M.D.**

Professor of Pathology and Immunology (primary appointment)  
Paul and Ellen Lacy Professor of Pathology and Immunology  
Bachelor of Science, Institute of Secondary Educati, 1952

Doctor of Medicine, Havana University, 1960

## V

### **Steven John Van Dyken, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Calvin College, 1998

Doctor of Philosophy, University of San Diego, 2006

### **Siddarth Venkatesh, Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)

Doctor of Philosophy, Rockefeller University, 2015

### **William Vermi**

Adjunct Assistant Professor of Pathology and Immunology

### **Herbert W Virgin, Ph.D., M.D.**

Adjunct Professor of Pathology and Immunology

Bachelor of Arts, Harvard University, 1977

Doctor of Philosophy, Harvard University, 1985

Doctor of Medicine, Harvard University, 1985

## W

### **Xiaoxiao Wan, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, University of Missouri Columbia, 2015

### **Yi Wang, Ph.D.**

Instructor in Pathology and Immunology (primary appointment)

Bachelor of Science, Peking University, 2008

Doctor of Philosophy, University of Pennsylvania, 2015

### **Mark A Watson, Ph.D., M.D.**

Professor of Pathology and Immunology (primary appointment)

Vice Chair of Faculty Development

Bachelor of Arts, University of Pennsylvania, 1985

Doctor of Philosophy, Washington University in St Louis, 1992

Doctor of Medicine, Washington University in St Louis, 1992

### **Daniel Morgan Webber, M.S., Ph.D., M.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)

Bachelor of Science, University of Arkansas Main Campus, 2006

Master of Science, University of Arkansas Main Campus, 2006

Doctor of Philosophy, University of Arkansas for Medical Sciences, 2017

Doctor of Medicine, University of Arkansas for Medical Sciences, 2017

### **Cody Hudson Weimholt, D.O.**

Assistant Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, University of Missouri Columbia, 2005

Doctor of Osteopathic Medicine, Kirksville College of Osteopathic Medicine, 2013

### **Frances V White, M.S., M.D.**

Professor of Pathology & Immunology (primary appointment)

Bachelor of Arts, Princeton University, 1975

Master of Science, University of North Carolina, 1978

Doctor of Medicine, University of North Carolina, 1989

### **Terry A Woodford-Thomas, M.S., Ph.D.**

Adjunct Assistant Professor of Pathology and Immunology

Bachelor of Science, Eastern Illinois University, 1975

Main Campus), 1977

Doctor of Philosophy, Virginia Polytechnic Institute and State University, 1982

### **Chao Wu, Ph.D.**

Instructor in Pathology and Immunology (primary appointment)

Bachelor of Science, China Agriculture University, 2008

Doctor of Philosophy, Washington University in St Louis, 2016

## Y

### **Melanie Leann Yarbrough, Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, University of Texas Southwestern Medical Center at Dallas, 2009

## Z

### **Pavel Zakharov, M.S., Ph.D.**

Instructor in Pathology and Immunology (Pending Dean's Approval) (primary appointment)

Master of Science, Moscow State University, 2016

Doctor of Philosophy, Moscow State University, 2016

### **Mark A. Zaydman, Ph.D., M.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Case Western Reserve University, 2007

Doctor of Medicine, Washington University in St Louis, 2016

null, Washington University in St Louis, null

### **Bernd Heinrich Zinselmeyer, Ph.D.**

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, University of Strathclyde, 2006

### **Wei Zou, M.A., Ph.D.**

Associate Professor of Pathology and Immunology (primary appointment)

Master of Arts, Sathyabama Institute of Science and Technology (SIST), 1994

Doctor of Philosophy, Hebrew University, 2003

## Research Electives

### Pathology and Immunology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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**Paul M. Allen, PhD**

BJC Institute of Health, 8th Floor  
Phone: 314-362-8758

This lab's focus is on research in immunology and the recognition of antigen by T cells. We are investigating how the T cell receptor functions developmentally, biochemically and structurally. We utilize in vivo models to study the role of T cells in alloreactivity/graft rejection and inflammatory bowel disease.

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**Jacques U. Baenziger, MD, PhD**

Kingshighway Building, 2nd Floor, Room 2423  
Phone: 314-362-8730

Glycobiology; informational role of carbohydrates in protein targeting and reproductive endocrinology.

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**Jeffrey I. Gordon, MD**

4444 Forest Park, 5th Floor  
Phone: 314-362-7243

Genomic and metabolic foundations of symbiotic host-microbial interactions in the human gut; impact on obesity and malnutrition.

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**Michael McDaniel, PhD**

3709 West Building  
Phone: 314-362-7435

The focus of this laboratory is to study the function and growth of pancreatic islets in Types 1 and 2 diabetes. Mammalian target of rapamycin (mTOR) is a protein kinase that integrates signals from growth factors and nutrients to regulate DNA and protein synthesis. G-protein-coupled receptor agonists such as GLP-1 have been shown to enhance proinsulin biosynthesis and secretion and to stimulate cellular growth and proliferation. Our objective is to further explore the mechanisms of action of GLP-1 to enhance DNA and protein synthesis via mTOR in rodent and human islets. These studies are of fundamental interest for optimizing mTOR to induce cellular growth and proliferation, to enhance pre- and post-islet transplantation in Type 1 diabetes, and to prolong b-cell compensation in response to insulin resistance in Type 2 diabetes. The failure of b-cells in obesity-associated Type 2 diabetes is believed to correlate with the intracellular accumulation of lipids that contribute to defects in insulin secretion and the maintenance of b-cell mass. Our studies have identified lipoprotein lipase in b-cells; this is a key enzyme for catalyzing the hydrolysis of lipoprotein-associated TAG to produce free fatty acids (FFAs) for local cellular uptake. We are also characterizing the effects of enhanced FFA uptake through fatty acid transporters and determining the regulation of lipid droplet synthesis and breakdown by lipid droplet-associated proteins. Recent studies suggest that FFAs upregulate mitochondrial uncoupling proteins proposed to

dissipate the proton gradient across the mitochondrial inner membrane. The objective of this study is to delineate the link between FFAs and b-cell mitochondrial dysfunction in Type 2 diabetes.

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**Kenneth M. Murphy, MD, PhD**

Clinical Sciences Research Building, 7th Floor, Room 7766  
Phone: 314-362-2009

Function of dendritic cells in T cell responses and anti-tumor vaccines.

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**Robert D. Schreiber, PhD**

BJC Institute of Health, 8th Floor  
Phone: 314-362-8747

Tumor immunology and cancer immunoediting; research on natural and therapeutically induced responses to tumors; definition of the molecular roles of interferon-gamma and interferon-alpha/beta in these processes.

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**Carl H. Smith, MD**

St. Louis Children's Hospital  
Phone: 314-454-6029

Placental transport; surface membrane structure and function.

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**Thaddeus S. Stappenbeck, MD, PhD**

Clinical Sciences Research Building, North Tower, Room 1020  
Phone: 314-362-4214

My lab studies the cause of inflammatory bowel disease, a condition that leads to spontaneous inflammation of the intestine. We study the mechanisms of host gene mutations as well as abnormalities in host-microbial interactions that drive this disease.

---

**Steven Teitelbaum, MD**

Barnes-Jewish Hospital  
Phone: 314-454-8463

This lab studies the cellular and molecular mechanisms of bone remodeling, with particular emphasis on osteoclast biology as it relates to the pathogenesis and prevention of diseases such as osteoporosis. We focus on integrin and cytokine biology utilizing a variety of genetically manipulated mice.

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**John Turk, MD, PhD**

6609 Wohl  
Phone: 314-362-8190

This lab looks at phospholipase A2 (PLA2) enzymes in the regulation of insulin secretion from pancreatic islet cells (e.g., a novel iPLA2 that does not require Ca<sup>2+</sup> cloned from rat and human islets that is involved in cell secretion and proliferation).

We also perform studies of iPLA2, its post-translational modifications, and its interactions with other proteins involving mice that are iPLA2-deficient globally or in selected tissues, transgenic mice that overexpress iPL2 in -cells, and insulinoma cells with genetically manipulated iPLA2 expression. The mass spectrometric characterization of proteins and complex lipids is an important tool in these studies.

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**Emil R. Unanue, MD**

BJC Institute of Health, 8414

Phone: 314-362-8748

Our focus is research that involves immunobiology and immunopathology. We examine cellular interactions that result in immune induction and cellular immunity. These cellular interactions are examined in normal immune responses and in autoimmune diseases. The focus is to identify the proteins responsible for the activation of lymphocytes in Type 1 diabetes.

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**Herbert Virgin, MD, PhD**

Clinical Sciences Research Building, Room 8849

Phone: 314-362-9223

We work on issues at the interface of virology and immunology by analyzing aspects of viral immunity, viral pathogenesis and viral genetics that contribute to virulence and disease.

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**Mark A. Watson, MD, PhD**

Clinical Sciences Research Building, North Tower, Room 1029

Phone: 314-454-7919

Our laboratory is interested in defining patterns of somatic gene mutation, gene expression and quantitative tumor clonality that can be used to predict distant site metastases and therapeutic vulnerability in patients with lung and breast cancer. Experimental approaches use histopathological review as well as the next-generation DNA exome and RNA sequencing (NGS) of primary cancer patient tissues, coupled with bioinformatics and statistical modeling, to identify candidate biomarker patterns that may be useful for the clinical management of cancer patients.

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## Courses

Visit online course listings to view offerings for M60 Path (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M60>).

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**M60 Path 523 Immunology**

The course consists of lectures, laboratory exercises and clinical correlations. It covers all aspects of the immune response - general properties of the immune system, effector molecules, cells and their function, cellular interactions, vaccines, and immunological diseases. Two laboratory exercises focus on blood typing and allergy. Students will also meet in groups (20-25 students) with clinicians to discuss a variety of clinical cases that relate to the course material.

Credit 37 units.

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**M60 Path 665 Pathology**

This course is a comprehensive survey of the biology and morphology of human disease through a combination of lectures and laboratory sessions. The year begins with a review of basic disease mechanisms at the cellular and molecular level. Subsequently, the pathogenesis and characteristics of important diseases involving each organ system of the body are presented. During the year, students will become familiar with the methods of contemporary pathologic analysis. They will also learn how the results of pathologic studies are used in the clinical setting to establish diagnoses, to assess prognosis and response to therapy, and to evaluate the quality of patient care.

Credit 115 units.

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**M60 Path 702 Laboratory Medicine Clerkship**

This elective is designed to teach the student how clinical laboratory assays are used in the diagnosis of disease and to understand the quality assurance tools the laboratory utilizes to assure the reliability of tests. The two-week elective includes rotations through laboratories in clinical chemistry, clinical microbiology, transfusion medicine, molecular diagnostics and hematopathology. During the elective the student will have a daily schedule, which includes didactic sessions with senior staff and house staff. Particularly useful clinical skills to be acquired include: morphology of peripheral blood smears and bone marrow biopsies; interpretation of coagulation tests, biomarkers of cardiac damage and serum protein electrophoresis patterns. Also covered are appropriate use of blood component therapy, and therapeutic apheresis and identification of infectious organisms. Students will attend quality assurance meetings with senior staff, participate in microbiology rounds and present case discussions during this elective.

Credit 77 units.

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**M60 Path 750 Surgical Pathology Clerkship**

This elective is designed to familiarize students with the discipline of surgical pathology and to encourage the development of basic skills in gross pathology and histopathological interpretation. The Laboratory of Surgical Pathology at Barnes-Jewish Hospital receives a broad range of medical biopsy material in addition to specimens derived from the busy surgical subspecialty practices. As a result, this elective is beneficial not only for students considering a career in pathology, but also for students planning careers in internal medicine, surgery, obstetrics-gynecology, pediatrics, radiology, radiation oncology and dermatology. Students on this elective will (1) Learn how patient specimens are received and processed, (2) Acquire skills in the gross examination and microscopic diagnosis of disease through active participation and (3) Learn the role of the pathologist in the preoperative, intraoperative, and postoperative care and management of patients. Students will function as junior house staff managing their own cases with supervision from residents, fellows and attending pathologists. Students may also wish to participate in ongoing research projects within the Department as time, and interest, allows. The daily schedule for students begins at 8:00 a.m. with morning conference. In general, the student will be able to complete all gross examination and sign-out activities by 4:30 p.m. Students are welcome to stay beyond 4:30 p.m. to participate in any of the academic or other working

activities of the Division. Student time distribution: Clinical duties 85%, Conference/Lectures 15%; Major teaching responsibility: Attending staff, residents and fellows; Patients seen/weekly: N/A; On call/weekend responsibility: None  
Credit variable, maximum 77 units.

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#### **M60 Path 805 Autopsy Pathology**

This elective is designed to introduce students to autopsy pathology. Students will assist in performing autopsies, and together with the first-year pathology residents, will participate in all of the activities of the Autopsy Service including brain cutting, specialty microscopic conferences, and weekly autopsy case conferences. Students will be under the direction of senior pathology faculty. Note that this elective is not available during the COVID-19 pandemic.

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#### **M60 Path 807 Dermatopathology**

The student will be involved in all activities of the dermatopathology service. These include review, discussion, and signout of microscopic skin specimens. Signout occurs each day with a team that includes an attending, fellow, and residents from both dermatology and pathology. The medical student will work closely with the residents and fellow to preview cases prior to signout. Dermatology Grand Rounds is held Thursday mornings and is mandatory. In addition, dermatopathology slide review conferences are held most Tuesday mornings and are mandatory (schedule will be provided). Other learning opportunities include informal unknown slide sessions and consensus conferences. The primary goal of this elective is to acquire basic competence in the diagnosis of skin diseases at the microscopic level.

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#### **M60 Path 812 General Cytopathology**

This elective is designed to familiarize students with the discipline of Cytopathology and to encourage the development of basic skills. Cytopathology impacts many different areas of patient care and medical practice. The Cytopathology Laboratory at Barnes-Jewish Hospital receives a broad range of medical cytology material involving fine needle aspiration biopsies (FNA), body fluids and Pap tests. As a result, the elective is beneficial for students considering a career in pathology and for students planning careers in internal medicine, surgery, OB/GYN, ENT, and radiology. The focus of the experience can be customized based on the interest of the student. Desk space and a microscope are provided. Students on the elective will (1) learn how patient specimens are received and processed, (2) acquire skills in the microscopic diagnosis of disease through active participation, and (3) learn the role of the cytopathologist in the care and management of patients. Students will have the opportunity to function as junior house staff managing their own cases with supervision from residents, fellows, and attending cytopathologist. There are text books and extensive study sets to permit students to focus on specific areas of interest. The daily schedule for student begins previewing the cytology cases at 8:00 am. The student will attend daily pathology noon didactic conferences. In general, the student will be able to complete sign-out activities by 4:30 pm.

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#### **M60 Path 813 Molecular Pathology**

This elective is designed to introduce students to the field of Molecular Pathology, including established molecular diagnostics and Next Generation Sequencing clinical assays. Students will learn through observation in the laboratory, didactic sessions, resident and fellow presentations, sign out with attending pathologists, and clinical informatics workshops. Opportunities

for assay validation as well as additional instruction in cytogenomics are available and tailored to student interest. Students will work with residents/fellows on the rotation and participate as part of the team.

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#### **M60 Path 815 OB/GYN Pathology**

This elective is a subinternship in Ob/Gyn pathology. The expectation is that the student participate in the service along with house officer rotating on the service. The elective stresses the principles of anatomic pathology when applied to operative material in obstetrics and gynecology. The sub-intern will examine gross and microscopic specimens in the Ob/Gyn Pathology Lab and review the histology along with pertinent literature with a senior pathologist. The elective is appropriate both for students intending a career in pathology, and those intending careers in other specialties. The student will gain familiarity with the diagnosis of more common OB/Gyn diagnoses, including malignancy, and premalignant conditions, as well as placental conditions. Ample time will be available for attending conferences in both OB/Gyn and Pathology.

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#### **M60 Path 820 Surgical Pathology**

This elective is designed to familiarize students with the discipline of Surgical Pathology and to encourage the development of basic skills in gross pathology and histopathological interpretation. The Laboratory of Surgical Pathology at Barnes-Jewish Hospital receives a broad range of medical biopsy material in addition to specimens derived from the busy surgical subspecialty practices. As a result, this elective is beneficial not only for students considering a career in pathology, but also for students planning careers in internal medicine, surgery, obstetrics-gynecology, pediatrics, radiology, radiation oncology and dermatology. Students on this elective will (1) learn how patient specimens are received and processed, (2) acquire skills in the gross examination and microscopic diagnosis of disease through active participation, and (3) learn the role of the pathologist in the preoperative, intraoperative, and postoperative care and management of patients. Students will function as junior house staff, managing their own cases with supervision from residents, fellows, and attending pathologists. Students may also wish to participate in ongoing research projects within the department as time and interest allow. At the end of the rotation, students are required to do a formal case presentation for the residents, fellows, and attending staff. The daily schedule for students begins at 8:00 am with morning conference. In general, the student will be able to complete all gross examination and sign-out activities by 4:30 pm. Students are welcome to stay beyond 4:30 pm to participate in any of the academic or other working activities of the Division.

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#### **M60 Path 825 Introduction to Neuropathology**

The course is structured to give the student a full-time immersion in the specialty of Neuropathology, including both Neurosurgical and Neuroautopsy derived material. The course is structured to give the student a full-time immersion in the specialty of neuropathology, including both neurosurgical and neuroautopsy derived material. There are daily didactic sessions that cover the spectrum of neurological diseases, review gross and microscopic neuro-anatomy, discuss approaches to the diagnosis of nervous system disease, and point out the interrelationships of research to clinical problems. Multiple clinical conferences and diagnostic working sessions complement reading, use of a large microscopic divisional study set and project work.

### M60 Path 860 Clinical Laboratory Medicine

This elective rotation is designed to teach the student how clinical laboratory assays are used in the diagnosis of disease and to understand the quality assurance tools the laboratory utilizes to assure the reliability of tests. The elective includes rotations through a variety of clinical laboratories including clinical chemistry, clinical microbiology, hematopathology, molecular pathology, and transfusion medicine. During the elective the student will have a daily schedule, which includes didactic sessions with faculty and regular interactions with house staff. Some examples of useful clinical skills acquired during the experience include: morphologic review of peripheral blood smears and bone marrow biopsies; interpretation of coagulation tests, biomarkers of cardiac damage and serum protein electrophoresis patterns; identification of infectious organisms; and appropriate use of blood component therapy and therapeutic apheresis. The rotation culminates with a case discussion presented by the medical student which focuses on application of clinical laboratory evaluations to direct patient care.

### M60 Path 900 Research Elective - Pathology

Research opportunities may be available. If interested, please contact the Department of Pathology and Immunology.

## Edward Mallinckrodt Department of Pediatrics

The primary aim of the teaching program of the Department of Pediatrics (<http://pediatrics.wustl.edu/>) is to stimulate interest in developmental biology — in particular, human growth and development — to provide students with a foundation sufficiently comprehensive to have an appreciation of clinical pediatric problems, regardless of their future career choices in medicine.

The major clinical and research facilities are in St. Louis Children's Hospital (<http://www.stlouischildrens.org/>), and the newborn services are at the Women and Infants Center (<http://www.stlouischildrens.org/women-and-infants/>). St. Louis Children's Hospital is a facility with 300 beds that accepts patients through 21 years of age with all types of medical and surgical problems. Hospital admissions average 11,200 annually. Pediatric medical ambulatory activity, including subspecialty and emergency visits, averages about 152,000 visits a year. Nearly 4,000 infants are born annually at the Washington University Medical Center.

Website: <http://pediatrics.wustl.edu>

## Faculty

### Department Chair

Gary Silverman, MD, PhD (<http://pediatrics.wustl.edu/Faculty/gsilverman/>)

### Department Vice Chairs

F. Sessions Cole, MD ([http://pediatrics.wustl.edu/Faculty/cole\\_francis\\_sessions/](http://pediatrics.wustl.edu/Faculty/cole_francis_sessions/))

Mark Lowe, MD, PhD ([http://pediatrics.wustl.edu/Faculty/Lowe\\_M/](http://pediatrics.wustl.edu/Faculty/Lowe_M/))

Andrew J. White, MD ([http://pediatrics.wustl.edu/Faculty/White\\_A/](http://pediatrics.wustl.edu/Faculty/White_A/))

### Division Chiefs

Ana Maria Arbeláez, MD, MSCI ([http://pediatrics.wustl.edu/Faculty/arbelaez\\_a/](http://pediatrics.wustl.edu/Faculty/arbelaez_a/))

F. Sessions Cole, MD ([http://pediatrics.wustl.edu/Faculty/cole\\_francis\\_sessions/](http://pediatrics.wustl.edu/Faculty/cole_francis_sessions/))

Vikas Dharnidharka, MD, MPH ([http://pediatrics.wustl.edu/Faculty/dharnidharka\\_v/](http://pediatrics.wustl.edu/Faculty/dharnidharka_v/))

Thomas Ferkol, MD ([http://pediatrics.wustl.edu/Faculty/ferkol\\_thomas/](http://pediatrics.wustl.edu/Faculty/ferkol_thomas/))

Anthony French, MD, PhD ([http://pediatrics.wustl.edu/Faculty/French\\_Anthony\\_R/](http://pediatrics.wustl.edu/Faculty/French_Anthony_R/))

David Hunstad, MD ([http://pediatrics.wustl.edu/Faculty/hunstad\\_david\\_a/](http://pediatrics.wustl.edu/Faculty/hunstad_david_a/))

Lisa Moscoso, MD, PhD ([http://pediatrics.wustl.edu/Faculty/moscoso\\_l/](http://pediatrics.wustl.edu/Faculty/moscoso_l/))

Katie Plax, MD ([http://pediatrics.wustl.edu/Faculty/plax\\_katie/](http://pediatrics.wustl.edu/Faculty/plax_katie/))

Kimberly Quayle, MD ([http://pediatrics.wustl.edu/Faculty/quayle\\_kimberly\\_s/](http://pediatrics.wustl.edu/Faculty/quayle_kimberly_s/))

Shalini Shenoy, MD ([http://pediatrics.wustl.edu/Faculty/Shenoy\\_Shalini/](http://pediatrics.wustl.edu/Faculty/Shenoy_Shalini/))

Gregory Storch, MD ([http://pediatrics.wustl.edu/Faculty/storch\\_gregory\\_a/](http://pediatrics.wustl.edu/Faculty/storch_gregory_a/))

Phillip Tarr, MD ([http://pediatrics.wustl.edu/Faculty/tarr\\_phillip/](http://pediatrics.wustl.edu/Faculty/tarr_phillip/))

Michael Turmelle, MD ([http://pediatrics.wustl.edu/Faculty/turmelle\\_m/](http://pediatrics.wustl.edu/Faculty/turmelle_m/))

George Van Hare, MD ([http://pediatrics.wustl.edu/Faculty/vanhare\\_g/](http://pediatrics.wustl.edu/Faculty/vanhare_g/))

Juliane Bubeck Wardenburg, MD, PhD ([http://pediatrics.wustl.edu/Faculty/Wardenburg\\_J/](http://pediatrics.wustl.edu/Faculty/Wardenburg_J/))

Visit our website for more information about our faculty (<http://pediatrics.wustl.edu/directory/>) and their appointments.

## A

Mohamed Shebl Abdelbaki, M.D.

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Cairo University, 2002

Manjusha Abraham, M.D.

Instructor in Pediatrics (primary appointment)



Doctor of Medicine, University of Cologne (Köln), 2011

**Philip Mulayara Abraham, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Boston College, 2006  
Doctor of Medicine, Ross University School of Medicine, 2010

**Susan E Adams, Ph.D., M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, University of Kansas, 1977  
Bachelor of Science, University of Kansas, 1977  
Doctor of Philosophy, University of Kansas Medical (Duplicate of  
University of Kansas Medical Center), 1984  
Doctor of Medicine, Washington University in St Louis, 1991

**William S Adams, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1985  
Doctor of Medicine, University of Missouri Columbia, 1989

**Adedotun Adewale, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
null, Obafemi Awolowo University, 2009

**Oloruntosin Adepeju Ifedadepe Adeyanju, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Williams College, 2008  
Doctor of Medicine, Emory University, 2012

**Sophia E. Agapova, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 2011  
Doctor of Medicine, Columbia University, 2017

**Manish Aggarwal, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Radiology  
Bachelor of Science, University of Iowa, 2008  
Doctor of Medicine, Carver College of Medicine at University of  
Iowa, 2012

**Randy Agolia, M.D.**

Voluntary Clinical Instructor in Pediatrics  
Doctor of Medicine, Saint Louis University, 1995

**Fahd Aqeeb Ahmad, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Missouri Columbia, 2002  
Doctor of Medicine, University of Missouri Columbia, 2006

**Etiyah S. Al-Falahi**

Instructor in Clinical Pediatrics

**Duha Naser Al-Zubeidi, MBBS**

Assistant Professor of Pediatrics (primary appointment)  
Foreign MD equivalent, University of Jordan, 2005

**Danielle Nicole Alfano, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, University of Minnesota Twin Cities, 2007

Doctor of Medicine, Washington University in St Louis, 2011

**Ardis Kay Allison, D.O.**

Instructor in Clinical Pediatrics  
Main Campus, 1980

**Denis Ian Altman, MB.BCh.**

Assistant Professor of Clinical Pediatrics  
Associate Professor of Clinical Neurology  
Foreign MD equivalent, University of the Witwatersrand, 1975

**Patricia J Amato, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Science, Notre Dame College, 1979  
Doctor of Medicine, School Not Listed, 1982

**Karine Amirikian, D.H.Sc.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Health Science, Thomas Jefferson University, 2015

**Mohamad T Amjad, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Science, School Not Listed, 1957  
Doctor of Medicine, School Not Listed, 1961

**Jagruti Shah Anadkat, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Ohio State University, 2000  
Doctor of Medicine, Northeastern University, 2005

**Kristen Minette Andersen**

Instructor in Clinical Pediatrics

**George Christopher Anderson, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, Saint Louis University, 1993

**Dana E Ankney, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 2001  
Doctor of Medicine, Wake Forest University, 2005

**Amal F. Antoun**

Instructor in Clinical Pediatrics

**Ana Maria Arbelaez, M.D.**

Professor of Pediatrics (primary appointment)  
Division Chief - Division of Endocrinology & Diabetes  
David English Smith Professorship In Medicine  
Doctor of Medicine, Universidad del Valle Med Sch, 1996

**Amy Elizabeth Armstrong, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Medicine, Virginia Commonwealth University, 2012

**Jennifer L. Arter, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Iowa, 1993  
Doctor of Medicine, Carver College of Medicine at University of  
Iowa, 1998

**Elizabeth G Atkinson, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, Hahnemann University, 1994

**Robert K Atteberry, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, Saint Louis University, 1998

**Adrienne Denise Atzemis, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, John Carroll University, 1996  
Doctor of Medicine, Creighton University, 2000

**Katherine Lea Austin, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 1994  
Doctor of Medicine, University of Missouri Columbia, 1998

**Sara Michelle Ayers, M.D.**

Instructor in Clinical Pediatrics  
null, University of Missouri Columbia, 1998

**Fariba Azarpour, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, School Not Listed, 1971

**B**

**Jill M Baer, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Kentucky, 1972  
Doctor of Medicine, University of Kentucky, 1975

**Dustin M Baldrige, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Dallas, 2002  
Doctor of Philosophy, Baylor University, 2010  
Doctor of Medicine, Baylor University, 2011

**David T Balzer, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 1981  
Doctor of Medicine, Saint Louis University, 1985

**Maha Bano, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)  
Doctor of Medicine, University of Central Florida, 2019

**Angela L Bard, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Science, Indiana University Bloomington, 1976  
Doctor of Medicine, Indiana University Bloomington, 1981

**David Lawrence Bark, Ph.D.**

Assistant Professor of Pediatrics (primary appointment)  
Main Campus, 2010

**Alan Roy Barnette**

Adjunct Instructor in Pediatrics

**Kevin Barton, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Haverford College, 2000  
Doctor of Medicine, Tulane University, 2006

**Laura Barton, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, Northwestern University, 1998  
Doctor of Medicine, University of Illinois Chicago, 2002

**Kevin W Baszis, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2004

**Maria S Baszis**

Instructor in Clinical Pediatrics

**Marie Lynn Batty, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 2013  
Doctor of Medicine, Saint Louis University, 2017

**Susan L Baumer, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, University of Oregon, 1969  
Doctor of Medicine, University of Pennsylvania, 1975

**Christie A. Bayer, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1986  
Doctor of Medicine, University of Missouri Columbia, 1990

**Julia M. Becker, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of Missouri Columbia, 1993  
Doctor of Medicine, University of Missouri Columbia, 1997

**Jeffrey John Bednarski, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Duke University, 1995  
Doctor of Philosophy, University of Michigan Ann Arbor, 2003  
Doctor of Medicine, University of Michigan Ann Arbor, 2003

**Earl C Beeks, M.D.**

Voluntary Clinical Professor of Pediatrics  
Bachelor of Science, Howard University, 1977  
Doctor of Medicine, University of Missouri Columbia, 1981

**Avraham Beigelman, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Hebrew University, 2000

**Walter F Benoist, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Arts, University of Pennsylvania, 1968  
Doctor of Medicine, Washington University in St Louis, 1972

**Stephanie Ann Berdy, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Georgia, 2009  
Doctor of Medicine, Georgetown University, 2013

**Mary Elizabeth Bernardin, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)

Bachelor of Science, Saint Louis University, 2009

Doctor of Medicine, Loyola University Chicago, 2013

**Jonathan Mark Bernheimer, M.D.**

Associate Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)

Bachelor of Arts, Harvard University, 1990

Doctor of Medicine, Tufts University, 2000

**Peter M Bess**

Assistant Professor of Clinical Pediatrics

**Michelle Louise Beumer, M.D.**

Assistant Professor of Clinical Pediatrics

Doctor of Medicine, University of Missouri Columbia, 1999

**Shobha Bhaskar, MBBS**

Assistant Professor of Pediatrics (primary appointment)

Foreign MD equivalent, Bangalore University, 1994

**Tarin Michael Q Bigley, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)

Assistant Professor of Molecular Microbiology

Assistant Professor of Pathology and Immunology

Bachelor of Science, University of Wisconsin Milwaukee, 2008

Doctor of Philosophy, Medical College of Wisconsin, 2014

Doctor of Medicine, Medical College of Wisconsin, 2016

**Jean E Birmingham, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Arts, Ohio Wesleyan University, 1984

Doctor of Medicine, University of Missouri Columbia, 1988

**Huldah C Blamoville, M.D.**

Associate Professor of Clinical Pediatrics

Bachelor of Science, Queens College, 1959

Doctor of Medicine, Meharry Medical College, 1965

**Kevin J Blanton**

Instructor in Clinical Pediatrics

**Joshua Andrew Blatter, M.P.H., M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Arts, Macalester College, 1996

Doctor of Medicine, University of Pittsburgh, 2008

Master of Public Health, University of Pittsburgh, 2014

**Gordon R Bloomberg, M.D.**

Professor Emeritus of Pediatrics

Champaign, 1955

Champaign, 1955

Champaign, 1959

**Trina Blythe, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Arts, Harvard University, 1992

Doctor of Medicine, Albany Medical College, 1996

**Joshua P Boldt**

Instructor in Clinical Pediatrics

**Nastassia Collen Bommel**

Voluntary Clinical Assistant Professor of Pediatrics

**Rachael Jane Bradshaw, M.S.**

Adjunct Assistant Professor of Pediatrics

Bachelor of Science, Earlham College, 2000

Main Campus, 2004

**Robert J Bradshaw, M.D.**

Instructor in Clinical Pediatrics

Bachelor of Arts, Emory University, 1976

Bachelor of Science, Emory University, 1976

Doctor of Medicine, Saint Louis University, 1980

**Sarah Nicole Bram, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)

Doctor of Medicine, Saint Louis University, 2015

**Celeste Capers Brancato, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, Wellesley College, 1997

Doctor of Medicine, University of Iowa, 2002

**Daphne Wang Branham, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, New York Medical College, 2015

**Kaye Elizabeth Brathwaite**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)

**Amelia G Bray-Aschenbrenner, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)

Bachelor of Science, University of Kansas, 2010

Doctor of Medicine, University of Missouri Columbia, 2014

**Colleen Catherine Brennan, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, University of Missouri Columbia, 2017

**Steven Kyle Brennan, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Arts, University Victoria, 2007

Doctor of Medicine, University of Queensland, 2013

**Kelleigh Elizabeth Briden, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, New York University, 2008

Doctor of Medicine, University of Connecticut, 2012

**Nicole Marie Brossier, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, Missouri University of Science and

Technology (Formerly University of Missouri at Rolla), 2004

Doctor of Medicine, University of Alabama in Birmingham, 2013

**Earline A Brownridge, M.D.**

Instructor in Clinical Pediatrics

Bachelor of Arts, Washington University in St Louis, 1978  
Doctor of Medicine, University of Missouri Columbia, 1982

**Seth J Brownridge, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1978  
Doctor of Medicine, Washington University in St Louis, 1982

**Beverly Sobchak Brozanski, M.D.**

Professor of Pediatrics (primary appointment)  
Vice Chair - Quality Improvement & Safety  
Doctor of Medicine, University of Pittsburgh, 2019

**Juliane Bubeck-Wardenburg, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Division Chief - Division of Critical Care Medicine  
Donald B Strominger Professor of Pediatrics  
Doctor of Philosophy, Washington University in St Louis, 2017  
Doctor of Medicine, Washington University in St Louis, 2017

**Tara M. Budetti**

Assistant Professor of Clinical Pediatrics

**Lorena Buffa, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, University of Missouri Columbia, 1998

**Rebecca Kay Bullivant, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Eastern Illinois University, 1988  
Doctor of Medicine, University of Illinois, 1992

**Max H Burgdorf, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1970  
Doctor of Medicine, Washington University in St Louis, 1974

**David Franklin Butler, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Medicine, Creighton University, 2013

**Lauren Elizabeth Buxbaum, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Illinois at Urbana-Champaign,  
2011  
Doctor of Medicine, Rush University, 2015

**C**

**Kelley S. Caddel, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Indiana University Bloomington, 1998  
Doctor of Medicine, George Washington University, 2008

**Archna Calfee, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Case Western Reserve University, 1997  
Doctor of Medicine, Washington University in St Louis, 2001

**Cecelia Lela Calhoun, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Michigan, 2006  
Doctor of Medicine, Wayne State University, 2011

**Joseph Edward Cangas**

Assistant Professor of Clinical Pediatrics

**Charles E Canter, M.D.**

Professor of Pediatrics (primary appointment)  
Lois B. Tuttle and Jeanne B. Hauck Chair in Pediatrics  
Bachelor of Science, Brown University, 1974  
Doctor of Medicine, Saint Louis University, 1979

**John R Carlile, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Kansas, 1972  
Doctor of Medicine, University of Kansas Medical (Duplicate of  
University of Kansas Medical Center), 1975

**Michael J. Carney, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of Notre Dame, 1987  
Doctor of Medicine, University of Missouri Columbia, 1991

**Jacquelyn L Carter**

Voluntary Clinical Assistant Professor of Pediatrics

**Erin Elizabeth Casey, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of Rochester, 2008  
Doctor of Medicine, University of Rochester, 2012

**Rubilinda Q Casino, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of Santo Tomas, 1979  
Doctor of Medicine, University of Santo Tomas, 1979

**Marta Celorrio Navarro, Pharm.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Philosophy, University of Navarra, 2015

**Allison Leigh Chalupa, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, University of Dayton, 2011  
Doctor of Medicine, University of Cincinnati, 2015

**Deepa Hasmukhlal Chand, M.S., M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, University of Missouri Columbia, 1996  
Master of Science, Xavier University, 2002

**Tattamangalam P Chandrika, M.S.**

Associate Professor of Clinical Pediatrics  
Master of Science, University of Calcutta, 2000

**William T Chao, M.D.**

Instructor in Clinical Pediatrics  
Champaign, 1975  
Champaign, 1979

**Jonathan C Chiles, M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Arts, University of Missouri Kansas City, 2004  
Doctor of Medicine, University of Missouri Kansas City, 2004

**Eileen Anna Ciccio, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Medicine, Saint Louis University, 2019

**Regina A Clemens, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Philosophy, University of Pennsylvania, 2007  
Doctor of Medicine, University of Pennsylvania, 2007

**Lindsay Davidson Clukies, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, McGill University, 2006  
Doctor of Medicine, New York Medical College, 2011

**Andrew Stephen Cluster, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Maryland, 2006  
Doctor of Medicine, University of Texas Southwest, 2010

**Ellen Marie Cody, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
null, Washington University in St Louis, 2012  
null, University of Pittsburgh, 2016

**Darryl S Cohen, D.O.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, University of North Texas, 1976  
Doctor of Osteopathic Medicine, School Not Listed, 1981

**Barbara A Cohan, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Michigan, 1974  
Doctor of Medicine, New York University, 1978

**F. Sessions Cole, M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Cell Biology and Physiology  
Park J White, M.D. Professor of Pediatrics  
Bachelor of Arts, Amherst College, 1969  
Doctor of Medicine, Yale University, 1973

**John C. Cole, Ph.D., M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1995  
Doctor of Philosophy, Washington University in St Louis, 2003  
Doctor of Medicine, Washington University in St Louis, 2003

**Meisha Graham Colletti, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Medicine, Tulane University, 2008

**Lora Pearlman Collier**

Instructor in Clinical Pediatrics

**Eve Ruth Colson, M.Ed., M.D.**

Professor of Pediatrics (primary appointment)  
Associate Dean of Program Evaluation and Continuous Quality Improvement

Doctor of Medicine, Yale University, 1989  
Master of Education, University of Illinois Chicago, 2014

**Bryanne Noel Colvin, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Dallas, 2006  
Doctor of Medicine, Saint Louis University, 2010

**Susan Conger**

Instructor in Clinical Pediatrics

**Tracy Marrs Conner, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Notre Dame College, 2013

**Megan Elizabeth Connolly, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
null, Truman State University (Formerly Northeast Missouri State University), 2015  
null, Creighton University, 2019

**Jonathan David Cooper, Ph.D.**

Professor of Pediatrics (primary appointment)  
Professor of Genetics  
Professor of Neurology  
Doctor of Philosophy, University of Bristol, 1990

**Megan A Cooper, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Pathology and Immunology  
Bachelor of Arts, College of Wooster, 1995  
Doctor of Philosophy, Ohio State University, 2002  
Doctor of Medicine, Ohio State University, 2004

**Tara Conway Copper, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Miami, 2017

**Andrea Michele Coverstone, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Gonzaga University, 2004  
Doctor of Medicine, Saint Louis University, 2009

**Mary Michaeleen Cradock**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Rice University, 1987

**Andrew Cronyn, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Princeton University, 1987  
Doctor of Medicine, Albert Einstein College of Medicine, 1996

**Betty Cross, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of Kansas, 1979  
Doctor of Medicine, University of Kansas, 1983

**Clayton Cummings, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 1996  
Doctor of Medicine, University of Missouri Columbia, 2000

**D**

**Raja Sekhar Dandamudi, M.D., MBBS**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Foreign MD equivalent, Dr. NTR University of Health Sciences,  
2002  
Doctor of Medicine, University of the West Indies, 2017

**Michael E Danter, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Missouri Columbia, 1983  
Champaign, 1987

**Yasmeen Daud, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2000

**Jesse Alan Davis, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
Doctor of Medicine, American University of Integrative Sciences,  
School of Medicine, 2019

**John C Davis, M.D.**

Associate Professor of Clinical Pediatrics  
Doctor of Medicine, University of Michigan (Duplicate of  
University of Michigan Ann Arbor), 1980

**Kasey L. Davis, M.S., Ph.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, McKendree University, 2002  
Master of Science, University of Indianapolis, 2004  
Doctor of Philosophy, University of Indianapolis, 2007

**Ray S Davis, M.D.**

Professor of Clinical Pediatrics  
Doctor of Medicine, University of Louisville, 1978

**Brian J. DeBosch, Ph.D., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Associate Professor of Cell Biology and Physiology  
Bachelor of Science, University of Michigan, 2001  
Doctor of Philosophy, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2008

**Dana Marie DeCuffa, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, Saint Louis University, 2019

**Jane E. Defalco, M.S., M.D.**

Assistant Professor of Clinical Pediatrics  
New Brunswick), 1977  
New Brunswick), 1978  
Doctor of Medicine, Case Western Reserve University, 1984

**Leanne Michelle DePalma, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
Bachelor of Science, University of Notre Dame, 2004  
Doctor of Medicine, University of Louisville, 2008

**Nicole Catherine Deptula, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, American University of the Caribbean, 2009

**Puja Desai, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Ross University School of Medicine, 2014

**Gerry Deschamps, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1976  
Doctor of Medicine, University of Missouri Columbia, 1983

**Vikas Ramnath Dharnidharka, M.D., MBBS**

Professor of Pediatrics (primary appointment)  
Division Chief - Division of Nephrology  
Vice Chair - Clinical Investigation  
Alexis Hartmann MD Professor of Pediatrics  
Foreign MD equivalent, Topiwala National Med College, 1988  
Doctor of Medicine, Topiwala National Med College, 1991

**Orsola Di Martino, M.S., Ph.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, U of Naples Federico II, 2010  
Master of Science, U of Naples Federico II, 2010  
Doctor of Philosophy, U of Naples Federico II, 2015

**Jorge Andres Di Paola, M.D.**

Professor of Pediatrics (primary appointment)  
Division Chief - Division of Hematology & Oncology  
Elizabeth Finney McDonnell Chair in Pediatric Hematology/  
Oncology  
Doctor of Medicine, Universidad de Buenos Aires, 1990

**Patricia Irene Dickson, M.D.**

Professor of Pediatrics (primary appointment)  
Centennial Professor of Genetics  
Division Chief - Division of Genetics and Genomic Medicine  
Centennial Professor of Pediatrics  
Baccalaureatus, University of Chicago, 1995  
Doctor of Medicine, Columbia College of Physicians and  
Surgeons, 1999

**Lizbeth H Didriksen**

Assistant Professor of Clinical Pediatrics

**Mary C Dinauer, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Pathology and Immunology  
Fred M. Saigh Distinguished Chair in Pediatric Research  
Bachelor of Arts, Lawrence University, 1975  
Doctor of Philosophy, University of Chicago, 1979  
Doctor of Medicine, University of Chicago, 1981

**Tulay F Dincer, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, School Not Listed, 1977

**Alla Dorfman, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, Chervovtsy State School of Med, 1986

**Julie R Dorfman, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, Saint Louis University, 2015

**Alexa Michelle Altman Doss, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 2015  
Doctor of Medicine, University of Missouri Kansas City, 2016

**Catherine J Doty**

Instructor in Clinical Pediatrics

**Charles H Dougherty, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Arts, Holy Cross College, 1969  
Doctor of Medicine, University of Rochester, 1973

**Matthew P Dougherty**

Instructor in Clinical Pediatrics

**Joan Catherine Downey, M.P.H., M.D.**

Professor of Pediatrics (primary appointment)  
Assistant Dean, College of Arts & Sciences  
Bachelor of Arts, Boston University, 1979  
Master of Public Health, Harvard University, 1985  
Doctor of Medicine, Harvard University, 1985

**Jennifer Gries Duncan, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Vanderbilt University, 1993  
Doctor of Medicine, University of Chicago, 1997

**Jennifer M Dunn, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Duke University, 1996  
Doctor of Medicine, Washington University in St Louis, 2000

**Maria Laura Duque Lasio, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
null, Universidad Catolica de Santia, 2013

**E**

**Adam C. Eaton, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Illinois, 1992  
Doctor of Medicine, Washington University in St Louis, 1997

**Lori L Eberhart**

Assistant Professor of Clinical Pediatrics

**Nathalie El Ters, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, American University of Beirut, 2006  
Doctor of Medicine, American University of Beirut, 2018

**Alysa G. Ellis, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 2004  
Doctor of Medicine, University of Missouri Kansas City, 2005

**Alexis M Elward, M.P.H., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Loyola College, 1988  
Doctor of Medicine, University of Maryland, 1994  
Master of Public Health, Saint Louis University, 2006

**Amanda R. Emke, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Saint Marys University, 1998  
Doctor of Medicine, Missouri University of Science and  
Technology (Formerly University of Missouri at Rolla), 2002

**Jay S Epstein, M.S., M.D.**

Voluntary Clinical Professor of Pediatrics  
Bachelor of Arts, Emory University, 1977  
Master of Science, Emory University, 1978  
Doctor of Medicine, Emory University, 1983

**Laura Ann Esswein, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1987  
Doctor of Medicine, University of Missouri Columbia, 1991

**Michele Marie Estabrook, M.A., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Bates College, 1976  
Master of Arts, Stanford University, 1979  
Doctor of Medicine, Case Western Reserve University, 1983

**Timothy Robert Evans, M.D.**

Instructor in Pediatrics (primary appointment)  
Instructor in Medicine  
Doctor of Medicine, Creighton University, 2016

**F**

**Christina Fahey**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)

**Korre Leigh Fairman**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)

**Elliott H Farberman, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, University of Rochester, 1969  
Doctor of Medicine, Saint Louis University, 1973

**Marjorie Ann Farrington, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)

Doctor of Medicine, University of Missouri Kansas City, 2019

**Yuri Fedorovich**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)

**Richard A. Felkel, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Saint Louis University, 1993  
Doctor of Medicine, Saint Louis University, 1997

**Isabel Fernandez-Holtzman, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, Michigan State University, 2019

**Margaret Ashley Ferris, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, Carnegie Mellon University, 2005  
Doctor of Medicine, Washington University in St Louis, 2013

**Melanie Erin Fields, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Science, Tulane University, 2003  
Doctor of Medicine, University of Texas Medical School Houston, 2008

**Mayte Ideliz Figueroa, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Mount Sinai School of Medicine, 1992

**Gregory K Finn, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Hendrix College, 1985  
Doctor of Medicine, Washington University in St Louis, 1992

**Emily Faith Rood Fishman, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Youngstown State University, 2005  
Doctor of Medicine, Northeast Ohio Medical University, 2009

**Jennifer Foersterling, M.D.**

Voluntary Clinical Assistant Professor of Pediatrics  
Doctor of Medicine, Saint Louis University, 1997

**Leslie A. Fogel, Ph.D., M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Rice University, 2007  
Doctor of Philosophy, Washington University in St Louis, 2016  
Doctor of Medicine, Washington University in St Louis, 2016

**Rebecca Hope Foster**

Voluntary Clinical Associate Professor of Pediatrics

**Mary E Fournier, M.P.H., M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, Rockhurst University, 1998  
Doctor of Medicine, Saint Louis University, 2002  
Master of Public Health, Harvard University, 2008

**Sharon Glave Frazee**

Adjunct Assistant Professor of Pediatrics

**Anthony Raymond French, M.S., Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Biomedical Engineering  
Professor of Pathology and Immunology  
Division Chief - Division of Rheumatology  
Alan L. Schwartz Chair in Pediatrics STLCH  
Bachelor of Science, University of Minnesota, 1989  
Master of Science, University of Illinois, 1993  
Doctor of Philosophy, University of Illinois, 1995  
Doctor of Medicine, University of Illinois, 1997

**Hayley Friedman, M.S., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Northwestern University, 2004  
Master of Science, Drexel University, 2006  
Doctor of Medicine, George Washington University, 2015

**Stuart Howard Friess, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Brown University, 1985  
Doctor of Medicine, Mount Sinai School of Medicine, 1999

**Stephanie Ann Fritz, M.S., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Wisconsin Milwaukee, 1997  
Doctor of Medicine, Medical College of Wisconsin, 2001  
Master of Science, Washington University in St Louis, 2008

**G**

**John P Galgani, M.D.**

Voluntary Clinical Professor of Pediatrics  
Bachelor of Science, Massachusetts College of Pharmacy and Health Sciences, 1977  
Doctor of Medicine, Saint Louis University, 1982

**Tessa D Gardner, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Massachusetts Institute of Technology, 1968  
Doctor of Medicine, Harvard University, 1972

**Caryn Garriga**

Assistant Professor of Clinical Pediatrics

**Sarah Kathryn Garwood, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Truman State University, 1998  
Doctor of Medicine, University of Missouri in St Louis, 2002

**Karen J Garzia**

Instructor in Clinical Pediatrics

**Avihu Zalman Gazit, M.D.**

Professor of Pediatrics (primary appointment)  
Israel Inst. of Tec, 1997

**Elliot Field Gellman, M.D.**



Prof of Clinical Pediatrics  
Bachelor of Arts, Iowa State University, 1957  
Doctor of Medicine, University of Missouri Columbia, 1961

**Nicole Marie Gilbert, Ph.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Philosophy, Saint Louis University, 2011

**Michelle Gill, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Homer E Nash Jr, MD Professorship of Pediatrics  
Bachelor of Science, Louisiana State University Shreveport,  
1988  
Doctor of Philosophy, Louisiana State University Shreveport,  
1993  
Doctor of Medicine, Louisiana State University, 1995

**Thomas J Girard, Ph.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Wisconsin Oshkosh, 1979  
Doctor of Philosophy, Iowa State University, 1985

**Sarah Katherine Girresch-Ward, Ph.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Philosophy, Tennessee State University, 2018

**Andrew Charles Glatz, M.D.**

Professor of Pediatrics (Pending Executive Faculty Approval)  
(primary appointment)  
Division Chief of Pediatric Cardiology  
null, Princeton University, 1996  
null, Washington University in St Louis, 2002

**John F Gleeson, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, Saint Louis University, 2007

**Lakshmi Gokanapudy Hahn, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of California Los Angeles, 2008  
Doctor of Medicine, Saint George's University, 2014

**Joseph K Goldenberg, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, University of Missouri Kansas City, 1980  
Doctor of Medicine, University of Missouri Kansas City, 1980

**Matthew I Goldsmith, M.S., M.D.**

Professor of Pediatrics (primary appointment)  
Assistant Professor of Genetics  
Bachelor of Science, University of Toronto, 1987  
Master of Science, University of Toronto, 1990  
Doctor of Medicine, University of Toronto, 1995

**Catherine Frances Gooch, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Tennessee, 2016

**Gary M Goodman, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Science, Wayne State University, 1977  
Doctor of Medicine, University of Michigan (Duplicate of  
University of Michigan Ann Arbor), 1981

**Gary S Gottesman, M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Medicine  
Baccalaureatus, Harvard University, 1982  
Doctor of Medicine, University of Michigan Ann Arbor, 1988

**Ronald M Grady, M.A., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Princeton University, 1984  
Master of Arts, Washington University in St Louis, 1989  
Doctor of Medicine, Washington University in St Louis, 1989

**John Edward Graham, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 2013  
Doctor of Medicine, University of Missouri Kansas City, 2013

**Laquita A Graham, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1991  
Doctor of Medicine, Saint Louis University, 1996

**Jorge Luis Granadillo De Luque, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Univ Industrial de Santander, 2007

**Dorothy K. Grange, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Mount Holyoke College, 1976  
Doctor of Medicine, University of Florida, 1981

**Cori L Grant, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2015

**Crystal Jean Gravatte, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Nevada Reno, 2008  
Doctor of Medicine, University of Nevada Reno, 2013

**Abby Margaret Green, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Pathology and Immunology  
Doctor of Medicine, New York University School of Medicine,  
2019

**Ted Allen Green, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Eastern Illinois University, 1990  
Champaign), 1994

**Sarah E. Greene, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
Bachelor of Science, Barnard College, 2005  
Doctor of Medicine, Washington University in St Louis, 2016

**Sara Kathleen Greer, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, University of Illinois, 2010  
Doctor of Medicine, John Hopkins University, 2014

**Lauren Waldholtz Gregory, M.S., M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 2011  
Master of Science, Eastern Virginia Medical School, 2013  
Doctor of Medicine, Eastern Virginia Medical School, 2017

**Allie Ann Grither, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Johns Hopkins University, 2011  
Doctor of Medicine, Saint Louis University, 2015

**Georgeann Keh-Teng Groh, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Rice University, 2001  
Doctor of Medicine, Baylor College of Medicine, 2006

**Jesse Brookshire Groh, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Rice University, 2002  
Doctor of Medicine, Baylor University, 2006

**Santosh K Gupta, D.C.**

Associate Professor of Clinical Pediatrics  
Doctor of Chiropractic, University of London, 1966

**H**

**Allah B Haafiz**

Adjunct Assistant Professor of Pediatrics

**Kimberly Noelle Hackney, D.O.**

Assistant Professor of Clinical Pediatrics  
Doctor of Osteopathic Medicine, Des Moines University, 2009

**Justin T Hagen**

Assistant Professor of Clinical Pediatrics

**Michelle Lynn Hagene, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Southern Illinois University, 2010  
Doctor of Medicine, Southern Illinois University, 2014

**Carmen Marie Halabi, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Cell Biology and Physiology  
Bachelor of Science, University of Iowa, 2001  
Doctor of Philosophy, University of Iowa, 2009  
Doctor of Medicine, University of Iowa, 2009

**Bridget Hall**

Voluntary Clinical Assistant Professor of Pediatrics

**Laura Evelyn Hall, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Allegheny College, 2005

Doctor of Medicine, University of Toledo, 2010

**Melanie G Hampton, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Georgetown College, 1976  
Doctor of Medicine, University of Louisville, 1981

**Elinor F Hancock, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Fisk University, 1975  
Doctor of Medicine, Meharry Medical College, 1982

**Robin D Hanson, Ph.D., M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Johns Hopkins University, 1985  
Doctor of Philosophy, Washington University in St Louis, 1993  
Doctor of Medicine, Washington University in St Louis, 1993

**Suzanne M Hanson, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Johns Hopkins University, 1989  
Doctor of Medicine, Northwestern University, 1993

**Michael Raymond Harris, M.S., Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Saint Louis University, 1973  
Master of Science, Saint Louis University, 1976  
Doctor of Philosophy, Saint Louis University, 1981  
Doctor of Medicine, Saint Louis University, 1991

**Elizabeth Avis Harrison, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Vanderbilt University, 2002  
Doctor of Medicine, Washington University in St Louis, 2006

**Thomas J. Harrison, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1970  
Doctor of Medicine, University of Missouri Columbia, 1979

**David E Hartenbach, M.D.**

Voluntary Clinical Professor of Pediatrics  
Bachelor of Arts, Saint Louis University, 1983  
Doctor of Medicine, University of Missouri Columbia, 1987

**Laura Hartman**

Instructor in Clinical Pediatrics

**Mary E Hartman, M.P.H., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Mount Holyoke College, 1994  
Doctor of Medicine, University of Rochester, 1999  
Master of Public Health, University of Pittsburgh, 2006

**Rebecca Roelofs Hartog, M.D.**

Instructor in Pediatrics (primary appointment)  
Instructor in Medicine  
Bachelor of Arts, Columbia University, 2007  
Doctor of Medicine, University of Pittsburgh, 2014  
Health System, null

**John Edward Hartweger**

Instructor in Clinical Pediatrics

**Robert J Hayashi, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, Stanford University, 1982  
Doctor of Medicine, Washington University in St Louis, 1986

**Jennifer M. Heeley, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 2003  
Doctor of Medicine, Washington University in St Louis, 2009

**Katherine Quinn Hefner**

Assistant Professor of Clinical Pediatrics

**Kara E Hennelly, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, UMICCSOM, 2015

**Milarys Hernandez Martinez, M.D.**

Instructor In Pediatrics (Pending Dean Approval) (primary appointment)  
Doctor of Medicine, University of Puerto Rico, 2017

**Mary Jo Hernandez-Zipfel, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of North Carolina (Duplicate of University of North Carolina at Chapel Hill), 1996  
Doctor of Medicine, University of Florida, 2001

**Christina Kim Ahn Hickey, M.S., M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, Stanford University, 2003  
Master of Science, Washington University in St Louis, 2009  
Doctor of Medicine, Washington University in St Louis, 2009

**Erin Margaret Hickey, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Connecticut, 2012  
Doctor of Medicine, Lewis Katz School of Medicine at Temple University, 2016

**Tunde Hidvegi, M.S., Ph.D.**

Associate Professor of Pediatrics (primary appointment)  
Master of Science, Eotvos Lorand University (University of Budapest), 1980  
Doctor of Philosophy, Eotvos Lorand University (University of Budapest), 1988

**Jennifer M Hinton**

Instructor in Clinical Pediatrics

**Stanley P Hmiel, M.Phil., Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, Case Western Reserve University, 1980  
Master of Philosophy, Cambridge University, 1981  
Doctor of Philosophy, Case Western Reserve University, 1987  
Doctor of Medicine, Case Western Reserve University, 1989

**Hieu Dinh Hoang, Ph.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, San Jose State University, 2009  
Doctor of Philosophy, University of Alabama, 2015

**Sandra Jean Hodel**

Instructor in Clinical Pediatrics

**Dee Hodge, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Occidental College, 1974  
Doctor of Medicine, University of California San Francisco, 1978

**Erik R Hoefgen, M.S., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Missouri in St Louis, 2001  
Master of Science, University of Missouri in St Louis, 2004  
Doctor of Medicine, Southern Illinois University, 2012

**Jacqueline L. Hoffman, M.A., Ph.D., M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, University of California, 1973  
Master of Arts, Harvard University, 1974  
Doctor of Philosophy, Harvard University, 1979  
Doctor of Medicine, Washington University in St Louis, 1994

**Russell G. Hoffmann, Ph.D.**

Instructor in Clinical Pediatrics  
Doctor of Philosophy, University of Florida, 1995

**George Michael Hoganson, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Arts, Loyola University Chicago, 2001  
Doctor of Medicine, Loyola University Chicago, 2014

**Nicholas Alan Holekamp, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Dartmouth College, 1982  
Doctor of Medicine, Saint Louis University, 1987

**Abby Solomon Hollander, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Cornell University, 1982  
Doctor of Medicine, University of Cincinnati, 1986

**Nancy E Holmes, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Arts, University of Kansas, 1972  
Doctor of Medicine, University of Missouri Columbia, 1976

**Lori Rachel Holtz, M.S., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Tulane University, 1999  
Doctor of Medicine, Ohio State University, 2003  
Master of Science, Saint Louis University, 2014

**Amjad Horani, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Cell Biology and Physiology  
Hadassah Med, 2004

Hadassah Med, 2015

**Caroline Clare Horner, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1993  
Doctor of Medicine, Saint Louis University, 2000

**Jennifer A. Horst, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 2003  
Doctor of Medicine, University of Missouri Columbia, 2007

**Christine M Hrach, M.D.**

Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Saint Louis University, 2002

**Keith A Hruska, M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Cell Biology and Physiology  
Professor of Medicine  
Bachelor of Science, Creighton University, 1965  
Doctor of Medicine, Creighton University, 1969

**Paul W. Hruz, Ph.D., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Associate Professor of Cell Biology and Physiology  
Bachelor of Science, Marquette University, 1987  
null, Medical College of Wisconsin, 1993  
Doctor of Medicine, Medical College of Wisconsin, 1994

**Frederick Szujuei Huang, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1990  
Doctor of Medicine, Baylor University, 1994

**Anna Payton Huger, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, University of Missouri School, 2019

**Monica L Hulbert, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Indiana University Bloomington, 1996  
Doctor of Medicine, Washington University in St Louis, 2000

**Laura Kathleen Hulteen, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, University of Illinois, 2015

**David A Hunstad, M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Molecular Microbiology  
Division Chief - Division of Infectious Diseases  
Arnold W Strauss, MD Endowed Professorship For Mentoring  
Bachelor of Arts, Carleton College, 1991  
Doctor of Medicine, Washington University in St Louis, 1995

**Jane Alyce Hunt, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2014  
Doctor of Medicine, Washington University in St Louis, 2014

**Michael G Hunt**

Assistant Professor of Clinical Pediatrics

**Catherine Carissa Hutter**

Voluntary Clinical Associate Professor of Pediatrics

**I**

**Richard J Iken, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, University of Wisconsin Madison, 1972  
Doctor of Medicine, University of Missouri Columbia, 1978

**Carl S Ingber, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, University of Rochester, 1968  
Doctor of Medicine, Boston University, 1972

**Tracy Lynn Ivy, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2004  
Doctor of Medicine, University of Virginia, 2009

**J**

**Andrew Bok Seng Janowski, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Molecular Microbiology  
Doctor of Medicine, University of Wisconsin, 2010

**Shannon M. Joerger, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Southern Illinois University Edwardsville,  
1995  
Columbia, 2007

**William Beck Johansen, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, West Virginia University, 2016

**Denise R Johnson, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Oakwood University, 1979  
Doctor of Medicine, Loma Linda University, 1984

**Joyce D Johnson, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Oberlin College, 1977  
Doctor of Medicine, Case Western Reserve University, 1982

**Mark C Johnson, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Rochester, 1978  
Doctor of Medicine, Johns Hopkins University, 1982

**William Lee Johnson, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Science, University of Missouri Columbia, 1977  
Doctor of Medicine, University of Missouri Columbia, 1981

**Angela Marie Jones, M.D.**

Assistant Professor of Clinical Pediatrics

Doctor of Medicine, Universidad Nacional de Colomb, 1989

**Katherine McMullin Jones, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Amherst College, 2001  
Doctor of Medicine, Washington University in St Louis, 2007

**Larry A Jones, M.B.A., M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Johns Hopkins University, 1972  
Doctor of Medicine, Johns Hopkins University Medical (Duplicate of Johns Hopkins University), 1976  
Master of Business Administration, Washington University in St Louis, 1999

**Heather Robin Joyce, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Missouri Columbia, 2002  
Doctor of Medicine, University of Missouri Columbia, 2006

**Samuel F. Julian, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Texas Austin, 2001  
Doctor of Medicine, University of Texas Southwest, 2007

**Erzsebet Jung, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, School Not Listed, 1987

**K**

**Courtney Kaar, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Massachusetts, 2009  
Doctor of Medicine, Saint Louis University, 2017

**Lawrence I Kahn, M.D.**

Professor Emeritus of Pediatrics  
Bachelor of Arts, University of Alabama (Duplicate of University of Alabama in Tuscaloosa), 1941  
Doctor of Medicine, Louisiana State University Health Sciences (Duplicate of Louisiana State University Health Sciences Center at New Orleans), 1945

**Carol M Kao, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Ohio State University, 2008  
Doctor of Medicine, Ohio State University, 2012

**Thomas J Kasper**

Instructor in Clinical Pediatrics

**Bhushan Katira, Ph.D., MBBS**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
Foreign MD equivalent, University of Mumbai, 2003  
Doctor of Philosophy, University of Toronto, 2020

**Jenny E Kaufman, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Science, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1999  
Doctor of Medicine, Washington University in St Louis, 2004

**Robert S Kebler, M.D.**

Instructor in Clinical Pediatrics  
null, Muhlenberg College, 1980  
null, Saint Louis University, 1984

**Martin S Keller, M.D.**

Associate Professor of Pediatrics  
Bachelor of Science, University of Pennsylvania, 1985  
Doctor of Medicine, University of Vermont, 1990

**Robert V Kellow**

Assistant Professor of Clinical Pediatrics

**Brian J Kelly, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, School Not Listed, 1964  
Doctor of Medicine, School Not Listed, 1972

**James Scott Kemp, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, Creighton University, 1972  
Doctor of Medicine, Creighton University, 1976

**Michele E Kemp, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1977  
Doctor of Medicine, Washington University in St Louis, 1981

**Kaitlin Gabrielle Kenney, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, University of Louisville, 2019

**Aayush Khanal, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
SOM), 2019

**Kent Leon Killian, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1986  
Doctor of Medicine, Saint Louis University, 1990

**Katherine Abell King, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Saint Olaf College, 2011  
Doctor of Medicine, University of Mississippi Medical Center, 2015

**Abigail Kissel, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
null, Northwestern University, 2006  
null, Baylor College of Medicine, 2010

**Maleewan Kitcharoensakkul, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Mahidol University, 2002

**Darci Elizabeth Klein, M.S., Ph.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, MISSOURI STATE UNIVERSITY  
(Duplicate of Missouri State University (Formerly Southwest  
Missouri State)), 2013  
Main Campus), 2015  
Main Campus), 2019

**Richard D Knight**

Instructor in Clinical Pediatrics

**Shirley M Knight, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Arts, Dillard University, 1976  
Doctor of Medicine, Washington University in St Louis, 1980

**Daisuke Kobayashi, M.P.H.**

Associate Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Master of Public Health, Wayne State University, 2019

**Joel S Koenig, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Science, Yale University, 1978  
Doctor of Medicine, Vanderbilt University, 1982

**Amanda Kolmar, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of California San Francisco, 2019

**Nikoleta S. Kolovos, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Pittsburgh, 1991  
Doctor of Medicine, University of Pittsburgh, 1996

**Jamie L Kondis, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Westminster College, 2002  
Doctor of Medicine, Indiana University South Bend, 2006

**Valerie Rose Kover, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, Drexel University, 2006

**Beth Ann Kozel, Ph.D., M.D.**

Adjunct Associate Professor of Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1996  
Doctor of Philosophy, Washington University in St Louis, 2004  
Doctor of Medicine, Washington University in St Louis, 2004

**James M Krafcik**

Instructor in Clinical Pediatrics

**Michael Alan Kramer, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, Creighton University, 2016

**Theodore Raymond Kremer, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Saint Louis University, 2011  
Doctor of Medicine, Saint Louis University, 2015

**Katherine L Kreusser, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Science, University of Pennsylvania, 1973  
Doctor of Medicine, Indiana University Bloomington, 1978

**Kendra Noelle Daiss Krietsch, M.S., Ph.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Arizona, 2012  
Master of Science, University of Florida, 2015  
Doctor of Philosophy, University of Florida, 2018

**Cadence Amber Kuklinski, D.O.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Maryville University, 2001  
Doctor of Osteopathic Medicine, Des Moines University College,  
2012

**Sakil Subhash Kulkarni, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, PGIMER, 2010

**Denise Kung, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, University of Missouri Columbia, 1986  
Doctor of Medicine, Yale University, 1991

**Abby Kushnir, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Northwestern University, 2002  
Main Campus), 2006

**L**

**Jennifer S Ladage, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Valparaiso University (Duplicate of  
Valparaiso University), 1987  
Doctor of Medicine, Saint Louis University, 1991

**Stacie Sharon Laff, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Lawrence University, 1989  
Bachelor of Music, Lawrence University, 1989  
Doctor of Medicine, School Not Listed, 1993

**Alexandra Lahart, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Lake Forest College, 2009  
Doctor of Medicine, University of Maryland, 2013

**Li-Ling Lai**

Instructor in Clinical Pediatrics

**Peter Donato LaRossa, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Rochester, 2004  
Doctor of Medicine, University of Pittsburgh, 2014

**Russell K Lawrence, M.D.**

Adjunct Instructor in Pediatrics  
Bachelor of Science, University of Texas Austin, 1998

Doctor of Medicine, Baylor College of Medicine, 2002

**Leland M Laycob, M.D.**

Instructor in Clinical Pediatrics

Bachelor of Arts, Washington University in St Louis, 1964

Doctor of Medicine, University of Missouri Columbia, 1968

**Richard Lee Lazaroff, M.D.**

Professor of Clinical Pediatrics

Bachelor of Arts, Brown University, 1974

Doctor of Medicine, Saint Louis University, 1978

**Caroline Kim Lee, M.D.**

Professor of Pediatrics (primary appointment)

Bachelor of Arts, Wellesley College, 1995

Doctor of Medicine, University of Virginia, 1999

**Caroline Martz Lee, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, Knox College, 2003

Doctor of Philosophy, University of North Carolina, 2009

Doctor of Medicine, University of North Carolina, 2011

**Kathryn B Leonard, M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Science, Saint Louis University, 2006

Doctor of Medicine, Saint Louis University, 2010

**Jared Rubin Levin, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Assistant Professor of Orthopedic Surgery

Doctor of Medicine, Albany Medical College, 2014

**Kenneth C Levy, M.D.**

Instructor in Clinical Pediatrics

Bachelor of Arts, Emory University, 1983

Doctor of Medicine, University of Chicago, 1988

**Philip Thaler Levy, M.D.**

Adjunct Instructor in Pediatrics

New Brunswick), 2001

Aviv University (Duplicate of Tel Aviv University), 2003

**Christopher Bradley Lewis, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, University of Texas, 2010

**Fuhai Li, Ph.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, Yantai University, 2003

Doctor of Philosophy, Peking University (#####), 2008

**Steve Ming-Che Liao, M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Science, University of California Los Angeles, 1999

Doctor of Medicine, Saint Louis University, 2003

**Anna Lijowska, M.D.**

Associate Professor of Pediatrics (primary appointment)

Doctor of Medicine, Jagiellonian University, 1988

**John Chao-Chun Lin, M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Science, University of Virginia, 1994

Doctor of Medicine, University of Virginia, 1998

**Kim Hung Ho Liss, M.D.**

Instructor in Pediatrics (primary appointment)

Bachelor of Science, Northwestern University, 2007

Doctor of Medicine, Northwestern University, 2011

**David Liu, M.D.**

Instructor in Pediatrics (primary appointment)

Doctor of Medicine, Saint Louis University, 2007

**Maurice J Lonsway, M.D.**

Professor Emeritus of Clinical Pediatrics

Bachelor of Arts, Washington University in St Louis, 1946

Doctor of Medicine, Washington University in St Louis, 1950

**Alina M. Lopez, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Arts, Washington University in St Louis, 2006

Doctor of Medicine, University of Miami, 2010

**Stephanie Nicole Lorts, M.D.**

Assistant Professor of Clinical Pediatrics

Champaign), 2011

Doctor of Medicine, Southern Illinois University (Duplicate of Southern Illinois University Carbondale), 2015

**Mark E Lowe, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)

Vice Chair - Clinical Affairs & Strategic Planning

Interim Associate Dean for Research

Harvey R Colten Professor of Pediatric Science

Vice Chancellor

Bachelor of Arts, Washington University in St Louis, 1973

Doctor of Philosophy, University of Pennsylvania, 1977

Doctor of Medicine, University of Miami, 1984

**Ilana Rebecca Luft-Barrett**

Voluntary Clinical Assistant Professor of Pediatrics

**Clifford James Luke, Ph.D.**

Professor of Pediatrics (primary appointment)

Bachelor of Science, University of Liverpool, 1994

Doctor of Philosophy, University of Surrey, 1999

**M**

**Shannon Nicole Macgregor, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Science, Virginia Tech (Duplicate of Virginia

Polytechnic Institute and State University), 2007

Doctor of Medicine, Eastern Virginia Medical School, 2016

**John C. Madden, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Science, Yale University, 1994

Doctor of Medicine, Washington University in St Louis, 2002

**Jeffrey A Magee, Ph.D., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Associate Professor of Genetics  
Bachelor of Science, University of Wisconsin Madison, 1997  
Doctor of Philosophy, Washington University in St Louis, 2005  
Doctor of Medicine, Washington University in St Louis, 2005

**Jay Randolph Malone, M.S., Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Oklahoma, 2005  
Doctor of Medicine, University of Oklahoma, 2009  
Master of Science, Creighton University, 2012  
Doctor of Philosophy, Saint Louis University, 2019

**Daniel Mark Mammel, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Carleton College, 2009  
Doctor of Medicine, University of Queensland, 2015

**Mark John Manary, M.D.**

Professor of Pediatrics (primary appointment)  
Helene B. Roberson Professor of Pediatrics  
Bachelor of Science, Massachusetts Institute of Technology, 1977  
Doctor of Medicine, Washington University in St Louis, 1982

**Arushi Manga, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Franklin & Marshall, 2007  
Doctor of Medicine, McGill University, 2011

**Mohannad Mannaa, MBBS**

Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
Foreign MD equivalent, Jordan University of Science & Technology, 1993

**John F Mantovani, M.D.**

Assistant Professor of Clinical Pediatrics  
Associate Professor of Clinical Neurology  
Bachelor of Arts, University of Evansville, 1971  
Doctor of Medicine, University of Missouri Columbia, 1974

**Bess Adkins Marshall, M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Cell Biology and Physiology  
Bachelor of Science, Vanderbilt University, 1982  
Doctor of Medicine, Vanderbilt University, 1986

**Megan Spokes Martin, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Notre Dame, 2007  
Doctor of Medicine, University of Kansas, 2012

**Shakila Mathew, D.O.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Missouri University of Science and Technology, 2004

Doctor of Osteopathic Medicine, Kirksville College of Osteopathic Medicine, 2009

**Patrice Mathews, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Trinity University, 1984  
Doctor of Medicine, University of Oklahoma, 1988

**Dzmitry Matsiukevich, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Gomel State Medical University, 2003

**Marvin M Maurer, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1968  
Doctor of Medicine, Washington University in St Louis, 1972

**Melissa Michelle Mavers, Ph.D., M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
null, University of Miami, 2003  
null, Saint Louis University, 2009  
null, Saint Louis University, 2011  
null, Stanford University, null

**Ariane E May, M.P.H., M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Tufts University, 1983  
Master of Public Health, Boston University, 1992  
Doctor of Medicine, School Not Listed, 1993

**Gillian Sloane Mayersohn**

Assistant Professor of Clinical Pediatrics

**Jina L McAtee**

Assistant Professor of Clinical Pediatrics

**Megan McBride**

Instructor in Clinical Pediatrics

**William Frederick McComas, M.D.**

Instructor in Pediatrics (Pending Dean Approval) (primary appointment)  
null, University of Arkansas for Medical Sciences, 2019

**Maggie Steffen McCormick, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, Loyola University Chicago, 2004

**Mark E. McGranahan, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Marquette University, 1993  
Doctor of Medicine, Saint Louis University, 1997

**Thomas Casey McKinney, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Arts, Illinois Wesleyan University, 1976  
Doctor of Medicine, Washington University in St Louis, 1980

**William A McManus, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Carroll College, 1980



Doctor of Medicine, Saint Louis University, 1986

**Kyle P McNerney, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Chicago, 2010  
Doctor of Medicine, Case Western Reserve University, 2014

**Christopher Clayton McPherson**

Associate Professor of Clinical Pediatrics

**Shilpa Menolascino, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, University of Missouri Columbia, 2019

**Sarah J. Mermelstein, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Indiana University Bloomington, 2002  
Doctor of Medicine, Drexel University, 2007

**Elizabeth Sarah Messer, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2009  
Doctor of Medicine, University of Illinois Chicago, 2013

**Mary Shaughnessy Meyer, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1999  
Doctor of Medicine, Saint Louis University, 2003

**Jenny Lynn Miele, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Valparaiso University, 2001  
Doctor of Medicine, University of Illinois at Chic, 2005

**Donna C Miller, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Boston College, 1978  
Doctor of Medicine, University of Miami, 1982

**Caroline Elizabeth Mohrmann, M.S.N., Ph.D.**

Instructor in Pediatrics (primary appointment)  
Master of Science in Nursing, Vanderbilt University, 2009  
Doctor of Philosophy, University of Missouri Columbia, 2017

**Deepa Mokshagundam, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Massachusetts Institute of Technology, 2009  
Doctor of Medicine, University of Louisville, 2013

**Christopher Molitor**

Instructor in Clinical Pediatrics

**Gail Lynn Moolsintong, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of Missouri Columbia, 1997  
Doctor of Medicine, University of Missouri Columbia, 2001

**Darlene A. Moore, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Eastern Illinois University, 1974

Champaign), 1978

**Lauren Rogowski Moran, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Champaign, 2010  
Doctor of Medicine, University of Illinois at Chicago, 2014

**Diane M Morie, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1989  
Doctor of Medicine, University of Missouri Columbia, 1993

**Sharon Celeste Morley, Ph.D., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Associate Professor of Pathology and Immunology  
Doctor of Philosophy, Harvard University, 2002  
Doctor of Medicine, Harvard University, 2002

**Lisa Mae Moscoso, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Associate Dean for Student Affairs  
Co-Division Chief - Division of Hospitalist Medicine  
Bachelor of Science, University of Wisconsin Madison, 1989  
Doctor of Philosophy, Washington University in St Louis, 1998  
Doctor of Medicine, Washington University in St Louis, 1998

**Janet Gwen Mueller, M.D.**

Voluntary Clinical Associate Professor of Pediatrics  
Bachelor of Arts, Kansas State University, 1985  
Doctor of Medicine, Washington University in St Louis, 1992

**Margaret M Mueller**

Assistant Professor of Clinical Pediatrics

**Steven Mueth, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, University of Illinois, 1994

**Shalaka Ajit Mulherkar, M.S., Ph.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Mumbai University, 2002  
Master of Science, University of Mumbai, 2004  
Doctor of Philosophy, National Brain Research Centre, 2011

**Jonathan E. Mullin, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2005  
Doctor of Medicine, Case Western Reserve University, 2010

**Admire Munanairi, Ph.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2015

**Maria Ganninger Mura, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, University of Missouri Kansas City, 2000

**Mark C. Murawski, M.D.**

Instructor in Clinical Pediatrics  
null, Villanova University, 1995

null, Saint Louis University, 1999

**Kevin J Murphy, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Science, Birmingham Southern College, 1974  
Doctor of Medicine, Saint Louis University, 1978

**Gian Marco Musarra, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Central Florida, 1998  
Doctor of Medicine, University of Miami, 2003

**John A Myers, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1993  
Doctor of Medicine, Southern Illinois University S, 1997

**N**

**Stephen Jeffrey Nageotte, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of California Irvine, 2012

**Venkata S. Nagireddi**

Instructor in Clinical Pediatrics

**Tasnim A Najaf, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Dow Medical College Karachi, 1991

**Alison C Nash, M.D.**

Professor of Clinical Pediatrics  
Bachelor of Science, Howard University, 1977  
Doctor of Medicine, Baylor University, 1981

**Ameera Farhat Nauman**

Assistant Professor of Clinical Pediatrics

**Lynn G Nelms**

Instructor in Clinical Pediatrics

**Tara Marie Neumayr, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Duke University, 1999  
Doctor of Medicine, University South Dakota Vermillion, 2003

**Jason Guy Newland, M.Ed., M.D.**

Professor of Pediatrics (primary appointment)  
Vice Chair of Community Health and Strategic Planning  
Schnuck Family Endowed Chair in Pediatric Infectious Diseases  
SLCH  
Doctor of Medicine, University of Oklahoma, 2000  
Main Campus, 2011

**Hoanh Thi Nguyen, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Tulane University, 2003

**Suong Thu Nguyen, Ph.D., M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, University of Tulsa, 2006

Doctor of Philosophy, University of Texas Southwest, 2016  
Doctor of Medicine, University of Texas Southwest, 2016

**Ellen Margaret Nicastro**

Instructor in Clinical Pediatrics

**Ramzi T Nicolas**

Adjunct Associate Professor of Pediatrics

**Caroline Kellagher Noel, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, University of Texas Medical School Houston, 2018

**David Craig Norman, M.D.**

Assistant Professor of Clinical Pediatrics  
Champaign, 1988  
Doctor of Medicine, School Not Listed, 1992

**Karen K Norton, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Science, Loyola University (Duplicate of Loyola University New Orleans), 1985  
Doctor of Medicine, Louisiana State University, 1989

**Douglass Susumu Nozaki, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, University of California San Diego, 1991  
Doctor of Medicine, Saint Louis University, 1996

**O**

**Kevin Sullivan O'Bryan, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Michigan, 2010

**Shawn David O'Connor, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Georgia, 2006  
Doctor of Medicine, Medical College of Georgia, 2010

**Sarah Grace O'Grady**

Instructor in Clinical Pediatrics

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Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, University of Missouri Columbia, 1977  
Doctor of Medicine, Saint Louis University, 1981  
Master of Business Administration, University of Massachusetts Amherst, 2007

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Instructor in Pediatrics (primary appointment)  
Foreign MD equivalent, University of Lagos, 1982

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Instructor in Pediatrics (primary appointment)  
Bachelor of Science, Georgetown University, 2010  
Doctor of Medicine, University of Missouri Columbia, 2015

**Andrea Cohron Orr, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Science, University of Georgia, 2007  
Doctor of Medicine, Medical College Georgia, 2013

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Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Georgia, 2009  
Doctor of Medicine, Medical College of Georgia, 2013

**Rachel C. Orscheln, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 1994  
Doctor of Medicine, University of Missouri Columbia, 1998

**Cynthia M. Ortinau, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2005

**Irma I Ortiz-Arroyo, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Puerto Rico (Duplicate of  
University of Puerto Rico), 1981  
Doctor of Medicine, University of Puerto Rico (Duplicate of  
University of Puerto Rico), 1985

**Anthony Walter Orvedahl, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Pathology and Immunology  
Doctor of Philosophy, University of Texas Southwestern Medical  
Center at Dallas, 2012  
Doctor of Medicine, University of Texas Southwestern Medical  
Center at Dallas, 2012

**Austin James Ostermeier, M.S., M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Arts, University of Missouri Columbia, 2007  
Master of Science, Stanford University, 2010  
Doctor of Medicine, University of Missouri Columbia, 2015

**Alison H Oswald**

Instructor in Clinical Pediatrics

**P**

**Pamela B Padda, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, University of Michigan, 1986  
Doctor of Medicine, University of Illinois, 1990

**Stephen Pak, Ph.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Sydney, 1990  
Doctor of Philosophy, University of New South Wales, 1996

**Jennifer Ann Panasci**

Assistant Professor of Clinical Pediatrics

**Michael Papacostas**

Voluntary Clinical Assistant Professor of Pediatrics

**Robert T Paschall, M.A., M.D.**

Professor Emeritus of Pediatrics

Bachelor of Science, University of Tennessee, 1967  
Doctor of Medicine, University of Tennessee, 1974  
Master of Arts, Park University, 1986

**Purvi R Patel, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Rice University, 1996  
Doctor of Medicine, Baylor University, 2000

**Rinkal Raj Patel**

Assistant Professor of Clinical Pediatrics

**Diliane Charles Pelikan, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 1997  
Doctor of Medicine, University of Missouri Kansas City, 1997

**Meryl Kersten Perlman, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Harvard University, 1996  
Doctor of Medicine, University of Chicago, 2001

**Gillian Clare Pet, M.S., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of California Berkeley, 2006  
Master of Science, Washington University in St Louis, 2010  
Doctor of Medicine, Washington University in St Louis, 2011

**Thomas M Pfeiffer, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Medicine, Medizinische Universität Wien, 2014

**Megan Elizabeth Philibert, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
SOM), 2018

**Catherine Pike**

Voluntary Clinical Assistant Professor of Pediatrics

**Jessica E Pittman, M.P.H., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, Oberlin College, 1998  
Doctor of Medicine, Washington University in St Louis, 2004  
Master of Public Health, University North Carolina, 2009

**Daniel S Plax, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Brown University, 1988  
Doctor of Medicine, Washington University in St Louis, 1993

**Kathryn L. Plax, M.D.**

Professor of Pediatrics (primary appointment)  
Division Chief - Division of Adolescent Medicine & the HHT  
Center

Ferring Family Chair Professor of Pediatrics

Bachelor of Arts, Brown University, 1989

Doctor of Medicine, University of Rochester, 1996

**Steven I Plax, M.D.**

Professor Emeritus of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1957  
Doctor of Medicine, University of Missouri Columbia, 1961

**Santiago Boye Plurad, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1982  
Doctor of Medicine, School Not Listed, 1987

**Deepika Polineni, M.P.H., M.D.**

Associate Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
null, University of Missouri Kansas City, 2001  
null, Boston University, 2003  
null, University of Missouri Kansas City, 2004

**Juanita C Polito-Colvin, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, University of Dallas, 1975  
Doctor of Medicine, Southwest Texas State University, 1979

**Brooke Ivan Polk, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Colorado State University, 2008  
Doctor of Medicine, University of Colorado Boulder, 2012

**Claudia Preuschoff, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, Wake Forest University, 1983

**Cassandra Michelle Pruitt, M.D.**

Professor of Pediatrics (primary appointment)  
Vice Chair of Outpatient Health  
Bachelor of Arts, Emory University, 1994  
Doctor of Medicine, Texas Tech University, 1999

**Peter J Putnam, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Williams College, 1993  
Doctor of Medicine, Dartmouth College, 2007

**Jenna M Putzel, M.P.H., M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
null, Saint Louis University, null  
null, Saint Louis University, null  
null, Washington University in St Louis, null

**Q**

**Robert Louis Quaas, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Cornell College, 1970  
Bachelor of Science, University of South Dakota, 1973  
Doctor of Medicine, University of Chicago, 1975

**Kimberly S Quayle, M.D.**

Professor of Pediatrics (primary appointment)

Division Chief - Division of Emergency Medicine  
Dana Brown Chair for Emergency Medicine at St. Louis  
Children's Hospital  
Bachelor of Arts, University of Missouri Columbia, 1984  
Doctor of Medicine, Washington University in St Louis, 1988

**Jennifer Quinn, M.D.**

Instructor in Clinical Pediatrics  
null, University of Kentucky, 1982  
null, University of Kentucky, 1986

**R**

**Edon Rabinowitz, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, St. George's University, 2012

**Mohammad H Rahman**

Instructor in Clinical Pediatrics

**Pathmawathy T Ramesvara, M.S.**

Instructor in Clinical Pediatrics  
Master of Science, School Not Listed, 1972

**Rakesh Rao, M.D., MBBS**

Associate Professor of Pediatrics (primary appointment)  
Foreign MD equivalent, University College of Med Sci, 1992  
Doctor of Medicine, Maulana Azad Medical College, 1996

**Emanuel Rashet, M.D.**

Instructor in Clinical Pediatrics  
Champaign, 1958  
Doctor of Medicine, Saint Louis University, 1962

**Sheryl S Ream, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1982  
Doctor of Medicine, Saint Louis University, 1986

**Shawn Robert Reathaford, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Evansville, 1993  
Doctor of Medicine, University of Illinois, 1999

**Timothy Reed**

Instructor in Clinical Pediatrics

**Patrick Joseph Reich, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Saint Louis University, 2007  
Doctor of Medicine, Saint Louis University, 2011

**Phillip D Reichert, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1992  
Doctor of Medicine, Saint Louis University, 1996

**Brian Davis Reinholz**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)

**Catherine R Remus, M.S.N., M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Luther College (Duplicate of Luther College  
Iowa), 1975

Master of Science in Nursing, Rush University, 1978  
Doctor of Medicine, School Not Listed, 1983

**Elizabeth A Remus**

Assistant Professor of Clinical Pediatrics

**George H Rezabek, D.O.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Saint Louis College of Pharmacy, 1982  
Doctor of Osteopathic Medicine, School Not Listed, 1988

**Noor Riaz, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2008

**Brian E Richter**

Assistant Professor of Clinical Pediatrics

**Joan K. Riley, M.S., Ph.D.**

Associate Professor of Pediatrics  
Associate Professor of Medicine  
Bachelor of Science, University of Illinois, 1992  
Doctor of Philosophy, Washington University in St Louis, 1998  
Master of Science, University of Leeds, 2015

**Melissa Marie Riley, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Northeast Ohio Medical University, 2005

**Katherine Rivera-Spoljaric, M.S., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Puerto Rico, 1997  
Doctor of Medicine, University of Puerto Rico, 2001  
Master of Science, Washington University in St Louis, 2008

**William L. Rives, M.S., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Master of Science, University of Missouri Columbia, 1992  
Doctor of Medicine, University of Missouri Columbia, 1996

**Kris Ann Roberts, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Midland Lutheran College, 1991  
Doctor of Medicine, Kirksville College of Osteopathic Medicine,  
1995

**Janis B Robinson, M.A., M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Saint Joseph College, 1969  
Master of Arts, Yale University, 1972  
Doctor of Medicine, University of Pennsylvania, 1977

**Justin William Robison, D.O.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Osteopathic Medicine, Nova Southeastern University,  
2013

**Rebecca Ann Rockamann**

Voluntary Clinical Assistant Professor of Pediatrics

**Melissa A Roewe, D.O.**

Assistant Professor of Clinical Pediatrics  
Doctor of Osteopathic Medicine, Lake Erie College of  
Osteopathic Medicine in Bradenton, 2009

**Ashley Heesoo Roh, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, University of Missouri Columbia, 2018

**Ram Kevin Rohatgi, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Radiology  
Doctor of Medicine, Saint Louis University, 2013

**Sandeep Rohatgi, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1989  
Doctor of Medicine, University of Medicine and Dental Of New  
Jersey, 1993

**Rachael Elissa Rose, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2015

**David A. Rosen, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Molecular Microbiology  
Bachelor of Science, University of Michigan Ann Arbor, 2002  
Doctor of Philosophy, Washington University in St Louis, 2010  
Doctor of Medicine, Washington University in St Louis, 2010

**Joan Lee Rosenbaum, M.S., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Rice University, 1978  
Master of Science, University of California, 1980  
Doctor of Medicine, University of Texas Austin, 1983

**Isabel L Rosenbloom, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Goucher College, 1979  
College Park), 1984

**Kelly Ross, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Missouri Kansas City, 1991  
Doctor of Medicine, University of Missouri Columbia, 1996

**William J Ross, M.D.**

Associate Professor of Clinical Pediatrics  
Oxford), 1968  
Doctor of Medicine, Washington University in St Louis, 1972

**Jeffrey Harold Rothweiler**

Voluntary Clinical Associate Professor of Pediatrics  
Adjunct Instructor

**Rene Martin Roy, Ph.D., M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, Harvard University, 2002  
Doctor of Philosophy, University of Wisconsin Madison, 2012  
Doctor of Medicine, University of Wisconsin Madison, 2014

**Ella Rozin**

Assistant Professor of Clinical Pediatrics

**Ronald Craig Rubenstein, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Division Chief - Division of Allergy, Immunology, & Pulmonary  
Medicine  
Robert C. Strunk Endowed Chair for Lung and Respiratory  
Research  
Bachelor of Science, Massachusetts Institute of Technology,  
1984  
Doctor of Philosophy, University of Texas Southwest, 1990  
Doctor of Medicine, University of Texas Southwest, 1991

**Joshua Bennett Rubin, M.S., Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Neuroscience  
Professor of Neurology  
Bachelor of Science, Yale University, 1982  
Master of Science, Albert Einstein College of Medicine, 1992  
Doctor of Philosophy, Albert Einstein College of Medicine, 1994  
Doctor of Medicine, Albert Einstein College of Medicine, 1994

**Christina M Ruby-Ziegler, M.D.**

Voluntary Clinical Associate Professor of Pediatrics  
Bachelor of Science, Loyola University, 1990  
Doctor of Medicine, Northwestern University Medical, 1994

**Martin D Rudloff, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Central Methodist College (Duplicate of Central  
Methodist University), 1977  
Doctor of Medicine, Washington University in St Louis, 1981

**David Rudnick, Ph.D., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Associate Professor of Developmental Biology  
Champaign, 1987  
Doctor of Philosophy, Washington University in St Louis, 1994  
Doctor of Medicine, Washington University in St Louis, 1994

**Daniel G. Rudolph, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Saint Louis University, 1988  
Doctor of Medicine, Saint Louis University, 1992

**Diane Mary Rup, M.A., M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, State University of New York, 1976  
Master of Arts, State University of New York, 1979  
Doctor of Medicine, Case Western Reserve University, 1986

**Brigida Agnese Rusconi, M.S., Ph.D.**

Instructor in Pediatrics (primary appointment)

Bachelor of Science, University of Fribourg, 2007  
Master of Science, University of Zurich, 2009  
Doctor of Philosophy, University of Lausanne, 2014

**Lisa A Ryan, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, University of Nebraska, 2019

**Rachael Ryan**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)

**S**

**Brooke E. Sadler, M.S., Ph.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
Bachelor of Arts, George Washington University, 2006  
Master of Science, Arizona State University, 2010  
Doctor of Philosophy, Arizona State University, 2014

**Ahmed Sameh Said, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Ain Shams University, 2000  
Doctor of Philosophy, Ain Shams University, 2009

**Surbhi Saini, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Medicine, Panjab University, 2007

**Martine Saint-Cyr, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Connecticut, 2012

**Charles Michael Samson, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of North Carolina, 1998  
Doctor of Medicine, University of Washington, 2003

**Gretchen A Sander, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Vanderbilt University, 2000  
Doctor of Medicine, Loyola University Chicago, 2004

**Heidi L Sandige, M.A., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Northwestern University, 1991  
Master of Arts, Washington University in St Louis, 2003  
Doctor of Medicine, Washington University in St Louis, 2005

**Marco Sardiello, Ph.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Bari, 2003

**Scott Saunders, Ph.D., M.D.**

Associate Professor of Pediatrics (primary appointment)  
Associate Professor of Developmental Biology  
Bachelor of Science, University of Minnesota, 1983  
Doctor of Philosophy, Stanford University, 1990

Doctor of Medicine, Stanford University, 1990

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Assistant Professor of Clinical Pediatrics

**Blaine M Sayre, M.P.H., M.D.**

Professor of Clinical Pediatrics

Doctor of Medicine, Washington University in St Louis, 1968

Master of Public Health, University of California Berkeley, 1972

**Joseph Schachter, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Arts, Indiana University Bloomington, 1974

Doctor of Medicine, Indiana University Bloomington, 1979

**Kim E Schamel, M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Science, University of Missouri in St Louis, 1997

Doctor of Medicine, University of Missouri in St Louis, 2001

**Janet Nagel Scheel, M.D.**

Professor of Pediatrics (primary appointment)

Bachelor of Science, Georgetown University, 1980

Doctor of Medicine, Georgetown University, 1985

**Allek Lee Scheele, M.D.**

Instructor in Pediatrics (primary appointment)

Bachelor of Science, University of Missouri Columbia, 2011

Doctor of Medicine, University of Missouri Columbia, 2015

**Howard J Schlansky, M.D.**

Instructor in Clinical Pediatrics

Bachelor of Arts, University of Missouri Kansas City, 1976

Doctor of Medicine, University of Missouri Kansas City, 1978

**Margaret Ann Schmandt, M.D.**

Associate Professor of Clinical Pediatrics

Bachelor of Arts, University of Iowa, 1982

Doctor of Medicine, Saint Louis University, 1987

**Erica Grace Schmitt, Ph.D., M.D.**

Instructor in Pediatrics (primary appointment)

Bachelor of Science, University of Wisconsin Madison, 2006

Doctor of Philosophy, Medical College of Wisconsin, 2013

Doctor of Medicine, Medical College of Wisconsin, 2015

**Jacquelyn C Schnidman, M.D.**

Instructor in Clinical Pediatrics

Bachelor of Arts, University of Missouri Columbia, 1975

Doctor of Medicine, Saint Louis University, 1979

**Laura Graves Schuettelpelz, Ph.D., M.D.**

Associate Professor of Pediatrics (primary appointment)

Associate Professor of Developmental Biology

Doctor of Philosophy, Northwestern University, 2000

Doctor of Medicine, Northwestern University Medical, 2005

**Carly Rae Schuetz, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, Marshall University, 2010

Doctor of Medicine, Marshall University, 2014

**Allison Schuh, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)

Doctor of Medicine, University of Minnesota, 2016

**Ginny Lynn Schulz**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)

null, University of Missouri Columbia, 2006

null, University of Missouri Columbia, 2011

**Alan L Schwartz, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)

Professor of Developmental Biology

Alumni Endowed Professor of Pediatrics

Bachelor of Arts, Case Western Reserve University, 1970

Doctor of Philosophy, Case Western Reserve University, 1974

Doctor of Medicine, Case Western Reserve University, 1976

**Drew J. Schwartz, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)

Assistant Professor of Obstetrics and Gynecology

Assistant Professor of Molecular Microbiology

Bachelor of Science, Duke University, 2007

Doctor of Philosophy, Washington University in St Louis, 2015

Doctor of Medicine, Washington University in St Louis, 2015

**Colleen Erika Seematter, M.D.**

Assistant Professor of Clinical Pediatrics

Doctor of Medicine, Saint Louis University, 1998

**Katarina Marie Semkiu, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)

Bachelor of Arts, Saint Louis University, 2010

Doctor of Medicine, Loyola University Chicago, 2014

**Anchal Sethi**

Voluntary Clinical Assistant Professor of Pediatrics

**Penelope G Shackelford, M.D.**

Professor Emerita of Pediatrics

Bachelor of Science, University of Wisconsin Madison, 1964

Doctor of Medicine, Washington University in St Louis, 1968

**Neel Shah, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, St. George's University, 2019

**Snehal Paresh Shah, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Arts, Boston College, 2003

Doctor of Medicine, Ross University School of Medicine, 2010

**Rachel E. Shakofsky, M.D.**

Instructor in Clinical Pediatrics

Bachelor of Science, University of Missouri Columbia, 2003

Doctor of Medicine, University of Missouri Columbia, 2007

**Jaiprakash Sharma, D.Sc.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, University of Rajasthan, 2002  
Other professional doctorate, National Brain Research Centre,  
2011

**Margaret Suhail Shatara, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, University of Jordan, 2010

**Angela Marie Shaw, M.S., M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
null, University of Illinois at Chicago, 2011  
null, University of Texas Houston, 2018

**Eleanor Maria Shaw, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, University of Missouri Columbia, 1978  
Doctor of Medicine, University of Missouri Columbia, 1983

**Megan Elizabeth Shelton**

Assistant Professor of Clinical Pediatrics

**Shalini Shenoy, M.D., MBBS**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, M.G.R. Medical University, 1981  
Foreign MD equivalent, Kasturba Medical College, 1981  
Doctor of Medicine, Kasturba Medical College, 1985

**Ross William Shepherd, M.D., MBBS**

Adjunct Professor of Pediatrics  
Foreign MD equivalent, University of Queensland, 1970  
Doctor of Medicine, University of Queensland, 1979

**Marwan Shinawi, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, Hebrew University, 1989  
Israel Inst. of Tec, 1996

**Min-Yi Katherin Shiue, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Washington University in St Louis, 1992  
Doctor of Medicine, Washington University in St Louis, 1996

**Jennifer N Silva, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Union College New York, 1997  
Doctor of Medicine, St. George's University, 2002

**Gary Arthur Silverman, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Harriet B Spoehrer Professor of Pediatrics  
Head of the Department of Pediatrics  
Professor of Genetics  
Professor of Cell Biology and Physiology  
Bachelor of Science, Washington Jefferson College, 1978  
Doctor of Philosophy, University of Chicago, 1982  
Doctor of Medicine, University of Chicago, 1984

**Connie Darlene Simmons**

Instructor in Clinical Pediatrics

**Paul S Simons, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Texas Austin, 1963  
Doctor of Medicine, Washington University in St Louis, 1967

**Jessica Cherell Sims, M.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Medicine, University of Kansas Medical Center, 2018

**Kimberly Sirl**

Voluntary Clinical Associate Professor of Pediatrics

**Bryan Anthony Sisk, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Medicine  
Bachelor of Science, University of Missouri Columbia, 2007  
Doctor of Medicine, Case Western Reserve University, 2013

**Kelsey Alayne Sisti, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Alaska, 2005  
Doctor of Medicine, University of Arkansas, 2009

**Kyleigh Kay Skedgell**

Assistant Professor of Clinical Pediatrics

**Alan Joseph Skoultchi, M.S., M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Duke University, 1989  
Master of Science, University of Pennsylvania, 1990  
Doctor of Medicine, University of Medicine and Dental Of New  
Jersey (Duplicate of University of Medicine and Dentistry of New  
Jersey), 1995

**Patrick Edward Sloan, M.S., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Illinois, 2005  
Master of Science, University of Illinois, 2006  
Doctor of Medicine, University of Illinois, 2013

**Katelyn Smelser, M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
null, University of Missouri Columbia, 2011  
null, University of Missouri Columbia, null

**Carolyn Anne Delaney Smith, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Rice University, 1996  
Doctor of Medicine, Washington University in St Louis, 2000

**Joshua C Smith**

Instructor in Clinical Pediatrics

**Mallory Brooke Smith, M.S., M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
null, University of Texas Medical Branch at Galveston, 2014  
null, University of Washington School of Public Health, 2021



**Sherea Monica Smith, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Assistant Professor of Orthopedic Surgery  
Doctor of Medicine, University of Missouri Columbia, 2014

**Matthew D Smyth, M.D.**

Professor of Pediatrics  
Bachelor of Arts, Cornell University, 1992  
Doctor of Medicine, University of California San Francisco, 1996

**Nareshkumar J Solanki, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, University of Nairobi, 1975

**David Stuart Sonderman, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, Loyola University Chicago, 2012

**Kathryn August Spector, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Georgetown University, 2010  
Doctor of Medicine, University of Cincinnati, 2014

**Robert D Spewak, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Drake University, 1975  
Doctor of Medicine, Saint Louis University, 1979

**Craig A Spiegel, M.D.**

Voluntary Clinical Associate Professor of Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1978  
Doctor of Medicine, Case Western Reserve University, 1982

**Jennifer E. Sprague, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Indiana University Bloomington, 2000  
Doctor of Philosophy, Washington University in St Louis, 2007  
Doctor of Medicine, Washington University in St Louis, 2007

**Mythili Srinivasan, M.S., Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Madras, 1981  
Master of Science, Madurai Kamaraj University, 1983  
Doctor of Philosophy, Saint Louis University, 1991  
Doctor of Medicine, Saint Louis University, 1996

**Danielle R St Leger**

Instructor in Clinical Pediatrics

**Kristin Voellinger Stahl, M.D.**

Instructor in Clinical Neurology  
Bachelor of Arts, Johns Hopkins University, 1992  
Doctor of Medicine, University of Missouri Columbia, 1996

**Sarah A Stanage, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2001  
Doctor of Medicine, University of Louisville, 2008

**Edward Stapleton, M.D.**

Assistant Professor of Clinical Pediatrics

Doctor of Medicine, University of Texas Health Science Center,  
2014

**Ashley L. Steed, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Duke University, 2001  
Doctor of Philosophy, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2008

**Norman P Steele, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Indiana University Bloomington, 1968  
Doctor of Medicine, Indiana University Bloomington, 1972

**Miriam Bathia Steinham, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2011  
Doctor of Medicine, Washington University in St Louis, 2015

**Randall S Sterkel, M.D.**

Voluntary Clinical Associate Professor of Pediatrics  
Bachelor of Arts, Duke University, 1989  
Doctor of Medicine, Washington University in St Louis, 1993

**Anita R Stiffelman, M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Washington University in St Louis, 1983  
Doctor of Medicine, New York Medical College, 1987

**Jeffrey R Stokes, M.D.**

Professor of Pediatrics (primary appointment)  
Bachelor of Science, Kansas State University, 1987  
Doctor of Medicine, KANSAS UNIVERSITY SCHOOL OF  
MEDICINE, 1991

**Janis Marie Stoll, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Eastern Virginia Medical School, 2004  
Bachelor of Arts, Washington University in St Louis, 2012

**Stephen I Stone, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Illinois at Chicago, 2005  
Doctor of Medicine, Rosalind Franklin University of Medicine and  
Science (Formerly Finch University of Health Sciences), 2010

**Gregory A Storch, M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Molecular Microbiology  
Professor of Medicine  
Ruth L. Siteman Professor of Pediatrics  
Bachelor of Arts, Harvard University, 1969  
Doctor of Medicine, New York University, 1973

**Brian Ross Stotter, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Medicine, Tufts University, 2013

**Robert H Strashun, M.A., M.D.**

Associate Professor of Clinical Pediatrics  
Bachelor of Arts, Yeshiva University, 1978  
Master of Arts, Yeshiva University, 1978  
Doctor of Medicine, New York University, 1982

**M. Anne Street, M.A., M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Defiance College, 1968  
Master of Arts, University of Connecticut, 1970  
Champaign), 1976

**Rosa M Suarez-Solar, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, University of Puerto Rico (Duplicate of  
University of Puerto Rico), 1990  
Doctor of Medicine, School Not Listed, 1991

**Lisa Suffian, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, University of Missouri Kansas City, 1990  
Doctor of Medicine, University of Missouri Kansas City, 1996

**Christopher Alan Sumski, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Doctor of Medicine, Kansas City University of Medicine and  
Biosciences, 2013

**Kimberly Anne Sutton, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Bachelor of Science, University of Notre Dame, 2012  
Doctor of Medicine, University of Illinois at Chicago, 2016

**Stuart C Sweet, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
W. Mckim O. Marriott Professor of Pediatrics  
Bachelor of Science, University of Michigan, 1981  
Doctor of Philosophy, University of Michigan, 1989  
Doctor of Medicine, University of Michigan, 1990

**Amanda Sweetland**

Instructor in Clinical Pediatrics

**Stephen Matthew Sykes, Ph.D.**

Associate Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Bachelor of Science, Mount Allison University, 2000  
Doctor of Philosophy, University of Pennsylvania, 2007

**Susan C. Sylvia**

Instructor in Clinical Pediatrics

**T**

**Linda Ann Tackes, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, University of Missouri Kansas City, 1993

**Phillip Irwin Tarr, M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Molecular Microbiology

Division Chief - Division of Gastroenterology, Hepatology, &  
Nutrition

Melvin E Carnahan Professor of Pediatrics  
Bachelor of Arts, Brown University, 1975  
Doctor of Medicine, Yale University, 1980

**Kristen A Terrill**

Assistant Professor of Clinical Pediatrics

**Donna T Thackrey, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, John Carroll University, 1990  
Main Campus), 1994

**Stephen Thierauf**

Instructor in Clinical Pediatrics

**Michael D Thompson, Ph.D., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2003  
Doctor of Philosophy, University of Pittsburgh, 2012  
Doctor of Medicine, University of Pittsburgh, 2012

**Mary A Tillman, M.D.**

Professor of Clinical Pediatrics  
Doctor of Medicine, Howard University, 1960

**Robert W Tolan, M.A., M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Indiana University Bloomington, 1982  
Master of Arts, Indiana University Bloomington, 1983  
Doctor of Medicine, Washington University in St Louis, 1987

**Tomi Toler, M.S., D.P.H.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, University of Missouri Columbia, 2007  
Master of Science, University of North Carolina at Greensboro,  
2009  
Other professional doctorate, Tulane University, null

**Inna Treskov, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Medicine, University of Missouri Columbia, 2006

**Garland R Tschudin, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, University of Missouri Columbia, 1971  
Doctor of Medicine, University of Missouri Columbia, 1975

**Michael P Turmelle, M.D.**

Professor of Pediatrics (primary appointment)  
Co-Division Chief - Division of Hospitalist Medicine  
Bachelor of Arts, Bowdoin College, 1994  
Doctor of Medicine, Johns Hopkins University, 1998

**Yumirle Padron Turmelle, M.D.**

Associate Professor of Pediatrics (primary appointment)  
Associate of Arts, Miami Dade Community College, 1993  
Bachelor of Arts, University of Miami, 1995

Doctor of Medicine, University of Florida, 2000

**Ashley Davidson Turner, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)

Doctor of Medicine, University of Missouri Columbia, 2016

**Ashlyn Brooke Turner, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, University of Iowa, 2008

Doctor of Medicine, University of Illinois College, 2012

**Afia Gyamfuaah Twumasi, M.D.**

Instructor in Pediatrics (primary appointment)

Doctor of Medicine, University of Texas Austin, 2018

**April L Tyus**

Instructor in Clinical Pediatrics

Bachelor of Arts, Washington University in St Louis, 1995

**U**

**Elizabeth C Utterson, M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Arts, University of Notre Dame, 1994

Doctor of Medicine, Creighton University, 1998

**V**

**Pablo Ezequiel Valguarnera, D.Sc.**

Instructor in Pediatrics (Pending Dean's Approval) (primary appointment)

Bachelor of Science, Universidad de Buenos Aires, 2009

Doctor of Science, Universidad Nacional de San Martín Argentina, 2015

**George Van Hare, M.D.**

Professor of Pediatrics (primary appointment)

Louis Larrick Ward Professor of Pediatrics

Bachelor of Science, Bates College, 1980

Doctor of Medicine, University of Connecticut, 1980

**Yasasvi Vasili, M.D.**

Instructor in Pediatrics (primary appointment)

Doctor of Medicine, East Tennessee State University, 2015

**Laird Henry Vermont**

Instructor in Clinical Pediatrics

**Zachary Andrew Vesoulis, M.S., M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, Miami University, 2005

Doctor of Medicine, Ohio State University, 2009

null, Washington University in St Louis, 2019

**Arpita Vyas, MB.ChB.**

Associate Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)

null, University of Sheffield, 2001

**W**

**Jean V Wagner**

Assistant Professor of Clinical Pediatrics

**Colleen M Wallace, M.D.**

Associate Professor of Pediatrics (primary appointment)

Director, Humanities Program

Bachelor of Science, University of Notre Dame, 1997

Doctor of Medicine, Washington University in St Louis, 2001

**Jennifer Anne Wambach, M.D.**

Associate Professor of Pediatrics (primary appointment)

Bachelor of Science, Vanderbilt University, 1997

Doctor of Medicine, Vanderbilt University, 2001

**Barbara B. Warner, M.S., M.D.**

Professor of Pediatrics (primary appointment)

Division Chief - Division of Newborn Medicine

F. Sessions Cole, MD, Chair in Newborn Medicine

Bachelor of Science, University of Dayton, 1976

Master of Science, University of Massachusetts, 1981

Doctor of Medicine, University of Cincinnati, 1985

**Michael S Watson, M.S., Ph.D.**

Adjunct Professor of Pediatrics

Bachelor of Science, The American University, 1974

Master of Science, University of Alabama (Duplicate of University of Alabama in Tuscaloosa), 1978

Doctor of Philosophy, University of Alabama (Duplicate of University of Alabama in Tuscaloosa), 1981

**Courtney E Watza**

Voluntary Clinical Assistant Professor of Pediatrics

**Kristin Kay Wenger, M.D.**

Assistant Professor of Clinical Pediatrics

Bachelor of Arts, Ohio Wesleyan University, 1997

Doctor of Medicine, Washington University in St Louis, 2008

**Jennifer Corinne Wessman, M.D.**

Instructor in Pediatrics (primary appointment)

Bachelor of Science, College of William and Mary, 2001

Doctor of Medicine, Commonwealth College, 2005

**Keisha White, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, University of Connecticut, 2017

**Neil Harris White, M.D.**

Professor of Pediatrics (primary appointment)

Professor of Medicine

Bachelor of Science, State University of New York at Albany, 1971

Doctor of Medicine, Albert Einstein College of Medicine, 1975

**Halana Victoria Whitehead, M.D.**

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Science, University of Pennsylvania, 2009

Doctor of Medicine, Case Western Reserve University, 2013

**Karen Whiteside, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Washington University in St Louis, 1993  
Doctor of Medicine, Washington University in St Louis, 1998

**Rae Alexandra Wilkerson Maixner**

Voluntary Clinical Assistant Professor of Pediatrics

**Kristine G Williams, M.P.H., M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Arts, Georgetown University, 1989  
Doctor of Medicine, Georgetown University, 1994  
Master of Public Health, Saint Louis University, 2001

**Daniel Nathan Willis, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Benedictine College, 2009  
Doctor of Medicine, University of Kansas Medical, 2013

**David B Wilson, Ph.D., M.D.**

Professor of Pediatrics (primary appointment)  
Professor of Developmental Biology  
Bachelor of Arts, Kalamazoo College, 1980  
Doctor of Philosophy, Washington University in St Louis, 1986  
Doctor of Medicine, Washington University in St Louis, 1986

**Susan May Wiltrakis, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Valparaiso University, 2010  
Doctor of Medicine, University of Alabama in Birmingham, 2012

**Loralee Jane Wold, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Arts, Saint Louis University, 1993  
Doctor of Medicine, Saint Louis University, 1997

**Katie Knoedelseder Wolfe, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty  
Approval) (primary appointment)  
null, Vanderbilt University, 2007  
Doctor of Medicine, Saint Louis University, 2011

**Kel Vin Woo, Ph.D., M.D.**

Instructor in Pediatrics (Pending Dean's Approval) (primary  
appointment)  
Doctor of Philosophy, Vanderbilt University, 2010  
Doctor of Medicine, Vanderbilt University, 2012

**Mark Norman Woolley, M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Rockhurst College, 2009  
Doctor of Medicine, Saint Louis University, 2013

**Ronald Edward Worthington**

Adjunct Professor of Pediatrics

**Linda Xiao-Chen Wu, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, University of Waterloo, 2007  
Doctor of Medicine, Midwestern University, 2011

**Kathie R Wuellner, M.D.**

Voluntary Clinical Professor of Clinical Pediatrics  
(Champaign), 1973  
Doctor of Medicine, Saint Louis University, 1978

**Hayley Wurzel, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Brown University, 1995  
Doctor of Medicine, Washington University in St Louis, 1999

**Kristine M Wylie, Ph.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Arts, Southern Illinois University Edwardsville, 1996  
Doctor of Philosophy, Saint Louis University, 2009

**Todd N Wylie**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, Southern Illinois University Edwardsville,  
1995

**X**

**Xunjun Xiao, M.S., Ph.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, China Agricultural University, 1998  
Master of Science, China Agricultural University, 2001  
Doctor of Philosophy, Virginia Polytechnic Institute and State  
University, 2005

**Y**

**Mona Yassin, M.D.**

Instructor in Clinical Pediatrics  
Doctor of Medicine, School Not Listed, 1979

**Aecha Marion Ybarra, M.S., M.D.**

Assistant Professor of Pediatrics (primary appointment)  
Bachelor of Science, University of Miami, 2003  
Master of Science, Barry University, 2007  
Doctor of Medicine, St. George's University, 2012

**Kentaro Yomogida, MB.BCh.**

Instructor in Pediatrics (primary appointment)  
Foreign MD equivalent, Nippon Medical School, 2008

**Julia Catherine Young, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, Saint Louis University, 1999

**Staci R. Young, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, Truman State University (Duplicate of  
Truman State University (Formerly Northeast Missouri State  
University)), 1997  
Doctor of Medicine, Southern Illinois University (Duplicate of  
Southern Illinois University Carbondale), 2002

**Cecilia H Yu, M.D.**

Assistant Professor of Clinical Pediatrics  
Bachelor of Science, Brown University, 1987

Doctor of Medicine, University of Texas Southwest, 1992

## Z

### **Christina Elizabeth Zanaboni, M.D.**

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)  
null, Saint Louis University, 2016

### **Ritu L Zei, M.D.**

Instructor in Pediatrics (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2008  
Doctor of Medicine, Medical College of Wisconsin, 2013

### **Bo Zhang, Ph.D.**

Instructor in Pediatrics (primary appointment)  
Doctor of Philosophy, Chinese Academy of Sciences, 2013  
Bachelor of Science, Wuhan University, 2020

### **Daisy Zhou, M.D.**

Assistant Professor of Clinical Pediatrics  
Doctor of Medicine, Washington University in St Louis, 2016

### **Amy Christine Zimmermann, M.D.**

Instructor in Clinical Pediatrics  
Bachelor of Science, University of Missouri Columbia, 1998  
Doctor of Medicine, University of Missouri Columbia, 2003

### **Andrew C. Zuckerman**

Instructor in Clinical Pediatrics

## Research Electives

### Pediatrics Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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### **Ana Maria Arbelaez, MD**

Northwest Tower, 10th Floor  
Phone: 314-286-1138

Clinical research in diabetes mellitus; clinical research studies on hypoglycemia-associated autonomic failure in patients with type 1 diabetes mellitus and on cystic fibrosis-related diabetes

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### **Charles E. Canter, MD**

Northwest Tower, Division of Cardiology, 8th Floor  
Phone: 314-454-6095

Single-center and multicenter clinical studies and trials in pediatric cardiomyopathy, heart failure and heart transplantation

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### **F. Sessions Cole, MD, and Jennifer Wambach, MD, MS**

Northwest Tower, 8th Floor, and McDonnell Pediatric Research Building, 5th Floor  
Phone: 314-454-6148

Using candidate gene sequencing, exome sequencing, whole genome sequencing, and computational prediction and filtering strategies for the discovery of deleterious variants in population-based cohorts, case-control cohorts, and trios of affected infant and parents, our laboratory focuses on discovering novel candidate genes associated with neonatal respiratory distress syndrome and understanding the contribution of genetic variation in candidate genes of the pulmonary surfactant metabolic pathway (including surfactant protein B, surfactant protein C, NKX2-1, and ABCA3) to the risk of neonatal respiratory distress syndrome.

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### **Vikas Dharnidharka, MD, MPH**

Northwest Tower, 10th Floor  
Phone: 314-286-1574

The focus of this lab is on clinical and translational research in childhood kidney disease. Our group is involved in several different types of clinical and translational research, including multicenter clinical intervention trials to improve teen adherence with transplant medications and to test new medications in children on dialysis; translational biomarker studies in transplant acute and chronic rejection and genomic studies or post-transplant lymphoproliferative disease; and large transplant database epidemiological analyses for associations of immunosuppressive regimens with efficacy and morbidity balance.

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### **Stephanie A. Fritz, MD, MSCI**

Northwest Tower, Room 10125  
Phone: 314-454-4115

Our research team studies the epidemiology, microbial virulence mechanisms, and host defenses against community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) colonization, transmission and disease. We are investigating the transmission dynamics of CA-MRSA in households as well as interventions to interrupt the transmission of CA-MRSA and to prevent subsequent infections. Our lab also explores the microbial and host genomic determinants as well as the host immune response to staphylococcal toxins implicated in the pathogenesis of CA-MRSA in patients across the spectrum of disease states. Our goal is to develop novel approaches for the prevention of CA-MRSA infections.

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### **Carmen Halabi, MD, PhD**

McDonnell Pediatric Research Building, 4th Floor, Room 4107  
Phone: 314-286-1376

Our focus is on the extracellular matrix in vascular development and disease. Specifically, we study the extracellular matrix proteins that make up the elastic fibers of blood vessels. Elastic fibers convey elasticity to blood vessels, allowing large arteries to store energy during systole and release it during diastole. Abnormalities in elastic fiber components lead to

various complications, including hypertension, stiff vessels, and aneurysms. In the laboratory, we utilize mouse models to understand how abnormalities in these proteins lead to disease, which helps us not only to learn about the normal function of these proteins but also to identify potential novel therapeutic targets.

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**Robert J. Hayashi, MD**

St. Louis Children's Hospital, Suite 9S  
Phone: 314-454-4118

Our clinical research interests include stem cell transplantation and its complications, including post-transplant lymphoproliferative disease and the long-term side effects of therapy.

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**Keith A. Hruska, MD**

McDonnell Pediatric Research Building, 5th Floor  
Phone: 314-286-2772

The research in the laboratory focuses on chronic kidney disease and its complications of the chronic kidney disease mineral bone disorder syndrome, which involves skeletal frailty, cardiovascular disease, and vascular calcification. The lab has discovered important new pathologic mechanisms of disease leading to vascular calcification through systemic effects of factors involved in renal repair and hyperphosphatemia. Translational studies that continue to develop new therapeutic approaches are being aggressively pursued. New therapies for chronic kidney disease and its complications are being studied in clinical trials.

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**Paul Hruz, MD, PhD**

McDonnell Pediatric Research Building, 3rd Floor  
Phone: 314-286-2797

Our research interests include structure/function relationships in facilitative glucose transporters, congenital and acquired lipodystrophy syndromes, and insulin resistance associated with HIV protease inhibitor therapy.

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**David A. Hunstad, MD**

McDonnell Pediatric Research Building, Room 6106  
Phone: 314-286-2710

Work in our lab focuses on the interactions of pathogenic bacteria with their hosts. We aim to elucidate the modulation of host immune responses by pathogens and to determine the mechanisms by which these bacteria present specific virulence factors on their surfaces. Currently, we use cultured bladder epithelial cell models and murine models of cystitis to investigate the ability of uropathogenic *Escherichia coli* to modulate host innate and adaptive immune responses. In addition, we are studying the molecular mechanisms by which selected outer membrane proteins contribute to the virulence of uropathogenic

*E. coli*. Our primary goal is to discover novel targets for interventions that will prevent and better treat bacterial infections of the urinary tract. Along these lines, we are leveraging recent discoveries in UTI pathogenesis to design nanoparticle-based therapies for the prevention of acute and recurrent UTI. We have also launched a new translational study of immune responses to UTI in male and female infants, paired with an innovative new mouse model of male UTI that permits first-ever studies of sex differences in these infections.

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**S. Celeste Morley, MD, PhD**

McDonnell Pediatric Research Building, Room 6105  
Phone: 314-286-2136

Our laboratory investigates the molecular mechanisms underlying immune cell signaling and trafficking using mouse models. We hope to identify the molecules that are critical for host defense against infectious organisms such as pneumococcus. Our focus is currently on an actin-binding protein called L-plastin, which is required for normal T and B cell motility.

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**Alan L. Schwartz, PhD, MD**

425 McDonnell Sciences Building  
Phone: 314-286-1709

Our investigative efforts are aimed at understanding the biology of cell surface receptors, including the biochemical and molecular dissection of the mechanisms responsible for the receptor-mediated endocytosis of blood coagulation proteins and the regulation of intracellular protein turnover.

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**Shalini Shenoy, MD**

St. Louis Children's Hospital, Suite 9S  
Phone: 314-454-6018

Investigation of novel reduced-intensity transplant strategies for pediatric nonmalignant disorders and the immunologic basis of graft-versus-host disease and graft rejection

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**Gregory A. Storch, MD; Kristine Wylie, PhD; Todd Wylie, BS; and Richard S. Buller, PhD**

St. Louis Children's Hospital, Suite 2N52  
Phone: 314-454-6079

Our focus is the study of infectious disease genomics. Our laboratory is interested in applying genomic analysis to a variety of problems in infectious diseases, mostly related to viral infections. Recent studies include the use of next-generation sequencing to define the human virome in immunocompromised children; improved methods for detecting viruses using next-generation sequencing; the use of next-generation sequencing for clinical diagnosis; analysis of the human transcriptome

response to acute infections; sequencing of the genome of enterovirus D68; and the development of a rapid diagnostic test for enterovirus D68. Students would have the opportunity to learn genomic techniques, including informatics analysis.

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**Phillip I. Tarr, MD**

McDonnell Pediatric Research Building, Room 6103  
Phone: 314-286-2848

Our work involves research in the areas of pediatric gastroenterology, hepatology and nutrition. Students have opportunities in broadly encompassing research projects. Investigators in the division have funded and vibrant projects in liver disease (fatty liver disease, acute liver failure, biliary atresia, liver transplants, cystic fibrosis liver disease), inflammatory bowel diseases (Crohn's disease, ulcerative colitis), infections of the gastrointestinal tract (diarrhea), acute liver failure, Hirschsprung disease, diarrhea, gut microbiome, aflatoxin injury to the liver and stunting, health services research, necrotizing enterocolitis, antibiotic-resistant pathogens in the human gut, and quality improvement, particularly related to inflammatory bowel disease management. Short- and long-term projects can be arranged around these and other related efforts. The exact nature of the project depends on the time that the student can contribute to the effort and the availability of any of the division faculty, who all have established track records as mentors. Interested students should contact any of our faculty or Dr. Tarr to discuss the possibilities.

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**Neil H. White, MD, CDE**

St. Louis Children's Hospital, Northwest Tower, 10th Floor  
Phone: 314-286-1157

Our work involves patient-oriented research in the management of diabetes in children. Arrangements can be made for involvement in or the development of projects aimed at improving outcomes of or the prevention of diabetes mellitus and its complications.

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**David B. Wilson, MD, PhD**

St. Louis Children's Hospital, Northwest Tower, 9th Floor  
Phone: 314-286-2834

Our research is focused on the molecular switches that regulate control genes during early embryonic development and differentiation.

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## Courses

Visit online course listings to view offerings for M65 Peds (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M65>).

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**M65 Peds 501 Introduction to Genetic Counseling I**

This seminar provides an overview of genetic counseling and health care, and it discusses how individual differences can affect health care choices and belief systems. Students will become familiar with the process of genetic counseling, and they will build an awareness of related health professions, the health care system, and important terminology. Attendance and active participation are expected and required. Course activities will include interactive lectures, class discussions, class member presentations, guest presentations, and outside reading. This course is open to students in the Program in Genetic Counseling. Admittance may be offered to other students by request.

Credit 4 units.

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**M65 Peds 502 Current Topics in Human and Mammalian Genetics**

This graduate-level course provides an overview of concepts in mammalian molecular genetics, especially as it pertains to human diseases. Guest lecturers will give seminars on their topics of research and assign relevant papers for discussion. Students should read assigned papers prior to each lecture and contribute to the class discussion.

Credit 3 units.

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**M65 Peds 503 Laboratory Genetic Counseling**

This course is designed for genetic counseling students, and it focuses on a variety of areas related to genetic counseling in the laboratory. Students will become familiar with various laboratory testing methodologies, data interpretation, and report writing in addition to professional and regulatory scenarios encountered in the lab. Attendance and active participation are expected and required. The course will consist of lectures, class discussions, hands-on demonstrations and tutorials, laboratory tours, and written materials. Some travel will be required. This course is open to students in the Master's in Genetic Counseling Program. Admittance may be offered to other students by request.

Credit 3 units.

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**M65 Peds 504 Genetic Counseling Journal Club**

This journal club is a monthly, two-hour discussion of a relevant topic in clinical genetics. Research articles are selected from the literature and presented by attendees (one article per attendee). Summaries of the articles include a critical appraisal of the study and its methodology and results; the potential implications of the results for clinical practice (if any); the limitations of the conclusions that can be drawn from the study; and any biases or conflicts of interest that could have affected the study results. This course is open to students in the Master's Program in Genetic Counseling. Admittance may be offered to other students by request.

Credit 1 unit.

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**M65 Peds 505 Introduction to Genetic Counseling II**

This course is a seminar focusing on preparing students for their clinical rotations and learning and practicing basic counseling skills. Attendance and active participation is expected and required. Course activities will include interactive lectures, class discussions, class member presentations, guest presentations, and outside reading. This course is open to students in the Master's in Program in Genetic Counseling. Admittance may be offered to other students by request. Prerequisite for this course is Introduction to Genetic Counseling I.

Credit 4 units.

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**M65 Peds 506 Clinical Genetic Specialties**

This course is a seminar focusing on a variety of specialty areas in clinical genetics. Attendance and active participation are expected and required. Course activities will include interactive lectures, class discussion, and class member presentations. There will be 2 examinations - mid-term and final. This course is open to students in the Master's Program in Genetic Counseling. Admittance may be offered to other students by request. Prerequisites for this course are Introduction to Genetic Counseling I and Laboratory Genetic Counseling.

Credit 3 units.

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**M65 Peds 507 Genetic Counseling Research Design and Ethics**

This course will provide the foundation for the development and execution of the research project required for successful completion of the Master's of Science in Genetic Counseling degree. Through a series of interactive lectures, class discussions, student presentations, guest presentations, and outside reading, students will learn about common genetic counseling-relevant research methods; areas of active genetic counseling research on both a local and national level; and ethical guidelines for the conduct of responsible human subjects research. By the end of the course, students will select a topic for their research project and submit a research proposal. Students will register for Research Project I, II, and III to complete their research projects with faculty mentorship and peer support. This course is open to graduate students at Washington University School of Medicine. Prerequisites for this course are admission into the WUSM Graduate Program in Genetic Counseling or special permission from the instructor.

Credit 3 units.

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**M65 Peds 601 Advanced Genetic Counseling I**

This course is a seminar focusing on starting to build advanced genetic counseling skills. Students will become familiar with unique aspects of various genetic counseling specialties, with a focus on prenatal genetics. Students will also learn about counseling theories, psychosocial assessment, psychosocial counseling techniques, and professional development skills. Attendance and active participation are expected and required.

Credit 4 units.

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**M65 Peds 602 Research Project II**

The primary objective of this course series is to ensure the timely completion of student research projects. This course series provides research project scaffolding, mentorship, and opportunities for peer feedback. Research Project II is taken during the fall semester of the second year.

Credit 2 units.

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**M65 Peds 603 Clinical Fieldwork Rotations II**

This course covers clinical fieldwork rotations. Participation as requested by supervisors is required. Clinical Fieldwork Rotations II involves two 14-day clinical rotations during the fall semester of the second year. Students who complete this course successfully will be able to demonstrate management of a genetic counseling case from contracting to follow-up and successfully use psychosocial counseling skills with patients.

Credit 3 units.

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**M65 Peds 640 Pediatrics: Physicians, Patients & Society**

Students are introduced to the unique nature of pediatrics as a subspecialty through a series of clinically oriented lectures and Team-Based Learning sessions focusing on the unique physiology and pathophysiology of pediatric patients. These sessions demonstrate the longitudinal nature of pediatrics by addressing normal and pathologic aspects of human growth and development as well as the unique role of the physician in assessing and managing pediatric patients at all stages of development.

Credit 27 units.

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**M65 Peds 760 Pediatric Clerkship**

This is a five-week clerkship. This course emphasizes pediatric pathophysiology and normal growth and development from birth through adolescence. Weeks are spent inpatient at St. Louis Children's Hospital in general pediatrics on 10.100 or 11.100. Weeks are spent in pediatric acute care in one of the following: Acute Care at St. Louis Children's Hospital, Acute Care at Missouri Baptist Medical Center (community hospital) or Acute Care at Progress West Hospital (community hospital). One week is spent on newborn nursery in one of the following: assessment nursery at 6800 Parkview Tower or Missouri Baptist Medical Center nursery (community hospital). One week is spent in outpatient ambulatory clinic in one of the following: St. Louis Children's Hospital sub-specialty clinics or Children's Specialty Care Center (CSCC) on Mason Road. Emphasis is on performing a pediatric history and physical examination and developing an appropriate differential diagnosis. Daily rounds with house staff and attending physicians as well as weekly case management conferences and bedside teaching further this emphasis.

Credit 192 units.

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**M65 Peds 801 General Pediatrics Subinternship**

This is the general pediatric subinternship. The student will be assigned patients on one of three inpatient pediatric floor teams. They will follow patients from initial evaluation and for continuing care until discharge. Students work directly under the supervision of the senior resident and manage their own patients without co-coverage by an intern. Teaching rounds are conducted by the faculty. The elective will provide experience in the management of many pediatric medical conditions (variable depending on floor) and will include the care of patients with various diseases including pulmonary, infectious diseases, gastrointestinal, renal, neurological, endocrine, and rheumatologic issues. Additionally, patients with failure to gain appropriate weight, status asthmaticus, ingestions, fever of unknown origin, and undiagnosed conditions may be seen.

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**M65 Peds 808 Pediatric Asthma and Allergy**

In a predominantly outpatient setting, students will evaluate patients with a wide variety of allergic and immunologic disorders including asthma, allergic rhinitis, anaphylaxis, food allergy, atopic dermatitis, urticaria, angioedema and primary immunodeficiency. Rotation goals include: (1) the extension of history-taking skills to include environmental exposures, (2) the recognition of physical findings suggestive of allergic disease, (3) understanding the indications and interpretation of diagnostic testing including skin testing and assessment of pulmonary function, and (4) application of appropriate therapeutic strategies to these disorders. Weekly didactic conferences and inpatient consultations provide additional educational opportunities to the student.



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#### **M65 Peds 809 Pediatric Pulmonary Subinternship**

On the 7100 Respiratory Unit, the subintern is an active member of a multidisciplinary care team, which consists of attending pulmonologist, advanced practice nurses, second-year pediatric residents, unit nurses, and other care providers. The subintern takes responsibility for children with acute and chronic lung diseases admitted to the unit, and in addition, may be responsible for patients with non-respiratory disorders or general pediatric conditions as well. The student will be co-managed and directly supervised by senior pediatric residents and attending physician in the daily care of patients. The rotation is structured to provide students with a clinical experience to allow them to gain exposure to the breadth of respiratory diseases seen at St. Louis Children's Hospital. The volume of patients on the 7100 Respiratory Unit and number covered by the subintern varies. He or she will typically be responsible for the care of two to six patients at any given time, and will be exposed to children with wide-ranging lung diseases and breathing disorders, such as asthma, cystic fibrosis, bronchopulmonary dysplasia, bronchiolitis, pneumonia, chronic respiratory insufficiency, and congenital lung anomalies during this rotation. The student will also have the opportunity to participate in tests and procedures essential to the practice of pulmonary medicine, including pulmonary function studies, flexible bronchoscopy, and overnight polysomnography. Subinterns do not have evening coverage responsibilities, and weekend responsibilities are limited to two days during the four-week block. They are strongly encouraged to attend departmental and divisional conferences.

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#### **M65 Peds 811 Pediatric Critical Care Subinternship**

This elective is designed to familiarize the student with the diagnosis and treatment of critical illness in infants and children. To this end, each student is made responsible for a small number of assigned cases under the direct supervision of pediatric residents, pediatric critical care fellows, and faculty. The teaching activities emphasize the understanding of pathophysiological processes that lead to respiratory, circulatory, and central nervous system dysfunction and their therapy in the developing subject. Students are expected to participate in all the daily activities of the Pediatric Intensive Care Unit at St. Louis Children's Hospital and be on occasional call after hours.

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#### **M65 Peds 813 Pediatric Cardiac Catheterization**

This elective will focus on the interpretation of hemodynamic and angiographic data acquired in the cardiac catheterization laboratory.

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#### **M65 Peds 819 Pediatric Cardiology - Outpatient Service**

Students will be exposed to the wide spectrum of pediatric cardiology on an outpatient basis. In addition to general cardiology clinics, several subspecialty clinics are also available, including heart failure/transplant, electrophysiology/inherited arrhythmias, pulmonary hypertension, William's syndrome, Down syndrome, cardiac neurodevelopmental, COVID-19/MIS-C, and preventative cardiology clinic. Students will independently evaluate clinic patients referred for a variety of cardiac complaints, such as cardiac murmurs, chest pain, syncope, arrhythmia, as well as a wide variety of congenital cardiac lesions, and report their findings to the attending. Cardiac auscultation skills will be enhanced through auscultation of cardiac patients in a clinic environment. Students will learn basics of ECG and echocardiogram interpretation by reviewing studies performed during clinic with the attending. Clinics are held at St. Louis Children's Hospital and the Children's Specialty

Care Center in West County, Richardson Crossing clinic in Arnold, Graham Road clinic in North St. Louis County, and Shiloh clinic in Shiloh, IL. Students also have the option to participate in outreach clinics that occur on a monthly basis (locations include Cape Girardeau, Poplar Bluff, Rolla, Bonne Terre, and Columbia). Depending on interest, students may spend additional time in the echocardiography laboratory for more in-depth exposure to echocardiography, including fetal echocardiography. Participation in weekly surgical conference and daily cardiology educational conferences is encouraged.

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#### **M65 Peds 826 Genetics and Genomic Medicine**

The goal of this senior elective is to facilitate the acquisition of clinical skills and knowledge in genetics and genomic medicine. The student will actively participate in the diagnosis and management of pediatric and adult patients with genetic disease in both the ambulatory and inpatient settings. Emphasis will be placed on application of the science of genetics to the bedside and will include a broad exposure to patients with biochemical, metabolic, structural and complex genetic diseases. Students will have an opportunity to visit clinical laboratories involved with diagnosis of genetic disorders, including the cytogenetics, molecular genetics, and biochemical genetics laboratories. Students will be expected to participate in the weekly clinical case conference.

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#### **M65 Peds 827 Pediatric Hematology/Oncology Subinternship**

Students will assume the responsibilities of a pediatric resident on the inpatient Hematology/Oncology service at St. Louis Children's Hospital. Serving in a classic subintern role, the student will perform evaluations and manage, under the supervision of a senior resident, patients who span the scope of diseases in our discipline. Additional educational activities include: regularly held didactic lectures, participation in our weekly "tumor board" conference, reviewing peripheral smears and bone marrow aspirate specimens obtained from our patients.

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#### **M65 Peds 836 Pediatric Rheumatology**

Opportunities are available to care for children with a variety of immunologic and rheumatologic disorders. Students will see patients in outpatient clinics and inpatient consultations. An in-depth approach to evaluating autoimmune disease and disorders of the immune system will be provided. Students will participate in evaluation of new and return patients with a variety of rheumatologic diseases, including juvenile idiopathic arthritis (JIA), systemic lupus erythematosus (SLE), juvenile dermatomyositis (JDM), autoinflammatory/periodic fever syndromes, and scleroderma. The student will also learn the approach to patients with positive autoantibodies, joint pain, muscle pain, and other common complaints that a general pediatrician may encounter. Locations include SLCH inpatient/outpatient, SLCH Specialty Care Center clinics, and Shriners Hospital clinics. Students will have the opportunity to attend multiple conferences.

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#### **M65 Peds 838 Pediatric Gastroenterology, Hepatology, and Nutrition**

The rotation in Pediatric Gastroenterology, Hepatology, and Nutrition provides broad exposure to specialized and common pediatric gastrointestinal and hepatobiliary problems. Division patients are seen in the outpatient suites and in the hospital. Students evaluate outpatients with common pediatric complaints

like abdominal pain, constipation, and poor growth. Additionally, students experience the ongoing outpatient care of patients with liver disease, inflammatory bowel disease, short-gut syndrome, celiac disease, and other rare disorders. The inpatient service provides experience in caring for patients with acute illnesses such as gastrointestinal bleeding, malnutrition, liver failure, complications of inflammatory bowel disease, and pancreatitis as well as seeing patients on the pediatric gastrointestinal consultation service. Students participate in diagnostic and therapeutic endoscopic procedures. At weekly divisional conferences, faculty, fellows, and students review pathology slides from current cases and discuss difficult patient problems and topics of interest.

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**M65 Peds 839 Antimicrobial Use, Resistance, and Stewardship**

In 2013, the CDC estimated that 23,000 Americans die annually from antibiotic-resistant infections, and an additional two million are infected with one of these difficult-to-treat pathogens. The primary driver of this resistance is the use -- and, more importantly, the misuse -- of antibiotics. In 2015, the White House published the National Action Plan for Combating Antibiotic-Resistant Bacteria. This plan calls for improvement in antimicrobial use in human and agricultural medicine, better diagnostics, increased collaboration domestically and internationally, and the accelerated development of new antibiotic agents. This fourth-year elective rotation will be focused on educating the student on the current state of domestic and global antibiotic resistance and the mechanisms by which health care systems are addressing this problem. The student will participate in the daily antimicrobial stewardship activities conducted at St. Louis Children's Hospital, attend weekly stewardship and clinical infectious diseases meetings both at the hospital and BJC system levels, review antimicrobial use data, and participate in hands-on activities in the microbiology laboratory. At the end of this rotation, the student will be able to do the following: (1) List the antimicrobials and the pathogens they effectively treat; (2) Analyze bacteria for genotypic and phenotypic resistance through standard and rapid microbiologic techniques; (3) Describe the antimicrobial stewardship interventions that can be implemented in different health care settings; (4) List the social determinants that impact antimicrobial stewardship programs; and (5) Explain how the microbiome and resistome are important in our efforts to improve antimicrobial use.

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**M65 Peds 840 Pediatric Infectious Diseases**

This elective is designed to engage students in the clinical aspects of routine and complex infectious diseases in children (ages birth to 18 years). Students will perform ID specialty consultations on both inpatients and outpatients. Regular daily activities will include evaluation of new patients, work rounds on inpatient consults, and teaching rounds with the ID fellow and/or attending. Students will attend the general pediatric ID clinic and the pediatric HIV clinic, one half-day each per week. Formal teaching includes HIV and ID Core Curriculum sessions, a weekly pediatric ID case conference, a weekly joint clinical conference with the adult ID division, and weekly clinical microbiology teaching rounds with Pathology faculty from the bacteriology and molecular diagnostics labs.

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**M65 Peds 845 Pediatric Emergency Medicine Subinternship**

The goal of this elective is to provide the senior medical student with a broad introductory clinical experience in pediatric emergency medicine. Functioning as a subintern in the Emergency Unit of St. Louis Children's Hospital, the student will have the opportunity to evaluate and manage patients with a wide variety of emergent and urgent medical and surgical problems. Examples include: respiratory distress, abdominal pain, lacerations, bone injuries, rashes, fever, etc. Students will work either a day shift (7:30 am - 3:00 pm) or an evening shift (3:00 pm - 11:00 pm) in rotation. Daily teaching conferences are provided by the attending staff. A weekly meeting of the students and senior faculty will occur to review interesting cases. Also, attending staff and senior pediatric residents provide 24-hour on-site supervision. Each medical student will be asked to prepare a 20-minute presentation on a topic of his/her choosing.

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**M65 Peds 846 Child Abuse Pediatrics**

The medical student will work with the Child Protection (CPP) team at St. Louis Children's Hospital, which consists of two Child Abuse Pediatrics attending physicians, one Child Abuse Pediatrics fellow, a Pediatric nurse practitioner, a clinic nurse, and 2 social workers. Pediatric residents or Pediatric Emergency Medicine fellows also may be rotating with the team at the same time. The student will observe inpatient consults for physical and sexual abuse and outpatient clinic patients for physical and sexual abuse. The student may attend court cases (off campus) and watch expert witness testimony by the CPP physicians/nurse practitioner. The student may attend Fatality Review meetings (off campus). The student will observe a forensic interview at the Child Advocacy Center (off campus). The student may see acute sexual assault cases conducted by the Sexual Assault (SANE) nurse practitioners in the Emergency Department. The student will be asked to complete a short project on a topic related to child maltreatment and will present it to the team at the end of the rotation. The student will be given a list of readings/didactic activities to do during the rotation. The student will have daily (45 minute) lectures with one of the child abuse attending physicians on a variety of topics related to child maltreatment and will attend the Child Protection team meeting (1 hour) every day. The student can also attend Pediatric Residency noon conference during this rotation.

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**M65 Peds 849 Pediatric Endocrinology and Diabetes**

This elective is designed to include broad clinical experience in pediatric endocrinology and diabetes. The student will have an opportunity to evaluate both patients admitted to St. Louis Children's Hospital and patients referred for consultation in our three outpatient clinics each week. In addition to a divisional conference to review referred patients, several joint conferences with the adult Endocrinology and Diabetes Division (clinical rounds, journal club/research seminar, case conference) are held weekly.

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**M65 Peds 852 Clinical Pediatric Pulmonary Medicine**

This elective provides an excellent opportunity for students to be exposed to the full scope of respiratory diseases and sleep disorders in infants and children. Pediatric referrals will be seen in both an inpatient and outpatient setting. Rotation goals for students include: 1. Gain greater insights into the genetics, epidemiology, pathophysiology, and clinical presentations of lung diseases in children, 2. Learn the importance of the physical examination using inspection, percussion, and auscultation, 3. Understand indications and interpretation of diagnostic tests, such as chest imaging, blood

gas measurements, polysomnography, pulmonary function testing, and bronchoscopy with biopsy and lavage, and 4. Learn to apply therapeutic interventions to common lung diseases. Unique aspects of this rotation include: A broad exposure to children with asthma, cystic fibrosis, ciliopathies, interstitial lung diseases, chronic lung disease of infancy, congenital lung malformations, and advanced cardiopulmonary diseases referred for lung transplantation. Weekly didactic sessions and divisional clinical conferences provide opportunities for the trainee to develop his or her presentation skills.

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#### **M65 Peds 861 Newborn Medicine**

The goal of this course is to allow students the opportunity to assume primary responsibility for patients in the Neonatal Intensive Care Unit (NICU) under the direct supervision of first or second year residents as well as fellows and attendings. Students will participate in formulation of diagnostic and treatment plans, coordination of care and communication with families. Throughout the rotation the students will broaden their understanding of pathophysiology as it relates to the transition from fetal to neonatal life and in common disease states affecting neonates. There will be emphasis on improving clinical problem-solving skills, communication within the team as well as with ancillary staff and families. Students during each rotation will have the option to rotate through the Neonatal Intensive Care Unit at St. Louis Children's Hospital and/or the Neonatal Assessment Center /Labor and Delivery services at Parkview Tower -Barnes-Jewish Hospital. Students assigned to the Labor and Delivery Service will routinely be involved in normal newborn care and delivery room management. Expectations during the rotation in the NICU (please check with your attending - schedules will vary): Arrive between 6:30 and 7 am (arrange timing with resident), daily Examine assigned patients and review your plan with the supervising resident/fellow on the team prior to rounds 8:00-8:30 am: attend NICU teaching rounds, Monday through Thursday. Location: 5100 conference room. (currently virtual) 8:30 to 8:45 am: Radiology rounds, Monday through Thursday. (currently virtual) 8:45 to 10 am: Patient care rounds, daily (please check expectations for presentations with your attending/fellow) 12 noon: All resident conference in SLCH auditorium. (currently virtual) 1:00 to 2:00 pm: Division conferences (Case Conferences, M&M and core lectures), Wednesdays only. Location: varies (verify with fellow/attending)

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#### **M65 Peds 870 Pediatric Immunology**

Students in the two-week or four-week pediatric immunology elective will learn to apply immunology knowledge to clinical practice by participation in caring for pediatric immunology patients in various settings, including Immunology, Allergy, Rheumatology, and Immunology BMT clinics. They will also participate in inpatient rounds with faculty and fellows in the immunology service.

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#### **M65 Peds 875 Pediatric Renal Disease**

This course is designed to provide the student with a wide exposure to all aspects of pediatric renal disease and an opportunity to explore a desired aspect of the field in-depth. The student will be an integral part of the Renal Team and as such will see both inpatients and outpatients. Students will have an opportunity to follow the courses of patients with acute renal disease as well as those with more chronic problems and will help to plan the evaluation and therapeutic management of these patients. Discussions and rounds with the attending staff and fellows emphasize the relationship between clinical problems and the pathophysiology of the underlying

disease. These informal teaching sessions are supplemented by more formal sessions. These include renal attending rounds, pediatric nephrology educational conferences, renal research rounds and grand rounds, which are conducted weekly in conjunction with the Renal Division of Barnes-Jewish Hospital. Renal biopsy material is reviewed with the renal pathologists. Attendance at the weekly pediatric grand rounds and pediatric case conferences is encouraged. Opportunities in clinical and translational research projects will be discussed with interested students.

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#### **M65 Peds 876 Pediatric Lung Transplantation**

St. Louis Children's Hospital has the largest pediatric lung transplantation experience in the world. This flexible and unique clinical rotation will provide the potential for students to be exposed to the process of lung transplantation from referral and listing to surgical and post-operative care. The use of diagnostic tests, including flexible fiberoptic bronchoscopy with biopsies and bronchoalveolar lavage, histopathology of infection and graft rejection, and the complexities of immunosuppression will all be explored. In addition to both inpatient and outpatient exposure to pediatric lung transplant patients, students are encouraged to participate in weekly multidisciplinary meetings with our team, as well as meetings focused on program quality improvement and patient/family psychosocial issues. Our patient referral base is worldwide, and includes infants and children with cystic fibrosis, pulmonary hypertension, complex congenital heart defects, and congenital lung diseases including surfactant protein deficiencies. Because our patient volume is variable, students will also have the opportunity to participate in general inpatient and outpatient pediatric pulmonology clinics and inpatient services as their interests and time permit. Students are encouraged to reach out to the course director in advance of the rotation so that we can tailor the experience to best meet their needs.

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#### **M65 Peds 878 Clerkship In Rural Primary Care Pediatrics**

The clerkship in rural primary care pediatrics is designed to provide the student with first-hand experience in general pediatric practice in a rural community setting. Students will have the opportunity to see patients in a private office, participate in delivery room resuscitation, evaluate patients in the emergency department, and provide pediatric consultation to family practitioners, obstetricians, and surgeons. The objective of this elective is to provide the student with the experience of serving as a general pediatrician providing comprehensive health services in a rural community. Students assume responsibility for ongoing care of patients and have opportunities to perform procedures.

Credit 154 units.

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#### **M65 Peds 900 Research Elective-Pediatrics**

Research opportunities may be available. If interested, please contact the Department of Pediatrics.

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## **Department of Psychiatry**

Instruction in psychiatry is given throughout the medical curriculum. Emphasis is on the teaching of psychiatry as a medical discipline, including the biological, social and psychological mechanisms and manifestations of psychiatric illness as well as psychological reactions to other illnesses. Psychiatric disorders are common and disabling illnesses. An

explosion of knowledge resulting from research in neuroscience, genetics and epidemiology is leading to exciting advances in understanding and treating these disorders. Our department is heavily involved in this research, and our didactic curriculum integrates current clinical information with research advances to help students develop the knowledge, skills and attitudes needed to recognize these illnesses and to understand the basic principles of treatment.

## William Greenleaf Eliot Division of Child & Adolescent Psychiatry

The Division of Child & Adolescent Psychiatry (<http://wuchild.wustl.edu/>) offers a varied teaching program for medical students, residents in psychiatry, and fellows at St. Louis Children's Hospital and the Child Psychiatry Center, which provides outpatient services to children with an array of mental disorders. Trainees are assigned to these various services, where they participate in diagnostic evaluations and see patients in treatment, under the supervision of a fellow and the attending physician.

Website: <http://www.psychiatry.wustl.edu>

## Faculty

**Eric J. Lenze, MD** (<https://psychiatry.wustl.edu/people/eric-lenze-m-d/>)

Department Chair

Visit our website for more information about our faculty (<http://www.psychiatry.wustl.edu/Faculty/>) and their appointments.

### A

**Arpana Agrawal, Ph.D.**

Professor of Psychiatry (primary appointment)

Lecturer in Psychology

Doctor of Philosophy, Virginia Commonwealth University, 2004

**Aqeeb Ahmad**

Instructor in Clinical Psychiatry

**Kirsten Gilbert Alberts, Ph.D.**

Assistant Professor of Psychiatry (primary appointment)

Bachelor of Arts, Stanford University, 2005

Doctor of Philosophy, Yale University, 2014

**Dale J Anderson, M.D.**

Instructor in Clinical Psychiatry

Doctor of Medicine, Washington University in St Louis, 1978

**Richard H Anderson, M.S., Ph.D., M.D.**

Instructor in Clinical Psychiatry

Bachelor of Science, Brigham Young University, 1982

Master of Science, Brigham Young University, 1984

Doctor of Philosophy, Brigham Young University, 1986

Doctor of Medicine, Saint Louis University, 1989

**Andrey P Anokhin, M.S., Ph.D.**

Professor of Psychiatry (primary appointment)

Master of Science, Moscow State University, 1981

Doctor of Philosophy, Russia Academy of Science, 1987

**E. James Anthony, M.S., Ph.D., M.D.**

Professor Emeritus of Psychiatry (Child Psychiatry)

Bachelor of Science, School Not Listed, 1938

Master of Science, School Not Listed, 1941

Doctor of Philosophy, School Not Listed, 1948

Doctor of Medicine, School Not Listed, 1949

**Scott J Arbaugh, M.D.**

Instructor in Clinical Psychiatry

Bachelor of Arts, Saint Louis University, 1980

Doctor of Medicine, Saint Louis University, 1985

**Ahmad Beheshti Ardekani, M.D.**

Assistant Professor of Clinical Psychiatry

Doctor of Medicine, School Not Listed, 1974

**Naazia H Azhar, M.B.A., M.D.**

Assistant Professor of Psychiatry (primary appointment)

Bachelor of Science, Union College New York, 2008

Master of Business Administration, Union College New York, 2009

Doctor of Medicine, Albany Medical College, 2012

### B

**Michael Roman Banton, M.D.**

Instructor in Clinical Psychiatry (Child Psychiatry)

Bachelor of Arts, Johns Hopkins University Medical (Duplicate of Johns Hopkins University), 1981

Doctor of Medicine, Saint Louis University, 1985

**Vadim Baram**

Instructor in Clinical Psychiatry

**Desiree Cherie Baumgartner**

Instructor in Psychiatry (primary appointment)

**Laura J Bierut, M.D.**

Professor of Psychiatry (primary appointment)

Alumni Endowed Professor of Psychiatry

Bachelor of Arts, Harvard University, 1982

Doctor of Medicine, Washington University in St Louis, 1987

**Callie Bishop**

Instructor in Psychiatry (primary appointment)

**Monica E. Bishop, M.D.**

Professor of Psychiatry (primary appointment)

Bachelor of Arts, University of Pennsylvania, 1995

Doctor of Medicine, Washington University in St Louis, 2001

**Kevin J. Black, M.D.**

Professor of Psychiatry (primary appointment)

Professor of Radiology

Professor of Neurology

Professor of Neuroscience

Bachelor of Science, Brigham Young University, 1986  
Doctor of Medicine, Duke University, 1990

**Donald David Bohnenkamp, M.D.**

Associate Professor of Psychiatry (primary appointment)  
Bachelor of Science, Saint Louis University, 2003  
Doctor of Medicine, University of Nebraska Medical Center, 2007

**Marie A. Bosch, Ph.D., M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, Emory University, 2002  
Doctor of Philosophy, Washington University in St Louis, 2015  
Doctor of Medicine, Washington University in St Louis, 2015

**Kelly N Botteron, M.D.**

Professor of Psychiatry (Child) (primary appointment)  
Professor of Radiology  
Bachelor of Arts, University of Kansas, 1984  
Doctor of Medicine, University of Kansas Medical, 1988

**Susan Kathleen Boyer, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, Rockhurst College (Duplicate of Rockhurst University), 1988  
Doctor of Medicine, University of Missouri Columbia, 1993

**Robert Harry Brady, M.D.**

Assistant Professor of Psychiatry (Pending Executive Faculty Approval) (primary appointment)  
Adjunct Instructor  
Bachelor of Science, University of Notre Dame, 1988  
Doctor of Medicine, Tufts University, 1995

**Meryl Brune**

Voluntary Clinical Instructor in Psychiatry

**Kathleen K Bucholz, M.S., Ph.D.**

Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Yale University, 1972  
Master of Science, Yale University, 1982  
Doctor of Philosophy, Yale University, 1986

**Michael Bunis, M.S., Psy.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, Loyola College, 2002  
Master of Science, Loyola College, 2006  
Doctor of Psychology, Loyola College, 2010

**Joan Rachel Butcher**

Instructor in Clinical Psychiatry

**James Byrd, M.D.**

Instructor in Clinical Psychiatry (Child Psychiatry)  
Bachelor of Science, Southeast Missouri State University, 1987  
Doctor of Medicine, School Not Listed, 1991

**C**

**Joshua W. Calhoun, M.D.**

Instructor in Clinical Psychiatry (Child)  
Bachelor of Science, Yale University, 1978

Doctor of Medicine, University of Connecticut, 1982

**Robert Michael Carney, Ph.D.**

Professor of Psychiatry (primary appointment)  
Professor of Psychological & Brain Sciences  
Bachelor of Arts, University of Missouri Columbia, 1969  
Doctor of Philosophy, Washington University in St Louis, 1978

**Anil Govind Cashikar, M.S., Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Associate Professor of Neurology  
Bachelor of Science, Bangalore University, 1989  
Master of Science, Madurai Kamaraj University, 1991  
Doctor of Philosophy, Jawaharlal Nehru University, 1997

**Patricia A Cavazos-Rehg, Ph.D.**

Professor of Psychiatry (primary appointment)  
Vice Chair - Diversity, Equity and Inclusion  
Bachelor of Arts, University of Texas San Antonio, 1998  
Doctor of Philosophy, State University of New York, 2004

**Gregory Peter Cejas, M.D.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 2012  
Doctor of Medicine, University of Missouri Columbia, 2017

**Matthew B Chapman, M.D.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Science, Saint Louis University, 2013  
Doctor of Medicine, Creighton University, 2018

**Natchanan Charatcharungkiat, M.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Medicine, Chulalongkorn University, 2008

**Mina Charepoo, M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Arts, State University of New York at Buffalo, 1997  
Doctor of Medicine, Drexel University, 2002

**Christopher Charlot, M.D.**

Assistant Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2005  
Doctor of Medicine, Washington University in St Louis, 2014

**Li-Shiun Chen, M.P.H., Sc.D., M.D.**

Associate Professor of Psychiatry (primary appointment)  
Doctor of Medicine, National Taiwan University, 1993  
Master of Public Health, Johns Hopkins University, 1995  
Other professional doctorate, Johns Hopkins University, 1998

**Andrew Chirchirillo, Ph.D.**

Instructor in Clinical Psychiatry (Child)  
Bachelor of Arts, Illinois State University, 1973  
Doctor of Philosophy, University of Missouri in St Louis, 1981

**Theodore J Cicero, M.S., Ph.D.**

Professor Emeritus in Psychiatry  
Bachelor of Science, Villanova University, 1964

Main Campus), 1966  
Main Campus), 1969

**William W Clendenin, M.D.**

Assistant Professor of Clinical Psychiatry  
Doctor of Medicine, University of Tennessee, 1963

**C. Robert Cloninger, M.D.**

Emeritus Professor of Psychiatry  
Bachelor of Arts, University of Texas Austin, 1966  
Doctor of Medicine, Washington University in St Louis, 1983

**David M Conner, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, University of Oklahoma, 1979  
Doctor of Medicine, University of Oklahoma, 1983

**Charles Richard Conway, M.D.**

Professor of Psychiatry (primary appointment)  
Professor of Radiology  
Doctor of Medicine, University of Missouri Columbia, 1995

**Juan C Corvalan, M.D.**

Assistant Professor Emeritus of Clinical Psychiatry  
Bachelor of Arts, School Not Listed, 1957  
Doctor of Medicine, School Not Listed, 1965

**Linda B Cottler, M.P.H., Ph.D.**

Adjunct Professor of Psychiatry  
Bachelor of Arts, Emmanuel College (Duplicate of Emmanuel  
College Massachusetts), 1977  
Master of Public Health, Boston University, 1980  
Doctor of Philosophy, Washington University in St Louis, 1987

**Lucia del Pilar Cristancho Pimiento, M.D.**

Associate Professor of Psychiatry (primary appointment)  
Doctor of Medicine, Univ Industrial de Santander, 2000

**Carlos Cruchaga, M.S., Ph.D.**

Professor of Psychiatry (primary appointment)  
Professor of Neurology  
Professor of Genetics  
Barbara Burton & Reuben Morriss III Professor  
Bachelor of Arts, University of Navarra, 2000  
Master of Arts, University of Navarra, 2002  
Doctor of Philosophy, University of Navarra, 2005

**D**

**David Nicholas Daniels, M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Doctor of Medicine, Loyola University Chicago, 2013

**Mary A Davis, M.D.**

Assistant Professor Emeritus of Clinical Psychiatry  
Main Campus), 1947  
Doctor of Medicine, Washington University in St Louis, 1952

**Carie Kollmeyer Dinehart, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, Saint Louis University, 1999

Doctor of Medicine, Saint Louis University, 2003

**Meghan Rose Donohue, Ph.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Philosophy, Georgia State University, 2018

**E**

**Sarah Ann Eisenstein, Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Associate Professor of Radiology  
Doctor of Philosophy, University of Georgia, 2008

**Matthew S Ellis, M.P.H., Ph.D.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Arts, Rockhurst College, 2004  
Master of Public Health, Washington University in St Louis, 2011  
null, Saint Louis University, 2021

**Baris C Ercal, Ph.D., M.D.**

Instructor in Psychiatry (primary appointment)  
null, Harvard University, 2010  
Doctor of Philosophy, Washington University in St Louis, 2017  
Doctor of Medicine, Washington University in St Louis, 2017

**Abdallah M. Eteleeb, Ph.D.**

Instructor In Psychiatry (primary appointment)  
Doctor of Philosophy, University of Louisville, 2015

**F**

**Nuri Bradford Farber, M.D.**

Professor of Psychiatry (primary appointment)  
Vice Chair - Education  
Bachelor of Arts, Washington University in St Louis, 1985  
Doctor of Medicine, Washington University in St Louis, 1989

**Maria-Victoria Fernandez Hernandez, M.S., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, University of Barcelona, 2005  
Master of Science, University of Bangor, 2007  
Doctor of Philosophy, University of Gerona, 2012

**Robert T. Fitzgerald, M.P.H., Ph.D.**

Assistant Professor of Psychiatry (Child) (primary appointment)  
Adjunct Instructor  
Bachelor of Science, Abilene Christian University, 1998  
Master of Science, Saint Louis University, 2000  
Doctor of Philosophy, Saint Louis University, 2012

**Ellen E Fitzsimmons-Craft, M.S., Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Bachelor of Science, University of Notre Dame, 2008  
Master of Science, University North Carolina, 2010  
Doctor of Philosophy, University of North Carolina, 2014

**Cynthia Florin, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Science, Grinnell College, 1976  
Doctor of Medicine, Columbia University, 1984

**Lauren A Fowler, Ph.D.**

Instructor in Psychiatry (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Eastern Michigan University, 2013  
Doctor of Psychology, George Washington University, 2018

**Kenneth E Freedland, M.A., Ph.D.**

Professor of Psychiatry (primary appointment)  
Professor of Psychological & Brain Sciences  
Bachelor of Science, University of Oregon, 1975  
Master of Arts, University of Hawaii at Manoa, 1979  
Doctor of Philosophy, University of Hawaii, 1982

**Darrin Friesen, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, School Not Listed, 1990  
Doctor of Medicine, Washington University in St Louis, 1996

**Qiang Fu**

Visiting Instructor in Psychiatry

**Lara A Fuchs**

Instructor in Clinical Psychiatry

**G**

**Bridget Mary Galati, D.O.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Science, University of Dayton, 2010  
Doctor of Osteopathic Medicine, Des Moines University, 2016

**Marcie Epstein Garland, M.D.**

Associate Professor of Psychiatry (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 2008  
Doctor of Medicine, University of Missouri Kansas City, 2008

**Christina J Gesmundo, D.Sc.**

Instructor in Psychiatry (primary appointment)  
Other professional doctorate, University of the Philippines, 2004

**Torie Gettinger, M.S.W.**

Instructor in Psychiatry (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Saint Louis University, 2008  
Master of Social Work, Saint Louis University, 2009

**Andrea Marie Giedinghagen, M.D.**

Assistant Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Arts, Cornell University, 2007  
Doctor of Medicine, Washington University in St Louis, 2013

**Luis Giuffra, M.S., Ph.D., M.D.**

Professor of Clinical Psychiatry  
Bachelor of Science, School Not Listed, 1983  
Master of Science, School Not Listed, 1985  
Doctor of Medicine, School Not Listed, 1986  
Doctor of Philosophy, Yale University, 1991

**Paul E Glaser, M.S., Ph.D., M.D.**

Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Science, University of Chicago, 1986

Master of Science, University of Chicago, 1986  
Doctor of Philosophy, Washington University in St Louis, 1996  
Doctor of Medicine, Washington University in St Louis, 1996

**Anne L Glowinski, M.S., M.D.**

Voluntary Clinical Professor of Psychiatry  
Bachelor of Science, University of Houston, 1988  
Doctor of Medicine, Baylor University, 1992  
Master of Science, Washington University in St Louis, 2001

**Jessica A Gold, M.S., M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Arts, University of Pennsylvania, 2009  
Master of Science, University of Pennsylvania, 2009  
Doctor of Medicine, Yale University, 2014

**Mark Gold, M.D.**

Adjunct Professor of Psychiatry  
Bachelor of Arts, Washington University in St Louis, 1971  
Doctor of Medicine, University of Florida, 1975

**David Goldmeier, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, Dartmouth College, 1978  
Doctor of Medicine, Washington University in St Louis, 1982

**Julia D. Grant, M.A., Ph.D.**

Adjunct Associate Professor of Psychiatry  
Bachelor of Arts, Davidson College, 1989  
Master of Arts, Wake Forest University, 1993  
Main Campus), 1997

**H**

**Rita N Haddad, M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Doctor of Medicine, University of Balamand, 2013

**Oscar Marcos Harari, M.A., Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Associate Professor of Genetics  
Bachelor of Arts, Universidad del Buenos Aires, 1997  
Master of Arts, Universidad del Buenos Aires, 1999  
Doctor of Philosophy, University of Granada, 2009

**Melissa A. Harbit, M.D.**

Professor of Psychiatry (primary appointment)  
Vice Chair - Clinical Affairs  
Bachelor of Science, University of Iowa, 1993  
Doctor of Medicine, University of Iowa, 1997

**Michael P. Harms, Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Doctor of Philosophy, Massachusetts Institute of Technology, 2002

**Sarah McConnell Hartz, Ph.D., M.D.**

Associate Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Knox College, 1996  
Doctor of Philosophy, University of Illinois, 2002

Doctor of Medicine, University of Iowa, 2005

**Steven Arthur Harvey, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, Washington University in St Louis, 1988  
Doctor of Medicine, Washington University in St Louis, 1992

**Andrew C Heath, Ph.D.**

Professor of Psychiatry (primary appointment)  
Associate Professor of Psychological & Brain Sciences  
Professor of Genetics  
Spencer T. Olin Professor of Psychology in Psychiatry  
Bachelor of Arts, University of Oxford, 1979  
Doctor of Philosophy, Oxford University, 1983

**Laura P Hennefield, M.S., Ph.D.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Science, State University of New York at Purchase,  
2005  
Master of Science, Hunter College, 2008  
Doctor of Philosophy, Washington University in St Louis, 2015

**Tamara G Hershey, Ph.D.**

Professor of Psychiatry (primary appointment)  
Adjunct Professor  
Professor of Neurology  
Professor of Radiology  
James S McDonnell Professor of Cognitive Neuroscience  
Director of the McDonnell Center for Systems Neuroscience  
Division Director - Translational Neuroscience  
Bachelor of Arts, Earlham College, 1988  
Doctor of Philosophy, Washington University in St Louis, 1996

**Jarrold Holiday, M.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Medicine, University of Kansas Medical Center, 2016

**Barry Allen Hong, M.Div., Ph.D.**

Professor Emeritus of Psychiatry  
Bachelor of Arts, Concordia University, 1969  
Master of Divinity, Concordia University, 1972  
Doctor of Philosophy, Saint Louis University, 1978

**Jaime Patricia Hook, M.D.**

Associate Professor of Psychiatry (primary appointment)  
null, Rhodes College, 2000  
null, Saint Louis University, 2005

**Caroline P Hoyniak, D.Sc.**

Instructor in Psychiatry (primary appointment)  
Doctor of Science, Indiana State University, 2019

**James J Hudziak**

Adjunct Professor of Psychiatry

**I**

**Laura Ibanez, M.S., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Assistant Professor of Neurology

Bachelor of Arts, University of Barcelona, 2007  
Bachelor of Arts, University of Barcelona, 2007  
Master of Arts, University of Barcelona, 2008  
Doctor of Philosophy, University of Barcelona, 2015

**Keith E Isenberg, M.D.**

Professor Emeritus of Psychiatry  
Bachelor of Arts, Wabash College, 1974  
Doctor of Medicine, Indiana University Bloomington, 1978

**Abhirami Kannan Iyer, M.S., Ph.D.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Science, University of Mumbai, 2007  
Master of Science, University of Mumbai, 2009  
Doctor of Philosophy, Indiana University Indianapolis, 2016

**Yukitoshi Izumi, Ph.D., M.D.**

Professor of Psychiatry (primary appointment)  
null, Yamagata University, 1985  
Doctor of Philosophy, Yamagata University, 1989

**J**

**Celina Rose Jacobi, M.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2012

**Aleksandar Janca, M.D.**

Adjunct Professor of Psychiatry  
Doctor of Medicine, School Not Listed, 1900

**Michael R Jarvis, M.S., Ph.D., M.D.**

Professor of Psychiatry (primary appointment)  
Vice Chair - Clinical Affairs  
Bachelor of Science, University of Minnesota, 1977  
Master of Science, University of Illinois, 1980  
Doctor of Philosophy, University of Illinois, 1982  
Doctor of Medicine, Washington University in St Louis, 1985

**Emma Covey Johnson, M.A., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Lecturer in Psychology  
Bachelor of Science, University North Carolina, 2013  
Master of Science, University of Colorado Boulder, 2016  
Doctor of Philosophy, University of Colorado Boulder, 2017

**Mark C. Johnson, M.D.**

Associate Professor of Clinical Psychiatry  
Bachelor of Arts, Eckerd College, 1972  
Doctor of Medicine, University of Kentucky, 1980

**K**

**Celeste Marie Karch, Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Doctor of Philosophy, University of Florida, 2009

**Nicole Renee Karcher, M.A., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Arts, College of William and Mary, 2008  
Master of Arts, University of Missouri Columbia, 2012



Doctor of Philosophy, University of Missouri Columbia, 2017

**Kaitlin Marie Keister**

Voluntary Clinical Instructor in Psychiatry

**Saaid Khojasteh, M.D.**

Assistant Professor of Clinical Psychiatry  
Doctor of Medicine, School Not Listed, 1981

**Neha Navsaria Kirtane, M.A., Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Bryn Mawr College, 1999  
Master of Arts, Columbia University, 2003  
Doctor of Philosophy, Temple University, 2008

**Valerie S. Knopik, M.A., Ph.D.**

Adjunct Assistant Professor of Psychiatry  
Bachelor of Arts, Wesleyan College, 1994  
Master of Arts, University of Colorado Boulder, 1998  
Doctor of Philosophy, University of Colorado Boulder, 2000

**Maria Kovacs**

Visiting Professor of Psychiatry

**Alexxai V Kravitz, Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Associate Professor of Anesthesiology  
Associate Professor of Neuroscience  
Bachelor of Arts, Wesleyan University, 2019  
Doctor of Philosophy, University of Pennsylvania, 2019

**L**

**Suzanne Nicole L'Ecuyer, M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Doctor of Medicine, University of Louisville, 2016

**Timothy O. Laumann, Ph.D., M.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2017  
Doctor of Medicine, Washington University in St Louis, 2017

**Rachel Emma Lean, Ph.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2015

**Eric J Lenze, M.D.**

Professor of Psychiatry (primary appointment)  
Professor of Anesthesiology  
Wallace and Lucille K Renard Professor of Psychiatry  
Head of the Department of Psychiatry  
Doctor of Medicine, Washington University in St Louis, 1994

**Shannon N Lenze, M.S., Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Adjunct Instructor  
Champaign, 1995  
Master of Arts, University of Pittsburgh, 2003  
Doctor of Philosophy, University of Pittsburgh, 2007

**Christina Lessov-Schlaggar, Ph.D.**

Adjunct Associate Professor of Psychiatry  
Doctor of Philosophy, Oregon Health Science University  
(Duplicate of Oregon Health & Science University), 2000

**Angela Lin, M.D.**

Instructor in Psychiatry (Pending Dean Approval) (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2018

**Penelope Alatheia Lind**

Adjunct Instructor in Psychiatry

**Joan L Luby, M.D.**

Professor of Psychiatry (Child) (primary appointment)  
Samuel and Mae S. Ludwig Chair in Psychiatry at Barnes-Jewish Hospital  
Bachelor of Arts, Brown University, 1981  
Doctor of Medicine, Wayne State University, 1985

**Federica Lucantonio, D.Sc.**

Instructor in Psychiatry (primary appointment)  
Doctor of Science, University of Maryland, 2013

**Patrick Joseph Lustman, M.S.W., Ph.D.**

Professor of Psychiatry (primary appointment)  
Professor of Psychological & Brain Sciences  
Bachelor of Arts, University of Illinois, 1972  
Master of Social Work, University of Wisconsin Madison, 1974  
Doctor of Philosophy, Michigan State University, 1980

**Michael T. Lynskey, M.S., Ph.D.**

Adjunct Professor of Psychiatry  
Bachelor of Science, School Not Listed, 1987  
Master of Science, University of Canterbury, 1989  
Doctor of Philosophy, School Not Listed, 1997

**M**

**Pamela A Madden, M.S., Ph.D.**

Professor of Psychiatry (primary appointment)  
Bachelor of Science, University of Pittsburgh, 1978  
Master of Science, University of Pittsburgh, 1983  
Doctor of Philosophy, University of Pittsburgh, 1992

**Susan Eileen Maloney, M.A., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Arts, University of Missouri in St Louis, 2003  
Master of Arts, University of Missouri in St Louis, 2007  
Doctor of Philosophy, University of Missouri in St Louis, 2012

**Daniel T. Mamah, M.D.**

Professor of Psychiatry (primary appointment)  
Doctor of Medicine, Semmelweis University of Med, 1998

**Lauren Ashley Marks, M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Other professional doctorate, Washington University in St Louis, 2015

**Natasha M.V. Marrus, Ph.D., M.D.**

Associate Professor of Psychiatry (primary appointment)

Bachelor of Arts, University of Southern California, 1999  
Bachelor of Science, University of Southern California, 1999  
Doctor of Philosophy, Washington University in St Louis, 2007  
Doctor of Medicine, Washington University in St Louis, 2007

**Nicholas Gordon Martin**  
Adjunct Instructor in Psychiatry

**Gregory Warren Mattingly, M.D.**  
Assistant Professor of Clinical Psychiatry  
Bachelor of Science, University of Missouri Columbia, 1985  
Doctor of Medicine, Washington University in St Louis, 1989

**Marcia June McCabe, M.A., Ph.D.**  
Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Washburn University, 1985  
Master of Arts, University of Missouri Columbia, 1987  
Doctor of Philosophy, University of Missouri Columbia, 1991

**Kimberli McCallum, M.D.**  
Assistant Professor of Clinical Psychiatry (Child Psychiatry)  
Bachelor of Science, Brown University, 1981  
Doctor of Medicine, Yale University, 1986

**Vivia Van Dyne McCutcheon, M.S.S.W., Ph.D.**  
Associate Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Ohio State University, 1985  
Master of Science, Washington University in St Louis, 2001  
Doctor of Philosophy, Washington University in St Louis, 2005

**Steven James Mennerick, Ph.D.**  
Professor Of Psychiatry (primary appointment)  
Interim Associate Dean for Biology and Biomedical Sciences  
Professor of Neuroscience  
Vice Chair - Research  
John P Feighner Professor of Neuropsychopharmacology  
Bachelor of Arts, Earlham College, 1988  
Doctor of Philosophy, Washington University in St Louis, 1995

**Jay L Meyer, M.D.**  
Associate Professor of Clinical Psychiatry  
Bachelor of Arts, Washington University in St Louis, 1956  
Doctor of Medicine, Saint Louis University, 1960

**Ruth Huang Miller, M.S., Ph.D.**  
Adjunct Instructor in Psychiatry  
Bachelor of Science, University of Houston, 1994  
Master of Science, Rice University, 1999  
Doctor of Philosophy, University of Houston, 2011

**Miguel A Minaya, D.Sc.**  
Instructor in Psychiatry (Pending Dean Approval) (primary appointment)  
Doctor of Science, Universidad Automoma de Madrid, 2015

**Carrie M Mintz, M.D.**  
Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Harvard University, 2005  
Doctor of Medicine, Washington University in St Louis, 2013

**David M Montani, M.D.**  
Instructor in Clinical Psychiatry  
Bachelor of Arts, Harvard University, 1991  
Doctor of Medicine, Washington University in St Louis, 1996

**Blake William Moore, Ph.D.**  
Professor Emeritus of Biochemistry in Psychiatry  
Bachelor of Science, University of Akron (Duplicate of University of Akron Main Campus), 1948  
Doctor of Philosophy, Northwestern University, 1952

**David H Morris**  
Instructor in Clinical Psychiatry

**Randi H Mozenter, M.A., Ph.D.**  
Instructor in Clinical Medical Psychology in Psychiatry  
Bachelor of Arts, Washington University in St Louis, 1980  
Master of Arts, Washington University in St Louis, 1982  
Doctor of Philosophy, Washington University in St Louis, 1989

**Emily Hazel Mukherji, M.D.**  
Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, Massachusetts Institute of Technology, 2006  
Doctor of Medicine, Tufts University, 2010

**George E Murphy, M.D.**  
Professor Emeritus of Psychiatry  
Bachelor of Science, Oregon State University, 1949  
Doctor of Medicine, Washington University in St Louis, 1952

## N

**Elliot C Nelson, M.D.**  
Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Johns Hopkins University, 1982  
Doctor of Medicine, University of Illinois, 1986

**Ginger E. Nicol, M.D.**  
Associate Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Arts, University of Iowa, 1988  
Doctor of Medicine, University of Iowa, 2002

**Kevin K. Noguchi, M.A., Ph.D.**  
Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, University of California Santa Barbara, 1996  
Master of Arts, University of California Los Angeles, 1998  
Doctor of Philosophy, University of California Los Angeles, 2003

**Thomas John Nowotny, M.D.**  
Assistant Professor of Clinical Psychiatry  
Bachelor of Science, Washington University in St Louis, 1980  
Doctor of Medicine, Washington University in St Louis, 1985

**Lari Niko-Petteri Nykanen, M.S., Ph.D.**  
Instructor in Psychiatry (Pending Dean's Approval) (primary appointment)  
Master of Science, University of Helsinki, 2012  
Doctor of Philosophy, University of Helsinki, 2016

## O

### **Brendan Joseph O'Connor, M.D.**

Associate Professor of Psychiatry (primary appointment)  
Bachelor of Science, Creighton University, 2006  
Doctor of Medicine, Creighton University, 2010

### **Kalu Onuma**

Instructor in Clinical Psychiatry

### **Akinkunle Owoso, M.D.**

Associate Professor of Psychiatry (primary appointment)  
Bachelor of Arts, University of Oklahoma, 2003  
Bachelor of Science, University of Oklahoma, 2003  
Doctor of Medicine, University of Oklahoma, 2007

## P

### **Steven Marc Paul, M.S., M.D.**

Professor of Psychiatry (primary appointment)  
Professor of Neurology  
Bachelor of Science, Tulane University, 1972  
Master of Science, Tulane University, 1975  
Doctor of Medicine, Tulane University, 1975

### **Michele L. Pergadia, M.S., Ph.D.**

Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1991  
Master of Science, Finch University of Health Sciences, 1997  
Doctor of Philosophy, Finch University of Health Sciences, 2001

### **Michael T Perino, Ph.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Philosophy, University of Illinois at Urbana-Champaign, 2018

### **Susan B Perlman, D.Sc.**

Associate Professor of Psychiatry (primary appointment)  
Doctor of Science, Duke University, 2019

### **Marco Pignatelli, D.Sc.**

Assistant Professor of Psychiatry (primary appointment)  
Doctor of Science, University of Rome, 2008

### **Elizabeth F Pribor, M.D.**

Associate Professor of Clinical Psychiatry  
Bachelor of Arts, Emory University, 1981  
Doctor of Medicine, Saint Louis University, 1985

### **Madelon T Price, Ph.D.**

Research Professor Emerita of Neurobiology in Psychiatry  
Bachelor of Arts, Washington University in St Louis, 1953  
Doctor of Philosophy, Washington University in St Louis, 1973

### **Rumi Kato Price, M.A., Ph.D.**

Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Ochanomizu Univ, 1976  
Master of Arts, University of California, 1982  
Doctor of Philosophy, University of California, 1988

### **John R. Pruett, Ph.D., M.D.**

Professor of Psychiatry (Child) (primary appointment)  
Professor of Psychological & Brain Sciences (Courtesy)  
Professor of Radiology  
Bachelor of Arts, Princeton University, 1990  
Doctor of Philosophy, Washington University in St Louis, 2000  
Doctor of Medicine, Washington University in St Louis, 2000

## R

### **John S Rabun, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, University of Tennessee, 1900  
Doctor of Medicine, University of Tennessee, 1900

### **Tahir Rahman, M.D.**

Associate Professor of Psychiatry (primary appointment)  
Doctor of Medicine, University of Kansas Medical, 1995

### **Alex Taylor Ramsey, M.A., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Adjunct Instructor  
Bachelor of Science, University of Evansville, 2008  
Master of Arts, Southern Illinois University Carbondale, 2010  
Doctor of Philosophy, Southern Illinois University Carbondale, 2012

### **Diane Rankin, M.D.**

Assistant Professor of Clinical Psychiatry  
Bachelor of Arts, University of Colorado Boulder, 1962  
Doctor of Medicine, University of Colorado Boulder, 1968

### **Radhika Rao, M.D.**

Instructor in Clinical Psychiatry  
Doctor of Medicine, University of South Dakota, 2001

### **Mary Katherine O Ray, Ph.D.**

Instructor in Psychiatry (primary appointment)  
Doctor of Philosophy, University of Alabama, 2018

### **Syed A Raza, M.D.**

Assistant Professor of Clinical Psychiatry (Child Psychiatry)  
Bachelor of Science, Osmania Medical College, 1953  
Doctor of Medicine, School Not Listed, 1959

### **Chandrashekar Reddy**

Instructor in Clinical Psychiatry

### **Angela M. Reiersen, M.D.**

Associate Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Science, University of California Davis, 1994  
Doctor of Medicine, University of Southern California, 1999

### **Daniel B. Reising**

Instructor in Clinical Psychiatry (Child Psychiatry)

### **John P Rice, M.A., Ph.D.**

Professor of Mathematics in Psychiatry (primary appointment)  
Professor of Biostatistics  
Professor of Genetics  
Bachelor of Arts, Cornell University, 1969  
Master of Arts, Washington University in St Louis, 1972

Doctor of Philosophy, Washington University in St Louis, 1975

**Thomas F Richardson, M.D.**

Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Millikin University, 1960  
Doctor of Medicine, Washington University in St Louis, 1963

**William M Riedesel, M.D.**

Associate Professor of Clinical Psychiatry  
Bachelor of Arts, University of Rochester, 1968  
Doctor of Medicine, Cornell University, 1973

**Syed T Rizvi**

Assistant Professor of Clinical Psychiatry (Child Psychiatry)

**John Deno Rogakos, M.D.**

Instructor in Clinical Psychiatry (Child Psychiatry)  
Bachelor of Science, University of Dayton, 1990  
Doctor of Medicine, Washington University in St Louis, 1995

**Cynthia E Rogers, M.D.**

Professor of Psychiatry (primary appointment)  
Division Director of Child and Adolescent Psychiatry  
Blanche F Ittleson Professor of Psychiatry (Child Psychiatry)  
Bachelor of Arts, Harvard University, 1998  
Doctor of Medicine, Washington University in St Louis, 2005

**John W Rohrbaugh, Ph.D.**

Professor Emeritus of Psychiatry  
Bachelor of Science, Heidelberg College (Duplicate of  
Heidelberg University), 1968  
Champaign), 1973

**Alexander Bernard Rose**

Instructor in Clinical Psychiatry

**Max S. Rosen, M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2010  
Doctor of Medicine, Washington University in St Louis, 2015

**Eugene Harold Rubin, Ph.D., M.D.**

Professor Emeritus of Psychiatry  
Bachelor of Arts, University of Rochester, 1971  
Doctor of Philosophy, Washington University in St Louis, 1977  
Doctor of Medicine, Washington University in St Louis, 1978

**John Conrad Rudersdorf**

Instructor in Clinical Psychiatry (Child)

**James Rutherford, M.D.**

Assistant Professor Emeritus of Clinical Psychiatry  
Bachelor of Arts, Drake University, 1975  
Doctor of Medicine, University of Iowa, 1980

**Jo-Ellyn M Ryall, M.D.**

Associate Professor of Clinical Psychiatry  
New Brunswick), 1971  
Doctor of Medicine, Washington University in St Louis, 1975

**S**

**Frank Scott Saccone, Ph.D.**

Professor of Psychiatry (primary appointment)  
Bachelor of Arts, Rensselaer Polytechnic Institute, 1990  
Doctor of Philosophy, Brown University, 1995

**Berette A Salazar, M.D.**

Assistant Professor of Clinical Psychiatry  
Bachelor of Arts, Middlebury College, 1973  
Main Campus), 1982

**Carolyn E. Sartor, M.S., Ph.D.**

Adjunct Associate Professor of Psychiatry  
Bachelor of Science, Oberlin College, 1994  
Master of Science, Catholic University America (Duplicate of  
Catholic University of America), 1999  
Doctor of Philosophy, Palo Alto College, 2005

**Norman Sartorius**

Adjunct Professor of Psychiatry

**Jeffrey Frank Scherrer, Ph.D.**

Adjunct Associate Professor of Psychiatry  
Doctor of Philosophy, Saint Louis University, 2004

**Jeffrey I Schulman, M.B.A., M.D.**

Instructor in Clinical Psychiatry (Child Psychiatry)  
Bachelor of Arts, Yale University, 1970  
Doctor of Medicine, University of Kentucky, 1974  
Master of Business Administration, Washington University in St  
Louis, 1988

**Rebecca Frye Schwarzlose, Ph.D.**

Instructor in Psychiatry (Pending Dean Approval) (primary  
appointment)  
Bachelor of Arts, Northwestern University, 2002  
Doctor of Philosophy, Massachusetts Institute of Technology,  
2008

**Adelita Segovia Langley**

Associate Professor of Clinical Psychiatry (Child Psychiatry)

**Bryan Norbert Sewing, D.O.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Science, Texas Christian University, 1991  
Doctor of Osteopathic Medicine, Kirksville College of  
Osteopathic Medicine, 1998

**Lawrence Evan Shapiro, Psy.D.**

Instructor in Clinical Psychiatry  
Doctor of Psychology, University of California, 1990

**Paul W Sheffner, M.D.**

Assistant Professor of Clinical Psychiatry  
Doctor of Medicine, Washington University in St Louis, 1974

**Nathan M Simon, M.S., M.D.**

Professor Emeritus of Clinical Psychiatry  
Bachelor of Science, Yale University, 1949  
Master of Science, Yale University, 1950

Doctor of Medicine, Washington University in St Louis, 1955

**Reed Earl Simpson, M.D.**

Assistant Professor of Clinical Psychiatry  
Bachelor of Arts, Wabash College, 1972  
Doctor of Medicine, Washington University in St Louis, 1976

**Judith Ann Skala, M.A., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, Washington University in St Louis, 1989  
Master of Arts, Washington University in St Louis, 1992  
Doctor of Philosophy, Washington University in St Louis, 2001

**James B Smith, M.D.**

Associate Professor Emeritus of Clinical Psychiatry  
Bachelor of Arts, University of Missouri Columbia, 1963  
Doctor of Medicine, University of Missouri Columbia, 1967

**Stacey L Smith, M.D.**

Assistant Professor of Clinical Psychiatry  
Bachelor of Arts, Northwestern University, 1986  
Doctor of Medicine, Northwestern University, 1991

**Carolina Soriano Tarraga, M.S., Ph.D.**

Instructor in Psychiatry (Pending Dean's Approval) (primary appointment)  
Master of Science, University of Barcelona, 2006  
Doctor of Philosophy, University of Barcelona, 2009

**Timothy Eric Spiegel, M.D.**

Associate Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 2001  
Doctor of Medicine, Saint Louis University, 2006

**Afshan Sultana, M.D.**

Instructor in Psychiatry (Child) (primary appointment)  
Doctor of Medicine, University of Karachi, 1996

**Yun Ju Sung, Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Associate Professor of Biostatistics  
Doctor of Philosophy, University of Minnesota, 2003

**Dragan M Svrakic, Ph.D., M.D.**

Professor of Psychiatry (primary appointment)  
Doctor of Medicine, University of Belgrade, 1978  
Doctor of Philosophy, University of Belgrade, 1989

**Chad M Sylvester, Ph.D., M.D.**

Associate Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Science, University of Notre Dame, 2001  
Doctor of Philosophy, Washington University in St Louis, 2009  
Doctor of Medicine, Washington University in St Louis, 2009

**Hannah Selene Szlyk, M.S.S.W., Ph.D.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Arts, Kenyon College, 2009  
Master of Science in Social Work, Columbia University, 2011  
Doctor of Philosophy, University of Texas Austin, 2018

**T**

**Mini Tandon, D.O.**

Associate Professor of Psychiatry (Child) (primary appointment)  
Bachelor of Science, Truman State University, 1997  
Doctor of Osteopathic Medicine, Kansas City University of  
Medicine and Biosciences, 2002

**Alexandre Todorov, M.Ed., Ph.D.**

Professor of Psychiatry (primary appointment)  
Bachelor of Science, Vanderbilt University, 1985  
Master of Education, Vanderbilt University, 1988  
Doctor of Philosophy, Louisiana State University, 1992

**Ludwig Trillo Alvarez, M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Doctor of Medicine, Universidad de San Agustin, 2005

**V**

**Erica J Vance**

Instructor in Clinical Psychiatry

**Jeffrey A. Vander Kooi, M.D.**

Instructor in Clinical Psychiatry  
Bachelor of Science, University of Iowa, 1997  
Doctor of Medicine, University of Iowa, 2002

**Jessica Vanderlan, M.A., Ph.D.**

Instructor in Clinical Psychiatry  
Bachelor of Arts, University of Michigan (Duplicate of University  
of Michigan Ann Arbor), 2004  
Master of Arts, Alliant University (Duplicate of Alliant  
International University (AIU)), 2013  
Doctor of Philosophy, Alliant University (Duplicate of Alliant  
International University (AIU)), 2015

**Theresa Nieva Villaflores, M.D.**

Instructor in Psychiatry (Child) (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 1999

**Alecia C. Vogel-Hammen, Ph.D., M.D.**

Assistant Professor of Psychiatry (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2010  
Doctor of Medicine, Washington University in St Louis, 2013

**W**

**Mary C. Waldron, Ph.D.**

Adjunct Assistant Professor of Psychiatry  
Doctor of Philosophy, University of Virginia, 2004

**Marysia Weber**

Instructor in Clinical Psychiatry

**Reuben R Welch, M.Ed., Ph.D.**

Professor of Psychiatry (primary appointment)  
Lecturer in Psychological and Brain Sciences  
Bachelor of Arts, Point Loma Nazarene College, 1980  
Master of Education, University of Missouri Columbia, 1982  
Doctor of Philosophy, University of Missouri Columbia, 1988

**Michael L Wenzinger, M.D.**

Assistant Professor of Psychiatry (Child) (primary appointment)  
Doctor of Medicine, Eastern Virginia Medical School, 2014

**Diana J Whalen, Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Lecturer in Psychological & Brain Sciences  
Bachelor of Science, University of Pittsburgh, 2005  
Doctor of Philosophy, University of Pittsburgh, 2014

**Denise Wilfley, Ph.D.**

Professor of Psychiatry (primary appointment)  
Professor of Psychological & Brain Sciences  
Professor of Medicine  
Professor of Pediatrics  
Scott Rudolph University Professor  
Doctor of Philosophy, University of Missouri Columbia, 1989

**Joshua L Wilson, M.D.**

Instructor in Psychiatry (primary appointment)  
Bachelor of Science, University of North Texas, 2008  
Doctor of Medicine, University of Texas Health Science Center,  
2012

**Matthew Stewart Wilson**

Instructor in Clinical Psychiatry

**Eric Nicholas Wittrock, D.O.**

instructor in Psychiatry (primary appointment)  
Doctor of Osteopathic Medicine, Kansas State University, 2011

**Edwin D Wolfgram, M.D.**

Assistant Professor of Clinical Psychiatry  
Bachelor of Science, Iowa State University, 1954  
Doctor of Medicine, University of Iowa, 1959

**David F Wozniak, M.A., Ph.D.**

Professor Emeritus of Psychiatry  
Bachelor of Arts, Hobart College (Duplicate of Hobart William  
Smith Colleges), 1973  
Master of Arts, Connecticut College, 1977  
Doctor of Philosophy, Washington University in St Louis, 1984

**Y**

**Carla Marie Yuede, Ph.D.**

Associate Professor of Psychiatry (primary appointment)  
Associate Professor of Neurology  
Associate Professor of Neuroscience  
Doctor of Philosophy, University of Missouri in St Louis, 2006

**Sean H Yutzey**

Adjunct Professor of Psychiatry

**Z**

**Charles F Zorumski, M.D.**

Professor of Psychiatry (primary appointment)  
Samuel B. Guze Professor of Psychiatry  
Professor of Neuroscience

Director of the Taylor Family Institute for Innovative Psychiatric  
Research

Bachelor of Arts, Saint Louis University, 1974

Doctor of Medicine, Saint Louis University, 1978

**Jorge Sergio Zwir, M.S., Ph.D.**

Assistant Professor of Psychiatry (primary appointment)  
Bachelor of Science, Universidad del Buenos Aires, 1991  
Master of Science, Universidad del Buenos Aires, 1995  
Doctor of Philosophy, University of Granada, 2001

## Research Electives

### Psychiatry Research Electives

During the fourth year, opportunities exist for many varieties of  
advanced clinical or research experiences.

**Note to Students:** There are always a number of research  
projects in the Department of Psychiatry. For additional  
information, contact Dr. Rubin at 314-362-2462.

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**Andrey Anokhin, PhD**

Genetics of the Brain, Behavior and Psychopathology  
Central Institute for the Deaf (CID) Building

660 S. Euclid Ave., Suite 1

Phone: 314-286-2201

andrey@wustl.edu

This research elective is intended for students interested in  
cognitive neuroscience, biological psychiatry, and behavior  
genetics. Dr. Anokhin's laboratory investigates the links  
between genes, brain and behavior in order to better  
understand the complex etiology of mental disorders. Our major  
focus is on the externalizing spectrum of psychopathology  
characterized by deficits in inhibitory self-regulation and related  
psychopathologies, including ADHD, conduct disorder and  
addictive behaviors. We are particularly interested in the  
intermediate phenotypes (endophenotypes) mediating genetic  
risk for addiction, such as impulsivity, risk taking, and abnormal  
reward processing. In our laboratory-based studies with human  
volunteers, including twins, we investigate individual differences  
in brain activity using the recording of brain oscillations (event-  
related brain potentials) and functional magnetic resonance  
imaging (fMRI). For example, an ongoing longitudinal study  
of adolescent twins explores the developmental and genetic  
determinants of brain activity related to reward and punishment  
processing, inhibitory control of behavior, and risk taking  
to identify prospective predictors of substance abuse and  
associated behavioral problems. In another ongoing study, we  
examine twins who are discordant for adolescent marijuana use  
in order to identify the consequences of substance abuse for  
the brain, cognition and emotion and to distinguish them from  
preexisting risk factors. Interested students will be able to learn a  
variety of methods used in these studies, such as the recording  
and analysis of neural activity, including electroencephalogram  
(EEG) and event-related brain potentials (ERPs), MRI scanning,

startle response, autonomic measures, the administration of neuropsychological and behavioral tests, and the statistical analysis of data. The format of this research elective may include the following: (1) directed reading; (2) participation in laboratory experiments involving human subjects; (3) analysis of existing data from various research projects; and (4) designing and piloting new behavioral experiments. Qualifications include reliability and responsibility, the ability to commit a specified amount of time per week and to work a schedule that can be negotiated on an individual basis, and good computer skills.

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**Deanna M. Barch, PhD**

Cognitive and Affective Neuroscience of Schizophrenia and Depression  
4525 Scott Avenue, Suite 1153K  
Phone: 314-747-2160

Students may participate in the conduct of clinical studies of schizophrenia and depression. Involvement in clinical studies can include training and experience in interviewing psychiatric patients, or it may involve gaining experience in the techniques of assessing cognitive and emotional function using behavioral and brain imaging methods.

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**Laura Jean Bierut, MD**

Renard Building  
Phone: 314-362-2544

This research elective will focus on analyzing data from high-risk studies of smoking and other addictions. Students will have the opportunity to examine genetic and environmental factors that place some individuals at risk for developing nicotine, alcohol and other substance dependence and that protect others from the development of these disorders.

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**Kevin J. Black, MD**

4525 Scott Ave., Room 2205  
Phone: 314-362-5041  
kevin@wustl.edu

Students will participate in ongoing studies of brain imaging, movement disorders or neuropsychiatric illnesses. Degree of participation will relate to the student's available research time, skills and interest. Visit the laboratory's webpage (<https://sites.wustl.edu/blacklab/>) for examples of past research.

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**Ginger E. Nicol, MD**

Taylor Avenue Building, Suite 121  
Phone: 314-362-5154

We are part of the Healthy Mind Lab in the department of psychiatry, and our clinical research broadly focuses on increasing longevity and quality of life in children, adolescents, adults and older adults. Our specific projects focus primarily on obesity treatment and prevention, and they include clinical and

genetic studies of psychotropic medications known to cause weight gain, like antipsychotic agents. We are interested in developing and testing medication-assisted psychotherapies with agents like ketamine and psilocybin for weight management and disordered eating. We also employ mobile health (mHealth) tools for collecting data and for delivering healthy lifestyle and behavioral weight loss treatments, and we use precision functional and molecular brain imaging techniques to study individual, brain-based mechanisms of illness and treatment response. This elective offers the student a broad exposure to clinical research protocols, including protocols in adults and children. Students will have an opportunity to focus on a particular project of interest.

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## Courses

Visit online course listings to view offerings for M85 Psych (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M85>).

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**M81 Gateway 630 Psychiatry Clerkship**

Credit 308 units.

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**M85 Psych 676A Diseases of the Nervous System: Psychiatry**

This course will emphasize the diagnosis of major psychiatric illnesses in adults and children. Psychiatric diseases will be described in terms of epidemiology, clinical presentations, natural history, genetics, differential diagnosis and clinical management. Biological and psychological influences on these diseases will be presented. Interviewing techniques and performance of the mental status exam will be demonstrated by patient interviews.

Credit 44 units.

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**M85 Psych 770 Psychiatry Clerkship**

Students spend three weeks on the inpatient psychiatry service of Barnes-Jewish Hospital at the main campus unit. Students evaluate and treat patients with psychiatric illness under the supervision of house staff and an attending physician. Students are also assigned for one week at either an ambulatory treatment site or an inpatient consult-liaison service. There is also an opportunity for students to gain exposure to emergency psychiatric services in the Barnes-Jewish Hospital emergency department. The clerkships includes required attendance at teaching conferences, including small-group sessions with WUSM clinical faculty and upper-level psychiatry residents. Students are responsible for completing learning exercises and other assignments.

Credit 154 units.

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**M85 Psych 771 Ambulatory Clerkship: Psychiatry for Generalists**

Up to 2 students may elect to pursue their ambulatory medicine selective through the psychiatry department. Students participate in clinical duties depending on assigned locations, which can include the BJH adult psychiatry clinic, a community mental health center, the Wash U child and adolescent psychiatry clinic,

and both the adult and child psychiatry consultation services. Students will also submit a written review of a relevant clinical topic of their choice. There are no call obligations at any clinical site.

Credit 77 units.

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#### **M85 Psych 805 Psychiatry Consult Subinternship**

Students spend four weeks on the psychiatry consult service at Barnes-Jewish Hospital. Under the supervision of house staff and attending physicians, students participate in the evaluation and collaborative management of inpatients on medical and surgical units for a broad range of psychiatric and behavioral concerns. They learn about the intersection between psychiatry and other medical specialties and important skills for collaborative patient care. Students attend departmental conferences and other educational sessions, and they also prepare and present a clinical topical review of their choice

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#### **M85 Psych 810 Outpatient Community Psychiatry**

This elective will provide the student with a significant outpatient experience in Psychiatry. Students will be paired with a Resident physician and have exposure to two adult clinics and one child clinic over the course of the rotation. Students will observe and assist in the diagnosis and treatment of patients in the clinic setting. Students will also attend scheduled lectures and conferences over the course of the rotation relevant to outpatient Psychiatry. During the elective, the student will learn about the outpatient presentations of psychiatric disorders, a variety of treatment techniques (psychotherapy and psychopharmacology), and general principles of outpatient clinical management.

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#### **M85 Psych 836 Inpatient Psychiatry Subinternship**

This is a senior rotation that provides the students with an opportunity to expand their knowledge of inpatient clinical psychiatry by functioning as interns. Students attend all staffing and teaching conferences given to first-year psychiatry residents and are responsible for the assessment and management of acute psychiatric patients. Immediate supervision is provided by the inpatient attending, and additional supervision can be arranged as desired. Teaching emphasis is directed toward psychiatric diagnosis, appropriate use of psychopharmacologic agents, psychotherapeutic intervention, use of community resources and pursuit of the psychiatric scientific literature. The student will write a self-selected clinical topic relevant to treatment and management of psychiatric inpatients.

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#### **M85 Psych 840 Child Psychiatry**

This elective in child psychiatry utilizes the St. Louis Children's Hospital St. Louis Children's Hospital Pediatric Behavioral Health Unit and the Consult-Liaison service. It provides experience in age-appropriate diagnostic and treatment methods in children and adolescents. A portion of your time may be spent in the outpatient clinics if interested and if circumstances permit. A paper on a topic of the student's choosing is required.

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#### **M85 Psych 844 Forensic Psychiatry**

The medical student will be actively involved in many aspects of forensic psychiatry including civil litigation, workman's compensation, malpractice, civil commitment, and guardianship. There may be opportunities to be involved in criminal forensic issues. The rotation is primarily self-directed but the student will work with several faculty within the Department of Psychiatry and will meet with the Course Director a minimum of two hours per week. They will also work with The City of St Louis Probate

Court and shadow at the St. Louis Psychiatric Rehabilitation Center, a nearby forensic hospital. The student will also be assigned readings of landmark cases, textbooks, psychiatric expert opinions, legal filing with the probate court and attend civil hearings. The student will learn relevant criminal statutes regarding competency and civil commitment, causation in civil litigation, the concept of medical malpractice and risk assessment of violence and suicide. There may be the opportunity to witness sexually violent predator evaluations and/or treatment. The student will be required to research and write an opinion on a specific approved topic in forensic psychiatry. The objectives will be measured by attendance and by formal evaluation of the student's participation and knowledge during the supervision discussion. It will also be determined by the originality, thoroughness, and quality of the research paper.

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#### **M85 Psych 880 Schizophrenia Precursors & Prodromal States**

This is an opportunity for trainees to gain experience in the evaluation of children and adolescents who may be at high risk for schizophrenia. The rotation would center around the "First Contact Assessment Service", which evaluates patients who show characteristics suggestive of prodromal schizophrenia (such as new-onset attenuated psychotic symptoms along with recent deterioration in functioning) and/or early life characteristics that may indicate risk for developing schizophrenia later in life (for example, nonspecific social/emotional/behavioral symptoms in a child/adolescent with a strong family history of schizophrenia). Since the full symptoms of schizophrenia are often preceded by a wide range of childhood behavioral and developmental abnormalities, this rotation would also help trainees integrate information regarding the continuity between childhood development and adult psychopathology. Trainee would observe all aspects of First Contact evaluations (including semi-structured diagnostic interviews and examination of subtle neurological signs), participate in case discussions, and observe follow-up consultations involving patients with psychotic and/or complex neurodevelopmental disorders. Trainee would also be required to write a literature review on a topic relevant to the rotation.

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#### **M85 Psych 900 Research Elective: Psychiatry**

Research opportunities may be available. If interested, please contact the Department of Psychiatry.

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## **Department of Radiation Oncology**

The Department of Radiation Oncology (<http://radonc.wustl.edu/>) was created in 2001, after having been part of the Mallinckrodt Institute of Radiology for many decades. The department has a broad academic program that focuses on excellence in patient care and the development of new treatment paradigms; innovative research in each of our three divisions: Clinical, Medical Physics and Cancer Biology; and teaching graduate students, medical students, residents in both radiation oncology and medical physics, and allied health personnel.



The department is one of the largest, most academically balanced, and best equipped in the country, and it is responsible for all radiation therapy procedures at Washington University Medical Center and at Siteman Cancer Center facilities throughout the St. Louis regional area. Our faculty have gained international recognition for innovative technological advances in physics and treatment planning, biological research, computer applications and clinical investigation.

We have advanced treatment planning computer systems for 3D conformal and intensity-modulated radiation therapy as well as the latest Gamma Knife, the ICON unit. We have six linear accelerators with on-board CT imaging capability. The brachytherapy suite includes capabilities for high dose rate remote after-loading and for image-guided permanent prostate seed implants. Interstitial and external hyperthermia treatments are also available.

**The Department of Radiation Oncology offers the following formal educational programs:**

- Clinical Residency Training Program (4 years), ACGME-accredited; established 1971
- Medical Physics Residency Training Program (2 years), CAMPEP-accredited; established 1993
- Post-PhD Graduate Certificate in Medical Physics (2 years), CAMPEP-accredited; established 2017
- Master of Science (MS) in Medical Physics (2 years), CAMPEP-accredited; established 2020
- Doctor of Philosophy (PhD) in Medical Physics (2 years); established 2022

Website: <http://radonc.wustl.edu>

## Faculty

**Dennis Hallahan, MD** (<https://radonc.wustl.edu/people/dennis-hallahan/>)  
Department Head

**Maria Thomas, MD** (<https://radonc.wustl.edu/people/maria-a-thomas-md-phd/>)  
Clerkship Director

**Joanna Yang, MD**  
Clinical Residency Program Director

**Olga Green, PhD**  
Medical Physics Residency Program Director

**Michael Altman, PhD** (<https://radonc.wustl.edu/people/michael-altman-phd/>)  
Director of Education in Medical Physics

Visit our website for more information about our faculty (<https://radonc.wustl.edu/faculty/>) and their appointments.

## A

**Christopher Abraham, M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Assistant Professor of Medicine  
Bachelor of Science, Medical College Georgia, 2005  
Doctor of Medicine, Saint Louis University, 2006

**Michael Bernard Altman, Ph.D.**

Associate Professor of Radiation Oncology (primary appointment)  
Doctor of Philosophy, University of Chicago, 2010

**Anthony John Apicelli, Ph.D., M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Princeton University, 1999  
Doctor of Philosophy, Washington University in St Louis, 2009  
Doctor of Medicine, Washington University in St Louis, 2009

## B

**Shahed Nicolas Badiyan, M.D.**

Associate Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, University of Texas Austin, 2005  
Doctor of Medicine, University of Texas Austin, 2009

**Brian Christopher Baumann, M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Arts, Princeton University, 2003  
Doctor of Medicine, University of Pennsylvania, 2012

**Carmen Renee Bergom, M.S., Ph.D., M.D.**

Associate Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Massachusetts Institute of Technology, 1998  
Master of Science, Cambridge University, 1999  
Doctor of Philosophy, Medical College of Wisconsin, 2006  
Doctor of Medicine, Medical College of Wisconsin, 2008

**Walter R Bosch, M.S., D.Sc., B.E.E.**

Associate Professor of Radiation Oncology (primary appointment)  
Other bachelor's degree, Washington University in St Louis, 1980  
Master of Science, Washington University in St Louis, 1983  
Other professional doctorate, Washington University in St Louis, 1990

## C

**Douglas Ford Caruthers, M.S.**

Instructor in Radiation Oncology (primary appointment)  
Master of Science, University of Texas Health Science Center, 2010

**Aadel Ahmed Chaudhuri, M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Assistant Professor of Computer Science and Engineering

Assistant Professor of Genetics  
Bachelor of Science, Massachusetts Institute of Technology,  
2004  
Doctor of Medicine, Stanford University, 2013

**Jessika Contreras**

Assistant Professor of Radiation Oncology (Pending Executive  
Faculty Approval) (primary appointment)

**David T Curiel, Ph.D., M.D.**

Professor of Radiation Oncology (primary appointment)  
Professor of Obstetrics and Gynecology  
Professor of Medicine  
Distinguished Professor of Radiation Oncology  
Bachelor of Arts, West Georgia College, 1978  
Doctor of Medicine, Emory University, 1982  
Doctor of Philosophy, University of Groningen, 2000

**D**

**Arash Darafsheh, M.S., Ph.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Bachelor of Science, University of Tehran, 2004  
Master of Science, University of North Carolina at Charlotte,  
2011  
Doctor of Philosophy, University of Pennsylvania, 2015

**Carl J. DeSelm, Ph.D., M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Dartmouth College, 2004  
Doctor of Medicine, Washington University in St Louis, 2012  
Doctor of Philosophy, Washington University in St Louis, 2016

**Venkata Rao Devineni, M.D.**

Associate Professor of Clinical Radiation Oncology  
Doctor of Medicine, Osmania Medical College, 1973

**Igor Dmitriev, Ph.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Doctor of Philosophy, SRC Vector, 1994

**Robert E Drzymala, Ph.D.**

Professor Emeritus of Radiation Oncology  
Bachelor of Science, Northern Illinois University, 1972  
Doctor of Philosophy, University of Oklahoma, 1977

**G**

**H Michael Gach, Ph.D.**

Professor of Radiation Oncology (primary appointment)  
Professor of Radiology  
Doctor of Philosophy, University of Pittsburgh, 1998

**Jose L Garcia, M.S.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, University of Puerto Rico, 1995  
Master of Science, Finch University of Health Sciences, 1997

**Hiram Alberto Gay, M.D.**

Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, University of Puerto Rico, 1996  
Doctor of Medicine, University of Puerto Rico, 2000

**Sreekrishna M Goddu, M.S., Ph.D.**

Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Andhra University, 1983  
Master of Science, Andhra University, 1985  
Doctor of Philosophy, Andhra University, 1991

**Yuxing Gu, Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Doctor of Philosophy, University of Missouri in St Louis, 2014

**H**

**Lannis Hall, M.P.H., M.D.**

Associate Professor of Clinical Radiation Oncology  
Bachelor of Arts, University of Michigan (Duplicate of University  
of Michigan Ann Arbor), 1988  
Doctor of Medicine, Howard University, 1992  
Master of Public Health, Saint Louis University, 1995

**Dennis E Hallahan, M.D.**

Professor of Radiation Oncology (primary appointment)  
Professor of Biomedical Engineering  
Elizabeth H and James S McDonnell III Distinguished Professor  
of Medicine  
Head of the Department of Radiation Oncology  
Professor of Cell Biology and Physiology  
Professor of Pathology and Immunology  
Professor of Molecular Microbiology  
Bachelor of Science, University of Illinois, 1980  
Doctor of Medicine, Rush University, 1984

**Yao Hao, Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
California, 2004  
Doctor of Philosophy, University of Massachusetts Lowell, 2016

**Jiayi Huang, M.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Doctor of Medicine, University of Massachusetts Medical School  
Worcester, 2007

**Yi Huang, Sc.M.**

Instructor in Radiation Oncology (primary appointment)  
null, Louisiana State University Health Sciences Center at New  
Orleans, 2016

**Geoffrey Douglas Hugo, Ph.D.**

Professor of Radiation Oncology (primary appointment)  
Professor of Computer Science and Engineering  
Director - Physics Division, Medical Physics  
Doctor of Philosophy, University of California Los Angeles, 2003

**I**

**Amir Irvani Tabrizipour, M.D.**

Assistant Professor of Radiation Oncology  
Doctor of Medicine, Tehran University, 2003

## K

### **Vaishali Kapoor, M.S., Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Arts, Delhi University, 2006  
India Inst of Medical Sci, 2008  
India Inst of Medical Sci, 2013

### **Hyun Kim, M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, University of California, 2006  
Doctor of Medicine, University of Pittsburgh, 2012

### **Taeho Kim, Ph.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Doctor of Philosophy, Washington University in St Louis, 2007

### **Nels C Knutson, M.S., Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, University of Montana Missoula, 2009  
Master of Science, Louisiana State University, 2012  
Doctor of Philosophy, University of Massachusetts Lowell, 2016

## L

### **Susan Joy Laduzinsky, M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Doctor of Medicine, University of Illinois, 1983

### **Heui Chang Lee, M.S., Ph.D.**

Assistant Professor of Radiation Oncology (Pending Executive  
Faculty Approval) (primary appointment)  
Bachelor of Science, Hanyang University, 2009  
Master of Science, Seoul National University, 2011  
Main Campus, 2016

### **Jason Dole Lee, Ph.D., M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Doctor of Philosophy, Duke University, 2009  
Doctor of Medicine, Duke University, 2010

### **Hua Li, Ph.D.**

Professor of Radiation Oncology (Pending Executive Faculty  
Approval) (primary appointment)  
Doctor of Philosophy, Huazhong University of Science and  
Technology (#####, HUST), 2001

### **Hsiu-San Lin, Ph.D., M.D.**

Professor Emeritus of Radiation Oncology  
Doctor of Medicine, National Taiwan University, 1960  
Doctor of Philosophy, University of Chicago, 1968

### **Zhi Hong Lu, Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Fudan University, 1990

Doctor of Philosophy, University of Mississippi Medical Center,  
1999

## M

### **Stephanie Markovina, M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Madison, 2010

### **Nichole M Maughan, Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2017

### **Thomas Rolf Mazur, Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Union College New York, 2007  
Doctor of Philosophy, University of Texas Austin, 2014

### **Jeff Michael Michalski, M.B.A., M.D.**

Professor of Radiation Oncology (primary appointment)  
Director - Clinical Division, Clinical Programs  
Vice Chair - Department of Radiation Oncology  
Carlos Perez Distinguished Professor of Radiation Oncology  
Bachelor of Science, University of Wisconsin Madison, 1982  
Doctor of Medicine, Medical College of Wisconsin, 1986  
Master of Business Administration, Washington University in St  
Louis, 2001

### **Justin Mikell, Ph.D.**

Assistant Professor of Radiation Oncology (Pending Executive  
Faculty Approval) (primary appointment)  
Champaign, 2002  
null, University of Texas Houston, 2015

### **Timothy John Mitchell, M.S., Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, John Carroll University, 2005  
Master of Science, Washington University in St Louis, 2007  
Doctor of Philosophy, University of Missouri in St Louis, 2014

### **Eric Daniel Morris, Ph.D.**

Assistant Professor of Radiation Oncology (Pending Executive  
Faculty Approval) (primary appointment)  
null, Michigan Technological University, 2015  
null, Wayne State University, 2020

### **Robert J Myerson, Ph.D., M.D.**

Professor Emeritus of Radiation Oncology  
Bachelor of Arts, Princeton University, 1969  
Doctor of Philosophy, University of California, 1974  
Doctor of Medicine, University of Miami, 1980

## N

### **Gilbert H Nussbaum, M.A., Ph.D.**

Associate Professor Emeritus of Radiation Oncology  
Bachelor of Science, City College, 1960  
Master of Arts, Harvard University, 1962  
Doctor of Philosophy, Harvard University, 1967

## P

### **Carlos A Perez, M.D.**

Professor Emeritus of Radiation Oncology  
Bachelor of Science, School Not Listed, 1952  
Doctor of Medicine, School Not Listed, 1960

### **Stephanie Mabry Perkins, M.D.**

Associate Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Union University, 2001  
Doctor of Medicine, University of Tennessee at Memphis, 2005

### **James Vernon Piephoff, M.D.**

Instructor in Clinical Radiation Oncology  
Bachelor of Science, Citadel Military College of South Carolina, 1985  
Doctor of Medicine, University of South Carolina (Duplicate of University of South Carolina Columbia), 1989

### **Alex Price, M.S.**

Instructor in Radiation Oncology (primary appointment)  
Bachelor of Science, Hampden Sydney College, 2013  
Master of Science, Duke University, 2015

### **Michael Thomas Prusator, M.S., Ph.D.**

Assistant Professor Radiation Oncology (primary appointment)  
Bachelor of Science, University of Ozarks, 2012  
Master of Science, University of Oklahoma Health Sciences, 2014  
Doctor of Philosophy, University of Oklahoma Health Sciences, 2018

### **James A Purdy, M.A., Ph.D.**

Emeritus Professor of Radiation Oncology  
Bachelor of Science, Lamar University, 1967  
Master of Arts, University of Texas Austin, 1969  
Doctor of Philosophy, University of Texas Austin, 1971

## R

### **Francisco Javier Reynoso, M.S., Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Master of Science, Georgia Tech, 2008  
Doctor of Philosophy, Georgia Tech, 2014

### **Clifford Grant Robinson, M.D.**

Professor of Radiation Oncology (primary appointment)  
Professor of Medicine  
Bachelor of Science, University of Pittsburgh, 2000  
Doctor of Medicine, Case Western Reserve University, 2004

### **Buck Edward Rogers, M.A., Ph.D.**

Professor of Radiation Oncology (primary appointment)  
Professor of Radiology  
Bachelor of Science, Loyola University Chicago, 1989  
Master of Arts, Washington University in St Louis, 1991  
Doctor of Philosophy, Washington University in St Louis, 1995

### **Joseph L Roti Roti, Ph.D.**

Professor Emeritus of Radiation Oncology  
Bachelor of Science, Michigan Technological University, 1965  
Doctor of Philosophy, University of Rochester, 1972

### **Tapan Roy, M.S.**

Instructor in Clinical Radiation Oncology  
Master of Science, Baroda Medical College, 1974

## S

### **Pamela Parker Samson, M.A., M.P.H., M.S., M.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Arts, University North Carolina, 2001  
Master of Arts, University of Washington, 2003  
Master of Science, University of Cincinnati, 2007  
Doctor of Medicine, University of Cincinnati, 2011  
Master of Public Health, Washington University in St Louis, 2020

### **Matthew Schmidt, M.S., Ph.D.**

Instructor in Radiation Oncology (primary appointment)  
Bachelor of Science, Valdosta State College, 2011  
Master of Science, Duke University, 2013  
null, University of Massachusetts Lowell, 2022

### **Julie K Schwarz, Ph.D., M.D.**

Professor of Radiation Oncology (primary appointment)  
Professor of Cell Biology and Physiology  
Director - Cancer Biology Division  
Vice Chair - Research  
Bachelor of Science, Duke University, 1995  
Doctor of Philosophy, Washington University in St Louis, 2004  
Doctor of Medicine, Washington University in St Louis, 2004

### **Joseph Rogers Simpson, Ph.D., M.D.**

Professor Emeritus of Radiation Oncology  
Bachelor of Arts, Cornell University, 1963  
Doctor of Philosophy, University of Chicago, 1967  
Doctor of Medicine, Harvard University, 1973

### **Abhay Kumar Singh, M.S., Ph.D.**

Instructor in Radiation Oncology (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, Brabu, 2002  
Master of Science, Jamia Hamdard University, 2005  
India Inst of Medical Sci, 2012

### **Christopher Spencer, M.A., M.D.**

Adjunct Instructor in Radiation Oncology  
Master of Arts, Truman State University (Duplicate of Truman State University (Formerly Northeast Missouri State University)), 2006  
Doctor of Medicine, Saint Louis University, 2010

### **William L Straube, M.E.E.**

Associate Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, University of Illinois, 1983  
Master of Electrical Engineering, Washington University in St Louis, 1992

**Jeffrey Szymanski, Ph.D., M.D.**

Instructor in Radiation Oncology (Pending Dean's Approval)  
(primary appointment)  
Bachelor of Science, Northern Michigan University, 2005  
Doctor of Philosophy, Wayne State University, 2014  
Doctor of Medicine, Wayne State University, 2014

**T**

**Maria A Thomas, Ph.D., M.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Bachelor of Science, Creighton University, 2000  
Doctor of Philosophy, Saint Louis University, 2006  
Doctor of Medicine, Saint Louis University, 2008

**Wade L Thorstad, M.D.**

Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Trinity University, 1986  
Doctor of Medicine, University of Texas Austin, 1991

**Amaris Renee Tippey, Ph.D.**

Assistant Professor of Clinical Radiation Oncology  
Doctor of Philosophy, East Carolina University, 2014

**V**

**Gregory Riccardo Vlacich, Ph.D., M.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Doctor of Philosophy, University of Chicago, 2007  
Doctor of Medicine, University of Chicago, 2009

**W**

**Phillip Douglas Hardenbergh Wall, M.S., Ph.D.**

Assistant Professor of Radiation Oncology (Pending Executive  
Faculty Approval) (primary appointment)  
null, Davidson College, 2014  
null, Louisiana State University, 2017  
null, Louisiana State University, 2020

**Bruce J Walz, M.D.**

Associate Professor of Clinical Radiation Oncology  
Bachelor of Arts, Washington University in St Louis, 1962  
Doctor of Medicine, Washington University in St Louis, 1966

**Jeffrey F Williamson, M.S., Ph.D.**

Professor of Radiation Oncology (primary appointment)  
Bachelor of Arts, Saint Olaf College, 1974  
Master of Science, University of Minnesota, 1980  
Doctor of Philosophy, University of Minnesota, 1982

**Y**

**Joanna Chensi Yang, M.P.H., M.D.**

Assistant Professor of Radiation Oncology (Pending Executive  
Faculty Approval) (primary appointment)  
null, Stanford University, 2008  
Doctor of Medicine, Mount Sinai School of Medicine, 2013

Master of Public Health, Harvard University, 2018

**Z**

**Jin Zhang, M.Eng., Ph.D.**

Assistant Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, Tianjin University (#####), 2005  
Master of Science, Tianjin Polytechnic University (#####), 2008  
Doctor of Philosophy, University of Connecticut, 2012

**Tiezhi Zhang, M.S., Ph.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Bachelor of Science, Jilin Medical University, 1994  
Master of Science, Drexel University, 1999  
Doctor of Philosophy, University of Wisconsin Madison, 2004

**Tianyu Zhao, M.S., Ph.D.**

Associate Professor of Radiation Oncology (primary  
appointment)  
Bachelor of Science, Shanghai Jiao Tong University, 1998  
Master of Science, Shanghai Jiao Tong University, 2001  
Doctor of Philosophy, Washington University in St Louis, 2010

**Tong Zhu, Ph.D.**

Associate Professor of Radiation Oncology (Pending Executive  
Faculty Approval) (primary appointment)  
Doctor of Philosophy, University of Rochester, 2009

**Imran Zoheri, M.D.**

Professor of Radiation Oncology (primary appointment)  
Bachelor of Science, University of South Dakota, 1992  
Doctor of Medicine, Washington University in St Louis, 1996

**Jacqueline Esthappan Zoheri, Ph.D.**

Professor of Radiation Oncology (primary appointment)  
Bachelor of Arts, University of Chicago, 1995  
Doctor of Philosophy, University of Chicago, 2000

## Research Electives

### Radiation Oncology Research Electives

The Cancer Biology division provides opportunities for graduate students in the Division of Biology and Biomedical Sciences (<http://dbbs.wustl.edu/Pages/>) (DBBS) and the Medical Scientist Training Program (<http://mstp.wustl.edu/Pages/>) (MSTP) to train with faculty in the cancer biology research laboratories.

The Department of Radiation Oncology offers a clinical clerkship for medical students that can be selected as an elective through the medical school.

Please visit the Department of Radiation Oncology website (<https://radonc.wustl.edu/education/>) for more information about current research in the department.

## Courses

For course information related to the Post-PhD Graduate Certificate, Master's of Science in Medical Physics, and PhD in Medical Physics programs, please visit the Medical Physics (p. 59) page of this *Bulletin*.

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## MD/MSTP Programs

The Department of Radiation Oncology offers courses that are open to students in the MD and MSTP (MD/PhD) programs. For course information, please visit the online course listings (<https://acadinfo.wustl.edu/CourseListings/Semester/Listing.aspx>).

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### M92 RadOnc 740 Radiation Oncology Clerkship

The two-week clerkship in Radiation Oncology will provide students with the opportunity to participate in the evaluation and management of a broad range of patients referred for consideration of radiation therapy. Clerkship activities will take place at the Barnes-Jewish Hospital/Siteman Cancer Center complex and at our satellite facilities. Students will conduct patient evaluations under the supervision of radiation oncology department residents and faculty. Students will attend many conferences throughout the weeks of this clerkship, with the workday starting between 7:00 and 7:30 a.m. Students will also have the opportunity to attend the appropriate multidisciplinary clinics, follow-up clinics, and multidisciplinary conferences (such as pediatric neuro-oncology, cardiothoracic oncology, lymphoma, GYN tumor conferences, and so on) pertaining to their rotation schedule. Instructional materials are available for students on the rotation. (Students are not expected to purchase any curricular materials for the clerkship.) Student performance will be evaluated by both resident and faculty members who supervise the student over the course of the two-week clerkship. Credit 77 units.

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### M92 RadOnc 801 Clinical Radiation Oncology Subinternship

The Radiation Oncology clinical division offers an elective with emphasis on the evaluation, planning, and administration of radiation therapy in patients with malignant tumors. Students will have the opportunity to enhance their knowledge of the natural history of cancer as well as its pathological and biological features. Students will sharpen their clinical skills by participating in the management of cancer patients. Students will be mentored to prepare and lead a department noon conference on the management of a specific patient's care, including literature review and discussion. Students will be expected to prepare for clinical consultations by reviewing patient records and relevant literature, obtaining the patient's history, and performing a physical examination. This will be followed by presenting findings and a proposed care plan to the attending and resident physicians. This course is designed for MS4 students who are entering the Radiation Oncology Match. If a student is an MS4 applying in another specialty but interested in a radiation oncology elective, we encourage them to pursue a two-week special study elective in Radiation Oncology.

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### M92 RadOnc 900 Radiation Oncology Research Elective

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## Department of Radiology

The Edward Mallinckrodt Institute of Radiology — more commonly known as Mallinckrodt Institute of Radiology or MIR — serves as the Department of Radiology (<https://www.mir.wustl.edu/>) for Washington University School of Medicine in St. Louis (<http://medicine.wustl.edu/>), helping to guide the consulting physician in the discovery, the treatment, and, ultimately, the healing of disease. Established in 1930, MIR is one of the largest and most scientifically sophisticated radiology centers worldwide.

Internationally recognized for its groundbreaking research, the Institute continues to pioneer new radiological techniques for better patient care.

## Milestones

- Development of the first diagnostic test for gallbladder disease
- Design and construction of the first cross-sectional X-ray laminagraph
- Collaboration on design and installation of the first cyclotron located in a U.S. medical center
- Development of positron emission tomography (PET)
- Installation of one of the world's first computed tomography (CT) and magnetic resonance (MR) scanners
- Interfacing of a minicomputer with a gamma camera to improve the accuracy and efficiency of nuclear medicine procedures
- Establishment of the first mobile mammography van west of the Mississippi River
- Integration of CT and MR scans with a three-dimensional technology application of organic chemistry to the preparation of radiopharmaceuticals used in medical imaging
- Measurement of cerebral blood flow and metabolism
- Establishment of one of the largest and most comprehensive interventional radiology services in the United States
- Application of PET for measuring metabolic activity in relation to cardiac blood flow
- Early adoption of sequential PET/MR imaging

The Institute occupies more than 400,000 total square feet and comprises its own 12-story building, with satellite facilities in Barnes-Jewish and St. Louis Children's hospitals; the Clinical Sciences Research and East buildings; the Scott Avenue Imaging Center; the Center for Advanced Medicine; the Knight Emergency and Trauma Center; and the South County Siteman Cancer Center. The department provides diagnostic radiology, nuclear medicine and radiation physics services for all hospitals in the Washington University Medical Center, Barnes-Jewish

West County and Barnes-Jewish St. Peters hospitals. The Institute also provides diagnostic radiology for the Washington University Orthopedic and Barnes-Jewish Hospital Outpatient Orthopedic center.

MIR clinical facilities are on several floors of the Institute, with general diagnostic radiology on the second floor; neuroradiology on the third floor; gastrointestinal and genitourinary radiology and ultrasonography on the fourth floor; and MRI on the fifth floor. A comprehensive interventional radiology center occupies the eighth floor. Nuclear medicine is on the ninth floor of the Barnes-Jewish Hospital West Pavilion. Orthopedic imaging and musculoskeletal radiology services are on the sixth floor of the Center for Advanced Medicine. The Breast Health Center, on the fifth floor of the Center for Advanced Medicine, is a multidisciplinary facility that provides a full range of breast imaging services and interventional procedures. In the north wing of St. Louis Children's Hospital is a complete pediatric radiology facility, offering ultrasound, nuclear medicine, CT and MRI, and interventional radiology.

The Institute has 102 examination rooms used for diagnostic radiology. Clinical and research equipment includes two PET/CT scanners, 13 CT scanners, two PET scanners, one PET/MR scanner, 15 MR scanners (including an 11.7-Tesla research scanner), 12 high-end ultrasound machines (plus seven portable units), nine interventional radiology systems, five digital chest units, 10 computer radiography units, two neurointerventional radiology systems and six mammography units. In addition, as part of the department's community outreach effort, the Institute co-sponsors with the Alvin J. Siteman Cancer Center a mobile mammography van that provides screening services at corporate and public sites in the St. Louis area.

MIR has approximately 200,000 square feet devoted to research, with facilities in the Clinical Sciences Research Building (radiological sciences), in the East Building (electronic radiology), in the Scott Avenue Imaging Center (neurological PET, molecular pharmacology, biomedical MR imaging, optical imaging and cardiovascular imaging), and in the Center for Clinical Imaging Research (a bioimaging facility for basic and translational inpatient and outpatient clinical research).

Administrative, teaching and support functions occupy the sixth floor and the ninth through the 12th floors of the Institute. Information and training related to the use of radioactive materials is handled by Environmental Health and Safety (<https://ehs.wustl.edu/radioactive-material-safety/>); for more information, contact the department's director Maxwell Amurao, PhD, MBA, at 314-362-2988 or [maxwell.amurao@wustl.edu](mailto:maxwell.amurao@wustl.edu).

Website: <https://www.mir.wustl.edu>

## Faculty

**Richard L. Wahl, MD** (<https://wuphysicians.wustl.edu/patients/find-a-physician/richard-leo-wahl/>)

Department Chair

Visit our website for more information about our faculty (<https://www.mir.wustl.edu/patient-care/directory-of-physicians/>) and their appointments.

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### A

**Diane S Abou, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Montpellier II, 2003  
Master of Science, Faculté des sciences d'Orsay, 2005  
Doctor of Philosophy, Delft University of Technology, 2010

**Samuel I Achilefu, Ph.D.**

Voluntary Research Professor of Radiology  
Doctor of Philosophy, University of Nancy I, 1991

**Joseph J.H. Ackerman, Ph.D.**

Professor of Radiology (primary appointment)  
William Greenleaf Eliot Professor Emeritus of Chemistry  
Bachelor of Arts, Boston University, 1972  
Doctor of Philosophy, Colorado State University, 1977

**Tabassum Ahmad, M.D.**

Associate Professor of Radiology (primary appointment)  
Doctor of Medicine, Aga Khan University, 1996

**Maryellen Amato, M.D.**

Instructor in Clinical Radiology  
Bachelor of Arts, Notre Dame College, 1976  
Doctor of Medicine, Case Western Reserve University, 1981

**Maxwell Amurao, M.B.A., M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Radiation Oncology  
Master of Science, De la Salle University Manila, 2002  
Doctor of Philosophy, University of Texas San Antonio, 2008  
Master of Business Administration, University of Texas Austin, 2012  
Bachelor of Science, University of the Philippines, 2020

**Hongyu An, M.S., Ph.D.**

Professor of Radiology (primary appointment)  
Professor of Neurology  
Bachelor of Science, Fisher More College, 1993  
Master of Science, Washington University in St Louis, 1999  
Doctor of Philosophy, Washington University in St Louis, 2001

**Trevor John Andrews, Ph.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, University of Texas Austin, 1994  
Doctor of Philosophy, University of Texas Health Sciences at San Antonio, 2005

## B

### **Kyongtae T Bae, M.Eng., M.S., Ph.D., M.D.**

Adjunct Associate Professor of Radiology  
Bachelor of Science, Seoul National University, 1981  
Master of Engineering, University of Iowa, 1983  
Master of Science, University of Pennsylvania, 1985  
Doctor of Philosophy, University of Pennsylvania, 1988  
Doctor of Medicine, University of Chicago, 1992

### **Jonathan C Baker, M.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Saint Louis University, 2000  
Doctor of Medicine, Washington University in St Louis, 2004

### **Edwin J Baldelomar, Ph.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, University of Texas Arlington, 2011  
Doctor of Philosophy, University of Hawaii Manoa, 2019

### **Dennis M Balfe, M.D.**

Professor Emeritus of Radiology  
Bachelor of Science, Santa Clara University, 1968  
Doctor of Medicine, Medical College of Wisconsin, 1975

### **David Hilton Ballard, M.S., M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, McNeese State University, 2008  
Master of Science, McNeese State University, 2011  
Doctor of Medicine, Louisiana State University Health Sciences,  
2015

### **Krystle G. Barhaghi, M.D.**

Assistant Professor of Radiology (primary appointment)  
Doctor of Medicine, Tulane University, 2014

### **Chadwick Dale Barrs, M.D.**

Instructor in Radiology (primary appointment)  
null, University of South Carolina Columbia, 2011  
null, Medical University of South Carolina, 2016

### **Adam Quentin Bauer, M.S., Ph.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Truman State University, 2001  
Master of Science, Washington University in St Louis, 2005  
Doctor of Philosophy, Washington University in St Louis, 2009

### **Michael Beal, M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Medicine  
Doctor of Medicine, Saint Louis University, 2014

### **Debbie Lee Bennett, M.D.**

Associate Professor of Radiology (primary appointment)  
Section Chief - Breast Imaging  
Bachelor of Science, Princeton University, 2003  
Doctor of Medicine, Harvard University, 2008

### **Kevin Michael Bennett, Ph.D.**

Associate Professor of Radiology (primary appointment)

Bachelor of Science, Milwaukee School of Engineer, 1998  
Doctor of Philosophy, Medical College of Wisconsin, 2003

### **Tammie Lee Smith Benzinger, Ph.D., M.D.**

Professor of Radiology (primary appointment)  
Professor of Neurological Surgery  
Bachelor of Arts, Williams College, 1993  
Doctor of Philosophy, University of Chicago, 1998  
Doctor of Medicine, University of Chicago, 2000

### **Mikhail Y Berezin, M.S., Ph.D.**

Associate Professor of Radiology (primary appointment)  
Master of Science, Moscow Institute of Oil & Gas, 1987  
Doctor of Philosophy, Moscow Institute of Oil & Gas, 1991

### **Sagine Audra Berry-Tony, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Stony Brook University, 2008  
Doctor of Medicine, George Washington University, 2013

### **Sanjeev Bhalla, M.D.**

Professor of Radiology (primary appointment)  
Section Chief - Cardiothoracic  
Professor of Medicine  
Bachelor of Science, Yale University, 1990  
Doctor of Medicine, Columbia College of Physicians and  
Surgeons, 1994

### **Andrew J Bierhals, M.P.H., M.D.**

Professor of Radiology (primary appointment)  
Professor of Pediatrics  
Professor of Medicine  
Bachelor of Science, University of Pittsburgh, 1993  
Master of Public Health, University of Pittsburgh, 1996  
Doctor of Medicine, University of Pittsburgh, 2000

### **Joelle Biernacki, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 1988  
Doctor of Medicine, University of Missouri Kansas City, 1989

### **Janine Diane Bijsterbosch, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Maastricht University, 2006  
Master of Science, University of Sheffield, 2007  
Doctor of Philosophy, University of Sheffield, 2011

### **Mitra Bill Boodram, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, McMaster University, 1983  
Doctor of Medicine, CHICAGO MEDICAL SCHOOL, 1989

### **Jennie Esther Brodsky, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, New York University, 2003  
Doctor of Medicine, New York University School of Medicine,  
2007

### **Arianna Cloe Buckley, M.D.**

Assistant Professor of Radiology (primary appointment)



Bachelor of Science, Southern Methodist University, 2011  
Doctor of Medicine, Southern Illinois University, 2015

**Scott Michael Bugenhagen, Ph.D., M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Milwaukee School of Engineer, 2007  
Doctor of Philosophy, Medical College of Wisconsin, 2014  
Doctor of Medicine, Medical College of Wisconsin, 2016

**C**

**Daniel Charles Castro, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Washington, 2011  
Master of Science, University of Michigan Ann Arbor, 2013  
Doctor of Philosophy, University of Michigan Ann Arbor, 2016

**Karen A Caudill, M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Pediatrics  
Bachelor of Science, University of Missouri Kansas City, 1996  
Doctor of Medicine, University of Missouri Kansas City, 1996

**Ganesh B Chand, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Tribhuvan University, 2003  
Master of Science, Tribhuvan University, 2007  
Doctor of Philosophy, Georgia State University, 2015

**Aisling M. Chaney, Ph.D., MSBI**

Assistant Professor of Radiology (Pending Executive Faculty  
Approval) (primary appointment)  
null, Imperial College, 2012  
null, University of Manchester, null

**Arindam Rano Chatterjee, M.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Columbia University, 2000  
Doctor of Medicine, University of Tennessee at Memphis, 2006

**Sadaf Summer Chaudhry, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, Boston University, 2003  
Doctor of Medicine, Boston University, 2007

**Wenhua Chu, M.S., Ph.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, Ocean University of China (#####), 1982  
Master of Science, Academia Sinica China, 1985  
Doctor of Philosophy, Academia Sinica China, 1988

**Marc F. Clemente, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, University of California Davis, 1993  
Doctor of Medicine, Saint Louis University, 1997

**Paul Kevin Commean**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Physical Therapy  
Bachelor of Science, Georgia Tech, 1982

**Thomas E Conturo, Ph.D., M.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Arts, University of Pennsylvania, 1981  
Doctor of Philosophy, Vanderbilt University, 1989  
Doctor of Medicine, Vanderbilt University, 1989

**Constance Stone Courtois, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Wofford College, 1980  
Doctor of Medicine, Medical University of South Carolina, 1985

**Joseph P Culver, Ph.D.**

Professor of Radiology (primary appointment)  
Professor of Physics (Courtesy)  
Professor of Electrical and Systems Engineering  
Sherwood Moore Professor of Radiology  
Bachelor of Arts, Whitman College, 1985  
Bachelor of Science, University of Washington, 1988  
Doctor of Philosophy, University of Pennsylvania, 1997

**Douglas J Curry, M.D.**

Instructor in Clinical Radiology  
Doctor of Medicine, University of Texas Southwest, 1997

**George Matthew Cyriac, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Missouri Columbia, 2010  
Doctor of Medicine, University of Missouri Kansas City, 2015

**D**

**Michael D Darcy, M.D.**

Professor of Radiology (primary appointment)  
Associate Professor of Surgery (General Surgery)  
Bachelor of Science, Ohio State University, 1976  
Doctor of Medicine, Ohio State University, 1979

**Gene Layton Davis, M.B.A., M.D.**

Assistant Professor of Clinical Radiology  
Bachelor of Arts, University of Virginia, 1968  
Doctor of Medicine, University of Virginia, 1972  
Master of Business Administration, Webster University, 1991

**Farrokh Dehdashti, M.D.**

Professor of Radiology (primary appointment)  
Senior Vice Chair - Division of Nuclear Medicine  
Barry A and Marilyn J Siegel Professor of Radiology  
Doctor of Medicine, Pahlavi University, 1977

**Christina Doherty, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Truman State University, 1997  
Doctor of Medicine, Southern Illinois University, 2001

**Steven Don, M.D.**

Professor of Radiology (primary appointment)  
Professor of Pediatrics  
Bachelor of Arts, Johns Hopkins University, 1981  
Doctor of Medicine, Vanderbilt University, 1985

**James R Duncan, Ph.D., M.D.**

Professor of Radiology (primary appointment)  
Section Chief - Interventional  
Bachelor of Science, Davenport University, 1982  
Doctor of Philosophy, Washington University in St Louis, 1988  
Doctor of Medicine, Washington University in St Louis, 1988

**E**

**Adam Thomas Eggebrecht, M.S., Ph.D.**

Associate Professor of Radiology (primary appointment)  
Master of Science, Washington University in St Louis, 2005  
Doctor of Philosophy, Washington University in St Louis, 2009

**Cihat Eldeniz, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Bogazici University, 2006  
Master of Science, Duke University, 2008  
Doctor of Philosophy, University of North Carolina, 2014

**Allen Devaney Elster, M.B.A., M.S., M.D.**

Professor of Radiology (primary appointment)  
Master of Science, Oxford University, 1978  
Doctor of Medicine, Baylor University, 1980  
Master of Business Administration, Wake Forest University, 1999

**Ronald G Evens, M.D.**

Professor Emeritus of Radiology  
Bachelor of Arts, Washington University in St Louis, 1961  
Doctor of Medicine, Washington University in St Louis, 1964

**F**

**Keith C Fischer, M.D.**

Emeritus Associate Professor of Radiology  
Bachelor of Arts, Oberlin College, 1967  
Doctor of Medicine, Johns Hopkins University Medical (Duplicate of Johns Hopkins University), 1971

**Tyler Jacob Fraum, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Chicago, 2008  
Doctor of Medicine, Duke University, 2012

**Nelly Friedrichsen, M.S., Ph.D.**

Instructor in Radiology (primary appointment)  
Martinique, 2002  
Master of Science, University of Paris, 2008  
Doctor of Philosophy, University of Paris, 2012

**G**

**Joel Richard Garbow, Ph.D.**

Professor of Radiology (primary appointment)  
Bachelor of Science, University of Illinois, 1978  
Doctor of Philosophy, University of California Berkeley, 1983

**Heather Vallhonrat Garrett, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Arts, University of Virginia, 1996

Doctor of Medicine, Washington University in St Louis, 2002

**Charles F Garvin, M.D.**

Instructor in Clinical Radiology  
Bachelor of Arts, University of Missouri Columbia, 1980  
Doctor of Medicine, University of Missouri Columbia, 1982

**Aimilia Gastouniotti, Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Doctor of Philosophy, National Technical University of Athens, 2014

**Joseph Giardina, M.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Surgery (General Surgery)  
Bachelor of Arts, Williams College, 2004  
Doctor of Medicine, New York Medical College, 2010

**David S Gierada, M.D.**

Professor of Radiology (primary appointment)  
Bachelor of Science, Davenport University, 1983  
Doctor of Medicine, Wayne State University, 1988

**Matthew F. Glasser, Ph.D., M.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, Emory University, 2006  
Doctor of Philosophy, Washington University in St Louis, 2017  
Doctor of Medicine, Washington University in St Louis, 2017

**Harvey S Glazer, M.D.**

Professor of Radiology (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1971  
Doctor of Medicine, Washington University in St Louis, 1976

**Brian A Gordon, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Psychological & Brain Sciences  
Adjunct Lecturer  
Champaign, 2003  
Master of Science, University of Illinois, 2006  
Champaign, 2010

**Evan Moss Gordon, Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Duke University, 2004  
Doctor of Philosophy, Georgetown University, 2012

**Jennifer E Gould, M.D.**

Professor of Radiology (primary appointment)  
Bachelor of Arts, Cornell University, 1993  
Doctor of Medicine, Washington University in St Louis, 1997

**Manu Shri Goyal, M.S., M.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Neurology  
Associate Professor of Neuroscience  
Bachelor of Science, University of Illinois Chicago, 2000  
Master of Science, Oxford University, 2001  
Doctor of Medicine, University of Chicago, 2005

**Perry W Grigsby, M.B.A., M.S., M.D.**

Instructor in Radiology (Pending Dean's Approval) (primary appointment)  
Bachelor of Science, University of Kentucky, 1974  
Master of Science, University of Kentucky, 1978  
Doctor of Medicine, University of Kentucky, 1982  
Master of Business Administration, Washington University in St Louis, 1990

**Robert John Gropler, M.D.**

Professor of Radiology (primary appointment)  
Associate Professor of Biomedical Engineering  
Associate Professor of Medicine  
Senior Vice Chair - Division of Radiological Sciences, Research Laboratories  
Bachelor of Science, Allegheny College, 1977  
Doctor of Medicine, University of Cincinnati, 1981

**Carlos J Guevara, M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Surgery (General Surgery)  
Bachelor of Science, University South Carolina, 2002  
Doctor of Medicine, Duke University, 2006

**Punita Gupta, M.P.H., M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1995  
Master of Public Health, Saint Louis University, 1996  
Doctor of Medicine, University of Illinois, 2000

**Fernando R Gutierrez, M.D.**

Professor of Radiology (primary appointment)  
Professor of Medicine  
Doctor of Medicine, University of Valladolid, 1974

**Jordan M Gutovich, M.D.**

Instructor in Clinical Radiology  
Doctor of Medicine, Drexel University, 2013

**Gloria J. Guzman Perez-Carrillo, M.P.H., M.S., M.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Arts, Johns Hopkins University, 1999  
Doctor of Medicine, University of Puerto Rico, 2004  
Master of Science, University of Granada, 2011  
Master of Public Health, University of Arizona, 2019

**H**

**Paul Wayne Hargan, M.D.**

Instructor in Clinical Radiology  
Doctor of Medicine, Southern Illinois University, 1977

**Daniel Paul Harwood, M.D.**

Assistant Professor of Radiology (primary appointment)  
Doctor of Medicine, Creighton University, 2015

**Bruce L Hedgepeth, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, Arizona State University, 1986

Doctor of Medicine, University of Arizona, 1990

**Gyu Seong Heo, M.S., Ph.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, Sogang University, 2006  
Master of Science, Sogang University, 2008  
Doctor of Philosophy, Texas A&M University, 2016

**Thomas Eugene Herman, M.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Arts, Dartmouth College, 1971  
Doctor of Medicine, Johns Hopkins University Medical, 1975

**Albert E Hesker, M.D.**

Assistant Professor of Clinical Radiology  
Bachelor of Arts, University of Missouri Columbia, 1961  
Doctor of Medicine, University of Missouri Columbia, 1964

**Charles F Hildebolt, M.A., D.Dent., Ph.D.**

Professor Emeritus of Radiology  
Main Campus, 1966  
Main Campus, 1970  
Master of Arts, Washington University in St Louis, 1985  
Doctor of Philosophy, Washington University in St Louis, 1987

**Mark Jeffrey Hoegger, Ph.D., M.D.**

Assistant Professor of Radiology (primary appointment)  
Madison, 2007  
Doctor of Philosophy, University of Iowa, 2015  
Doctor of Medicine, University of Iowa, 2015

**Sumner Holtz, M.D.**

Associate Professor of Clinical Radiology  
Doctor of Medicine, Saint Louis University, 1948

**Rebecca L Hulett, M.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Pediatrics  
Baccalaureatus, Mount Holyoke College, 1977  
Doctor of Medicine, University of Michigan Ann Arbor, 1981

**Resten Imaoka, M.D.**

Instructor in Radiology (primary appointment)  
null, University of California Davis, 2008  
null, Saint George's University, 2013

**Joseph Edward Ippolito, Ph.D., M.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Biochemistry and Molecular Biophysics  
Bachelor of Science, Cornell University, 1998  
Doctor of Philosophy, Washington University in St Louis, 2007  
Doctor of Medicine, Washington University in St Louis, 2007

**Malak Itani, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, American University of Beirut, 2003  
Doctor of Medicine, American University of Beirut, 2007

## J

### **Amin Haghghat Jahromi, M.D.**

Assistant Professor of Radiology (primary appointment)  
Doctor of Medicine, Tehran University of Medical Sciences, 2007

### **William P James, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1989  
Doctor of Medicine, University of Missouri Columbia, 1993

### **Cylen Javidan, M.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Pediatrics  
Associate Professor of Medicine  
Doctor of Medicine, Iran Univ of Medical Sciences, 1994

### **Jack W Jennings, M.S., Ph.D., M.D.**

Professor of Radiology (primary appointment)  
Professor of Orthopedic Surgery  
Section Chief - Musculoskeletal  
Bachelor of Science, Wheaton College, 1992  
Master of Science, Ohio State University, 1995  
Doctor of Philosophy, University of South Florida, 1999  
Doctor of Medicine, University of South Florida, 2002

### **Hao Jiang, M.S., Ph.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, Gandhi Memorial Science College (G.G.M.  
Science College), 2006  
Master of Science, Murray State University, 2009  
Doctor of Philosophy, Virginia Tech, 2014

### **R. Gilbert Jost, M.D.**

Professor Emeritus of Radiology  
Bachelor of Arts, Harvard University, 1964  
Doctor of Medicine, Yale University, 1969

### **James A Junker, M.D.**

Instructor in Clinical Radiology  
Bachelor of Arts, Saint Louis University, 1975  
Doctor of Medicine, Saint Louis University, 1979

## K

### **John Peter Karageorgiou, M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Surgery (General Surgery)  
Bachelor of Science, Vanderbilt University, 2007  
Doctor of Medicine, Vanderbilt University, 2011

### **Pavan Kumar Kavali, M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Surgery (General Surgery)  
Bachelor of Science, Georgia Tech, 2003  
Doctor of Medicine, Morehouse School of Medicine, 2010

### **Jason A Kayser, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Missouri Kansas City, 1995

Doctor of Medicine, University of Missouri Columbia, 2002

### **James E. Kelly, M.A., M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Notre Dame, 1999  
Master of Arts, Washington University in St Louis, 2005  
Doctor of Medicine, Washington University in St Louis, 2005

### **Geetika Khanna**

Adjunct Professor of Radiology

### **Seung Kwon Kim, M.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Surgery (General Surgery)  
Doctor of Medicine, Kyung Hee University, 1995

### **Stacy Juyeh Kim, M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Medicine  
Bachelor of Arts, University of Illinois Chicago, 2009  
Doctor of Medicine, University of Illinois Chicago, 2013

### **Bridget Lynn Kistner, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, Saint Louis University, 2011  
Doctor of Medicine, Southern Illinois University, 2015

### **Lawrence M Kotner, M.D.**

Associate Professor Emeritus of Radiology  
Bachelor of Arts, Washington University in St Louis, 1965  
Doctor of Medicine, Washington University in St Louis, 1968

## L

### **Richard Laforest, M.S., Ph.D.**

Professor of Radiology (primary appointment)  
Bachelor of Arts, University of Laval, 1989  
Master of Science, University of Laval, 1991  
Doctor of Philosophy, University of Laval, 1994

### **Daniel Joseph Leary, M.D.**

Assistant Professor of Clinical Radiology  
Bachelor of Science, Saint Louis University, 1962  
Doctor of Medicine, Washington University in St Louis, 1966

### **John Joowon Lee, Ph.D., M.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, Brown University, 1990  
Champaign, 1998  
Doctor of Medicine, University of Illinois, 2002

### **Michelle Lee, M.D.**

Instructor in Radiology (primary appointment)  
null, University of Wisconsin Madison, 1993  
null, Northwestern University Medical, 2001

### **David Alan Leitman, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, Lindenwood University, 2006  
Doctor of Medicine, A T Still University of Health Sciences, 2010

**Paula M Leiva, M.D.**

Assistant Professor of Radiology (primary appointment)  
Doctor of Medicine, Univ Nacional de Cuyo, 2000

**Tsen Hsuan Lin, Ph.D.**

Instructor in Radiology (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2013  
Bachelor of Science, Tamkang University, 2015

**Yongjian Liu, M.S., Ph.D.**

Professor of Radiology (primary appointment)  
Bachelor of Science, Henan Normal University, 1997  
Master of Science, Zhejiang Medical University, 2000  
Doctor of Philosophy, University of Missouri Columbia, 2007

**Daniel Ryder Ludwig, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Brown University, 2009  
Doctor of Medicine, University of Pittsburgh, 2014

**Jose Marcio Luna, M.S., Ph.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, Universidad Distrital Francisco José de  
Caldas, 2004  
Main Campus, 2009  
Main Campus, 2014

**M**

**Carlos Andres Mahia, M.D.**

Assistant Professor of Radiology (primary appointment)  
null, Universidad Nacional de Cuyo Mendoza, 2001

**Mariam Akbar Malik, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Minnesota Twin Cities, 2007  
Doctor of Medicine, Saint Louis University, 2013

**Christopher Devin Malone, M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Surgery  
Bachelor of Science, Bucknell University, 2005  
Doctor of Medicine, Tulane University, 2011

**Naganathan B Mani, M.S., MBBS**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Surgery (General Surgery)  
Foreign MD equivalent, Tamilnadu Medical University, 1995  
Master of Science, PGIMER, 1999

**Jaimee Elizabeth Mannix, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, William Jewell College, 2011  
Doctor of Medicine, Creighton University, 2015

**Daniel Scott Marcus, Ph.D.**

Professor of Radiology (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1995  
Bachelor of Science, Washington University in St Louis, 1995  
Doctor of Philosophy, Washington University in St Louis, 2001

**Scott Allen Marek, Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, John Carroll University, 2012  
Doctor of Philosophy, University of Pittsburgh, 2017

**Ben R Mayes, M.D.**

Assistant Professor of Clinical Radiology  
Bachelor of Arts, Vanderbilt University, 1962  
Doctor of Medicine, Washington University in St Louis, 1966

**Parisa Mazaheri, M.D.**

Assistant Professor of Radiology (primary appointment)  
Doctor of Medicine, Tehran University, 2012

**William H McAlister, M.D.**

Professor of Radiology (primary appointment)  
Professor of Pediatrics  
Bachelor of Science, Wayne State University, 1950  
Doctor of Medicine, Wayne State University, 1954

**Elizabeth G. McFarland, M.D.**

Associate Professor of Radiology (primary appointment)  
Doctor of Medicine, University of San Diego, 1987

**Nicole S McKay, M.S., Ph.D.**

Instructor in Radiology (primary appointment)  
Bachelor of Science, University of Auckland, 2010  
Master of Science, University of Auckland, 2013  
Doctor of Philosophy, University of Auckland, 2019

**Robert Carolin McKinstry, M.S., Ph.D., M.D.**

Professor of Radiology (primary appointment)  
Professor of Pediatrics  
Senior Vice Chair - Division of Diagnostic Imaging at MIR  
William R. Orthwein, Jr. and Laura Rand Orthwein Chair in  
Radiology and Pediatrics  
Bachelor of Science, Boston University, 1984  
Master of Science, Massachusetts Institute of Technology, 1986  
Doctor of Philosophy, Massachusetts Institute of Technology,  
1991  
Doctor of Medicine, Harvard University, 1992

**Vincent Michael Mellnick, M.D.**

Professor of Radiology (primary appointment)  
Section Chief - Abdominal  
Bachelor of Science, University of Notre Dame, 2002  
Doctor of Medicine, University of Texas Houston, 2006

**Christine Onsy Menias, M.D.**

Adjunct Professor of Radiology  
Bachelor of Science, Marquette University, 1990  
Doctor of Medicine, George Washington University, 1995

**Joyce Chipo Mhlanga, M.D.**

Associate Professor of Radiology (primary appointment)  
Doctor of Medicine, University of Liverpool, 2000

**Ali Yusuf Mian, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Colby College, 1999

Doctor of Medicine, Virginia Commonwealth University, 2008

**William D Middleton, M.D.**

Professor of Radiology (primary appointment)  
Bachelor of Science, Duke University, 1977  
Doctor of Medicine, Duke University, 1981

**Mikhail V Milchenko, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Master of Science, Moscow State University, 1999  
Doctor of Philosophy, Louisiana Technical University, 2005

**Michelle M Miller-Thomas, M.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, California Institute of Technology, 1998  
Doctor of Medicine, Saint Louis University, 2002

**Aaron Joseph Mintz, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Stanford University, 2005  
Doctor of Medicine, Washington University in St Louis, 2013

**Stephen M Moerlein, M.A., Pharm.D., Ph.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Biochemistry and Molecular Biophysics  
Bachelor of Science, University of Illinois at Chicago, 1976  
Master of Arts, Washington University in St Louis, 1979  
Doctor of Philosophy, Washington University in St Louis, 1982  
Doctor of Pharmacy, University of Florida, 2008

**Barbara S Monsees, M.D.**

Professor Emeritus of Radiology  
Bachelor of Arts, Brandeis University, 1971  
Doctor of Medicine, Washington University in St Louis, 1975

**Stephen M Moore, M.E.E.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Washington University in St Louis, 1981  
Master of Electrical Engineering, Washington University in St  
Louis, 1984

**Christopher J Moran, M.D.**

Professor of Radiology (primary appointment)  
Professor of Neurological Surgery  
Bachelor of Science, University of Notre Dame, 1970  
Doctor of Medicine, Saint Louis University, 1974

**Carrie Christina Morrison, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, University of Missouri Columbia, 1982  
Doctor of Medicine, University of Iowa, 1991

**N**

**Kelby Brett Napier, Ph.D., M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Eastern Kentucky University, 2001  
Doctor of Philosophy, University of Louisville, 2006  
Doctor of Medicine, University of Louisville, 2008

**Vamsi R. Narra, M.D.**

Professor of Radiology (primary appointment)  
Senior Vice Chair for Clinical Imaging Informatics and New  
Clinical Business Development  
Doctor of Medicine, Osmania Medical College, 1990

**Michael Lee Nickels, Ph.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Northern Kentucky University, 2001  
Doctor of Philosophy, University of Illinois at Urbana-  
Champaign, 2007

**John Hart Niemeyer, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, Davenport University, 1978  
Doctor of Medicine, Washington University in St Louis, 1982

**Benjamin Edward Northrup, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Arts, Truman State University (Formerly Northeast  
Missouri State University), 2004  
Doctor of Medicine, Dartmouth College, 2009

**O**

**Lisa M Oakley, M.D.**

Assistant Professor of Radiology (Pending Executive Faculty  
Approval) (primary appointment)  
Bachelor of Science, Stanford University, 1988  
Doctor of Medicine, Duke University, 1992

**Gary H Omell, M.D.**

Assistant Professor of Clinical Radiology  
Doctor of Medicine, University of Tennessee, 1967

**P**

**Ashwin Singh Parihar, M.D., MBBS**

Instructor in Radiology (primary appointment)  
Foreign MD equivalent, Uttarakhand Technical University, 2014  
Doctor of Medicine, PGIMER, 2019

**Smita Parikh, M.D.**

Instructor in Clinical Radiology  
Doctor of Medicine, BJ Medical College, 1970

**Matthew S Parsons, M.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Arts, Miami University, 1995  
Doctor of Medicine, University of Cincinnati, 2000

**Michael W Penney, M.D.**

Associate Professor of Radiology (primary appointment)  
Section Chief - Community  
Bachelor of Science, University of Arkansas, 1992  
Doctor of Medicine, University of Arkansas Little Rock, 1996

**Daniel D Picus, M.D.**

Professor of Radiology (primary appointment)  
Professor of Surgery (General Surgery)  
Senior Vice Chair - Special Projects  
Bachelor of Science, University of Illinois, 1977

Doctor of Medicine, University of Chicago, 1981

**Maria Rosana Ponisio, M.D.**

Associate Professor of Radiology (primary appointment)  
Doctor of Medicine, La Plata University, 1990

**Vikas Prasad, MBBS**

Associate Professor of Radiology (primary appointment)  
null, Gandhi Memorial Science College (G.G.M. Science  
College), 2001

**Hilton I Price, M.D.**

Instructor in Clinical Radiology  
Doctor of Medicine, University of the Witwatersrand, 1972

**Linda Ruth Proctor, M.D.**

Voluntary Clinical Instructor in Radiology  
Bachelor of Science, University of Pennsylvania, 1985  
Doctor of Medicine, University of Pennsylvania, 1989

**Q**

**James D Quirk, M.A., Ph.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Massachusetts Institute of Technology,  
1994  
Master of Arts, Washington University in St Louis, 1998  
Doctor of Philosophy, Washington University in St Louis, 2001

**R**

**Edward Floyd Ragsdale, M.D.**

Instructor in Clinical Radiology  
Bachelor of Arts, University of Arkansas (Duplicate of University  
of Arkansas Main Campus), 1960  
Doctor of Medicine, Washington University in St Louis, 1964

**Marcus E Raichle, M.D.**

Professor of Radiology (primary appointment)  
Professor of Psychological & Brain Sciences  
Professor of Biomedical Engineering  
Professor of Neuroscience  
Professor of Neurology  
Alan A and Edith L Wolff Distinguished Professor of Medicine  
Bachelor of Science, University of Washington, 1960  
Doctor of Medicine, University of Washington, 1964

**Cyrus A Raji, Ph.D., M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Neurology  
Bachelor of Arts, University of Pittsburgh, 2004  
Bachelor of Science, University of Pittsburgh, 2004  
Doctor of Philosophy, University of Pittsburgh, 2009  
Doctor of Medicine, University of Pittsburgh, 2010

**Mohamed Zakariya Rajput, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Augustana College Rock Island, 2009  
Doctor of Medicine, Loyola University Chicago, 2013

**Constantine A Raptis, M.D.**

Professor of Radiology (primary appointment)

Associate Professor of Medicine  
Bachelor of Science, University of Chicago, 1999  
Doctor of Medicine, University of Pennsylvania, 2004

**Demetrios Andreas Raptis, M.D.**

Associate Professor of Radiology (primary appointment)  
Associate Professor of Pediatrics  
Associate Professor of Medicine  
Bachelor of Science, University of Chicago, 2005  
Doctor of Medicine, Case Western Reserve University, 2011

**David E Reichert, Ph.D.**

Voluntary Research Associate Professor of Radiology  
Bachelor of Science, Roanoke College, 1986  
Champaign, 1994

**Martin Nicholas Reis, M.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Princeton University, 1994  
Doctor of Medicine, Columbia University, 2000

**Patricia Manuela Ribeiro Pereira, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Universidade de Aveiro, 2010  
Master of Science, Universidade de Aveiro, 2012  
Doctor of Philosophy, Universidade de Aveiro, 2016

**Nassir Rostambeigi, M.S., M.D.**

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Surgery (General Surgery)  
Doctor of Medicine, Tehran University, 2005  
Master of Science, Monash University, 2008

**Toni Roth, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, Lehigh University, 1983  
Doctor of Medicine, Hahnemann University, 1987

**Henry D Royal, M.D.**

Professor of Radiology (primary appointment)  
Bachelor of Science, Providence College, 1970  
Doctor of Medicine, Saint Louis University, 1974

**S**

**Steven Sauk, M.S., M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Yale University, 2004  
Master of Science, Yale University, 2004  
Doctor of Medicine, University of California Los Angeles, 2008

**Floyd E Scales, M.D.**

Instructor in Clinical Radiology  
Bachelor of Science, University of Texas Austin, 1974  
Doctor of Medicine, University of Texas Southwest, 1979

**Robert F Scheible, M.D.**

Assistant Professor of Clinical Radiology  
Bachelor of Arts, Johns Hopkins University, 1968

Doctor of Medicine, Washington University in St Louis, 1972

**Thomas Hellmut Schindler, Ph.D., M.D.**

Professor of Radiology (primary appointment)

Professor of Medicine

Doctor of Medicine, University of Leipzig, 1995

Doctor of Philosophy, University of Geneva, 2009

**Sally J Schwarz, M.S.**

Professor of Radiology (primary appointment)

Bachelor of Science, University of Iowa, 1971

Master of Science, University of Southern California, 1976

**Janice Semenkovich, M.D.**

Associate Professor of Radiology (primary appointment)

Bachelor of Science, Yale University, 1977

Doctor of Medicine, Washington University in St Louis, 1981

**Ikbal Sencan Egilmez, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)

null, Fatih University, 2007

Master of Science, University of California Los Angeles, 2010

Doctor of Philosophy, University of California Los Angeles, 2013

**Gary D Shackelford, M.D.**

Professor Emeritus of Radiology

Bachelor of Arts, Northwestern University, 1964

Doctor of Medicine, Washington University in St Louis, 1968

**Vijay Sharma, M.S., Ph.D.**

Professor of Radiology (primary appointment)

Bachelor of Science, Panjab University, 1980

Master of Science, Panjab University, 1983

Doctor of Philosophy, Panjab University, 1987

**Anup Shashindra Shetty, M.D.**

Associate Professor of Radiology (primary appointment)

Bachelor of Arts, Duke University, 2003

Doctor of Medicine, University of Texas Southwest, 2007

**Joshua S Shimony, Ph.D., M.D.**

Professor of Radiology (primary appointment)

Israel Inst. of Tec, 1982

Doctor of Philosophy, University of Tennessee, 1988

Doctor of Medicine, University of Illinois, 1995

**Kooreh Isaac Shoghi, M.S., Ph.D.**

Professor of Radiology (primary appointment)

Bachelor of Science, University of California Los Angeles, 1996

Master of Science, University of California Los Angeles, 2000

Doctor of Philosophy, University of California Los Angeles, 2005

**Monica Shokeen, Ph.D.**

Associate Professor of Radiology (primary appointment)

Doctor of Philosophy, Washington University in St Louis, 2006

**Jeffrey L Shore, M.D.**

Voluntary Clinical Instructor in Radiology

Bachelor of Science, Saint Louis University, 1983

Doctor of Medicine, University of Missouri Columbia, 1987

**Ryan Gregory Short, M.D.**

Assistant Professor of Radiology (primary appointment)

Assistant Professor of Medicine

Bachelor of Science, Cedarville College, 2008

Doctor of Medicine, Ohio State University, 2013

**Hui Hua Shu, M.D.**

Assistant Professor of Radiology (primary appointment)

Bachelor of Arts, University of Missouri Kansas City, 1986

Doctor of Medicine, University of Missouri Kansas City, 1987

**Barry Alan Siegel, M.D.**

Professor of Radiology (primary appointment)

Professor of Medicine

Bachelor of Arts, Washington University in St Louis, 1966

Doctor of Medicine, Washington University in St Louis, 1969

**Cary Lynn Siegel, M.D.**

Professor of Radiology (primary appointment)

Bachelor of Science, Davenport University, 1983

Doctor of Medicine, Davenport University, 1987

**Marilyn J Siegel, M.D.**

Professor of Radiology (primary appointment)

Professor of Radiology in Pediatrics

Bachelor of Arts, Washington University in St Louis, 1965

Doctor of Medicine, State University of New York, 1969

**Jothilingam Sivapackiam, M.S., Ph.D.**

Instructor in Radiology (primary appointment)

Bachelor of Science, Madurai Kamaraj University, 1996

Master of Science, Madurai Kamaraj University, 1998

Doctor of Philosophy, Pondicherry University, 2004

**Celette Sugg Skinner, M.A., Ph.D.**

Adjunct Assistant Professor of Radiology

Bachelor of Arts, Furman University, 1980

Master of Arts, Wheaton College (Duplicate of Wheaton College Illinois), 1982

Doctor of Philosophy, University of North Carolina (Duplicate of University of North Carolina at Chapel Hill), 1991

**Alexander Skopec, M.D.**

Instructor in Radiology (primary appointment)

Bachelor of Science, University of Michigan Ann Arbor, 2009

Doctor of Medicine, Saint Louis University, 2015

**Emily Louise Smith, M.D.**

Assistant Professor Emeritus of Radiology

Bachelor of Arts, Washington University in St Louis, 1964

Doctor of Medicine, Washington University in St Louis, 1968

**Abraham Z Snyder, Ph.D., M.D.**

Professor of Radiology (primary appointment)

Associate Professor of Neurology

Bachelor of Arts, Columbia University, 1970

Doctor of Philosophy, Rockefeller University, 1977

Doctor of Medicine, State University of New York, 1981

**Steven Lee Solomon, M.D.**



Assistant Professor of Clinical Radiology  
Bachelor of Arts, Northwestern University, 1981  
Doctor of Medicine, University of Chicago, 1985

**Sheng-Kwei Song, M.S., Ph.D.**  
Professor of Radiology (primary appointment)  
Bachelor of Science, Tamkang University, 1981  
Master of Science, University of Alabama, 1986  
Doctor of Philosophy, Washington University in St Louis, 1990

**Aristeidis Sotiras, M.E.E., M.S., Ph.D.**  
Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Electrical and Systems Engineering  
Bachelor of Science, National Technical University of Athens,  
2006  
Master of Science, Ecole Polytechnique, 2007  
Doctor of Philosophy, Ecole Centrale Paris, 2011

**William Marshall Spees, Ph.D.**  
Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Truman State University, 1993  
Doctor of Philosophy, Washington University in St Louis, 1999

**Robert Peter Stachecki, M.D.**  
Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of Notre Dame, 2003  
Doctor of Medicine, Georgetown University, 2007

**James G Stewart, M.D.**  
Instructor in Clinical Radiology  
Bachelor of Science, University of Wisconsin, 1980  
Doctor of Medicine, Mayo Clinic, 1984

**Benjamin S Strnad, M.D.**  
Assistant Professor of Radiology (primary appointment)  
Bachelor of Arts, University of Texas Austin, 2010  
Doctor of Medicine, University of Texas Medical School Houston,  
2014

**Alexander L Sukstansky, M.S., D.Sc., Ph.D.**  
Associate Professor of Radiology (primary appointment)  
Master of Science, Kharkov State University, 1971  
Doctor of Philosophy, Donetsk State University, 1980  
Doctor of Science, Donetsk State University, 1991

**Noah Susman, M.D.**  
Professor Emeritus of Clinical Radiology  
Bachelor of Arts, Washington University in St Louis, 1948  
Doctor of Medicine, Washington University in St Louis, 1952

## T

**Yuan-Chuan Tai, M.E.E., Ph.D.**  
Associate Professor of Radiology (primary appointment)  
Associate Professor of Electrical and Systems Engineering  
Bachelor of Science, National Tsing Hua University, 1988  
Master of Electrical Engineering, University of Texas Arlington,  
1992  
Doctor of Philosophy, University of California Los Angeles, 1998

**Chandrakant Tailor, M.D.**  
Assistant Professor of Clinical Radiology  
Doctor of Medicine, Medical College of India, 1970

**Rui Tang, M.A., Ph.D.**  
Instructor in Radiology (primary appointment)  
Bachelor of Science, University of Science and Technology of  
China (#####), 2002  
Master of Arts, Washington University in St Louis, 2004  
Doctor of Philosophy, Washington University in St Louis, 2009

**Ting Y Tao, Ph.D., M.D.**  
Assistant Professor of Radiology (primary appointment)  
Section Chief - Pediatrics  
Bachelor of Science, Washington University in St Louis, 2000  
Doctor of Philosophy, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2008

**Sharlene A Teefey, M.D.**  
Professor of Radiology (primary appointment)  
Doctor of Medicine, University of Hawaii, 1980

**Daniel Lyndon Jaffe Thorek, Ph.D.**  
Associate Professor of Radiology (primary appointment)  
Bachelor of Science, University of Toronto, 2004  
Doctor of Philosophy, University of Pennsylvania, 2010

**Christopher O Thornton, M.B.A., M.D.**  
Instructor in Clinical Radiology  
Bachelor of Science, University of Missouri Kansas City, 1992  
Doctor of Medicine, University of Missouri Kansas City, 1994  
Master of Business Administration, Washington University in St  
Louis, 2019

**Malcolm Tobias, M.S., Ph.D.**  
Assistant Professor of Radiology (primary appointment)  
Master of Science, Washington University in St Louis, 1993  
Doctor of Philosophy, Washington University in St Louis, 1997

**Jerry Tobler, Ph.D., M.D.**  
Instructor in Clinical Radiology  
Bachelor of Science, Cornell University, 1973  
Doctor of Philosophy, California Institute Technology (Duplicate  
of California Institute of Technology), 1978  
Doctor of Medicine, Yale University, 1983

**Richard Tsai, M.D.**  
Assistant Professor of Radiology (Pending Executive Faculty  
Approval) (primary appointment)  
null, University of California San Diego, 2008  
null, Saint Louis University, 2012

**Zhude Tu, M.S., Ph.D.**  
Professor of Radiology (primary appointment)  
Bachelor of Science, Beijing Normal University (#####), 1988  
Master of Science, Beijing Normal University (#####), 1991  
Doctor of Philosophy, Beijing Normal University (#####), 1995

## U

### Alexander Ushinsky, M.D.

Assistant Professor of Radiology (primary appointment)  
Assistant Professor of Surgery (General Surgery)  
Bachelor of Science, University of California San Diego, 2010  
Doctor of Medicine, University of California San Diego, 2014

## V

### Theodore Louis Vander Velde, M.D.

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Calvin College, 1989  
Doctor of Medicine, Wayne State University, 1993

### Wenzel G Vas, M.D.

Instructor in Clinical Radiology  
Doctor of Medicine, St. John's Medical College, 1973

### Suresh Vedantham, M.D.

Professor of Radiology (primary appointment)  
Professor of Surgery (General Surgery)  
Bachelor of Arts, Northwestern University, 1988  
Doctor of Medicine, University of Chicago, 1992

### Andrei G Vlassenko, Ph.D., M.D.

Associate Professor of Radiology (primary appointment)  
Doctor of Medicine, Moscow Med Stomatology Inst, 1987  
Doctor of Philosophy, Institute of Neurology, 1991

### Katie Dieu Thu Vo, M.D.

Professor of Radiology (primary appointment)  
Section Chief - Neuroradiology  
Bachelor of Arts, Wellesley College, 1986  
Bachelor of Science, Massachusetts Institute of Technology, 1986  
Doctor of Medicine, Cornell University, 1991

### Cornelius Jan von Morze, Ph.D.

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, University of California Berkeley, 2001  
Doctor of Philosophy, University of California San Francisco, 2008

## W

### Richard L Wahl, M.D.

Professor of Radiology (primary appointment)  
Elizabeth E Mallinckrodt Professor of Radiology  
Director - The Edward Mallinckrodt Institute of Radiology  
Head of the Department of Radiology  
Professor of Radiation Oncology  
Bachelor of Arts, Wartburg College, 1974  
Doctor of Medicine, Washington University in St Louis, 1978

### Jerold W Wallis, M.S., M.D.

Associate Professor of Radiology (primary appointment)  
Associate Professor of Biomedical Engineering  
Bachelor of Science, Yale University, 1976  
Master of Science, Stanford University, 1981

Doctor of Medicine, Stanford University, 1981

### Liang Wang, M.D.

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Tianjin Medical University, 1994  
Doctor of Medicine, Tianjin Medical University, 1994

### Qing Wang, M.S., Ph.D.

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Changsha University of Science and Technology (#####), 1999  
Master of Science, Northeast Electrical University or Northeast Dianli University (#####), 2002  
Doctor of Philosophy, Washington University in St Louis, 2011

### Shuo Wang, Ph.D.

Assistant Professor of Radiology (primary appointment)  
Doctor of Philosophy, California Institute of Technology, 2014

### Wei Wang, M.S., Ph.D., M.D.

Assistant Professor of Radiology (primary appointment)  
Master of Science, University of Tennessee, 2002  
Doctor of Philosophy, Washington University in St Louis, 2006  
Doctor of Medicine, Peking Union Medical College, 2016

### Danielle Marie Weems, M.S., M.D.

Instructor in Radiology (primary appointment)  
Bachelor of Science, University of Mississippi, 1994  
Master of Science, Washington University in St Louis, 1996  
Doctor of Medicine, Washington University in St Louis, 2003

### Philip J Weyman, M.D.

Associate Professor of Clinical Radiology  
Bachelor of Arts, Yale University, 1968  
Doctor of Medicine, Yale University, 1972

### Muriah Dawn Wheelock, Ph.D.

Assistant Professor of Radiology (primary appointment)  
Bachelor of Arts, University of Alabama, 2010  
Doctor of Philosophy, University of Alabama, 2016

### Kimberly N Wiele, M.D.

Associate Professor of Radiology (primary appointment)  
Bachelor of Arts, University of Missouri Kansas City, 1981  
Doctor of Medicine, University of Missouri Kansas City, 1981

### Franz J Wippold, M.D.

Professor Emeritus of Radiology  
Bachelor of Arts, Westminster College, 1973  
Doctor of Medicine, Saint Louis University, 1977

### Dean Foster Wong, Ph.D., M.D.

Professor of Radiology (primary appointment)  
Professor of Neuroscience  
Professor of Psychiatry  
Professor of Neurology  
Bachelor of Science, University of Western Ontario, 1972  
Doctor of Medicine, University of Toronto, 1977  
Doctor of Philosophy, John Hopkins University, 1990

**Jonathan Rodger Wood, M.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Northwestern University, 2004  
Doctor of Medicine, University of Rochester, 2009

**Pamela K Woodard, M.D.**

Professor of Radiology (primary appointment)  
Professor of Biomedical Engineering  
Professor of Pediatrics  
Senior Vice Chair - Division of Radiological Sciences, Research  
Facilities  
Professor of Medicine  
Hugh Monroe Wilson Professor of Radiology  
Bachelor of Arts, Duke University, 1986  
Doctor of Medicine, Duke University, 1990

**X**

**Jinbin Xu, M.Eng., Ph.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Taiyuan University of Technology, 1991  
Master of Engineering, Taiyuan University of Technology, 1994  
Doctor of Philosophy, Taiyuan University of Technology, 1998

**Y**

**Dmitriy A Yablonskiy, M.S., D.Sc., Ph.D.**

Professor of Radiology (primary appointment)  
Master of Science, Kharkov State University, 1970  
Doctor of Philosophy, Institute for Physics and Eng, 1973  
Doctor of Science, Institute for Physics and Eng, 1981

**Z**

**Hanwen Zhang, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Lanzhou University, 1993  
Master of Science, China Institute of Atomic Energy, 2000  
Doctor of Philosophy, University of Basel, 2005

**Zhongwei Zhang, Ph.D., M.D.**

Assistant Professor of Radiology (primary appointment)  
Doctor of Medicine, Rowan College at Burlington County, 2000  
Sen University, 2009

**Shiying Zhao, M.M.E., Ph.D.**

Adjunct Associate Professor of Radiology  
Bachelor of Arts, University of Science & Tech (Duplicate of  
University of Science and Technology Beijing (#####)), 1982  
Master of Mechanical Engineering, Shanghai Jiao Tong  
University (Duplicate of Shanghai Jiao Tong University (#####  
#)), 1984  
Doctor of Philosophy, University of South Carolina (Duplicate of  
University of South Carolina Columbia), 1991

**Jie Zheng, M.S., Ph.D.**

Associate Professor of Radiology (primary appointment)  
Bachelor of Science, Beijing University, 1986  
Master of Science, University of Cincinnati, 1992

Doctor of Philosophy, University of Cincinnati, 1994

**Dong Zhou, M.S., Ph.D.**

Assistant Professor of Radiology (primary appointment)  
Bachelor of Science, Sagar Institute of Pharmaceutical Sciences,  
1990  
Master of Science, Sagar Institute of Pharmaceutical Sciences,  
1995  
Doctor of Philosophy, Washington University in St Louis, 2004

## Research Electives

### Radiology Research Electives

During the fourth year, opportunities exist for many varieties of  
advanced clinical or research experiences.

Interested students should contact the appropriate individual in  
each division regarding the types of research projects available.

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**David Ballard, MD (<https://profiles.wustl.edu/en/persons/david-ballard/>)**

Abdominal Imaging Section, Mallinckrodt Institute Radiology  
Phone: 314-362-2928  
davidballard@wustl.edu

Dr. Ballard's lab is engaged in clinical and translation 3D printing  
research with 3D-printed models for procedural planning,  
medical devices, and medical devices/implants impregnated  
with bioactive compounds. He is also active in clinical research  
in a broad scope of abdominal malignancies and infectious  
processes. Dr. Ballard is willing to mentor trainees and students  
at all levels for research in clinical 3D printing, translational 3D  
printing, clinical radiology, and radiology education.

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**Tom Conturo, MD, PhD**

East Building, 2nd Floor, Rm 2120  
Phone: 314-362-8421

Magnetic resonance (MR) imaging is a noninvasive means of  
providing images of the human body at high spatial resolution  
and contrast sensitivity. The contrast can be manipulated to  
depend on different properties of tissue water, enabling the  
study of a variety of biological processes. In some cases,  
endogenous or exogenous paramagnetic MR contrast agents  
are used to alter the MRI contrast by perturbing the tissue water  
environment. Recently, new MRI hardware has also enabled  
techniques having high temporal resolution. Using the unique  
contrast properties of MRI and the higher spatial/temporal  
resolution, noninvasive techniques can be devised to study  
neuronal activity, tissue perfusion, water mobility (diffusion), and  
neuronal fiber pathways in the human brain. The goals of Dr.  
Conturo's research lab are to develop and apply MR imaging  
techniques for quantitative imaging of cerebral perfusion,  
brain function, water diffusion, and neuronal fiber pathways.  
These techniques utilize the MR signal effects of exogenous  
bolus-injected contrast agents, endogenous hemoglobin, and

microscopic water diffusion. Long-term goals are to apply these methodologies toward imaging and understanding tissue structure, function, and physiology in the brain and other organs in normal and abnormal conditions. The approaches that are used in this laboratory cover a broad range of areas, including MRI physics, MRI pulse sequence development, theoretical derivations, computer simulations, image-processing, computer graphics, custom contrast agent design and synthesis, phantom studies, animal models, human studies, clinical patient studies, and comparison with other imaging modalities.

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**Farrokh Dehdashti, MD**

Nuclear Medicine PET Facility, 10th Floor, Mallinckrodt Institute of Radiology  
Phone: 314-362-1474

Positron emission tomography (PET) is an imaging technique that produces images reflective of biochemical processes of normal and abnormal tissues. PET is complementary to anatomic imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI). The ability of PET to quantify fundamental processes, such as blood flow, oxygen metabolism, glucose metabolism, and receptor density, makes this technique very desirable to both investigators and clinicians. Dr. Dehdashti's research utilizes the conventional PET radiopharmaceutical, F-18 fluorodeoxyglucose (FDG), as well as a variety of unique PET radiopharmaceuticals such as Cu-64-diacetyl-bis(N4-methylthiosemicarbazone) (Cu-64 ATSM), a hypoxic imaging tracer, and 18F-labeled 3'-deoxy-3'-fluorothymidine (FLT), a proliferative imaging tracer. Below is a partial list of the research projects relating to PET: (1) PET assessment of progesterone receptors in patients with newly diagnosed breast cancer with a new progesterone-receptor imaging tracer, 21-[18F]Fluoro-16,17-[(R)-1'-furylmethylidene]dioxo-19-norpregn-4-ene-3,20 dione (FFNP); (2) assessment of cell proliferation with a new tracer, N-(4-(6,7-dimethoxy-3,4-dihydroisoquinolin-2(1H)-yl)butyl)-2-(2-[18F]-fluoroethoxy)-5-methylbenzamide ([18F]3c), also called [18F]ISO-1 by imaging sigma receptors in patients with various solid cancers; (3) PET assessment of tumor hypoxia using 64Cu-ATSM in patients with cervical cancer (the major goal of this project is to predict prognosis); (4) FDG-PET/CT study in cervical cancer to evaluate the change in tumor FDG heterogeneity and SUVmax during chemoradiation and whether these changes are predictive of response to therapy; (5) PET using [18F]FHBG (9-[4-fluoro-3-hydroxymethyl-butyl]guanine), analog of Penciclovir, an acycloguanosine derivative and antiviral drug, for possible tracking of GvHD in patients who were prior recipients of unrelated allogeneic bone marrow transplant for any hematologic malignancy; and (6) FLT-PET/CT to assess tumor cell proliferation in patient must have histologically or cytologically confirmed ER+ stage IV or metastatic invasive breast cancer.

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**Rob J. Gropler, MD**

East Building, Room 1307  
Phone: 314-747-3878

The focus of our lab is on cardiovascular imaging research. The research in the Cardiovascular Imaging Laboratory is designed to better understand the relationship between myocardial perfusion, intermediary metabolism and mechanical function in both normal and abnormal cardiac states. The research involves the integration of several imaging techniques with diverse strengths such as PET, MRI, CT and echocardiography. The success of the research requires several paths of investigation to be pursued in parallel. For example, in order to image the biologic processes of interest requires continued technical developments for each of the imaging methods listed above. There are ongoing efforts to permit more accurate PET measurements of myocardial substrate metabolism. They include the development of novel tracers of extracted substrates, the development of acquisition schemes to assess endogenous substrate metabolism, and the validation of mathematical approaches to correlate the tracer kinetics with the underlying metabolic processes. These studies are being pursued in small and large animal models and then in humans. Another example includes the current efforts to develop approaches to image the coronary arteries noninvasively by MRI using novel contrast agents and acquisition schemes. In addition, techniques are being developed to permit MR guided interventions on the coronary arteries. This undertaking includes the development of novel guide-wire tracking and catheter tracking schemes using both passive and active approaches. Finally, to permit assessments of myocardial oxygenation and thus, perfusion, techniques are being developed to permit BOLD imaging the myocardium. Another path of the research is to determine how this perfusional-metabolic-functional relation is altered by normal life changes and then determine how disease states alter the relationship. For example, both PET and echocardiography are being used to characterize the age- and gender-related changes on myocardial perfusion, substrate metabolism and function. To study the relationship in disease states, similar studies are being performed in patients with diabetes and obesity. A third path is to determine the mechanisms responsible for these changes in this metabolic-functional relation and identify potential interventions that may reverse or ameliorate them. In this regard, similar imaging studies are being performed to determine the importance of nitric oxide and the PPAR $\alpha$  system in defining this metabolic-functional relation.

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**Stephen M. Moerlein, PharmD, PhD**

East Building, 1st Floor  
Phone: 314-362-8466

Our research interests lie in the general area of labeled tracer development for nuclear medicine imaging, especially positron-emission tomography (PET). Developmental effort begins with synthesis of target structures, preclinical screening that involves *in vitro* biochemistry and pharmacological testing, and *ex vivo* biodistribution studies in small animals. Promising tracers are then examined by *in vivo* imaging of animal subjects and tracer kinetic modeling. The final step in the transition of a radiochemical into a labeled drug takes into account radiation dosimetry, pharmaceutical quality, and the development of automated production and GMP production processes to streamline delivery to human subjects. Each of these aspects of radiopharmaceutical development are investigated, with a primary emphasis in novel agents for evaluation of pathological processes in neurology and oncology.

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**Marc Raichle, MD**

East Building, 2nd Floor  
Phone: 314-362-6907

We use functional imaging techniques — both positron emission tomography and functional magnetic resonance imaging — to study the normal organization of the human brain and the effect of selected diseases. The research focuses on both the methodology (imaging and experimental) and specific questions in cognitive neuroscience.

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## Courses

For more information, contact Michelle Miller-Thomas, MD, Coordinator of Radiology Medical Student Education, at miller-thomasm@wustl.edu or 314-362-5949.

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Visit online course listings to view offerings for M90 Radiol (https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M90).

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### M90 Radiol 701 General Radiology Clerkship

This four-week introductory radiology elective allows students to rotate through one of the following radiology services: Emergency Radiology, Mammography, Pediatrics, Chest, Abdominal Imaging, Musculoskeletal, Neuroradiology, Interventional Radiology, and Nuclear Medicine. The primary course objective is to familiarize students with the scope of diagnostic and interventional radiology, including the consulting role that radiologists provide to primary care and specialty providers; the risks, benefits, and cost-effectiveness of radiologic examinations; the guidelines for ordering common studies; and specific disease entities and their radiologic appearance and workup. Students spend the majority of the day in the radiology reading rooms with residents, fellows, and faculty for interactive teaching based on daily clinical cases. Students will attend morning case-based conferences and noon didactic conferences with the residents. The students will have an observational role in conferences and in the clinical setting. Students have allocated lectures to watch as part of the didactic component of this course. On Thursday afternoons, students will convene with a radiology resident for an interactive Q&A session related

to the aforementioned didactic lectures. On Friday afternoons, students will present an interesting case from the week in PowerPoint format. Each of these PowerPoint presentations will be submitted at the end of the rotation week for grading. Reading lists, references, and textbooks will be provided. The first and final days of the elective are mandatory. Grades will be based on daily attendance, workshop participation, and submitted PowerPoint presentations. More than three days' absence will require exceptional work for honors. No honors will be awarded if a student is absent for more than five days of the rotation. Credit variable, maximum 77 units.

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### M90 Radiol 740 Radiation Oncology Clerkship

The four-week clerkship in Radiation Oncology will provide students with the opportunity to participate in the evaluation and management of a broad range of patients referred for consideration of radiation therapy. Clerkship activities will take place at the Barnes-Jewish Hospital/Siteman Cancer Center complex and at our satellite facilities. Students will conduct patient evaluations under the supervision of radiation oncology department residents and faculty. Students will attend many conferences throughout the weeks, with the work day starting between 7:00 a.m. and 7:30 a.m. Students will also have the opportunity to attend the appropriate multidisciplinary clinics, follow-up clinics and multidisciplinary conferences (e.g., pediatric neuro-oncology, cardiothoracic oncology, lymphoma, GYN tumor) pertaining to their rotation schedule. Instructional materials are available for students on the rotation. (Students are not expected to purchase any curricular materials for the clerkship.) Student performance will be evaluated by both resident and faculty members who supervise the student over the course of the clerkship. Credit 154 units.

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### M90 Radiol 801 General Radiology

This four-week introductory radiology elective -- with a hybrid, predominantly in-person format -- allows students to rotate through four of the following radiology services: Pediatrics, Abdominal Imaging, Musculoskeletal, Neuroradiology, Nuclear Medicine, Emergency Radiology, Mammography, Chest, and Interventional Radiology. Preferences should be emailed at least two weeks prior to the course start date to andrewdr@wustl.edu; these are reviewed on a first-come, first-served basis and cannot be guaranteed. The primary course objective is to familiarize students with the scope of diagnostic and interventional radiology, including the consulting role that radiologists provide to primary care and specialty providers; the risks, benefits, and cost-effectiveness of radiologic examinations; the guidelines for ordering common studies; and specific disease entities and their radiologic appearance and workup. Students spend the majority of the day in the radiology reading rooms with residents, fellows, and faculty for interactive teaching based on daily clinical cases. Students will attend morning case-based conferences and noon didactic conferences with the residents. The students will have an observational role in conferences and in the clinical setting. On Thursday afternoons, students will attend virtual or in-person conferences with a radiology resident for an interactive workshop on a scheduled topic in radiology. On the days prior to these workshops, students are expected to watch specified lectures from the course material available online (on WUSTL Box). Students will be evaluated on their preparedness for and participation in the afternoon workshops. On Friday afternoons, students will present an interesting case from the week in PowerPoint format. Four of these PowerPoint presentations will be submitted at the end of the rotation for grading. Reading

lists, references, and textbooks will be provided. The first day of the elective is mandatory. Grades will be based on daily attendance and interactions, workshop participation, and the PowerPoint presentations. More than three days' absence will require exceptional work for honors. No honors will be awarded if a student is absent for more than five days of the rotation.

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### **M90 Radiol 802 Advanced Radiology**

This course is available only to students who have completed the General Radiology Clerkship Selective (M90 701) or the General Radiology Elective (M90 801). This four-week sub-internship in radiology is intended for students who are interested in pursuing radiology as their intended career choice. Students may tailor their experience to focus on one or more services, if desired; this will be considered on a case-by-case basis by the course directors. This elective -- with a hybrid, predominantly in-person format -- allows students to rotate through one or more of the following radiology services: Pediatrics, Abdominal Imaging, Musculoskeletal, Neuroradiology, Nuclear Medicine, Emergency Radiology, Mammography, Chest, and Interventional Radiology. Preferences should be emailed at least two weeks prior to the course start date to [andrewdr@wustl.edu](mailto:andrewdr@wustl.edu); these are reviewed on a first-come, first-served basis and cannot be guaranteed. The objective of this course is for students to have a more hands-on role in the reading room; they will help to investigate the patient's clinical history and the indications for the examination, preview the imaging studies, and communicate with referring teams and providers. Students spend the majority of the day in the radiology reading rooms with residents, fellows, and faculty for interactive teaching based on daily clinical cases. Students will attend morning case-based conferences and noon didactic conferences with the residents. The students will have an observational role in conferences and in the clinical setting. On Thursday afternoons, students will have the option to attend virtual or in-person conferences with a radiology resident for an interactive workshop on a scheduled topic in radiology. On Friday afternoons, students will present an interesting case from the week in PowerPoint format. Four of these PowerPoint presentations will be submitted at the end of the rotation for grading. Reading lists, references, and textbooks will be provided. The first day of the elective is mandatory. Grades will be based on daily attendance and interactions as well as the PowerPoint presentations. More than three days' absence will require exceptional work for honors. No honors will be awarded if a student is absent for more than five days of the rotation.

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### **M90 Radiol 820 Clinical Nuclear Medicine**

The clinical service in Nuclear Medicine (NM) is divided into five sections: outpatient general NM, inpatient general NM, Positron Emission Tomography (PET), Pediatric NM studies, NM Cardiac studies, and radionuclide therapy. The recommended schedule will be to spend weeks 1 and 3 in the Center for Advanced Medicine/BJH North Campus (second floor), where the emphasis will be on outpatient general and pediatric Nuclear Medicine with some time spent in the PET reading room. Week 2 will be in South Campus (West Pavilion 9th floor) and split between inpatient general nuclear medicine, outside PET facilities (morning), cardiac NM services (afternoon), and radionuclide therapy. The schedule for Week 4 will be Monday to Wednesday Center for Advanced Medicine/BJH North Campus and Thursday to Friday in South Campus. This rotation's primary objective is to provide exposure to the full range of clinical nuclear medicine studies. Under the direct supervision of the NM attendings, the student via ZOOM will participate in the planning and interpreting of imaging studies for patients referred to the Division. An opportunity also exists

to explore instrumentation techniques, including dedicated computer applications utilized to interpret NM studies. In addition to the clinical experience, the student will attend the NM daily morning conference, held via ZOOM, from 8-9:00 a.m. Also, the student will be excused to attend via ZOOM the daily diagnostic radiology resident noon conference from 12-1:00 p.m. The student will also be able to attend any conferences within the Department of Radiology and case management conferences where NM studies are discussed. The student has to participate by preparing a case for the Friday follow-up conference under an NM faculty member's supervision during the last week of their rotation. The student can find the PowerPoint template to use and examples of prior follow-up cases using the below link; <M:\Services\Nuclear Medicine\Nuclear Medicine Follow-Up Conferences> Students may keep a log of interesting cases to use as a guide for additional reading or discussions with the Course Director or other NM attendings. Educational material including textbooks and digital teaching file cases are available at the following url: <http://gamma.wustl.edu/index2.html> The first and final days of the elective are mandatory. No honors will be awarded if a student is absent for more than five days of the rotation. Please introduce yourself to Dr. Ponisio, Nuclear Medicine residency program director, and Ms. Bre Vittitow, Nuclear Medicine program coordinator, on the first day of your 4-week NM rotation.

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### **M90 Radiol 830 Interventional Radiology**

This elective is designed to give students in-depth exposure to and experience in all clinical and procedural aspects of interventional radiology including: patient evaluation and consultation, preparation of patients for procedures, performance of a wide range of vascular and non-vascular procedures, post-procedure patient management, and longitudinal patient follow-up. Students will actively participate in interventional procedures. Students will attend the departmental noon conference (daily) and morning section conferences including didactic lectures, Quality and Safety conference, Journal club, Interventional oncology conference, multidisciplinary liver tumor conference, and case conferences.

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### **M90 Radiol 840 Clinical Radiation Oncology Subinternship**

The clinical division offers an elective with emphasis on the evaluation, planning, and administration of radiation therapy in patients with malignant tumors. The students have the opportunity to enhance their knowledge of the natural history and of the pathological and biological features of cancer and to sharpen their clinical skills by participating in the management of these patients.

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### **M90 Radiol 842 Thoracic Imaging**

A four-week elective emphasizing the interactions between cardiothoracic radiologists and the various clinical services, to include thoracic surgery, thoracic oncology, and pulmonary medicine. Learn to read chest radiographs at the viewing console while providing liaison with the clinical teams. This active elective will include the daily chest teaching conference and participation in weekly pulmonary case conference, thoracic surgery, thoracic oncology conferences, as well as the imaging aspects of the clinico-pathological medicine conference. Learn to identify subtle pneumothorax and pneumonia. Learn the limitations of portable chest radiographs. Rotating on cardiac CT and MR service and in the ED service, if interested. The student will be expected to present a single case from what they have seen during the rotation at a 7AM teaching conference.

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**M90 Radiol 900 Research Elective: Radiology**

Research opportunities may be available. If interested, please contact the Departments of Radiology or Radiation Oncology.

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## Mary Culver Department of Surgery

Formal instruction in surgery begins during the third year, with the required 8-week Integrated Surgical Disciplines Clerkship. During this surgical clerkship, students are assigned to clinical rotations, mostly within the Department of Surgery, with some exposure to other surgical-related disciplines outside of the department. The clerkship gives students opportunities to participate in the care of surgical patients (both inpatient and outpatient), to spend time in the operating rooms, and to attend seminars, teaching conferences and didactic sessions on a regular basis. During the fourth year, students may select sub-internship electives within the Division of General Surgery, which include a variety of general surgical specialties. In addition to the general surgery sub-internships, electives are available in several other surgical subspecialties, including pediatric surgery, transplant surgery, vascular surgery, cardiovascular and thoracic surgery, urologic surgery, and plastic and reconstructive surgery.

Website: <http://www.surgery.wustl.edu>

## Faculty

**Bethany Sacks, MD, MEd**

Clerkship Director

Visit our website for more information about our faculty (<http://www.surgery.wustl.edu/Faculty/>) and their appointments.

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### A

**Rebecca L Aft, Ph.D., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Jeffrey F. Moley Professorship in Endocrine and Oncologic Surgery  
Bachelor of Science, University of Wisconsin Madison, 1978  
Doctor of Philosophy, University of Wisconsin Madison, 1983  
Doctor of Medicine, Washington University in St Louis, 1992

**Rami Al-Aref, M.D.**

Instructor in Surgery (General Surgery) (primary appointment)  
null, University of Michigan Dearborn, 2012  
null, Wayne State University, 2016

**Rachel Alexandria Anolik, M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, Pennsylvania State University, 2008  
Doctor of Medicine, University of Rochester, 2013

**Sunil Madhukar Apte, MBBS**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)

Foreign MD equivalent, University of Bombay, 1970

**Christopher Thomas Arett, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)

Bachelor of Science, Washington University in St Louis, 1999  
Doctor of Medicine, Washington University in St Louis, 2003

**Bracken Abram Armstrong**

Adjunct Assistant Professor of Surgery (General Surgery)

**Kenneth J Arnold, M.D.**

Assistant Professor of Clinical Surgery (General Surgery)

Bachelor of Arts, University of Notre Dame, 1964  
Doctor of Medicine, Washington University in St Louis, 1968

**Travis Atkinson Arnold-Lloyd**

Voluntary Clinical Assistant Professor of Surgery

**Michael Magdi Awad, Ph.D., M.D.**

Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, Brown University, 1994  
Doctor of Philosophy, Brown University, 2001  
Doctor of Medicine, Brown University, 2001

### B

**Jeffrey Allen Bailey, M.P.A., M.D.**

Professor of Surgery (General Surgery) (primary appointment)

Master of Public Administration, Golden Gate University, 1986  
Doctor of Medicine, Saint Louis University, 1996

**Ana Amelia L Baumann Walker, M.A., Ph.D.**

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)

Assistant Professor of Anesthesiology  
Bachelor of Arts, Brasilia University, 2000  
Master of Arts, Brasilia University, 2003  
Doctor of Philosophy, Utah State University, 2008

**Kenneth J Bennett, M.D.**

Associate Professor of Clinical Surgery (General Surgery)

Doctor of Medicine, Tulane University, 1965

**Martin Bergmann, M.D.**

Associate Professor Emeritus of Clinical Surgery (Cardiothoracic Surgery)

Bachelor of Arts, Washington University in St Louis, 1942  
Doctor of Medicine, Washington University in St Louis, 1945

**Kimberly Crawford Berni, M.D.**

Instructor in Surgery (Urologic Surgery) (Pending Dean's

Approval) (primary appointment)  
null, University of Missouri Columbia, 1988  
null, University of Missouri Columbia, 1993

**Sam B Bhayani, M.D.**

Professor of Surgery (Urologic Surgery) (primary appointment)

Robert Killian Royce, M.D. Distinguished Professor of Urologic Surgery  
Chief Medical Officer  
Bachelor of Science, Cornell University, 1992  
Doctor of Medicine, Washington University in St Louis, 1996

**Lawrence J Billy, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Arts, Youngstown State University, 1962  
Doctor of Medicine, Saint Louis University, 1966

**Jeffrey Alan Blatnik, M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, Miami University, 2003  
Doctor of Medicine, Case Western Reserve University, 2007

**Grant Bochicchio, M.P.H., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Section Chief - Division of Acute & Critical Care Surgery  
Harry Edison Professor of Surgery  
Master of Public Health, University of Pittsburgh, 1989  
Doctor of Medicine, Pennsylvania State University, 1993

**Richard V Bradley, M.D.**

Associate Professor Emeritus of Clinical Surgery (General Surgery)  
Main Campus), 1945  
Doctor of Medicine, Washington University in St Louis, 1952

**Keith E Brandt, M.D.**

Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
William G. Hamm Professor of Surgery (Plastic and Reconstructive Surgery)  
Bachelor of Science, Texas A&M University, 1979  
Doctor of Medicine, University of Texas Health Science Center, 1983

**Taylor Clarke Brown, M.H.S., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Rhodes College, 2007  
Doctor of Medicine, University of Louisville, 2011  
Master of Health Science, Yale University, 2018

**L. Michael Brunt, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Section Chief - Section of Minimally Invasive  
Pruett Professor of Surgery  
Bachelor of Arts, University of Mississippi, 1976  
Doctor of Medicine, Johns Hopkins University Medical, 1980

**Sara Anne Buckman, Pharm.D., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Doctor of Pharmacy, University of Wisconsin Madison, 1999  
Doctor of Medicine, University of Wisconsin Madison, 2008

**John B Buettner, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Arts, Dartmouth College, 1963  
Doctor of Medicine, Washington University in St Louis, 1967

**Arnold D Bullock, M.D.**

Professor of Surgery (Urologic Surgery) (primary appointment)  
Alan A and Edith L Wolff Distinguished Professor  
Bachelor of Science, Xavier University Louisiana, 1983  
Doctor of Medicine, Johns Hopkins University, 1987

**C**

**Yin Cao, M.P.H., D.Sc.**

Associate Professor of Surgery (Public Health Sciences) (primary appointment)  
Associate Professor of Medicine  
Master of Public Health, Columbia University, 2009  
Other professional doctorate, Harvard University, 2013

**David Anthony Caplin, M.D.**

Instructor in Clinical Surgery (Plastic and Reconstructive Surgery)  
Bachelor of Arts, Kenyon College, 1971  
Main Campus), 1975

**M. Richard Carlin, M.D.**

Associate Professor Emeritus of Clinical Surgery (Urologic Surgery)  
Bachelor of Arts, Dartmouth College, 1943  
Doctor of Medicine, Yale University, 1947

**Su-Hsin Chang, M.A., Ph.D.**

Associate Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Arts, National Chengchi University, 1995  
Master of Arts, Massachusetts Institute of Technology, 2004  
Doctor of Philosophy, Johns Hopkins University, 2010

**Will C Chapman, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Division Chief - Division of General Surgery  
Section Chief - Section of Transplantation  
Eugene M. Bricker Professor of Surgery (General Surgery)  
Bachelor of Arts, University of North Carolina, 1980  
Doctor of Medicine, University of South Carolina, 1984

**Joani Marie Christensen, M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Arts, Vanderbilt University, 2007  
Doctor of Medicine, Johns Hopkins University, 2014

**John E. Codd, M.D.**

Professor of Clinical Surgery (Cardiothoracic Surgery)  
Bachelor of Arts, Gonzaga University, 1954  
Doctor of Medicine, Saint Louis University, 1963

**Graham A Colditz, M.P.H., M.D., MBBS**

Professor of Surgery (General Surgery) (primary appointment)



Professor of Medicine  
Deputy Director for the Institute of Public Health  
Division Chief - Division of Public Health  
Niess-Gain Professor of Surgery (General Surgery)  
Bachelor of Science, University of Queensland, 1977  
Foreign MD equivalent, University of Queensland, 1979  
Master of Public Health, Harvard University, 1982  
null, University of Queensland, 1998

**H. Groves Cooke, M.S., D.Dent.**

Instructor in Clinical Surgery (Plastic and Reconstructive Surgery)  
Bachelor of Arts, De Paul University, 1967  
Doctor of Dentistry, Washington University in St Louis, 1971  
Master of Science, George Washington University, 1975

**Douglas E Coplen, M.D.**

Associate Professor of Surgery (Urologic Surgery) (primary appointment)  
Bachelor of Arts, Wabash College, 1981  
Doctor of Medicine, Indiana University Bloomington, 1985

**James L Cox, M.D.**

Evarts A. Graham Professor Emeritus of Surgery (Cardiothoracic Surgery)  
Bachelor of Science, University of Mississippi, 1964  
Doctor of Medicine, University of Tennessee, 1967

**Patrick Alexander Craft, M.M.Sc., D.O.**

Instructor in Surgery (General Surgery) (primary appointment)  
null, University of Kentucky, 2008  
null, Marshall University, 2010  
null, West Virginia School of Osteopathic Medicine, 2015

**Michael Crittenden, M.D.**

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Bachelor of Science, University of Notre Dame, 1974  
Doctor of Medicine, Georgetown University, 1979

**Kelly Bettina Currie, M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, State University of New York at Buffalo, 2004  
Doctor of Medicine, State University of New York at Buffalo, 2008

**D**

**Ralph James Damiano, M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Division Chief - Division of Cardiothoracic Surgery  
Evarts Ambrose Graham Professor of Surgery (Cardiothoracic Surgery)  
Bachelor of Arts, Dartmouth College, 1976  
Doctor of Medicine, Duke University, 1980

**Kia L Davis, M.P.H., Sc.D.**

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)  
Baccalaureatus, Washington University in St Louis, 2003  
Master of Public Health, Saint Louis University, 2007  
Other professional doctorate, Harvard University, 2015

**Alana C Desai, M.D.**

Associate Professor of Surgery (Urologic Surgery) (primary appointment)  
Bachelor of Science, Marquette University, 1997  
Doctor of Medicine, Georgetown University, 2002

**Patrick A Dillon, M.D.**

Associate Professor of Surgery (Pediatric Surgery) (primary appointment)  
Associate Professor of Pediatrics  
Bachelor of Arts, Brown University, 1983  
Doctor of Medicine, Georgetown University, 1988

**Francesca Maria Dimou, M.S., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Stetson University, 2006  
Doctor of Medicine, University of South Florida, 2011  
Master of Science, University of Texas Galveston, 2015

**Maria Bernadette Majella Doyle, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Trinity College Dublin, 1990  
Doctor of Medicine, Trinity College Dublin, 1996

**Bettina Drake, M.P.H., Ph.D.**

Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, Baylor University, 2001  
Master of Public Health, University of Texas Health Science Center, 2003  
Doctor of Philosophy, University of South Carolina, 2006

**Nathan Droz, M.D.**

Adjunct Assistant Professor of Surgery (General Surgery)  
Bachelor of Science, Rockhurst College (Duplicate of Rockhurst University), 2009  
Doctor of Medicine, Creighton University, 2013

**Kefu Du, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Bachelor of Science, Duke University, 2007  
Doctor of Medicine, University of Tennessee, 2011

**E**

**Joseph W Eades, M.D.**

Assistant Professor of Clinical Surgery (Plastic and Reconstructive Surgery)  
Bachelor of Arts, Amherst College, 1956  
Doctor of Medicine, Washington University in St Louis, 1960

**J. Chris Eagon, M.S., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Arts, Williams College, 1984

Doctor of Medicine, Harvard University, 1988

Master of Science, University of Utah, 1997

**Timothy J Eberlein, M.A., M.D.**

Professor of Surgery (General Surgery) (primary appointment)

Senior Associate Dean for Cancer Programs

Spencer T. and Ann W. Olin Distinguished Professor

Professor of Pathology and Immunology

Director, Siteman Cancer Center

Bachelor of Science, University of Pittsburgh, 1973

Doctor of Medicine, University of Pittsburgh, 1977

Master of Arts, Harvard University, 1996

**Trina Ghosh Ebersole, M.D.**

Assistant Professor of Surgery (Plastic & Reconstructive Surgery) (primary appointment)

null, University of Missouri Kansas City, 2009

null, University of Missouri Kansas City, 2015

**Shaina Rose Eckhouse, M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)

Doctor of Medicine, University of Texas Health Sciences at San Antonio, 2008

**James R Edgerton**

Adjunct Professor of Surgery

**Pirooz Eghtesady, M.S., D.Sc., M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)

Professor of Pediatrics

Emerson Chair in Pediatric Cardiothoracic Surgery

Bachelor of Science, University of California Los Angeles, 1987

Master of Science, University of California Los Angeles, 1987

Doctor of Science, University of California Los Angeles, 1993

Doctor of Medicine, University of California Los Angeles, 1993

**Zachary P Englert, D.O.**

Adjunct Assistant Professor of Surgery

Main Campus), 2005

Doctor of Osteopathic Medicine, Philadelphia College of

Osteopathic Medicine, 2009

**Neil Anthony Ermitano, D.P.M.**

Assistant Professor of Surgery (General Surgery) (Pending Executive Faculty Approval) (primary appointment)

Bachelor of Science, University of Central Arkansas, 2011

Doctor of Podiatric Medicine, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 2016

**F**

**Jason Michael Farrow, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)

Doctor of Medicine, University of California, 2015

**John Matthew Felder, M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)

Bachelor of Arts, University of Oregon, 2004

Doctor of Medicine, Baylor University, 2009

**Ryan Courtney Fields, M.D.**

Professor of Surgery (General Surgery) (primary appointment)

Kim and Tim Eberlein Distinguished Professor

Section Chief - Section of Surgical Oncology

Bachelor of Science, Davenport University, 1998

Doctor of Medicine, Duke University, 2003

**Robert S Figenshau, M.D.**

Professor of Surgery (Urologic Surgery) (primary appointment)

Taylor Family and Ralph V. Clayman, M.D. Professor of Surgery (Urologic Surgery)

Bachelor of Science, Macalester College, 1981

Doctor of Medicine, University of Minnesota, 1987

**Damian Findlay**

Voluntary Clinical Instructor of Surgery

**Ida K Fox, M.D.**

Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)

Bachelor of Science, Haverford College, 1994

Doctor of Medicine, University of Rochester, 1999

**Jason Kenneth Frankel, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)

Bachelor of Science, University of Washington, 2009

Doctor of Medicine, Albany Medical College, 2013

**Bradley D. Freeman, M.D.**

Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, University of Central Florida, 1984

Doctor of Medicine, Duke University, 1988

**G**

**Feng Gao, Ph.D.**

Professor of Surgery (Public Health Sciences) (primary appointment)

Professor of Biostatistics

Professor of Medicine

Doctor of Philosophy, Emory University, 2003

**William A Gay, M.D.**

Professor Emeritus of Surgery (Cardiothoracic Surgery)

Bachelor of Arts, Virginia Military Institute, 1957

Doctor of Medicine, Duke University, 1961

**Andrew E. Gelman, Ph.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Professor of Pathology and Immunology  
Jacqueline G and William E Maritz Endowed Chair in Immunology and Oncology  
Bachelor of Science, University of California Los Angeles, 1996  
Doctor of Philosophy, University of Pennsylvania, 2006

**Patrick J Geraghty, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Northwestern University, 1989  
Doctor of Medicine, Northwestern University, 1991

**William Ewald Gillanders, M.S., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Vice Chair - Research,  
Mary Culver Professorship in Surgery  
Bachelor of Arts, Williams College, 1987  
Doctor of Medicine, Duke University, 1991  
Master of Science, Medical University of South Carolina, 2006

**Jeffrey Scott Glaser, M.D.**

Instructor in Surgery (Urologic Surgery) (Pending Dean's Approval) (primary appointment)  
null, Northwestern University, 1983  
null, University of Missouri Columbia, 1987

**Sean C. Glasgow, M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Duke University, 1995  
Doctor of Medicine, Duke University, 1999

**Katherine LuBell Glover-Collins, Ph.D., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Xavier University Louisiana, 2001  
Doctor of Philosophy, Meharry Medical College, 2009  
Doctor of Medicine, Meharry Medical College, 2009

**Simon P Goedegebuure, Ph.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Doctor of Philosophy, Erasmus University Rotterdam, 1989

**Zeynep Gul, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Baccalaureatus, Princeton University, 2011  
Doctor of Medicine, Case Western Reserve University, 2015

**Steven William Guyton**

Associate Professor of Clinical Surgery (Cardiothoracic Surgery)

**H**

**Bruce Lee Hall, M.B.A., Ph.D., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Professor of Health Care Management (Olin School of Business)  
Fellow in the Center for Health Policy

Bachelor of Arts, Princeton University, 1984  
Doctor of Philosophy, Duke University, 1991  
Doctor of Medicine, Duke University, 1992  
Master of Business Administration, Harvard University, 2000

**Chet Hammill, M.S., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, University of Illinois at Urbana-Champaign, 1996  
Doctor of Medicine, University of Illinois at Urbana-Champaign, 2004  
Master of Science, Oregon Health Science University, 2012

**William G. Hawkins, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Neidorff Family and Robert C Packman Professor  
Section Chief - Section of Hepatobiliary-Pancreatic  
Bachelor of Arts, New York University, 1991  
Doctor of Medicine, State University of New York at Stonybrook, 1995

**Genevieve A Hayek, M.S., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 2005  
Master of Science, Columbia University, 2020  
Doctor of Medicine, University of Queensland, 2020

**Michael E Hayek, M.S., M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Arts, Saint Louis University, 1976  
Master of Science, Saint Louis University, 1978  
Doctor of Medicine, University of Missouri Columbia, 1982

**Sara E Holden, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Truman State University, 2005  
Doctor of Medicine, University of Minnesota, 2010

**Katherine M. Holzem, M.D.**

Assistant Professor of Surgery (General Surg) (Pending Executive Faculty Approval) (primary appointment)  
null, University of Pennsylvania, 2005  
null, Washington University in St Louis, 2017

**Mark Houston Hoofnagle, Ph.D., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Bucknell University, 1999  
Doctor of Philosophy, University of Virginia, 2008  
Doctor of Medicine, University of Virginia, 2009

**Ashley J Housten, M.P.A., O.T.D.**

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Arts, University of Washington, 2005  
Master of Public Administration, George Mason University, 2007

Doctor of Occupational Therapy, Washington University in St Louis, 2014

**Donald V Huebener, M.A., M.S., D.Dent.**

Professor Emeritus of Surgery  
Doctor of Dentistry, Washington University in St Louis, 1969  
Master of Science, Case Western Reserve University, 1971  
Master of Arts, Washington University in St Louis, 1975

**Jean Marie Hunleth, M.P.H., Ph.D.**

Associate Professor of Surgery (Public Health Sciences)  
(primary appointment)  
Instructor of Anthropology (Courtesy Affiliation)  
Bachelor of Arts, Vanderbilt University, 1998  
Master of Public Health, Northwestern University, 2011  
Doctor of Philosophy, Northwestern University, 2011

**Steven R Hunt, M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, Dartmouth College, 1992  
Doctor of Medicine, Stanford University, 1997

**Chelsea Marie Hutchinson, M.D.**

Adjunct Assistant Professor of Surgery (General Surgery)  
Doctor of Medicine, University of Virginia, 2014

**I**

**Mohsen Ibrahim, M.D.**

Instructor in Surgery (Cardiothoracic Surgery) (primary appointment)  
Doctor of Medicine, University of Rome, 1999

**Obeid Noor Ilahi, M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Doctor of Medicine, Aga Khan University, 1992

**J**

**Aimee S. James, M.A., M.P.H., Ph.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, Goucher College, 1995  
Master of Arts, University of Houston, 1998  
Doctor of Philosophy, University of Houston, 1999  
Master of Public Health, University of Texas Houston, 2000

**Shu Jiang, M.S., Ph.D.**

Associate Professor of Surgery (Public Health Sciences)  
(primary appointment)  
Bachelor of Science, Simon Fraser University, 2015  
Master of Science, University of Western Ontario, 2016  
Doctor of Philosophy, University of Waterloo, 2018

**Dane P Johnson, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Bachelor of Science, University of Minnesota, 2007  
Doctor of Medicine, University of Minnesota, 2011

**Michael Hiroshi Johnson, M.D.**

Associate Professor of Surgery (Urologic Surgery) (primary appointment)  
null, Dartmouth College, 2001  
null, University of Washington, 2009

**K**

**Puja Kachroo, M.S., M.D.**

Associate Professor of Surgery (Cardiothoracic Surgery)  
(primary appointment)  
Bachelor of Science, Boston University, 2001  
Master of Science, Columbia University, 2003  
Doctor of Medicine, Ross University School of Medicine, 2007

**Tsuyoshi Kaneko, M.D.**

Professor of Surgery (Cardiothoracic Surgery) (Pending Executive Faculty Approval) (primary appointment)  
John M Shoenberg Professor of Surgery (Cardiothoracic Surgery)  
null, Keio University, 2002

**Demetrios Katsikas, M.D.**

Instructor in Clinical Surgery (Urological Surgery)  
Bachelor of Science, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1985  
Doctor of Medicine, Wayne State University, 1989

**Amy Frances Kells, Ph.D., M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, Vanderbilt University, 1984  
Doctor of Philosophy, Vanderbilt University, 1992  
Doctor of Medicine, Vanderbilt University, 1993

**Adeel Khan, M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Bahria University, 1997  
Doctor of Medicine, Aga Khan University, 2002

**Saira Khan, M.P.H., Ph.D.**

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, Southeast Missouri State University, 2004  
Master of Public Health, Drexel University, 2008  
Doctor of Philosophy, University of North Carolina at Chapel Hill, 2016

**Vipul Khetarpaul, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Assistant Professor of Radiology  
Doctor of Medicine, Karnataka Institute of Medical Sciences, 2007

**Eric Hwan Kim, M.D.**

Associate Professor of Surgery (Urologic Surgery) (primary appointment)

Doctor of Medicine, Washington University in St Louis, 2012

**Jae Sung Kim, M.A., Ph.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Professor of Cell Biology and Physiology  
Bachelor of Science, Seoul National University, 1988  
Master of Arts, Seoul National University, 1990  
Doctor of Philosophy, University of Wisconsin, 1999

**John P. Kirby, M.S., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, University of Illinois, 1988  
Doctor of Medicine, University of Illinois, 1993  
Master of Science, University of Illinois, 1999

**Saul Klein, M.D.**

Instructor in Clinical Surgery (Urologic Surgery)  
Doctor of Medicine, Syracuse University, 1959

**Mary E Klingensmith, M.D.**

Professor Emerita of Surgery  
Bachelor of Arts, Wellesley College, 1988  
Doctor of Medicine, Duke University, 1992

**Coen Klos**

Voluntary Research Associate Professor of Surgery (General Surgery)

**Ira Joe Kodner, M.D.**

Professor Emeritus of Surgery (General Surgery)  
Bachelor of Arts, Washington University in St Louis, 1963  
Doctor of Medicine, Washington University in St Louis, 1967

**Paul Kogan, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Doctor of Medicine, SUNY Downstate Health Sciences University, 2012  
Bachelor of Science, SUNY Geneseo, null

**Piroska K Kopar, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, Saint Johns College, 1999  
Doctor of Medicine, Emory University, 2007

**Kunal Deepak Kotkar, M.D.**

Assistant Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Doctor of Medicine, Grant Medical College, 2004

**Benjamin D. Kozower, M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Bachelor of Science, University of Rochester, 1993  
Doctor of Medicine, University of Rochester, 1997

**Lindsay Kranker, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)

Doctor of Medicine, University of Colorado Anschutz Medical Campus, 2014  
Bachelor of Science, Johns Hopkins University, null

**Daniel Kreisel, Ph.D., M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Professor of Pathology and Immunology  
G Alexander Patterson MD and Mid America Transplant Endowed Distinguished Chair in Lung Transplantation  
Doctor of Medicine, Mount Sinai School of Medicine, 1995  
Doctor of Philosophy, University of Pennsylvania, 2002

**L**

**Hing Hung H Lai, M.D.**

Professor of Surgery (Urologic Surgery) (primary appointment)  
Professor of Anesthesiology  
Gerald L Andriole Professorship in Urologic Surgery  
Bachelor of Science, Rice University, 1994  
Doctor of Medicine, Cornell University, 1999

**Natasha Leigh, M.D.**

Assistant Professor of Surgery (General Surg) (primary appointment)  
Doctor of Medicine, University of Birmingham, 2020

**Jennifer M Leonard, Ph.D., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, Colorado College, 1999  
Doctor of Philosophy, Mayo Clinic, 2011  
Doctor of Medicine, Mayo Clinic, 2011

**Wenjun Li, M.S., M.D.**

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Doctor of Medicine, Guangdong Medical College, 1991  
Sen University, 2004

**Xiaowei Li, M.S., Ph.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, Fisher More College, 2002  
Master of Science, Fisher More College, 2005  
Doctor of Philosophy, Clemson University, 2012

**Jerry Michael Liddell, D.P.M.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, University of Utah, 1995  
Doctor of Podiatric Medicine, Ohio College of Podiatric Medicine, 2002

**Deacon Jones Lile, M.D.**

Adjunct Assistant Professor of Surgery (General Surgery)  
Doctor of Medicine, Drexel University, 2014

**Yiing Lin, Ph.D., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Duke University, 1997  
Doctor of Philosophy, Washington University in St Louis, 2005  
Doctor of Medicine, Washington University in St Louis, 2005

**Erin Lynn Linnenbringer, M.S., Ph.D.**

Associate Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2000  
Master of Science, Northwestern University, 2003  
Doctor of Philosophy, University of Michigan, 2014

**Ying Liu, Ph.D., M.D.**

Associate Professor of Surgery (Public Health Sciences) (primary appointment)  
Doctor of Medicine, Florida Beacon Bible College, 1995  
Doctor of Philosophy, Texas Tech University, 2006

**Alan M Londe, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Arts, Washington University in St Louis, 1957  
Doctor of Medicine, Washington University in St Louis, 1961

**Jeffrey A Lowell, M.D.**

Professor Emeritus of Surgery  
Bachelor of Arts, Oberlin College, 1981  
Doctor of Medicine, Yale University, 1985

**Esther Jiaxin Lu, M.S., Ph.D.**

Associate Professor of Surgery (Public Health Sciences) (primary appointment)  
Associate Professor of Biostatistics  
Bachelor of Science, Nankai University, 1997  
Master of Science, National Univ of Singapore, 2002  
Doctor of Philosophy, Medical College of Wisconsin, 2007

**Mark A Ludwig, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Arts, Emory University, 1972  
Doctor of Medicine, University of Chicago, 1976

**Chongliang Luo, Ph.D.**

Assistant Professor in Surgery (Public Health Sciences) (Pending Executive Faculty Approval) (primary appointment)  
Doctor of Philosophy, University of Connecticut, 2017

**Jingqin Luo, M.S., Ph.D.**

Professor of Surgery (Public Health Sciences) (primary appointment)  
Professor of Biostatistics  
Professor of Medicine  
Bachelor of Science, Queen of The Holy Rosary College, 1998  
Master of Science, Queen of The Holy Rosary College, 2001  
Doctor of Philosophy, Duke University, 2006

**M**

**Susan E Mackinnon, M.D.**

Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Professor of Otolaryngology  
Professor of Occupational Therapy  
Minot Packer Fryer Professor of Plastic Surgery  
Bachelor of Arts, Queens College, 1971  
Doctor of Medicine, Queen's University, 1975

**Kiran Mahajan, M.S., Ph.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Master of Science, Madurai Kamaraj University, 1991  
Doctor of Philosophy, Indian Institute of Science, 1998

**Nupam P Mahajan, Ph.D.**

Professor of Surgery (Urologic Surgery) (primary appointment)  
Endowed Professorship of Urologic Surgery Research  
Doctor of Philosophy, Indian Institute Of Technology, 1997

**Arnab Majumder, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Case Western Reserve University, 2007  
Doctor of Medicine, Ohio State University, 2011

**Sara M Malone, M.S.W., Ph.D.**

Instructor in Surgery (Public Health Sciences) (primary appointment)  
Adjunct Lecturer  
null, Centre College, 2012  
null, Washington University in St Louis, 2014  
null, Washington University in St Louis, 2022

**Julie Ann Margenthaler, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, Boston University, 1993  
Doctor of Medicine, Southern Illinois University, 1997

**Muhammad Faraz Masood, M.D.**

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Doctor of Medicine, Dow Medical College Karachi, 2001

**John E. Mazuski, M.S., Ph.D., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Arts, California State Fresno, 1973  
Master of Science, University of Wisconsin Madison, 1975  
Doctor of Medicine, University of California Los Angeles, 1981  
Doctor of Philosophy, University of Minnesota, 1993

**Patricia A McGuire, M.D.**

Instructor in Clinical Surgery (Plastic and Reconstructive Surgery)  
Doctor of Medicine, University of Missouri Columbia, 1985

**Matthew Justin McHale**

Voluntary Clinical Assistant Professor of Surgery

**Michelle Leah Medintz**

Voluntary Clinical Assistant Professor of Surgery

**Syed Mehmood**

Voluntary Clinical Instructor in Surgery (Cardiothoracic Surgery)

**Spencer J Melby, M.D.**

Associate Professor of Surgery (Cardiothoracic Surgery)  
(primary appointment)

Bachelor of Science, Brigham Young University, 1997

Doctor of Medicine, University of Utah, 2002

**Bryan F Meyers, M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary  
appointment)

Section Chief - Section of Thoracic Surgery

Patrick and Joy Williamson Endowed Professor of Surgery  
(Cardiothoracic Surgery)

Bachelor of Arts, Yale University, 1982

Doctor of Medicine, University of Chicago, 1986

**Jerry R Meyers, M.D.**

Assistant Professor of Clinical Surgery (General Surgery)

Bachelor of Arts, University of Texas Austin, 1962

Doctor of Medicine, Washington University in St Louis, 1966

**Jacob Ryan Miller, M.D.**

Instructor in Surgery (Cardiothoracic Surgery) (primary  
appointment)

Bachelor of Science, Indiana University Bloomington, 2020

Doctor of Medicine, Indiana University Indianapolis, 2020

**Kevin Joseph Mitchell, M.D.**

Instructor in Clinical Surgery (General Surgery)

Bachelor of Science, Howard University, 1981

Doctor of Medicine, Howard University, 1985

**Marc R Moon, M.D.**

Section Chief - Section of Cardiac Surgery

Bachelor of Science, University of Michigan, 1983

Doctor of Medicine, Wayne State University, 1988

**Julian C Mosley, M.D.**

Instructor in Clinical Surgery (General Surgery)

Doctor of Medicine, Washington University in St Louis, 1972

Bachelor of Science, Saint Louis University, 2000

**Nabil A Munfakh, M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary  
appointment)

Bachelor of Science, University of Michigan, 1981

Doctor of Medicine, University of Michigan, 1985

**Gregory P Murphy, M.D.**

Associate Professor of Surgery (Urologic Surgery) (primary  
appointment)

Bachelor of Arts, Tufts University, 2006

Doctor of Medicine, University of Massachusetts, 2011

**Matthew G Mutch, M.D.**

Professor of Surgery (General Surgery) (primary appointment)

Section Chief - Section of Colon-Rectal Surgery

Solon and Bettie Gershman Professorship in Colon and Rectal  
Surgery

Bachelor of Arts, Saint Olaf College, 1990

Doctor of Medicine, Washington University in St Louis, 1994

**Terence M. Myckatyn, M.D.**

Professor of Surgery (Plastic and Reconstructive Surgery)  
(primary appointment)

Doctor of Medicine, University of Northern British Columbia,  
1997

Bachelor of Science, University of Northern British Columbia,  
2003

**N**

**Dilip Sri Nath, M.D.**

Associate Professor of Surgery (Cardiothoracic Surgery)  
(primary appointment)

Bachelor of Science, University of California Berkeley, 1995

Doctor of Medicine, New York University School of Medicine,  
1999

**Ruben Nava, M.D.**

Assistant Professor of Surgery (Cardiothoracic Surgery) (primary  
appointment)

Doctor of Medicine, Univ of Armed Forces: Military, 2000

**Thoi Hieu Ngo, M.D.**

Assistant Professor of Surgery (General Surgery) (primary  
appointment)

College Park, 2010

Doctor of Medicine, New York Medical College, 2014

**Dennis Nguyen, M.S., M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive  
Surgery) (primary appointment)

Bachelor of Science, University of California Irvine, 2005

Master of Science, University of California Berkeley, 2009

Doctor of Medicine, University of California San Francisco, 2011

**Thomas E Niesen, M.D.**

Instructor in Clinical Surgery (General Surgery)

Bachelor of Science, Tulane University, 1975

Doctor of Medicine, Tulane University, 1979

**Richard James Nissen, M.S., D.Dent.**

Assistant Professor of Clinical Surgery (Plastic and  
Reconstructive Surgery)

Bachelor of Science, Iowa State University, 1979

Doctor of Dentistry, University of Iowa, 1983

Master of Science, Washington University in St Louis, 1985

**Charles Upshur Nottingham, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary  
appointment)

Bachelor of Science, Wake Forest University, 2006

Doctor of Medicine, Virginia Commonwealth University, 2012

**Anthony Ian Nunez**

Instructor in Clinical Surgery (Cardio Surgery)

## O

### **John Westley Ohman, M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Associate Professor of Radiology  
Bachelor of Science, University of Texas Austin, 2008  
Doctor of Medicine, University of Texas Health Science Center, 2012

### **Kerri A Ohman, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, University of Michigan, 2008  
Doctor of Medicine, University of Michigan, 2012

### **George A Oliver, M.D.**

Assistant Professor Emeritus of Clinical Surgery (General Surgery)  
Bachelor of Arts, Washington University in St Louis, 1948  
Doctor of Medicine, Washington University in St Louis, 1952

### **John A Olson, Ph.D., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bixby Professor of Surgery (General Surgery)  
Head of the Department of Surgery  
Bachelor of Science, University of Michigan Ann Arbor, 1986  
Doctor of Philosophy, University of Florida, 1990  
Doctor of Medicine, University of Florida, 1992

### **Tiffany Medlin Osborn, M.P.H., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Professor of Emergency Medicine  
Bachelor of Science, University of Houston, 1992  
Doctor of Medicine, University of Texas Health Sciences at San Antonio, 1997  
Master of Public Health, London Hygiene & Tropical Med, 2009

## P

### **Twinkle Kumar Samudra Pandian, M.P.H., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, University of Minnesota, 2006  
Master of Public Health, Johns Hopkins University, 2010  
Doctor of Medicine, Mayo Clinic, 2011

### **Sharad P Parikh**

Instructor in Clinical Surgery (General Surgery)

### **Yikyung Park, M.S., Ph.D.**

Associate Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, EWHA Womans University, 1994  
Master of Science, EWHA Womans University, 1996  
Doctor of Philosophy, Harvard University, 2005

### **Charles L Parks, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Science, University of South Dakota, 1967  
Doctor of Medicine, Washington University in St Louis, 1969

### **Jeffrey Andrew Parres, M.D.**

Instructor in Clinical Surgery (Urologic Surgery)  
Bachelor of Arts, Washington University in St Louis, 1983  
Doctor of Medicine, University of Missouri Columbia, 1987

### **Michael K Pasque, M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Professor of Biomedical Engineering  
Professor of Radiology  
Doctor of Medicine, University of Oklahoma, 1978

### **Kamleshkumar Patel, M.D.**

Associate Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, University of Missouri Kansas City, 2000  
Doctor of Medicine, University of Arizona, 2005

### **G Alexander Patterson, M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Joseph C Bancroft Professor of Surgery (Cardiothoracic Surgery)  
Doctor of Medicine, Queen's University, 1974

### **Amit Audumbar Pawale, MBBS**

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Other bachelor's degree, Shivaji University, 2001

### **Enrique Pedro Perinetti, Ph.D., M.D.**

Instructor in Clinical Surgery (Urologic Surgery)  
Doctor of Medicine, School Not Listed, 1969  
Doctor of Philosophy, School Not Listed, 1975

### **Mitchell A Pet, M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Doctor of Medicine, Washington University in St Louis, 2011

### **Gordon W Philpott, M.D.**

Professor Emeritus of Surgery (General Surgery)  
Bachelor of Science, Yale University, 1957  
Doctor of Medicine, Washington University in St Louis, 1961

### **Mary Politi, M.Phil., Ph.D.**

Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, Barnard College, 2001  
Master of Philosophy, George Washington University, 2004  
Doctor of Philosophy, George Washington University, 2006

### **Varun Puri, M.S., M.D.**

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
India Inst of Medical Sci, 1998



Master of Science, Creighton University, 2007  
Doctor of Medicine, Washington University in St Louis, 2009

## R

### **Nishant Raj, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Saint Johns University, 2004  
Doctor of Medicine, Ross University School of Medicine, 2009

### **Ricardo Rao, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Arts, University of California San Diego, 1983  
Doctor of Medicine, University of Missouri Columbia, 1987

### **Antonella Luisa Rastelli, M.D.**

Associate Professor of Surgery (General Surgery)  
Bachelor of Arts, University of Verona, 1984  
Doctor of Medicine, University of Verona, 1991

### **Shuddhadeb Ray, M.D.**

Assistant Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Doctor of Medicine, KANSAS UNIVERSITY SCHOOL OF MEDICINE, 2011

### **Nanette Rahee Reed, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Assistant Professor of Radiology  
Bachelor of Science, University of Notre Dame, 2000  
Doctor of Medicine, Baylor College of Medicine, 2004

### **Frank O Richards, M.D.**

Assistant Professor Emeritus of Clinical Surgery (General Surgery)  
Bachelor of Arts, Talladega College, 1944  
Doctor of Medicine, Howard University, 1947

### **Shale M Rifkin, M.D.**

Assistant Professor of Clinical Surgery (General Surgery)  
Doctor of Medicine, Washington University in St Louis, 1948

### **Harold G Roberts, M.D.**

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Bachelor of Arts, Hendrix College, 1977  
Doctor of Medicine, University of Arkansas for Medical Sciences, 1981

### **Brian G Rubin, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Professor of Radiology  
Bachelor of Arts, Colgate University, 1979  
Doctor of Medicine, University of Vermont, 1984

## S

### **Bethany Cara Sacks, M.Ed., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, Connecticut College, 1995  
Doctor of Medicine, Mount Sinai School of Medicine, 1999  
Master of Education, University of Houston, 2010

### **Justin M Sacks, M.B.A., M.D.**

Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Division Chief - Division of Plastic Surgery  
Sydney M Jr and Robert H Shoenberg Endowed Chair in Plastic & Reconstructive Surgery  
Bachelor of Science, Cornell University, 1993  
Doctor of Medicine, Mount Sinai School of Medicine, 1998  
Master of Business Administration, Johns Hopkins University, 2015

### **Adnan Sadiq, M.D.**

Assistant Professor of Surgery (Cardiothoracic Surgery)  
Bachelor of Science, State University of New York at Buffalo, 1996  
Doctor of Medicine, Royal College of Surgeons, 2001

### **Jacqueline Mitsouko Saito, M.B.A., M.D.**

Associate Professor of Surgery (Pediatric Surgery) (primary appointment)  
Bachelor of Science, Harvard University, 1989  
Doctor of Medicine, Columbia University, 1993  
null, Indiana University Indianapolis, 2021

### **Elizabeth Ann Salerno, M.P.H., Ph.D.**

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, University of Illinois at Urbana-Champaign, 2012  
Doctor of Philosophy, University of Illinois at Urbana-Champaign, 2017  
Master of Public Health, Johns Hopkins University, 2018

### **Luis A Sanchez, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Professor of Radiology  
Gregorio A. Sicard Distinguished Professor  
Section Chief - Section of Vascular  
Bachelor of Science, Yale University, 1983  
Doctor of Medicine, Harvard University, 1987

### **Kenneth Gordon Sands, M.B.A., D.O.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Master of Business Administration, Lincoln Memorial University, 2014  
Doctor of Osteopathic Medicine, Lincoln Memorial University, 2014

### **Dominic Sanford, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, Maryville University, 2005  
Doctor of Medicine, University of Missouri Columbia, 2009

**Donald C Sauer, M.D.**

Assistant Professor Emeritus of Clinical Surgery (General Surgery)  
Bachelor of Arts, Washington University in St Louis, 1956  
Doctor of Medicine, Washington University in St Louis, 1960

**Matthew Robert Schill, M.D.**

Instructor in Surgery (Cardiothoracic Surgery) (primary appointment)  
Bachelor of Science, University of Iowa, 2009  
Doctor of Medicine, Washington University in St Louis, 2013

**Douglas J Schuerer, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Allegheny College, 1991  
Doctor of Medicine, University of Pittsburgh, 1995

**Maryls E Schuh, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Science, University of North Dakota, 1973  
Doctor of Medicine, Washington University in St Louis, 1979

**Debra L Seoane, M.D.**

Instructor in Clinical Surgery (General Surgery)  
Doctor of Medicine, University of Miami, 1986

**Baddr Ahed Shakhsheer, M.D.**

Assistant Professor of Surgery (Pediatric Surgery) (primary appointment)  
Bachelor of Arts, University of Virginia, 2005  
Doctor of Medicine, Eastern Virginia Medical School, 2010

**Courtney Shands, M.D.**

Instructor in Clinical Surgery (Urologic Surgery)  
Bachelor of Arts, Stanford University, 1978  
Doctor of Medicine, Vanderbilt University, 1982

**Surendra Shenoy, Ph.D., M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Kasturba Medical College, 1980  
Doctor of Medicine, Kasturba Medical College, 1984  
Doctor of Philosophy, Institute of Medical Science, 1989

**Sachin Mahavir Shridharani**

Adjunct Associate Professor of Surgery (Plastic and Reconstructive Surgery)

**Gregorio A Sicard, M.D.**

Emeritus Professor of Surgery  
Bachelor of Science, Saint Louis University, 1965  
Doctor of Medicine, University of Puerto Rico (Duplicate of University of Puerto Rico), 1972

**Michelle Ilana Silver, M.S., Ph.D.**

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, Stanford University, 2007

Master of Science, Johns Hopkins University, 2009  
Doctor of Philosophy, Johns Hopkins University, 2015

**Matthew Leon Silveira, M.S., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Pennsylvania State University, 2001  
Doctor of Medicine, Temple University, 2005  
Master of Science, Temple University, 2010

**David Siroospour, M.D.**

Assistant Professor of Clinical Surgery (General Surgery)  
Doctor of Medicine, School Not Listed, 2000

**Arjun Sivaraman, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Doctor of Medicine, Madras Medical College, 2005

**Woodson Smelser, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
null, University of Missouri Columbia, 2011  
null, University of Missouri Kansas City, 2015

**Radhika K Smith, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2010

**Zachary Lee Smith, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2010

**Jason Andrew Snyder, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Kettering University, 2004  
Doctor of Medicine, Marshall University, 2008

**Alison K Snyder-Warwick, M.D.**

Associate Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Arts, Knox College, 2000  
Doctor of Medicine, Washington University in St Louis, 2004

**Dirk M Spitzer, Ph.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Doctor of Philosophy, Technische U Braunschweig, 1999

**Marguerite Spruce, M.D.**

Voluntary Clinical Assistant Professor of Surgery  
Bachelor of Science, University of Missouri Columbia, 2011  
Doctor of Medicine, University of Missouri Columbia, 2015

**Charlie Srivilasa**

Adjunct Assistant Professor of Surgery

**Jessica Staszak, M.S., M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, Boston University, 2008  
Master of Science, Georgetown University, 2009  
Doctor of Medicine, Georgetown University, 2013

**Alan Joel Stein, M.D.**

Assistant Professor of Clinical Surgery (Urologic Surgery)  
Bachelor of Science, University of Wisconsin Madison, 1972  
Doctor of Medicine, Wayne State University, 1976

**Daniel Charles Stoeckel**

Instructor in Clinical Surgery

**Steven M Strasberg, M.D.**

Professor Emeritus of Surgery  
Doctor of Medicine, University of Toronto, 1963

**Herbert Sunshine, M.D.**

Assistant Professor of Clinical Surgery (Urologic Surgery)  
Bachelor of Arts, Washington University in St Louis, 1950  
Doctor of Medicine, Washington University in St Louis, 1954

**Siobhan Sutcliffe, M.H.S., M.S., Ph.D.**

Professor of Surgery (Public Health Sciences) (primary appointment)  
Bachelor of Science, Princeton University, 1998  
Master of Health Science, Johns Hopkins University, 2001  
Master of Science, Johns Hopkins University, 2004  
Doctor of Philosophy, Johns Hopkins University, 2005

**T**

**Tsuyoshi Takahashi, Ph.D., M.D.**

Instructor in Surgery (Cardiothoracic Surgery) (primary appointment)  
Doctor of Medicine, Tokushima University, 2007  
Doctor of Philosophy, University of Tokyo, 2018

**Shoichiro Alberto Tanaka, M.P.H., M.D.**

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, University of Dallas, 2006  
Master of Public Health, Tulane University, 2008  
Doctor of Medicine, Texas A&M Health Science Center, 2012

**Marissa Morningstar Tenenbaum, M.D.**

Associate Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, University of Wisconsin Madison, 1998  
Doctor of Medicine, Washington University in St Louis, 2002

**Gregory S Tentindo**

Voluntary Clinical Instructor of Surgery

**David J Testrake**

Voluntary Clinical Assistant Professor of Surgery

**Ajit K Tharakan**

Visiting Assistant Professor of Surgery

**Lewis Jones Thomas, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (Pending Executive Faculty Approval) (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2008  
Doctor of Medicine, University of Missouri Columbia, 2012

**Robert W Thompson, M.D.**

Professor of Surgery (General Surgery) (primary appointment)  
Professor of Cell Biology and Physiology  
Professor of Radiology  
Bachelor of Arts, Hope College, 1979  
Doctor of Medicine, University of Michigan, 1983

**Adetunji Toriola, M.P.H., MB.ChB., Ph.D.**

Professor of Surgery (Public Health Sciences) (primary appointment)  
null, Obafemi Awolowo University, 1998  
null, University of Kuopio, 2007  
Doctor of Philosophy, University of Tampere, 2011

**Ralph J Torrence, M.D.**

Asst Prof of Clinical Surgery (Urologic Surgery)  
Doctor of Medicine, Georgetown University, 1983

**Erica J Traxel, M.D.**

Associate Professor of Surgery (Urologic Surgery) (primary appointment)  
Bachelor of Science, Texas A&M University, 1998  
Doctor of Medicine, Beaufort Technical College, 2002

**Thomas H Tung, M.D.**

Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)  
Bachelor of Science, Duke University, 1986  
Doctor of Medicine, University of Maryland, 1990

**Isaiah Turnbull, M.S., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, University of Oregon, 1998  
Master of Science, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2008

**V**

**Kelly Jean Vallar, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Doctor of Medicine, University of Missouri Kansas City, 2011

**Jesse Daya Vrecenak, M.D.**

Assistant Professor of Surgery (Pediatric Surgery) (primary appointment)  
Bachelor of Science, Yale University, 2003  
Doctor of Medicine, University of Pennsylvania, 2007

**Gino J Vricella, M.D.**

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)  
Doctor of Medicine, University of Missouri Columbia, 2006

Bachelor of Science, Saint Louis University, 2012

## W

### Howard S Walker, M.D.

Instructor in Clinical Surgery (Cardiothoracic Surgery)  
Bachelor of Arts, Citadel Military College of South Carolina, 1971  
Doctor of Medicine, Beaufort Technical College (Duplicate of  
Technical College of the Lowcountry), 1974

### Lisa Marie Waller, M.S., Ph.D.

Professor of Surgery (Public Health Sciences) (primary  
appointment)  
Bachelor of Science, Concordia College, 1982  
Master of Science, University of Memphis, 1991  
Doctor of Philosophy, University of Minnesota, 1995

### Fei Wan, M.S., Ph.D.

Associate Professor of Surgery (Public Health Sciences)  
(primary appointment)  
Master of Science, University of Vermont, 2001  
Doctor of Philosophy, University of Pennsylvania, 2015

### Zachary James Wanken, M.S., M.D.

Assistant Professor of Surgery (General Surgery) (primary  
appointment)  
Doctor of Medicine, Saint Louis University, 2015  
Master of Science, Dartmouth College, 2019

### Brad W. Warner, M.D.

Professor of Surgery (Pediatric Surgery) (primary appointment)  
Professor of Pediatrics  
Division Chief - Division of Pediatric Surgery  
Jessie L. Ternberg, M.D., PhD. Distinguished Professor of  
Pediatric Surgery in Surgery (Pediatric Surgery)  
Bachelor of Science, University of Missouri Kansas City, 1982  
Doctor of Medicine, University of Missouri Kansas City, 1982

### Erika Waters, M.P.H., M.S., Ph.D.

Professor of Surgery (Public Health Sciences) (primary  
appointment)  
Bachelor of Science, Arizona State University, 1999  
Master of Science, Rutgers University, 2003  
Doctor of Philosophy, Rutgers University, 2006  
Master of Public Health, Johns Hopkins University Medical, 2007

### Michael D Weiss, D.P.M.

Assistant Professor of Surgery (General Surgery) (primary  
appointment)  
Bachelor of Science, Ohio State University, 1977  
Doctor of Podiatric Medicine, Ohio College of Podiatric Medi,  
1981

### Jason R Wellen, M.D.

Associate Professor of Surgery (General Surgery) (primary  
appointment)  
Bachelor of Science, Emory University, 1998  
Doctor of Medicine, Saint George's University, 2002

### Samuel A Wells, M.D.

Professor Emeritus of Surgery  
Doctor of Medicine, Emory University, 1961

### Amanda Meppelink Westman, Ph.D.

Assistant Professor of Surgery (Plastic and Reconstructive  
Surgery) (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2012  
Doctor of Philosophy, University of Virginia, 2020

### Brad C White, M.D.

Instructor in Clinical Surgery (Urologic Surgery)  
Bachelor of Science, Illinois State University, 1986  
Doctor of Medicine, Loyola University Chicago, 1993

### Paul Edward Wise, M.D.

Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Georgetown University, 1992  
Doctor of Medicine, Johns Hopkins University, 1996

### Brian Wing-Chi Wong, Ph.D.

Assistant Professor of Surgery (General Surgery) (primary  
appointment)  
Bachelor of Science, University of British Columbia, 2001  
Doctor of Philosophy, University of British Columbia, 2011

### Matthew D Wood, M.S., Ph.D.

Associate Professor of Surgery (Plastic and Reconstructive  
Surgery) (primary appointment)  
Bachelor of Science, Saint Louis University, 2005  
Master of Science, Washington University in St Louis, 2008  
Doctor of Philosophy, Washington University in St Louis, 2009

## Y

### Yan Yan, M.A., M.H.S., Ph.D., M.D.

Professor of Surgery (Public Health Sciences) (primary  
appointment)  
Professor of Biostatistics  
Doctor of Medicine, Nanjing Medical University, 1983  
null, Georgetown University, 1993  
Master of Health Science, Johns Hopkins University, 1995  
Doctor of Philosophy, Johns Hopkins University, 1998

### Muhammad T Yasin, M.D.

Assistant Professor of Surgery (General Surgery) (primary  
appointment)  
Doctor of Medicine, Punjab University, 1985

### William D Yates, M.D.

Instructor in Clinical Surgery (General Surgery)  
Bachelor of Arts, Northwestern University, 1983  
Doctor of Medicine, Northwestern University, 1985

### Andrew Yeh, M.D.

Assistant Professor of Surgery (Pediatric Surgery) (Pending  
Executive Faculty Approval) (primary appointment)  
null, University of Toronto, 2007  
null, University of Hawaii Oahu, 2012

### Robert A Young, M.S., J.D., M.D.

Instructor in Clinical Surgery (Plastic and Reconstructive Surgery)  
Bachelor of Arts, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1973  
Main Campus), 1975  
Main Campus), 1978  
Juris Doctor, Saint Louis University, 1997

**Jennifer Yu, M.D.**

Assistant Professor of Surgery (General Surgery) (primary appointment)  
Bachelor of Science, Washington University in St Louis, 2008  
Doctor of Medicine, Washington University in St Louis, 2012

**Z**

**Mohamed A Zayed, Ph.D., M.D.**

Associate Professor of Surgery (General Surgery) (primary appointment)  
Associate Professor of Radiology  
Bachelor of Science, University North Carolina, 2002  
Doctor of Philosophy, University of North Carolina, 2007  
Doctor of Medicine, University of North Carolina, 2009

**Christian W Zemlin, Ph.D.**

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)  
Doctor of Philosophy, Humboldt University, 2012

## Research Electives

### Surgery Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

For the most up-to-date medical student research opportunities, please visit the Research page of the Department of Surgery website (<https://surgery.wustl.edu/research/>).

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#### Section of Minimally Invasive Surgery

660 S. Euclid, Box 8109  
Phone: 314-454-8877

Under the direction of **L. Michael Brunt, MD**, students may investigate minimally invasive gastrointestinal and hernia surgery. The minimum rotation length is four weeks. Under the auspices of the Section of Minimally Invasive Surgery and the Washington University Institute for Minimally Invasive Surgery, a number of surgeons are investigating outcomes of various minimally invasive surgical approaches to abdominal wall hernias, benign foregut disorders, bariatric surgery and cholecystectomy. Dr. Brunt is currently investigating the clinical outcomes and standardization of various laparoscopic surgical procedures, opioid prescribing patterns and opioid use in surgical patients, and education-related research and skills training for medical students planning to enter a surgical internship.

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#### Division of Plastic and Reconstructive Surgery

660 S. Euclid, Box 8238  
Phone: 314-747-0541

The Division of Plastic Surgery offers many opportunities for research projects on various topics related to plastic surgery. A project will be designed with students prior to their rotation on plastic surgery so that all of the materials and methods will be available at the beginning of the rotation. The basic science laboratories primarily investigate nerve injury and regeneration, including nerve transplantation. Students will be encouraged to design and complete their own research study during the elective. The minimum rotation length is six weeks.

The research rotation can be conducted in the plastic surgery laboratories under the direction of **Drs. Moore, Snyder-Warwick, Wood or Mackinnon**. Ongoing projects include the following:

- The influence of the immune system on nerve regeneration;
- Neural tissue engineering and regenerative medicine therapeutics, such as electrical stimulation to promote tissue regeneration
- The investigation of glial cells at the neuromuscular junction during development, maintenance, aging, and after nerve injury

Additional clinical and educational research opportunities in various fields of plastic surgery are available with **Drs. Fox, Myckatyn, Patel, Tung, and Woo**. These various projects include the following:

- In vivo tissue generation and tissue differentiation
- The mechanical, structural and biochemical effects of stress on scar tissue maturation
- In vivo anatomy of craniofacial deformities
- Outcome analysis of methods of cleft lip and palate management
- Breast reconstruction (3D imaging of breasts after cosmetic or reconstructive surgery, interpretation of angiograms of the breast to measure nipple perfusion)
- The use of nerve transfer to improve hand function in patients with cervical spinal cord injury/quadruplegia
- Surgical education (specifically web-based multimedia strategies for peripheral nerve surgery education)

The Department of Surgery can host Washington University medical students in any of its labs either to receive credit for a class they are currently enrolled in or to add them into the system as Washington University student employees to be paid for their time worked. Student work may be obtained through the Federal Work-Study program, the Office of Medical Student

Research, or direct communication initiated by the student with faculty they wish to work alongside on specific subjects of interest with the goal of furthering their education. This can occur during any year of a medical student's education.

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## Courses

Visit online course listings to view offerings for M95 Surgery (<https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M95>).

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### M95 Surgery 790 Integrated Surgical Disciplines Clerkship

During the 8-week surgery clerkship, each student is assigned to separate rotations. Each student is assigned to a required general surgery rotation at Barnes-Jewish Hospital or the John Cochran Veterans Administration Medical Center. In addition, each student selects elective rotations in other general surgical fields, surgical subspecialties and related disciplines of critical care. The student is an active participant in the daily care of patients on each service and attends the service teaching conferences and rounds. For the duration of the 8-week rotation, there are weekly small-group tutorial sessions with faculty members and a biweekly lecture series.  
Credit 308 units.

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### M95 Surgery 814 Trauma Service Subinternship

The student on this elective will function as a subintern on the Trauma and Acute Care Surgical Service within the Section of Acute and Critical Care Surgery. Through completion of this subinternship, the student will gain an ability to evaluate, resuscitate and manage trauma and emergency general surgery patients. Subinterns will actively interact with patients in the outpatient office, hospital ward and operating room. Practical experience will involve preoperative patient evaluation, resuscitation of acutely ill patients, operative patient management, in-hospital patient care and postoperative outpatient follow-up. The student will also participate in affiliated conferences and in-house call.

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### M95 Surgery 818 Surgical Night Float & ED Subinternship

This subinternship is specifically designed to give senior medical students an intern-level experience in managing acute on-call problems in surgical patients and in evaluating urgent and emergent problems in the ED. The rotation will be divided into two, two-week segments: one segment in the ED and the second on night float call on the surgical floors. Students will gain experience evaluating and managing the types of acute problems they will encounter as surgical interns as first responders to patients with acute abdominal pain, chest pain, hypotension, mental status changes, and other ER/on-call type problems. They will be assigned to the on-call surgical resident and will have a structured experience in order to maximize development of their diagnostic, management, and case presentation skills in the acute care setting so that they may more smoothly make the transition to a surgical internship.

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### M95 Surgery 820 Cardiothoracic Surgery Subinternship

The subinternship in cardiothoracic surgery is a four-week clinical rotation with two-week blocks divided between adult cardiac, pediatric cardiothoracic, and general thoracic surgery (according to the student's preference). Students will participate in morning work rounds, attend the operative procedures of their choice, and attend weekly conferences and teaching rounds.

Students will be introduced not only to the surgical procedures, but also to the postoperative care of the surgical patients. On the pediatric and adult cardiac services, students will be introduced to the principles of cardiopulmonary bypass, repair of congenital heart defects, ventricular assist devices, heart lung transplantation and procurement, coronary artery bypass surgery (on and off pump), valve repair and replacement, complex aortic surgery, the MAZE procedures and others. On the adult cardiac surgery service, students will function as sub-interns under the direct supervision of a faculty member. On the thoracic surgical rotation, students will have the opportunity to perform bronchoscopy, esophagoscopy, gastroscopy, and participate in surgical resections of lung cancer and esophageal cancer, as well as surgery for emphysema and for benign esophageal conditions. Students will also participate in lung transplantation surgery. Medical students are also invited to participate in ongoing research projects under the mentorship of surgery faculty. Please contact course director if you are interested in this option.

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### M95 Surgery 830 Plastic & Reconstructive Surgery Subinternship

The period on Plastic Surgery may either be spent as a clinical clerkship or conducting a research project. The purpose of the clinical subinternship is to familiarize the student with the basic principles of Plastic Surgery. The student will have successive assignments to each of the attending staff and the ward resident services during the four weeks. This will expose the student to the breadth and depth of plastic surgery. Alternatively, if the student has identified a focus of interest, the student may participate on those services of special interest, such as hand or pediatric plastic surgery. The student will assume an active role on the plastic surgery service and will participate in the total management of a wide variety of surgical problems including congenital anomalies, microvascular surgery, surgery of the upper extremity, peripheral nerve surgery, cosmetic surgery, and general reconstructive plastic surgery. Research projects should be student-motivated, and must be approved prior to scheduling and confirming the research rotation. Student will perform a ten-minute case presentation.

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### M95 Surgery 832 Plastic Surgery Externship

This course is for visiting medical students only. Students rotate on different Plastic Surgery Services for two weeks each to maximize exposure to all faculty. The student will assume an active role on the plastic surgery service and will participate in the total management of a wide variety of surgical problems including congenital anomalies, microvascular surgery, surgery of the upper extremity, peripheral nerve surgery, cosmetic surgery, and general reconstructive plastic surgery. Participation in conferences is expected. Students will turn in two H&Ps.

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### M95 Surgery 850 Urology Subinternship

The four-week clinical subinternship will offer the interested student experience with a spectrum of problems in clinical urology - both adult and pediatric. The student will learn the basic diagnostic procedures and management of surgical and non-surgical aspects of patient care under the supervision of the attending staff and house staff. Clinical conferences are held two days per week. Medical students are also invited to participate in ongoing research projects under the mentorship of urology faculty. Please contact course director prior to the start of the elective if you are interested in this option.

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**M95 Surgery 850A Urology Subinternship with Research**

The four-week elective will offer exposure to the full spectrum of problems in clinical urology (adult and pediatric). The student will learn the basic diagnostic procedures and management of surgical and nonsurgical aspects of patient care under the supervision of the attending staff and house staff. Clinical conferences are held one to two days per week.

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**M95 Surgery 862 Colon & Rectal Surgery Subinternship**

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Colorectal Surgery Service. Students work closely with the attendings within the Section of Colon and Rectal Surgery, and clinical exposure is focused on a wide range of benign and malignant colorectal diseases. There is exposure to radiation oncology and the specialized areas of nursing related to care of patients with colorectal cancer and inflammatory bowel disease. The course will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative, patient management under house staff, fellows, and faculty guidance, as well as ample opportunity to attend and participate in conferences. Notice: If a student desires to work more closely with a specific attending, he/she must make special arrangements with the Colorectal Surgery Office prior to beginning this elective.

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**M95 Surgery 863 Surgical Oncology & Endocrine Surgery Subinternship**

This subinternship is designed to give students in-depth experience in the clinical management of patients on the Endocrine and Surgical Oncology Service (Unit I Service). Students will serve as clerks and will be responsible for patient management with house staff under the guidance of the chief resident and attending surgeons. Clinical exposure is focused on thyroid and parathyroid surgery, as well as breast oncology, melanoma, and soft-tissue sarcomas. The course will offer opportunities for students to gain experience in preoperative, intraoperative, and postoperative patient management. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy and provide care under house staff and faculty guidance, as well as ample opportunity to attend and participate in conferences.

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**M95 Surgery 864 Ethical Challenges in Surgery and Medicine**

This elective will involve exploration of the ethical challenges discussed during didactic conferences and in clinical settings within the Department of Surgery at Washington University in St. Louis School of Medicine. The student will be guided through readings, discussions, and projects by department faculty members with expertise in clinical ethics. The elective will result in a manuscript ready to be revised/finalized for publication submission with the student as lead author. This elective provides the opportunity to work closely with faculty mentors and should appeal to any student interested in the ethical and humanitarian challenges facing physicians in particular and society in general.

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**M95 Surgery 871 Vascular Surgery Subinternship**

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Vascular Surgery Service. The elective will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative management of patients with surgically treated

vascular diseases/conditions. Students will serve as clerks and will be responsible for patient management with house staff under the guidance of the fellow and attending surgeons. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy, and provide care under house staff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Notice: If a student desires to work more closely with a specific attending, he/she must make special arrangements with the faculty member prior to beginning this elective.

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**M95 Surgery 879 Hepatobiliary-Pancreatic Surgery Subinternship**

This subinternship is designed to give students in-depth experience in the clinical management of patients on the Hepatobiliary-Pancreatic (HPB) Service. The HPB Service is a busy upper gastrointestinal service with a focus on hepatobiliary and pancreatic diseases and their treatment. The course offers opportunities for students to gain experience in preoperative, intraoperative, and postoperative patient management. Students will serve as clerks and will be responsible for patient management with house staff under the guidance of the fellow, chief resident and attending surgeons. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy, and provide care under house staff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Note: If a student desires to work more closely with a specific attending, he/she must make special arrangements with the faculty member prior to beginning this elective.

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**M95 Surgery 880 Pediatric Surgery Subinternship**

This subinternship will expose the student to a wide variety of pediatric surgical cases. This includes the preoperative and postoperative care of patients as well as the care of pediatric trauma patients. Daily walking or sit-down rounds are made with the resident, nurse practitioner, and attending staff, and participation is expected in the pediatric surgery clinic and the operating room. Weekly conference attendance is mandatory and includes mortality and morbidity, radiology, pathology, solid tumor board, ED/trauma, and GI conferences. Students have the opportunity to understand the widely differing anatomy and physiology of patients ranging from newborn infants to teenagers and young adults. The student functions as a team member and assumes level-appropriate responsibilities as determined by senior team members in this highly specialized care field.

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**M95 Surgery 891 Organ Transplantation Subinternship**

The care of transplant patients requires the integration of multiple diverse medical and surgical disciplines. This subinternship in organ transplantation encompasses the preoperative evaluation and management of adult and pediatric recipients of liver, kidney, and pancreas. Students participate in procurement of allografts from cadaveric or living donors, organ preservation, and transplantation. Emphasis is also placed on postoperative care, multimodality immunosuppression and management of allograft rejection. Basic hepatic and renal physiology, fluid and electrolyte balance, and transplantation immunology are stressed. Rotation provides an elaborate exposure to different facets of management of end stage renal and liver disease. Management of the complications of diabetes, hypertension, portal hypertension, and infectious problems are an integral part of pre- and post-transplant care. This course is designed to offer the student an overview of the field of organ transplantation, however, in addition to transplant surgery,

students will also get some exposure to vascular access and hepatobiliary surgery. The student functions as a member of the transplant team and assumes appropriate responsibilities under supervision.

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#### **M95 Surgery 893 Minimally Invasive Surgery Subinternship**

This subinternship elective in minimally invasive surgery is offered by the Chief of the Section of Minimally Invasive Surgery in the General Surgery Division. Surgeons in the Minimally Invasive Surgery group regularly perform the following procedures laparoscopically: cholecystectomy, splenectomy, adrenalectomy, hiatal hernia repair, endoscopic myotomy for achalasia, inguinal hernia repair, ventral hernia repair, complex abdominal wall reconstruction, robotic surgery, and bariatric surgery for morbid obesity. The medical student electing this rotation will participate in the outpatient office and direct patient care, assist and observe in a wide range of laparoscopic procedures and participate in teaching rounds and conferences. During this rotation, the student will also have the opportunity to observe and participate in minimally invasive surgical procedures performed by various surgeons within the Section of Minimally Invasive Surgery and will function as an acting intern.

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#### **M95 Surgery 900 Research Opportunities-Surgery**

Research opportunities may be available. If interested, please contact the department of Surgery.

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## People of the School of Medicine

### Faculty & Staff

#### Staff

For staff contact information, please visit the Washington University online directory (<http://wustl.edu/directory/>).

For access to online directories for Washington University, Washington University Physicians and BJC HealthCare, please visit the Washington University School of Medicine's online directories (<http://medicine.wustl.edu/directory/>).

#### Faculty

The All Faculty List of the online *Bulletin* is drawn from Washington University human resources data and provides academic appointments and education details. To update or change a faculty member's *Bulletin* listing, please contact the human resources representative for the department, division or program.

#### Students

For student contact information, please visit the Washington University online directory (<http://wustl.edu/directory/>).

## Faculty Committees

### Committees and Committee Members

This section of the *Bulletin* presents faculty committees, which govern various aspects of School of Medicine activities related to research, patient care and education. Their purpose is to help ensure that the school's activities are carried out in compliance with university policies as well as with state and federal law.

### Executive Faculty Members

#### Voting Members

David H. Perlmutter

*Executive Vice Chancellor for Medical Affairs*

*George and Carol Bauer Dean of the School of Medicine*

*Spencer T. and Ann W. Olin Distinguished Professor*

*Chair, Executive Faculty*

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Michael S. Avidan

Craig A. Buchman

Richard J. Cote

Victoria J. Fraser

Benjamin A. Garcia

Dennis E. Hallahan

Dineo Khabele

Jin-Moo Lee

Eric J. Lenze

Todd P. Margolis

Jeffrey D. Milbrandt

Regis J. O'Keefe

John A. Olson

David W. Piston

Linda J. Richards

Gary A. Silverman

Lilianna Solnica-Krezel

Richard L. Wahl

Sean P. J. Whelan

Gregory J. Zipfel

Timothy J. Eberlein

*Director, Siteman Cancer Center*

Joseph P. Vogel

*Vice Chair, Executive Committee of the Faculty Council*

Karen Norton

*Voluntary Faculty Representative*

#### Ex Officio

Andrew D. Martin

*Chancellor*

Beverly Wendland

*Provost*



## Faculty Council

The Faculty Council consists of all full-time and certain part-time (employed by the School of Medicine at greater than or equal to 0.5 FTE) members of the faculty with the rank of professor, associate professor or assistant professor as well as those instructors (full-time or part-time if employed by the School of Medicine at greater than or equal to 0.5 FTE) who have been on the faculty for at least three years.

## Executive Committee of the Faculty Council (ECFC)

Gregory F. Wu  
*Chair*

Joseph P. Vogel  
*Vice Chair*

For a full list of committee members, please visit the Executive Committee of the Faculty Council website (<https://ecfc.wustl.edu/>).

## Institutional Animal Care and Use Committee

Dr. John Cirrito  
*Chair*

Please visit the Institutional Animal Care and Use Committee ([http://research.wustl.edu/Offices\\_Committees/ASC/Pages/default.aspx](http://research.wustl.edu/Offices_Committees/ASC/Pages/default.aspx)) website for information.

## Committee on the Academic and Professional Evaluation of Students

Linda J. Pike, PhD  
*Chair*

Kari Allen, MD  
Paul Bridgman, PhD  
Steven Cheng, MD  
Erika C. Crouch, MD, PhD  
Brian Edelson, MD, PhD  
Melissa Harbit, MD  
Henry Huang, PhD  
Nigar Kirmani, MD  
Robert Naismith, MD  
Casey Pruitt, MD  
Deborah Rubin, MD

## Ex Officio

Eva Aagaard, MD  
Tom De Fer, MD  
Michael Donlan, PhD  
Lisa M. Moscoso, MD, PhD  
Valerie Ratts, MD  
Will R. Ross, MD, MPH  
Karen Winters, MD

## Committee on Admissions

Valerie S. Ratts  
*Chair*

For a full list of committee members, please visit the Medical Student Admissions website (<https://mdadmissions.wustl.edu/how-to-apply/selection-process/admissions-committee-bios/>).

## Committee on Fellowships and Awards

Jeffrey Miner, PhD, Department of Medicine  
*Chair*

Sharon Cresci, MD, Department of Medicine  
Alison Snyder-Warwick, MD, Department of Surgery

## Committee on Student Financial Aid

Bridget O'Neal  
*Chair*

Valerie S. Ratts, MD  
Greg Polites, MD

## Conflicts of Interest Review Committee

Robert Gropler, MD  
*Chair*

For a full list of committee members, please visit the Office of the Vice Chancellor for Research website (<http://research.wustl.edu/ComplianceAreas/COI/Committees/Pages/default.aspx>).

## Human Research Protection Office (HRPO)

### Washington University Institutional Review Board (IRB)

Amanda F. Cashen, MD  
*Executive Chair of the IRB*

### Human Research Protection Office (HRPO)

Jeanne Velders, JD, CIP  
*Executive Director*

For more information, please visit the Human Research Protection Office website (<https://hrpo.wustl.edu/>).

## Human Research Quality Assurance/Quality Improvement Committee

Edward M. Geltman  
*Chair*

Beau Ances  
*Vice Chair*

For a full list of committee members, please visit the Human Research Quality Assurance Program webpage (<https://research.wustl.edu/offices/hrqa/>).

## Institutional Biological and Chemical Safety Committee

Michael Caparon, PhD  
*Co-Chair*

Henry Huang, PhD  
*Co-Chair*

Ed Casabar, PharmD  
Michael Diamond, MD, PhD  
Scott Handley, PhD  
Bijal Parikh, MD, PhD  
Barbara Joy Snider, MD, PhD

### Ex Officio

Chad Faulkner, DVM, PhD  
Lance Franklin, PhD, PE, CHMM  
Susan Cook, PhD, CBSP(ABSA), SM(NRCM)  
Brian Dieckgraefe, MD, PhD

### Alternates

Ken Boschert, DVM  
Angela Hall, PhD

### Public Members

Melinda Darnell  
Robert Koehler  
Paul Mercurio

## Medical School Faculty Rights Committee

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*Co-Chair (2021)*

James A.J. Fitzpatrick, BSc, PhD  
*Co-Chair (2021)*

Judith E.C. Lieu, MD (2022-R)  
Anna N. Miller, MD (2022-R)  
Daniel R.C. Nieva, MD (2022-R)  
Tabassum Ahmad, MD (2023-A)  
Ali H. Ellebedy, PhD (2023-A)  
Kamlesh B. Patel MD, MSc (2023-A)

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Wayne M. Yokoyama  
*Program Director*

Megan A. Cooper  
*Associate Director*

Jorge Di Paola  
*Associate Director*

Nathan O. Stitzel  
*Associate Director*

For a full list of committee members, please visit the Medical Scientist Training Program website (<http://mstp.wustl.edu/about%20mstp/Pages/Administration.aspx>).

## Radiation Safety Committee

Barry A. Siegel, MD  
*Chair*

Buck E. Rogers, PhD  
*Vice Chair*

Maxwell Amurao, PhD  
*Radiation Safety Officer and Executive Secretary*

For a full list of committee members, please visit the Department of Radiation Safety website (<https://ehs.wustl.edu/about/committees/>).

## Radioactive Drug Research Committee

Barry A. Siegel, MD  
*Chair*

Thomas H. Schindler, MD  
*Vice Chair*

For a full list of committee members, please visit the Department of Radiation Safety website (<https://ehs.wustl.edu/about/committees/>).

## Alvin J. Siteman Cancer Center Protocol Review and Monitoring Committee (PRMC)

### Co-Chairs

- Meagan Jacoby, MD, PhD
- Brad Kahl, MD
- Julie Margenthaler, MD
- Yikyung Park, ScD
- Cliff Robinson, MD

For a full list of committee members, please visit the PRMC website (<https://siteman.wustl.edu/research/clinical-research-resources/protocol-review-and-monitoring-committee/>).

## Alvin J. Siteman Cancer Center Quality Assurance and Safety Monitoring Committee (QASMC)

Nancy L. Bartlett, MD  
*Chair*

For a full list of committee members, please visit the QASMC website (<https://siteman.wustl.edu/research/clinical-research-resources/quality-assurance-and-safety-monitoring/>).

## Officers

### Board of Trustees

Please visit the Board of Trustees website for the list of current trustees (<https://boardoftrustees.wustl.edu/trustees/>) and other information concerning the board.

### Emeritus Trustees

Please visit the Board of Trustees website for the list of emeritus trustees (<https://boardoftrustees.wustl.edu/emeritus-trustees/>) and other information concerning the board.

## Officers of the University Administration

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## Officers of the School of Medicine

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*Executive Director, Graduate Medical Education*

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*Assistant Dean for Educational Technology and Innovation*

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TBA  
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*Representative to the Graduate Professional Council (GPC Rep)*

## Policies & Guidelines of the School of Medicine

The policies and guidelines listed here relate to Washington University's and the medical school's educational mission. These policies, procedures and guidelines exist to assist Washington University students, faculty and administrators with doing the business of Washington University in St. Louis in ways that are effective, consistent and compliant and to provide a safe, effective and supportive environment in which to learn, teach and work.

## Washington University Policies & Guidelines

Some universitywide policies are available on the University Policies page (p. 6) of this *Bulletin*. A more complete list is available on the Washington University Compliance and Policies page (<https://wustl.edu/about/compliance-policies/>).

## School of Medicine Policies & Guidelines

Washington University School of Medicine is committed to providing a safe, professional and supportive environment in which to learn. These policies and guidelines pertain to professionalism, appropriate conduct and student rights. They exist to protect students and employees as they conduct their daily responsibilities.

- Liability Insurance (p. 358)
- Needle Stick and Blood and Body Fluid Policy and Procedure (p. 359)
- Policy on Student Rights Under the Family Educational Rights and Privacy Act (p. 360)

### **Definition of the Academic Record for MD Students:**

*This policy is designed to comply with the provisions of the Family Educational Rights and Privacy Act (FERPA) of 1974. Student academic records at Washington University School of Medicine consist of the following: AMCAS application (including personal statement, experience history, MCAT scores, transcripts from previously attended institutions); documents signed by the student (including the WUSTL confidentiality non-disclosure agreement and the BJC Healthcare third-party electronic information access confidentiality agreement); criminal background check information; student biographic and demographic information; transcripts of all medical school course work, program(s) of study, and dates of enrollment in medical school (including matriculation date, start and end of each academic period, dates of leaves of absence, withdrawal, dismissal, and/or graduation); USMLE scores (including exam date and notation of pass/fail); final performance evaluations (final end-of-clerkship patient care narratives, competency determination notification letters of the Competency Attainment Committee, and promotion notification letters from the Committee for Academic Promotion); documentation of determination appeals; change of status forms (related to leaves of absence, participation in joint degree programs, academic remediation requiring delay, name change, and documentation of dismissal or withdrawal); final disposition of disciplinary action records; the Medical Student Performance Evaluation (MSPE); a copy of the medical school diploma and an English translation; awards and prizes; and residency specialty and placement.*

- Professionalism & Conduct Policies (p. 360)
  - Policy Against Abusive Conduct (p. 360)
  - Research Integrity Policy (p. 360)
  - Social Media Policy (p. 360)
  - Student Organization Alcohol Guidelines (p. 361)
- Student Mistreatment Reporting and Monitoring Policy (p. 364)

## MD Program Policies & Guidelines

These policies and guidelines pertain to the four- and five-year medical degree programs as well as to the MD portion of joint degree programs. Full information about the Student Constitution and Bylaws can be found in Canvas (<https://md.wustl.edu/academics/learning-management-technology-canvas/>).

Please note that the MD Program Policies & Guidelines are subject to change as needed; effective dates will be noted.

### All MD Students

- Access to Healthcare Services Policy (p. 367)
- Clinical Supervision Policy (p. 368)
- Conflict of Interest During Student Assessment Policy (p. 369)
- Duty Hour Policy (p. 369)
- Grade Notification Policies and Procedures (p. 371)
- Policy for Non-Involvement of Providers of Student Health Services in Student Assessment (p. 371)
- Policy for the Preparation of the Medical Student Performance Evaluation (p. 371)
- Policy for Tuition Refund for the MD Program (p. 372)
- Technical Standards for the Medical Program (p. 372)
- Transportation Policy (p. 373)

### Gateway Curriculum Students

- Challenging the MSPE and Individual Competency-Contributing Assessments (p. 373)
- Formative Assessment and Feedback (p. 374)
- Monitoring of Student Time (p. 376)
- Narrative Assessment (p. 376)
- Phase 1 Attendance Policy (p. 377)
- Phase 2 Attendance Policy (p. 378)
- Phase 3 Attendance Policy (p. 379)
- Policy for the Preparation of Non-Faculty Instructors for the WUSM MD Program (p. 380)
- Procedure to Request an Alternate Educational Site or Clinical Assignment (p. 381)
- Professional Behaviors for MD Students in the Gateway Curriculum (p. 381)

## Promotion and Appeals for the Gateway Curriculum

- Policy for Review of Student Attainment of Competency (p. 381)
  - Committee for Academic Promotion Bylaws (p. 382)
  - Competency Attainment and Clerkship Competency Committees' Bylaws (p. 383)
- Policy for Student Promotion and Appeals (p. 386)
  - Contesting Individual Assessments Procedure (p. 387)
  - Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 387)
  - Course Credit Procedures (p. 389)

## Legacy Curriculum Students

- CAPES – Assessing Academic Achievement & Professionalism (p. 389)
  - Grade Point Average, Class Ranking, and Grade Distributions (p. 399)
  - Grading System (p. 400)
  - Professionalism (p. 400)
  - Remediation (p. 403)
- Clerkship Grade Appeals (p. 403)
- Clinical Absence Policy (p. 404)
- Exam Expectations for Faculty (p. 405)
- High-Stakes Exam Expectations for Students (p. 406)
- Leave of Absence Policy (p. 406)
- Student Status and Benefits (p. 407)
- USMLE (p. 408)

## Non-Curricular-Related Policies

- Advanced Standing Transfers Policy for Medical Students (p. 408)
- Non-University-Affiliated Speaker Compensation (p. 409)
- Policy on External Factors (p. 409)
- Policy on the Final Authority of the Committee on Admissions (p. 409)
- Policy on the Selection of Students (p. 410)

## Health Professions Policies & Guidelines

For information regarding the policies and guidelines of the following degrees and programs, please visit these sites:

- Applied Health Behavior Research (<https://crtc.wustl.edu/programs/degrees/ahbr/>)
- Audiology and Communication Sciences (<https://pacs.wustl.edu/programs/>)
- Biology and Biomedical Sciences (<http://dbbs.wustl.edu/curstudents/DBBSStudentPolicies/Pages/DBBSStudentPolicies.aspx>)

- Biomedical Engineering (<https://bme.wustl.edu/graduate/phd/Pages/default.aspx>)
- Biostatistics (<https://biostatistics.wustl.edu/>)
- Clinical Investigation (<https://crtc.wustl.edu/programs/degrees/msci/>)
- Doctor of Philosophy (<http://graduateschool.wustl.edu/policies-procedures/>)
- Genetic Counseling (<https://sites.wustl.edu/gencounseling/program-information/>)
- Occupational Therapy (<https://www.ot.wustl.edu/about/resources-118/>)
- Physical Therapy (<https://pt.wustl.edu/student-resources/>)
- Population Health Sciences (<http://mphs.wustl.edu/>)
- Public Health (<http://bulletin.wustl.edu/brownschool/policies/>)

## PhD & Joint Degree Program Policies & Guidelines

For policies and guidelines relating to any joint degree program, please refer to the MD program section of this page and the policies and guidelines for the respective program areas.

- Doctor of Medicine (Five-Year Program) (p. 357)
- Doctor of Medicine and Master of Science in Clinical Investigation (<https://crtc.wustl.edu/courses/class-list/academic-policies/>)
- Doctor of Medicine and Master of Population Health Sciences (<http://mphs.wustl.edu/>)
- Doctor of Medicine and Master of Public Health (<http://bulletin.wustl.edu/brownschool/policies/>)
- Doctor of Medicine and Doctor of Philosophy (<http://dbbs.wustl.edu/curstudents/DBBSStudentPolicies/Pages/DBBSStudentPolicies.aspx>)
- PhD Program Policies & Guidelines (p. 410)

## School of Medicine Policies and Guidelines

### Liability Insurance

*—This information applies to all School of Medicine students.—*

Washington University provides general liability insurance for all students or practicums while participating in required clinical experiences. In addition, Washington University voluntarily provides a defense and indemnification benefit for matriculated students who are candidates for the MD degree at Washington University School of Medicine.

The benefit is provided to School of Medicine students for the defense and indemnification of claims arising out of activities that are part of academic programs and only while a student is acting in their capacity as a medical student enrolled in the

undergraduate medical program at the School of Medicine. This policy is subject to terms, conditions, limitations and exclusions, and each request for defense/indemnification will be decided on a case-by-case basis at the sole discretion of the university.

Defense/indemnification will not be provided for any criminal acts, acts committed while under the influence, acts in violation of law, acts in which the injury or damage results from intentional malicious conduct or wrongdoing, or acts for which the action or proceeding is brought by or on behalf of Washington University. This indemnification does not cover any liability that is insured elsewhere, but it may be in excess of any amount payable under any other such insurance.

## Reporting An Incident

Any incident — either actual or alleged — involving patient injury that could lead to a claim, of which a student has knowledge, must be reported immediately to the Risk Management Office of the School of Medicine.

## Needle Stick and Blood and Body Fluid Policy and Procedure

*—This policy applies to all School of Medicine students.—*

### Background

In keeping with Liaison Committee on Medical Education (LCME) element 12.8, this document outlines the education of medical students about exposure prevention; the procedures for care and treatment after exposure; the definition of financial responsibility in care and treatment; and the effects of infectious and environmental disease or disability on learning.

### Policy

1. Students are introduced to the concept of infection control and work-related exposure during their first year of medical school. Education and training regarding exposures will be updated annually throughout the School of Medicine.
2. All exposures to human blood and body fluids are to be reported immediately to the School of Medicine's Student Health Services (<https://studenthealth.med.wustl.edu/>), which maintains a 24-hour reporting system. Students, including visiting students, must contact Student Health Services between 8 a.m. and 4 p.m., Monday through Friday, to report an exposure to blood and/or bodily fluid. The main contact number is 314-362-3523, and the after-hours contact number is 314-871-2966.
3. There are standardized protocols for exposures at the School of Medicine that involve HIV, HBV and HCV (please see below).
4. The financial coverage of the evaluation and treatment is fully covered by Student Health Services.
5. Students who are infected with any other potentially transmissible disease will not be excluded from participating in patient care activities or restricted in their access to patient care services or facilities because of their health status, unless medically based judgments in individual cases establish that exclusion or restriction is appropriate for the welfare of patients, the welfare of other member of the patient care community, or the welfare of the individual. Please refer to the School of Medicine Technical Standards for the Medical Program (p. 372) for additional information.

## Procedures

### Always Wear Personal Protective Equipment!

### Needle Stick Procedure

1. Cleanse the wound immediately with soap and water. If a mucous membrane has been exposed, rinse with copious amounts of water.
2. Identify the source of exposure.
3. Call Student Health Services for further instructions. The source patient will be evaluated for HIV, HBV and HCV. The physician in charge of the case is responsible for acquiring patient consent for testing. The employee or student will notify the physician. All source patient charges will be the responsibility of Student Health Services.
4. Complete the Injury/Exposure Report form.
5. Employees and students will report to Student Health Services for follow-up treatment. Individuals will be evaluated for the following:
  - a. HIV or serum sample save
  - b. HBV vaccination
  - c. Hepatitis B surface antibody testing (a positive test in the past eliminates the need for further testing)
  - d. HCV vaccination
  - e. Tetanus and diphtheria vaccination
  - f. Post-exposure prophylaxis

### Exposure to Blood or Body Fluid Procedure

1. Clean the area with soap and water.
  - a. Wash needle sticks and cut areas with soap and water.
  - b. Flush splashes to the nose, mouth or skin with water.
  - c. Irrigate the eyes with clean water or saline for 15 minutes.
2. Identify the source of exposure. Keep the source or patient available for HIV, HBV antigen and HCV testing.
3. Call Student Health Services for further instructions.
4. Follow the instructions given by Student Health Services. Complete an incident report.

*Last approved on October 3, 2022*



## Policy on Student Rights Under the Family Educational Rights and Privacy Act

*—This policy applies to all School of Medicine students.—*

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects student information.

The law also gives individual students certain rights:

- The right to inspect and review education records
- The right to seek the amendment of education records
- The right to consent to the disclosure of education records
- The right to obtain a copy of the school's FERPA policy (<http://sites.wustl.edu/universityregistrar/student-records/ferpa-privacy/washington-university-ferpa-policy/>)
- The right to file a complaint with the FERPA office in Washington, D.C.

### Student Directory Information

Although most information about a student is considered private and no one other than school officials (i.e., faculty and staff) with a legitimate educational interest may have access to it without the written consent of the student, certain categories of information designated as "directory information" may be disclosed by Washington University without obtaining the prior consent of the student.

Through WebSTAC (<https://acadinfo.wustl.edu/>), Washington University students have control over the release of their directory information.

Information with the "directory information" designation is as follows:

- Full name
- Home and local addresses and telephone numbers
- Email address
- Photographic, video or electronic image (picture)
- Academic division and major field of study
- Dates of attendance
- Previous schools attended
- Graduation dates and degrees received at Washington University
- Class (affiliated degree year)
- Academic awards
- Participation in intercollegiate activities
- Height and weight (National Collegiate Athletic Association Division III athletes only)

Refer to the full text of the Washington University FERPA Policy (<http://sites.wustl.edu/universityregistrar/student-records/ferpa-privacy/washington-university-ferpa-policy/>) for more information.

### Privacy Information for Parents

In accordance with federal law under the FERPA, the university may choose to release information about a student's academic performance to a parent if the student is claimed as a legal dependent on that parent's most recent federal income tax return. However, the university is not required to do so and prefers that students take the initiative to disclose and discuss academic goals and progress with their parents.

## Professionalism & Conduct Policies

*—These policies apply to all School of Medicine students.—*

### Policy Against Abusive Conduct

Please visit the Human Resources website for the Policy Against Abusive Conduct (<http://hr.med.wustl.edu/Policies/Pages/AbusiveConduct.aspx>).

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## Research Integrity Policy

Allegations of breach of the Research Integrity Policy are the primary responsibility of the Research Integrity Committee of the School of Medicine. Complaints regarding students enrolled for the MD degree will be directed promptly to that committee. The Research Integrity Committee will promptly investigate the charges and report its conclusions and recommendations to the dean, who will refer the issue to the Committee on the Academic and Professional Evaluation of Students (CAPES) as a breach of professional integrity if further action is warranted.

For further information, visit the Research Integrity Policy (<https://research.wustl.edu/washington-university-research-integrity-policy/>) posted on the Washington University website.

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## Social Media Policy

Students accepted to Washington University School of Medicine (WUSM) and current WUSM should be vigilant in their use of social networking (e.g., Facebook, Twitter, blogging). The profession of medicine requires the highest standards of conduct because of the level of trust patients place in medical professionals. When students are admitted to WUSM, enrollment remains contingent on their demonstration of this high standard of conduct through sound judgment, accountability and integrity. Written, voice, email and other electronic communications — including those used in blogs, social media sites and smart phone apps, as well as in published writing — should be thoughtful, and all individuals in the learning environment should be treated with mutual respect and understanding. Posting items

that represent unprofessional behavior, releasing patient health information or other HIPAA violations, or violating Washington University in St. Louis policies on social networking sites will result in disciplinary action by the medical school.

The following two Washington University policies are incorporated into this policy and apply to accepted and current students:

- Washington University Social Media Policy (<https://wustl.edu/about/compliance-policies/media-policies/social-media-policy/>)
- WUSM Social Media Guidelines (<https://medicine.wustl.edu/brand/social-media/>)

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## Guidelines Governing Alcohol Service at Events Sponsored by Student Organizations at the Washington University School of Medicine

### I. General Principle on Alcohol Service at Events Sponsored by Graduate and Professional Students and Organizations at Washington University in St. Louis

Washington University in St. Louis (WashU) has adopted a Drug and Alcohol Policy (<http://hr.wustl.edu/policies/Pages/DrugandAlcoholPolicy.aspx>) reinforcing our commitment to an education, work, living and patient care environment that is free of alcohol and drug abuse. Given our mission to support personal and public health, students of the School of Medicine (WUSM) have a particular responsibility to recognize alcohol impairment and the potentially dire social, physiological and psychological consequences of substance use and abuse. For information regarding the effects of alcohol and drug use and abuse and to learn about available counseling services, please consult the School of Medicine's Student and Occupational Health Services (<https://wusmhealth.wustl.edu/students/>).

As adults, students are expected to know and abide by all applicable state and federal laws and university policies and procedures. State law makes it illegal for a person under the age of 21 years old to purchase, attempt to purchase, or possess any intoxicating liquor. Violation can subject an individual to a fine between \$50 and \$1,000 and/or imprisonment for a maximum term of one year. County and municipality ordinances contain similar prohibitions and sanctions.

WashU expects its students and community members to exercise responsible decision making if they choose to include alcohol as part of their activities, including making sound judgments about whether, when, and how much to drink.

Individual students are responsible for their own behavior and will be held to university and school policies should their behavior not conform to standards of conduct. Individuals may also be referred for criminal prosecution.

If a student organization provides alcohol as part of an event, student organizers share in the responsibility of providing a safe environment for all attendees and must prioritize the safety, health, and well-being of participants when planning and hosting an event. Student organizations may also be held accountable for the actions of their members through university and school policies.

Student organizations are expected to follow the guidelines below when hosting events with alcohol. Individual schools and certain venues retain the discretion to impose additional guidelines on student organizations and events. For more information, contact the Office of Medical Student Affairs (<https://md.wustl.edu/resources/offices-and-contacts/office-of-medical-student-affairs/>) or the student services office of the applicable WUSM program.

## II. Event Protocols

### A. Registration

1. Any on- or off-campus event sponsored by a recognized student organization of the school or the university as a whole must comply with the Drug and Alcohol Policy of Washington University in St. Louis, the procedures set forth in these guidelines, and all other applicable university policies.
2. Any on-campus event involving alcohol funded in part by the Office of Medical Student Affairs or by the applicable WUSM student services office and not sponsored by the school itself must be sponsored by a recognized student organization.
3. All events with alcohol need to be registered with and approved by the Office of Medical Student Affairs or the student services office of the applicable WUSM program. Depending on the nature and location of the event, approval from multiple departments within the university or school may be required. Approval for the event should be obtained no less than one week before the event is scheduled to take place. Failure to obtain approval for an event with alcohol during this time frame will likely lead to the event being rescheduled or cancelled. An event may not be publicized until it is approved by the Office of Medical Student Affairs or the student services office of the applicable WUSM program and any other applicable department (e.g., Protective Services).
4. To register an event, an event registration form (<https://meet.wustl.edu/services/catering/catering-alcohol-guidelines/>) must be submitted to the Office of Medical Student Affairs or the student services office of the applicable WUSM program no less than two weeks before the proposed event.

## B. Marketing

1. Organizations may not plan events that promote or encourage the consumption of alcohol as the main focus of the event. The theme of all events at which alcohol is served must be primarily social, cultural or educational. Alcohol may be implied in campus advertising of the event to graduate and professional students using conventional phrases such as "happy hour" or "cocktail reception."
2. Student organization events marketed and open to the general public or to undergraduate students are not permitted to include alcohol.
3. Persons planning events should remember that the vast majority of events at WashU take place without alcohol, that most members of the undergraduate community are not of legal drinking age, and that many members of our community do not drink alcohol beverages at all.
4. The following are examples of prohibited depictions of excessive alcohol consumption in the advertisement or promotion of events:
  - Excessive or underage consumption or use of alcoholic beverages
  - All-you-can-drink activities
  - Drinking games
  - Price specials on alcohol
  - Promotions or prizes featuring alcohol

## C. Event Location

1. Student organizations should check in advance with the Office of Medical Student Affairs or the student services office of the applicable WUSM program, the WUSM Operations & Facilities Management Department (<https://facilities.med.wustl.edu/>), Danforth Event Management (<https://eventmanagement.wustl.edu/>), or the appropriate WashU office for the reservation of specific event locations and any separate guidelines (including reservation deadlines) applicable to that space. Where separate guidelines are applicable and may conflict with the guidelines herein, the more restrictive guidelines should be followed.
2. When alcohol is permitted, the space must be secured (or, for outdoor locations, roped off as necessary) to ensure that proper admittance and alcohol distribution can be regulated easily and effectively.

## D. Alcohol Types

1. Only beer and wine are permitted.
2. Hard liquor — including (but not limited to) grain alcohol, punches and mixed drinks — is not permitted at events.
3. Glass bottles are not permitted on campus and are discouraged at off-campus venues.
4. Kegs or other bulk containers of alcoholic beverages are not permitted.

## E. Food and Alternative Beverages

1. Food must be provided at all events where alcohol is served. The food options must include plentiful and appetizing nonsalty foods that are readily available, free, and displayed in an attractive manner.
2. Nonalcoholic beverages, including water, should also be readily available and free.
3. The food and nonalcoholic beverages should be replenished several times throughout the event so that they are continuously available.

## F. Distribution of Alcohol

1. In compliance with Missouri law and university policy, alcohol must be served in a controlled manner and may not be freely accessible. A central point of distribution must be designated to allow for proper identification.
2. Alcohol must not leave the confines of the event. The "responsible contacts" and security staff are responsible for ensuring that alcohol does not leave the event.
3. Under the law, no one who is under the age of 21 years or who is disorderly, disruptive, visibly intoxicated, or known to be a "habitual drunkard" may be served.
4. Regardless of who is managing distribution, the age of all attendees must be verified. Acceptable forms of identification are limited to the following: (1) a current driver's license from any U.S. state; (2) a U.S. military identification card; (3) a state of Missouri special identification card; or (4) a passport. Please note that a foreign driver's license and a special identification card from a state other than Missouri are not acceptable forms of identification.
5. If the server is not checking identification before serving each drink and if persons under 21 years old are permitted at the event, those guests who are 21 years old or older must be designated with a wristband or otherwise in a clear manner that is not easily replicated. For example, it is not permissible to mark hands with a marker or pen.
6. Those who serve alcohol and those who check proof of age and identification for any event may not consume or be under the influence of alcohol during the event.
7. Only one drink at a time may be served to each person. Each drink is not to exceed 12 ounces of beer or 5 ounces of wine. Guests are limited to a total maximum of one drink for each hour of the event (e.g., if the event lasts three hours, a guest may be served three drinks over the entirety of the event).
8. Alcohol distribution must conclude 30 minutes before the event ends.
9. Options for distribution must be discussed with and approved by the Office of Medical Student Affairs or the student services office of the applicable WUSM program. Depending on the nature and location of the event, options may include the following:

a. **Student organization servers:** Student organization members may order, set up, and control distribution of the alcohol at the event independently in compliance with these guidelines if attendance is less than 40 guests, including members of the sponsoring organization(s). Prior to the event, the student organization must designate which member(s) will act as server(s). Servers must always be present at the location where the alcohol is provided in order to monitor guests' consumption and to ensure that no persons under the age of 21 years receive alcohol. The practice of "self-serve," in which individual guests serve themselves from a common container or source, is prohibited.

b. **Third-party bartenders:** Student organization members may purchase alcohol, and a third-party bartending company with the requisite liquor license or permit may set up and control distribution of the alcohol at the event. Bartenders will be responsible for checking the identification of the guests.

c. **Third-party caterers:** Student organizations may contract with a third-party vendor with the requisite insurance and liquor license or permit (e.g., Bon Appetit (<http://wusm.cafebonappetit.com/catering/>), Aramark) to acquire, set up, and control distribution of the alcohol at the event, including checking the identification of the guests.

- Some university event spaces require a third-party caterer to be used for the service of alcohol or food. Student organizers must check policies and guidelines in advance with the Office of Medical Student Affairs or the student services office of the applicable WUSM program, WUSM Facilities, Danforth Event Management, or the appropriate WashU office.
- If there is any possibility that event attendees may be less than 21 years old, student organizers must use option b or c to distribute alcohol.
- If alcohol is offered for sale (e.g., cash bar), if admission is charged, if donations are solicited to attend the event, or if money is otherwise changing hands between the guests and the organization for the event (e.g., charge for cups or glasses, charge for tickets), then the distribution of alcohol may only be provided through option c.

10. **Off-campus events:** If an event is held at an off-campus venue and alcohol is being provided by the student organization, the student organization must use option c, unless such service is provided by the venue. The owner of the event space must assume liability for the event, and the owner or caterer must have the requisite liquor permit and

acceptable liability insurance. Organizations should check with the Office of Medical Student Affairs or the student services office of the applicable WUSM program to ensure that all requirements are understood.

11. The selling of alcohol may not be used as a fundraiser for the sponsoring organization.

## G. Drinking Games and Other Games of Chance

1. There may be no games of chance, drinking games, contests, or other similar activities that induce, encourage, or result in the consumption of alcohol. Examples include but are not limited to beer pong, flip cup, kings, caps, Jenga, quarters, or other games in which binge drinking is encouraged.

## H. Responsible Contacts

1. At least one individual from the student organization per 25 attendees must be designated as a "responsible contact" for the event. More responsible contacts may be required based on the size, type and location of the event. Training for those wanting to serve as responsible contacts is available through the Office of Medical Student Affairs or the student services office of the applicable WUSM program.
2. Responsible contacts are not to consume or be under the influence of any alcohol prior to or during any portion of the event, including setup and cleanup. The responsible contacts must remain the same individuals throughout the entire event. These individuals are responsible for overseeing and ensuring the safety of the event, the distribution of alcohol, and the implementation of this policy throughout the entire event.
3. Responsible contacts are required to introduce themselves to the security guards, the venue representatives and WashU Protective Services. One responsible contact should serve as the primary liaison with these individuals/agencies.
4. Responsible contacts should monitor the consumption of alcohol by guests and take appropriate action by calling the police for emergency medical services if any guest displays signs of intoxication and is in need of medical attention.
5. The responsible contacts must end an event during which these guidelines are not being followed or other significant problems arise that jeopardize the security of the event or the safety of students. Security staff or Protective Services should be available to assist with closing down an event per the contacts' request. University staff may close an event at any time if the security of the event is jeopardized or if the safety of students is at risk. A university staff representative may be required to attend large-scale events.

## I. Attendance and Proper Identification

1. Participants who intend to consume alcohol must show proof of minimum drinking age by presenting a government-issued photo identification. Washington University identification, driver's licenses, and state or federally issued identification cards may be checked for validity at the point of entrance. Fake identification cards will be confiscated; students risk disciplinary action and/or referral to off-campus law enforcement authorities if they present false identification.
2. A line for admission should be in a well-lit area and well organized. A security guard may be responsible for checking proof of legal age and affixing wristbands.

## J. Guest Policy

1. For events at which guests are permitted, each WashU student is allowed to bring one guest. Students are responsible for the conduct of their guests, and guests must enter with their hosts.
2. Guest misconduct could lead to disciplinary action for the WashU student, and the guest could be subject to prosecution off campus. Verification of age and identity (i.e., driver's license or state or federally issued identification card) will be required of all attendees at the entrance to the event.

## K. WashU Police Department and WUSM Protective Services

1. The WashU Police Department (WUPD) or WUSM Protective Services should be notified of all on-campus programs for which alcohol has been requested. Such events may require the presence of officers or security guards or the implementation of other security measures. Costs associated with security will be the responsibility of the sponsoring organization.

## L. Security

1. Private security guards may be required to assist with the safety of participants and the security of the facility when total attendance involves more than 100 attendees, as determined by WUPD or WUSM Protective Services. For all events that require security, student organizations should anticipate that a minimum ratio of three guards plus one additional guard for every 50 attendees may be required. The sponsoring organization is responsible for contacting and arranging for guards or for ensuring that the venue provides appropriate security staff.
2. WUPD or WUSM Protective Services should be involved in planning for the most effective use of the contract security contingent prior to the event. An example of how guards may be stationed is as follows:

- At least one guard would be stationed at the main entrance of the event to check for WashU student identification, to monitor the guest policy, and to help determine if anyone who appears to be intoxicated should be refused entry.
- A second guard would be assigned to the point of alcohol distribution and, depending on the security services provided, could monitor or check identification for proof of legal age and assist with pulling drink tabs from wristbands, if applicable.
- Other guard(s) would serve as roamer(s) and be responsible for monitoring legal drinking, access to event space, and all entrances.
- Additional guards may be required based on the nature of the event and the expected attendance. Security costs are the responsibility of the sponsoring organization.

3. Security staff must come from a licensed and bonded security company. However, some off-campus venues may prefer to have their own staff serve in this capacity. The security guards, bartenders, caterers or designated organization members (depending on the nature of the event) are required to verify the age of each participant with identification that provides the date of birth. If the event is held outdoors or in an unsecured area, distinct identification (e.g., wristband, stamp) is required to identify attendees who are 21 years old and older; this is to ensure that those passing through the event do not receive alcohol.

## M. Post-Event Cleanup

1. For any event on campus at which alcohol is being served, the student organization planning the event must make arrangements for custodial services when the space reservation is made. Service requests should include additional trash cans and recycling bins. Large events must have cleaning staff during the hours of the event to remove trash and clean restroom facilities. All expenses are the responsibility of the sponsoring organization.

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## Related Policies

Transportation Policy for Medical Students on Clinical Assignments (p. 373)

## School of Medicine Programs Student Mistreatment Reporting and Monitoring Policy

—This policy applies to all School of Medicine students.—

## I. Student Mistreatment Definition

As explained in our Abusive Conduct (<https://hr.wustl.edu/items/abusive-conduct-policy/>) and Discrimination and Harassment (<https://hr.wustl.edu/items/discrimination-harassment-policy/>) policies, the School of Medicine is committed to maintaining an environment free from behavior that is abusive, discriminatory, or harassing or that involves the mistreatment of students or others in the learning and working environment. For definitions and examples of conduct that would be considered mistreatment prohibited by the university, please refer to these policies.

This document identifies the mechanisms and protocols for students to report mistreatment against them or for other individuals to report student mistreatment they have observed. This document also outlines the systems in place aimed at monitoring, addressing, and preventing the mistreatment of students in the learning environment.

## II. Steps for Reporting Student Mistreatment

The School of Medicine strongly encourages students who feel they have experienced mistreatment — and those who feel they have witnessed mistreatment of a student — to report it immediately, without fear of retaliation, using the following resources:

1. *WashU Learner Mistreatment Form*  
Students and other community members may submit a report through the WashU Learner Mistreatment Form ([https://wustl.ethicspointvp.com/custom/wustl/forms/mgr/form\\_data.asp?lang=en](https://wustl.ethicspointvp.com/custom/wustl/forms/mgr/form_data.asp?lang=en)), which can also be found on the Supporting a Fair Environment (SAFE) website (<https://sites.wustl.edu/safe/>). Washington University Human Resources receives all reports and will direct these reports to appropriate university or hospital administrators for a prompt response. The reporting portal allows for individuals to submit concerns anonymously, if preferred, and it allows for bidirectional communication through the portal via a password, even if the report is submitted anonymously.
2. *To any of the following administrators (noted per program):*

### Medical Student Program

- Senior Associate Dean for Education (<https://education.med.wustl.edu/about/leadership-team/>)
- Associate Dean for Student Affairs (<https://md.wustl.edu/resources/offices-and-contacts/office-of-medical-student-affairs/>)
- Associate Dean for Medical Student Education (<https://md.wustl.edu/resources/offices-and-contacts/medical-student-education/>)

### Division of Biology and Biomedical Sciences

- Interim Associate Dean for Graduate Education ([menneris@wustl.edu](mailto:menneris@wustl.edu))
- Executive Director of the Division of Biology and Biomedical Sciences ([cjeliti22@wustl.edu](mailto:cjeliti22@wustl.edu))
- Director, Diversity, Equity & Inclusion and Student & Alumni Affairs ([joeltdalton@wustl.edu](mailto:joeltdalton@wustl.edu))
- Director, Curriculum and Graduate Programs ([vigueira@wustl.edu](mailto:vigueira@wustl.edu))

### Program in Occupational Therapy

- Program Director (<https://www.ot.wustl.edu/about/our-people/lisa-tabor-connor-171/>)
- Education Division Director (<https://www.ot.wustl.edu/about/our-people/christine-berg-11/>)
- Clinical Operations Director (<https://www.ot.wustl.edu/about/our-people/patricia-nellis-65/>)

### Physical Therapy Student Program

- Program Director (<https://pt.wustl.edu/people/gammon-m-earhart-pt-phd-fapta/>)
- Education Division Director (<https://pt.wustl.edu/people/steven-ambler-pt-dpt-phd-mp/>)
- Associate Director of Professional Curriculum and Director of Clinical Education (<https://pt.wustl.edu/people/megan-m-burgess-pt-dpt-ocs/>)

### Program in Audiology and Communication Sciences

- Director of Audiology Studies (<https://pacs.wustl.edu/contactus/>)
- Director of Deaf Education Studies (<https://pacs.wustl.edu/contactus/>)
- Director of Finance and Student/Academic Affairs (<https://pacs.wustl.edu/contactus/>)

## Confidentiality and Anonymous Reporting

When receiving a confidential report, the university will strive to protect, to the greatest extent feasible, the confidentiality of persons reporting mistreatment and of those accused of mistreatment. Because of legal obligations, the university cannot guarantee complete confidentiality where it would conflict with the university's obligation to investigate meaningfully or, where warranted, to take corrective action. For example, if a report identifies conduct that would fall within Title IX (<https://hr.wustl.edu/items/discrimination-harassment-policy/>), the university may have an obligation to investigate and take further action that requires disclosure of all or part of the information contained in the report to the person accused as well as to appropriate administrators. In addition, if a report identifies

conduct that poses a significant threat to the health or safety of an individual, the university may also need to investigate and take further action that requires the disclosure of information contained in the report.

Even when some disclosure of the university's information or sources is necessary, it will be limited to the extent possible. The university will keep confidential all records of complaints, responses, and investigations to the extent permitted by law.

**Anonymous reports may be submitted through the reporting portal. If a reporter wishes to remain anonymous, the university may be limited in its ability to respond and take action with respect to the report.**

### III. Options for Possible Resolution

Students who believe they have been subjected to mistreatment or other reporters who believe they have witnessed student mistreatment have several options available if they wish to seek resolution of a situation. At any time, they may consult with a Discrimination and Harassment Response Coordinator (see below), whose responsibilities include assisting students, faculty, and staff with questions regarding university policies and options for addressing concerns about mistreatment.

If a student or reporter feels comfortable dealing with the situation without assistance, they can communicate either orally or in writing with the person whose behavior is of concern. The most useful communication clearly describes the conduct of concern as well as its impact on the student and a request that the behavior should stop. Frequently, such a communication will cause the behavior to stop, particularly when the person may not be aware of its impact.

If a student or reporter would like to discuss a situation and possible options for resolution with the assistance of someone else, they may also consider the following: (1) asking a trained WUSM SAFE (Supporting A Fair Environment) Committee member to meet with them or to speak to the person whose behavior is of concern; or (2) consulting with one of the advisors listed below about other potential options to remedy the situation. As previously mentioned, these individuals may be obligated to report the incident or conduct disclosed to the university for further review (e.g., sexual assault or harassment, threat of harm to self or others).

Students may also initiate a more formal complaint process, which could involve a committee hearing, by contacting a Discrimination and Harassment Response Coordinator. If it has not already done so, the university will initiate an investigation into the allegations under the appropriate policy and, if substantiated, take disciplinary action as contemplated

by the applicable procedures. For example, if a student asserts that a faculty member has engaged in mistreatment in the form of sexual harassment, the university's Discrimination and Harassment Policy would be followed.

The university will remain in communication with the student throughout the university's investigation and response. The university may be limited in its ability to disclose personnel information or other action taken in response to a complaint. The university will only be able to return communication made by anonymous reporters if the reporter creates a password and logs back into the reporting portal to access information about the incident.

### IV. Monitoring and Education

The School of Medicine will provide ongoing education to promote a respectful and positive learning environment. The purpose of this education will be to communicate the school's standards of behavior and professionalism for an optimal learning environment and to commit to informing students and educators about policies around behavioral expectations and processes for reporting mistreatment. The policies and reporting protocols will be posted in the *Bulletin* and in the course syllabi, and they will be reviewed with students during orientation.

Data from the reports submitted to the portal and to the deans identified above will be aggregated for review by the SAFE Committee. The SAFE Committee will systematically review these data on a regular basis, in addition to internal and external survey data, when doing the following: (1) assessing trends and the overall climate in learning areas at the School of Medicine; (2) making any recommendations for changes to the policies and the reporting and response mechanisms in place; and (3) developing action plans to implement targeted educational interventions based on the data received. The SAFE committee will regularly report its findings and recommendations to the Academic Affairs Committee. Aggregate reports will also be regularly forwarded to program and/or department chairs for monitoring purposes.

### V. Student Advisors

The following is a list of offices and advisors who may provide guidance when addressing some of the potential issues discussed in the above guidelines:

- Gender Equity and Title IX Compliance Office (<https://titleix.wustl.edu/>)
- Discrimination and Harassment Response Coordinator (<https://hr.wustl.edu/items/discrimination-harassment-policy/>)
- School of Medicine Office of Diversity, Equity and Inclusion (<https://diversity.med.wustl.edu/>)

In addition, the following faculty advisors in each program may also be able to provide guidance:

### Medical Student Program

- Senior Associate Dean for Education (<https://education.med.wustl.edu/about/leadership-team/>)
- Associate Dean for Student Affairs (<https://md.wustl.edu/resources/offices-and-contacts/office-of-medical-student-affairs/>)
- Associate Dean for Medical Student Education (<https://md.wustl.edu/resources/offices-and-contacts/medical-student-education/>)
- Faculty Coaches (<https://sites.wustl.edu/gatewaycurriculum/curriculum-renewal-update-gateway-coaching-program/>)

### Program in Occupational Therapy

- Program Director (<https://www.ot.wustl.edu/about/our-people/lisa-tabor-connor-171/>)
- Education Division Director (<https://www.ot.wustl.edu/about/our-people/christine-berg-11/>)
- Clinical Operations Director (<https://www.ot.wustl.edu/about/our-people/patricia-nellis-65/>)
- Advising Coordinator (<https://www.ot.wustl.edu/about/our-people/sue-tucker-104/>)

### Physical Therapy Student Program

- Program Director (<https://pt.wustl.edu/people/gammon-m-earhart-pt-phd-fapta/>)
- Education Division Director (<https://pt.wustl.edu/people/steven-ambler-pt-dpt-phd-mph/>)
- Associate Director of Professional Curriculum and Director of Clinical Education (<https://pt.wustl.edu/people/megan-m-burgess-pt-dpt-ocs/>)

### Program in Audiology and Communication Sciences

- Director of Audiology Studies (<https://pacs.wustl.edu/contactus/>)
- Director of Deaf Education Studies (<https://pacs.wustl.edu/contactus/>)
- Director of Finance and Student/Academic Affairs (<https://pacs.wustl.edu/contactus/>)

## VI. Additional Resources

- School of Medicine Student Ombudsperson (Confidential Resource) (<https://ombuds.med.wustl.edu/>)
- Medical Student Peer Advocates (<https://md.wustl.edu/resources/wellness/>)
- Relationship and Sexual Violence Prevention Center (<https://students.wustl.edu/relationship-sexual-violence-prevention-center/>)

*Last approved on August 12, 2021*

## MD Program Policies and Guidelines

### All MD Students

### Medical Student Access to Healthcare Services Policy

*—This policy applies to all MD students.—*

### Background

The Liaison Committee on Medical Education (LCME), per element 12.4, expects that a medical school provides its medical students with timely access to needed diagnostic, preventive, and therapeutic health services at sites in reasonable proximity to the locations of their required educational activities and has policies and procedures in place that permit students to be excused from educational activities to seek needed care.

This LCME requirement is aligned with Washington University School of Medicine's (WUSM) dedication to providing access to support and high-quality care for the physical, emotional and mental well-being of its students. To achieve this, the Student Health Services team provides students at WUSM with efficient, accessible, high-quality care, without undue financial burden, in order to prevent and treat health problems that may interfere with a student's educational and professional goals while attending WUSM. The Student Health Services Office is located on the Medical School Campus and provides a full range of primary care medical, mental health, health promotion and wellness services. The staff consists of physicians, nurses, psychologists, and administrative support for those clinicians.

### Policies

In order to access these health services, medical students will be excused from classes or clinical activities. The following procedures will be followed:

#### A. Student responsibility



1. The student is responsible for notifying the office of the relevant director of the educational activity (e.g., the clerkship director) and, if applicable, the supervising clinician of their clinical team as soon as possible. This is for both routine preventative appointments and acute incidents.
2. For additional details regarding student responsibilities in the event of a planned or unplanned absence for students on clinical courses, please refer to the Absence Policy for Medical Students on Clinical Rotations (p. 404).

**B. Responsibility of directors of required educational activities (e.g., the clerkship director)**

1. Directors will work with students to ensure that students can access healthcare services in a timely manner and as needed.
2. If a student encounters any barrier to timely access to necessary health services, they are to notify the Associate Dean for Student Affairs or Ombuds. The Associate Dean for Student Affairs will address the concern with the clinical or course director and take appropriate action.

*Last approved on March 2, 2020*

## Clinical Supervision Policy for Medical Students on Clinical Rotations

*—This policy applies to all MD students.—*

### Background

Part of Washington University School of Medicine's mission is to develop and maintain excellent clinical programs to provide outstanding care. To fulfill this mission as an academic teaching hospital, we have created this clinical supervision policy to direct our clinical health care teams with the oversight of our medical students.

LCME Standards 9.2 and 9.3 require that a medical school ensure members of the school's faculty provide supervision of medical student learning experiences throughout required clerkships. Furthermore, we must ensure that medical students in clinical learning situations involving patient care are appropriately supervised at all times to ensure patient and student safety. We must also ensure that the level of responsibility delegated to the student is appropriate to their level of training and that the activities supervised are within the scope of practice of the supervising health professional.

For the purposes of this policy, the following definitions will be used. *Direct supervision* will mean that the supervising physician is physically present (or continually on virtual telehealth visits) with the student and the patient. *Indirect supervision* will mean that the supervising physician is not physically (or continually on virtual telehealth visits) present with the student and the patient but is immediately available to provide direct supervision

(or to join the telehealth visit) upon request, thus requiring that the supervising physician remain physically present within the hospital or other site of patient care. The supervising physician may include any member of the physician health-care team, including residents, fellows, and attending physicians. There are also some situations in which it is appropriate that direct supervision be provided by a nurse or other health-care provider, so long as the specific clinical activity falls within their scope of practice as specified below.

### Policies

Supervision of medical student learning experiences involving patient care is provided on clerkships and other clinical courses by members of the school's faculty. Faculty oversee the clinical curriculum by setting expectations for appropriate physician health-care team members about the level of student supervision required with patient care activities and the level of responsibility delegated to the student. Course directors are responsible for communicating supervision requirements according to a student's level of training to members of the physician health-care team. These teams are made aware of student clinical expectations, the level of student supervision, and the level of responsibility given to a student according to the student's level of training.

Supervision will need to be defined by the clinical environment and patient care activity. Below are several examples of types of patient care activities.

### Physical Exam

Students will be equipped with the basic skills necessary to perform general physical exam techniques commensurate with their level of training as they enter the clinical training environment. At the discretion of the physician health-care team and in accordance with course-specific guidelines, students are able to perform general physical exam techniques under indirect supervision, excluding techniques defined as "sensitive."

Some physical exam skills are considered sensitive and will always need to be performed under the direct observation of a chaperone who is the same gender as the patient, even if the physician health-care team determines that the student is capable of performing these exams under indirect supervision. These include — but are not restricted to — external genitalia exam on any patient, rectal exam on any patient, and breast exam on any person identifying as female. Infant external genital exams can be performed under indirect supervision without a chaperone at the discretion of the supervising physician. Pelvic examinations must always be performed under the direct supervision of a member of the physician health-care team. Please refer to the "Patient's Rights" policy for additional information regarding pelvic bimanual exams performed when the patient is under anesthesia.

## Procedures

Students may not perform procedures without direct supervision by a member of the physician health-care team or another health professional so long as the procedure is within that professional's scope of practice (e.g., a nurse supervising a venipuncture).

If any member of the physician health-care team has concerns about violations of the Clinical Supervision Policy, they are to contact the course director for immediate investigation of the situation. The course director is responsible for notifying the Office of Medical Student Education of any suspected violations of the Clinical Supervision Policy. Students will not be downgraded or in any other way penalized for reporting concerns about suspected violations of the Clinical Supervision Policy.

## Guidelines

If a student has concerns about a lack of clinical supervision, they are encouraged to discuss this with either the course director or the Office of Medical Student Education. If the issue is not resolved to satisfaction, the student can then approach the Associate Dean for Student Affairs, the Senior Associate Dean for Education, or the Office of the Ombuds for WUSM.

*Last approved on June 11, 2020*

## Conflict of Interest During Student Assessment Policy for Washington University School of Medicine

*—This policy applies to all MD students.—*

### Background

Washington University School of Medicine is committed to ensuring that individuals who directly assess and remediate students and/or make decisions about the competence and promotion of students do so without a conflict of interest that compromises the objectivity and integrity of our student assessment process. In keeping with Liaison Committee on Medical Education (LCME) element 12.5, health professionals who provide a medical student with health-care services, including psychiatric/psychological counseling, should generally be precluded from making decisions regarding that student's academic assessment or promotion and from certain teaching roles that include assessment or remediation as detailed below.

For the purposes of this policy, the term *conflict of interest* (COI) will refer to any set of circumstances in which a person's ability to assess, remediate and/or make competency decisions about a student objectively is compromised by personal, social, financial or other interests. Potential examples are included below.

## Policy

Persons assessing or making decisions about the competence or promotion of a student, including engagement in remediation, shall do so free of COIs that may bias their decision making about a student in a positive or negative manner. In situations where persons in the role of student assessment, promotion and/or remediation have a COI involving a particular student, such persons should recuse themselves from their roles in the assessment, promotion and/or remediation of that student.

Examples of potential COIs include but are not limited to the following:

- Individual treatment providers of health and/or psychiatric/psychological services to a medical student
- Faculty previously engaged in adverse action against the student, including personally filing a professionalism concern form or serving on a clerkship competency committee where previous adverse actions were submitted for that student. Serving on the competency attainment committee where the totality of data is reviewed for all students longitudinally is not considered a COI.
- Having significant personal, social or business relationships with the student or a member of the student's immediate or extended family
- Serving as that student's assigned academic advisor in their administrative capacity for Washington University School of Medicine (e.g., coaches, associate/assistant deans for student affairs, director of the student success team)

Faculty and students must recognize that the appearance of a COI may interfere with the learning environment for both the involved student as well as the student's peers and should also be considered, regardless of whether an actual COI is truly present. Should uncertainty arise as to whether an instructor's interactions or relationship with a student presents a COI, it is the expectation that the instructor take responsibility for managing the relationship based on the best interest of the student and disclose the COI to the relevant course or clerkship director and/or the appropriate administrative leader (i.e., committee lead, assistant or associate dean).

*Last approved on October 3, 2022*

## Duty Hour Policy for Medical Students on Clerkships and Other Clinical Rotations

*—This policy applies to all MD students.—*

## Background

Washington University School of Medicine (WUSM) is committed to the creation of effective learning environments that balance the importance of meaningful participation in clinical activities with the need to support equilibrium among student clinical responsibilities, learning, and personal health and well-being. The following policies and guidelines are set taking into account the effects of fatigue and sleep deprivation on learning and patient care.

In keeping with Standard 8.8 of the Liaison Committee on Medical Education, clerkship directors, directors of clinical electives, and the Office of Medical Student Education are responsible for monitoring duty hours and ensuring that these are adjusted as necessary. Duty hours are defined as all clinical and required academic activities related to medical student education, including patient care (both inpatient and outpatient), administrative duties (e.g., completion of paperwork, dictation of charts), the provision of the transfer of patient care (e.g., check-in, check-out), time spent in-house while on call, and scheduled academic activities (i.e., required academic conferences). Time spent in self-directed study or practice performed after the student has left the hospital (or after the student has been told that they can leave) does not count toward duty hours.

## Policies

- Students must not be scheduled for more than 80 clinical duty hours during a seven-day week, averaged over a four-week period.
- Students must have a minimum of four periods of 24 consecutive hours off over four weeks. **Note:** Official WUSM school breaks and holidays should not be counted toward this minimum time-off requirement. Weekends that are adjacent to holidays (e.g., Labor Day) are not considered official holidays.
- Students must not be on overnight call more frequently than every third night. Overnight shifts that do not extend a student's duty hours during the workday, such as those that might occur in Emergency Medicine or Obstetrics, are not included.
  - Students must have access to call room facilities during overnight call shifts that extend a student's duty hours during the workday.
- Students cannot be on call for more than 24 successive hours, with an added period of up to four hours for continuity, educational debriefing, and didactic activities. No new patients should be assigned to students after the 24-hour call limit.
- Students must have at least 14 hours off from clinical work and required educational activities following 24 hours of in-house call.

- Students will have at least 10 hours off between scheduled work periods, including all activities within the definition of duty hours above.
- All students on clinical rotations will have all official Washington University holidays off, regardless of whether the student's team is on-call or post-call the day of the holiday. On the workday immediately preceding the holiday, students will be dismissed by 5 p.m. and will not be assigned call duties or regular clinical duties until the day immediately following the holiday at the time set forth by the clerkship director, chief resident, or clinical elective director. In the case of clerkships/rotations with evening or night shifts, an equivalent amount of time off will be provided in as immediate proximity to the holiday as is possible to minimize additional loss of clinical exposure.
- All clerkship students are to be excused from clinical duties by 5 p.m. on the evening before they are scheduled to take an assigned National Board of Medical Examiners subject exam.
- Please refer to the Clinical Absence Policy (p. 367) for additional details regarding excused time off from clinical duties.
- Individual clerkship directors and directors of clinical electives may choose to implement duty hour guidelines that are more restrictive than the above. However, duty hours may not exceed the above regulations.
- If a student has concerns about duty hour violations, they should discuss it first with the clerkship director or the director of the clinical elective. If the issue is not resolved to the student's satisfaction, they may approach the Associate Dean for Medical Student Education, the Associate Dean for Student Affairs, or the Office of the Ombuds for WUSM.

## Guidelines

- It is strongly suggested that clerkship directors and directors of clinical electives take into consideration additional student workload created by required assignments or other required learning activities when monitoring student duty hours. Examples include but are not limited to e-learning activities, required writing assignments, and quizzes.
- Duty hours data will be collected via end-of-clerkship course evaluations and clinical elective course evaluations, which are completed by students after each clerkship and clinical elective.
- Clerkship directors and directors of clinical electives will review duty hours data after each rotation to address any concerns and to adjust requirements as necessary.

- The Office of Medical Student Education will review the data quarterly to address any concerns and to adjust requirements as necessary. Quarterly data will be presented to the Committee on Oversight of Medical Student Education and its subcommittee, the Clinical Curriculum Committee, which will charge the appropriate individuals or offices with improvement plans, when necessary.

*Last approved on November 5, 2019*

## Grade Notification Policies and Procedures

*—These policies apply to all MD students.—*

### Background

The Liaison Committee on Medical Education (LCME) element 9.8 requires that all final grades be recorded and available to students within six weeks of the end of a course or clerkship. The Gateway Curriculum of Washington University School of Medicine is a competency-based curriculum in which students do not receive tiered grades. Summative decisions regarding competency are made at the level of each phase and, during Phase 2, each clerkship for patient care only. Decisions regarding course credit, which are based on the completion of the required elements of a course, are made at the completion of each course during Phases 1 and 3. The purpose of this policy is to ensure that no summative assessment or course credit decision is delayed beyond six weeks from the end of or final requirement due date for any course or clerkship, as mandated by our accrediting body.

### Policies

- The Medical School Registrar is responsible for monitoring and reporting that all competency or credit decisions for School of Medicine courses, clerkships, and phases are submitted in the learning management system (LMS) and available to students within six weeks of the end of the course or clerkship or final requirement due date.
- The failure of course or clerkship directors to submit 100% of decisions within this six-week period will result in corrective action(s) as appropriate.

### Guidelines

- Communication: The expectations for the return of competency and credit decisions should be shared with course and clerkship directors at least annually. All course and clerkship directors should be encouraged to create a streamlined process for the completion and integration of student evaluations in order to meet grade submission deadlines.

*Last approved on January 9, 2023*

## Policy for Non-Involvement of Providers of Student Health Services in Student Assessment

*—This policy applies to all MD students.—*

### Background

In keeping with Liaison Committee on Medical Education (LCME) element 12.5, every medical student has the right to keep any and all health professionals who provide health services, including psychiatric/psychological counseling, from involvement in their academic assessment or promotion. Washington University School of Medicine is committed to ensuring that medical student health records are maintained in accordance with legal requirements for security, privacy, confidentiality, and accessibility.

### Policies/Requirement

All providers of health and psychiatric/psychological services to a medical student will have no role in directly assessing that student nor have a direct role in decisions about the competence and promotion of that student, excluding exceptional circumstances.

All student health services will ensure the security of confidential health information in accordance with legal requirements.

*Last approved on January 10, 2022*

## Policy for the Preparation of the Medical Student Performance Evaluation

*—This policy applies to all MD students.—*

### Background

The Medical Student Performance Evaluation (MSPE) is a letter that is submitted to the residency programs to which a student has applied and that is meant to capture a summary evaluation of that student's performance in medical school. The Assistant Dean for Career Counseling typically prepares these letters of evaluation. In keeping with LCME element 11.2, we recognize the importance of opportunities for medical students to request another MSPE writer.

### Policy

Medical students may request to have an alternative MSPE writer. Requests must be submitted in writing to the Associate Dean for Student Affairs (ADSA) by the end of July prior to the student's expected graduation. Requests will be considered on a case-by-case basis by the ADSA.

Last approved on September 12, 2022

## Policy for Tuition Refund for the MD Program

—This policy applies to all MD students.—

### Background

Pursuant to LCME element 12.2, Washington University School of Medicine (WUSM) is to have clear policies for the refund of a medical student's tuition, fees, and other allowable payments.

### Policies

A student who withdraws or takes a leave of absence from WUSM will receive a pro rata refund of tuition, other payments made for health benefits and disability insurance, and for other fees. For situations in which students elect to continue to receive student health benefits, they will not receive a refund for payments made for health benefits and disability insurance for the term in which they are enrolled. The refund will be based on the ratio of the number of weeks enrolled in the MD program (from the first day of classes to the termination date) to the total number of class weeks in the MD program in the term for which tuition and fees were paid. There is no point in the semester at which a student would have \$0 refunded in tuition. It is understood that the date on which a student formally notifies the Registrar's Office in writing of the decision to withdraw or take a leave of absence from WUSM shall be regarded as the termination date, with no retroactive clause to be accepted. A prospective date will be accepted, however. If tuition and fees were paid entirely or in part by financial aid from WUSM, the refund will be applied first to the total repayment of the accounts from which financial aid was drawn, with any remaining refund balance given to the student. Financial aid received in excess of the costs of tuition and fees must be refunded by the student to WUSM on the same pro rata basis as calculated for the tuition refund outlined elsewhere, per "Return of Title IV" federal guidelines. Any questions about these policies may be directed to either the Registrar's Office or Student Financial Planning.

### Guidelines

Any student who withdraws or takes a leave of absence must formally notify the Registrar's Office in writing.

Last approved on July 11, 2022

## Washington University School of Medicine Technical Standards for the Medical Program

—This information applies to all MD students.—

Washington University welcomes diverse applicants, including those with physical, sensory, learning, psychological, and chronic disease-related disabilities. The School of Medicine is committed to advocating for its students with disabilities and to educating a medical workforce that mirrors the diversity of the national population. We aim to be leaders in accessibility and inclusion.

Individuals seeking to graduate from Washington University with a Doctor of Medicine degree are expected to gain broad competence in the skills that underlie the practice of medicine and surgery. With or without accommodations, they must have the knowledge, attitudes, and skills necessary to meet the School of Medicine's educational program objectives and meet the Technical Standards outlined in this document.

All graduates must be able to take a patient's history, perform an examination, and synthesize the findings into an assessment and plan in a reliable and effective manner, with or without reasonable accommodations. The abilities needed to meet these standards include the following:

1. **Observation Skills**, including gaining information from instructional activities, taking a history, and recognizing and evaluating physical findings
2. **Communication Skills**, including effective verbal and non-verbal communication with patients, caregivers, the health care team, and the education community
3. **Motor Function**, including navigating the clinical environment and performing a physical examination
4. **Intellectual-Conceptual, Integrative, and Quantitative Abilities**, including acquiring, synthesizing and applying foundational knowledge and clinical data
5. **Behavioral, Social and Professional Attributes**, including functioning as a compassionate, respectful, effective, ethical member of the health care and education community; receiving and acting on feedback; possessing the emotional and mental health needed to provide patient care; and prioritizing patient care in the face of competing demands

Applicants to the MD program review and attest to their ability to meet these technical standards as part of their application to the School of Medicine, and students attest again on an annual basis.

We welcome students with disabilities to apply to our school, to disclose their disability, and to collaborate with us to develop accommodations so that they can thrive and do their best work. Individuals who anticipate needing accommodations are encouraged to contact the university's Disability Resources office (<https://students.wustl.edu/disability-resources/>) for a consultation. Disability Resources will engage in a confidential and interactive process with the student and other personnel as necessary to determine reasonable accommodations. As

accommodations are not applied retroactively and may require time to be implemented, they should be requested in a timely manner. Decisions on admission, retention and graduation will not be affected by the need for accommodations.

*Last approved on May 5, 2021*

## Transportation Policy for Medical Students on Clinical Assignments

*—This policy applies to all MD students.—*

### Background

The primary goal of the medical program at Washington University School of Medicine is to provide the highest quality education possible to its students resulting in the development of competent and caring physicians. Among the core curricular activities necessary to accomplish this are intensive and meaningful patient care rotations. Though most clinical assignments will be located on the Barnes-Jewish Hospital/Washington University campus, some required clinical assignments are located off campus. In keeping with LCME standards 5.5 and 6.4, this is to ensure appropriate resources for clinical instruction in both ambulatory and inpatient settings with adequate numbers and types of patients.

### Policies

A listing of clinical rotations requiring transportation will be available to students. This list will be updated annually by the Office of Medical Student Education (OMSE). All students are required to make themselves aware of these rotations well in advance so that they are familiar with travel requirements. Gas, mileage, parking fees, and ride or public transportation fares are not reimbursed by the school.

In order to more equitably distribute both on and off campus assignments, a system for centrally monitoring students' travel for off-campus clinical assignments will be available to clinical course directors and will be overseen by the Clinical Curriculum Committee (CCC). When applicable, students will have the opportunity to submit their ranked choices for clinical assignments in advance. A record of student choice with subsequent alignment and nonalignment with clinical assignment will be included in this system.

Medical students will be required to travel to off-campus clinical rotations when these are assigned by the clinical rotation course director. In order to avoid inequitable distributions of these assignments, a student's stated lack of access to a private vehicle should not be considered in and of itself when creating these assignments. Students who do not have access to a private vehicle will consult the "Guidelines" section of this policy item for recommended options.

If a student believes that they have been unfairly assigned, they should discuss it first with the clinical course director. If the issue is not resolved to satisfaction, they may approach the Assistant Dean for Curriculum and Clinical Sciences with their concerns.

### Guidelines

Clinical course directors should consider a student's current choice for assignment in the context of the degree to which their prior choices aligned with prior assignments. Clinical course directors should work to accommodate students who indicate a preference for a particular off-campus assignment as opposed to one that is on site.

Course directors should be aware of the significant amount of time incurred by students who are assigned off site in their commutes to and from campus when scheduling required learning activities on campus. When available, telecommunication strategies should be used as a way to mitigate this burden. Clinical courses that require a subset of enrolled students to travel to off-campus assignments are encouraged to consider changes in scheduling that compensate for the lost travel time.

Students without direct access to a car are advised of the following options for travel. These may include carpooling, ride services (e.g., taxi, Uber, Lyft), public transportation, rental car service, or biking/walking. Mutually acceptable trades in clinical assignments between peers can be considered at the discretion of the clinical course director, although there are no guarantees that these can always be accommodated.

*Last approved on April 6, 2020*

## Gateway Curriculum Students Challenging the MSPE and Individual Competency-Contributing Assessments

*—This policy applies to Gateway Curriculum students.—*

### Background

In accordance with LCME Element 11.6, all medical students have the right to challenge their educational records with regard to the accuracy of the content. This policy addresses this right for students in the MD program wishing to challenge the accuracy of content within the Medical Student Performance Evaluation (MSPE), individual competency-contributing assessments, and summary narratives that contribute to competency decisions and the MSPE.

## Policies

1. **Content of the MSPE:** Challenges to the accuracy of the biographical section of the MSPE or the information about research, leadership and extracurricular activities are made directly to the Assistant Dean of Career Counseling. Challenges to the narrative comments and competency determinations included in the MSPE are addressed in section 2 below.

A student who has substantive concerns regarding the tone and/or accuracy of their MSPE may submit a written request for review to the Associate Dean for Student Affairs, with the specific concerns noted. The request must be submitted by September 1 of the academic year of graduation, or seven calendar days from the point at which the MSPE becomes available, whichever comes later. An ad hoc committee will review the draft MSPE with the noted concerns and, if warranted, revise the MSPE. The review committee's decision and any MSPE revisions will be conveyed in writing to the student. The decision of the review committee is final.

2. **Individual Competency-Contributing Assessments and Summary Narratives that contribute to competency-decisions and the MSPE:** Students wishing to dispute a specific assessment, including narrative comments or the summary narrative of the CAC related to a competency decision, may do so using the QualtricsXM form available within Keystone (the LMS) within seven calendar days of formal notification of the assessment outcomes being posted to Keystone. The form will require the student to complete the following details:

- Assessment being disputed
- Reason for or description of dispute

Dispute forms will be sent to the Assistant Dean for Assessment, the Office of Medical Student Education (OMSE), and the appropriate party who has final authority to make determinations on changes at the individual narrative, assessment or assessment item level. See the Contesting Individual Assessments Procedure (p. 387) for details of the process. Competency decisions themselves must be formally appealed as documented in the Policy and Procedures for Formal Appeals of Competency Attainment (p. 381) and Promotion Decisions (p. 386).

*Last approved on November 7, 2022*

## Formative Assessment and Feedback for Medical Students Policy

—This policy applies to Gateway Curriculum students.—

## Background

Formative assessment is critical to high-quality medical education, and, as such, central to the educational mission of Washington University School of Medicine (WUSM). In keeping with Liaison Committee on Medical Education (LCME) standard 9.7, WUSM is committed to ensuring that each medical student is provided with formative assessment on their performance, including noncognitive achievement, early enough in their training to allow sufficient time for improvement. For the purposes of this policy, the term *formative assessment* is defined as any no-/low-stakes assessment, including narrative assessment, performed during the learning experience for the purposes of supporting the student's ability to achieve competence and meet their maximum potential. This information must be communicated to a medical student in a timely manner so that the student has the ability to modify their thinking or behavior to improve subsequent performance in the medical curriculum.

The WUSM Gateway Curriculum is a fully competency-based, longitudinal curriculum. There are six competency domains modeled on the Accreditation Council for Graduate Medical Education core competencies: (1) Foundational Knowledge for Practice; (2) Patient Care; (3) Interpersonal and Communication Skills; (4) Professionalism; (5) Practice-Based Learning and Improvement; and (6) Systems-Based Practice. Within each of the competency domains, there are several Educational Program Objectives (WUMS MD EPOs). All curriculum is mapped to the EPOs in a course structure to ensure the adequacy of content coverage at the course, clerkship, phase and overall curriculum levels. Assessments occur within courses and clerkships but are collated longitudinally. Assessments are labeled as competency-contributing or non-competency-contributing. Non-competency-contributing assessments are provided purely for formative purposes and can be used by students to measure their own knowledge, attitudes and skills in preparation for competency-contributing assessments. Competency-contributing assessments are also formative in that no single assessment can result in a learner being deemed not competent. In addition, performance on any given assessment or combination of assessments within a course does not result in a student passing or failing that course. Determinations of competence in each of the WUMS MD EPOs is made by the Competency Attainment Committee (CAC) at the end of each phase of the curriculum; recommendations for progression or remediation are sent to the Committee for Academic Promotion (CAP), which makes the final determination (see the Policy for Review of Student Attainment of Competency (p. 381) and the Policy for Student Promotion and Appeals (p. 386) for details). In addition, the CAC reviews student assessments continually, with formal interim reviews occurring throughout each phase. During the clerkship phase (Phase 2), each clerkship has its own clinical competency committee (CCC) that reviews four of the Patient Care EPOs that have a specialty-specific context to make

decisions about student achievement of competence in each of these four EPOs. The figure below depicts the frequency of formative and summative competency reviews by the CAC and the CCCs.

July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
		Phase 1									
						Phase 2					
						Phase 3					

Legend  
 ☺ = formative Competency Attainment Committee meetings [Jan, June, Oct meetings followed by 1:1 coaching]  
 ◆ = summative Competency Attainment Committee meeting [competency determination & promotion recommendation made to Committee for Academic Promotion]  
 ◊ = summative Clerkship Competency Committee meetings [competency determination for Patient Care WUSM EPOs, preceded by mid-clerkship feedback during which progression towards competency attainment in these EPOs is reviewed]

## Policies

All students must receive meaningful formative assessment on their performance in each of the EPOs at regular intervals during each phase of the Gateway Curriculum. This may include the following:

- The inclusion of non-competency-contributing assessments in each course or clerkship. This includes resources created by course leads as well as those provided by WUSM to support learning (e.g., UWorld, Aquifer, similar materials) if appropriately aligned with the content covered in the course or clerkship.
- The inclusion of multiple low-stakes competency-contributing assessments (e.g., TBL knowledge assessments, just-in-time clinical assessments, peer feedback, quizzes, low-stakes observed structured clinical examinations [OSCEs], written assignments, midpoint clerkship feedback) throughout the curriculum with the ability to comprehensively review results and seek clarification.
- Early intervention by the Student Success Team (i.e., the Associate Dean for Student Affairs, the Assistant Dean for Assessment, and the Director of Student Success) and coach when low- or high-stakes competency-contributing assessments suggest a student may be struggling, appearing off-track for achieving competence, or demonstrating a sudden change in performance.
- Specifically for clerkships, a separate midpoint clerkship feedback session with the clerkship director or their designee is required within each clerkship. The focus of this session must include discussion of the student's progress toward competence in the patient care EPOs reviewed by the CCC. It should also include information received related to other competency domains/EPOs. If there are concerns about the student's ability to achieve competence, the Student Success Team and the coach must be notified and work with the student and clerkship to support the attainment of competence.

- Interim review of progression toward competency attainment by the CAC for each student in each of the WUSM MD EPOs to allow for the early identification of at-risk students. Communication of CAC interim judgements must be provided to students in formal letters that should also support student review and interpretation of their portfolios.
- Prior to the summative review made by the CAC, students must have the ability to review the constellation of their competency-contributing assessments in a comprehensive portfolio. The purpose of this portfolio review is to allow students to assess their own growth and development and to develop an understanding of how the individual assessments are contributing to competency in each of the EPOs. Each portfolio also includes information about whether there is sufficient data, thus far, for students to make inferences from the data about whether they should alter their behavior/learning plan.
- Students must have formal 1:1 reviews of their portfolios with their coaches periodically throughout each phase, and they are encouraged to discuss concerns with their coaches at any time regardless of whether there is a formal 1:1 review. Coaches review the student-created individual learning plans. Each student's plan and the coach's observations regarding learner performance in coaching small group teaching sessions are incorporated into a summary narrative assessment that is non-competency-contributing and used to help consolidate feedback and ensure progression toward competence. These formal coach-supported reviews must occur at least three times during Phase 1, twice during Phase 2, and three times during Phase 3.

Clerkships are responsible for documenting that each student has received formative assessment at the midpoint of their clerkship. Coaches are responsible for documenting that each student has received formative assessment at the time of each required 1:1 portfolio review. The Committee for Oversight of Medical Education (COMSE) will conduct oversight of student responses on both internal and external surveys to assess the amount and quality of formative and narrative assessment and make recommendations for change as needed to ensure that the intent of this policy is met.

## Guidelines

Quality formative assessment ought to include reinforcement of things done well, identification of room for improvement or areas of growth, and specific strategies for improvement. Evidence for this feedback in the form of specific examples and observations should also be included.

*Last approved on October 3, 2022*



## Washington University School of Medicine Policy for Monitoring of Student Time

—*This policy applies to Gateway Curriculum students.*—

### Background

Washington University School of Medicine (WUSM) is committed to providing our students with an excellent education that is balanced with the need for learners to have sufficient time for self-directed learning and overall well-being. In keeping with Liaison Committee on Medical Education (LCME) standard 8.8, WUSM is responsible for monitoring the amount of time medical students spend in required learning activities in the Gateway Curriculum. This monitoring includes the total number of hours medical students are required to spend in clinical and educational activities during clerkships, the latter being accounted for in WUSM's Duty Hour Policy for Medical Students on Clerkships and Other Clinical Rotations (p. 369). For the purposes of this policy, required learning activities include clinical duty hours, all scheduled didactic activities, required preparatory work for didactic activities, scheduled clinical skills exercises, required community engagement, required coaching sessions, and summative assessments during Phase 1 of the Gateway Curriculum.

### Policies

Please see WUSM's Duty Hour Policy for Medical Students on Clerkships and Other Clinical Rotations (p. 369) for policies and guidelines regarding the monitoring of student time on clinical courses within the legacy curriculum of WUSM.

All students will be excused from required learning activities during all official Washington University holidays. All students will also be excused to access health services as described in WUSM's Medical Student Access to Healthcare Services Policy (p. 367).

Time spent on all required learning activities will be accounted for in the learning management system of WUSM.

All students spend no more than 35 hours per week on all required learning activities, including required preparatory work for said learning activities, while enrolled in any of the nonclinical courses of Phase 1 of the Gateway Curriculum.

Students are to spend no more than 50 hours per week on all required learning activities during their enrollment in the Clinical Immersions of Phase 1, inclusive of clinical experiences, course-specific classroom-based activities, coaching and online work.

Student workload during required courses of the Gateway Curriculum will be monitored by the Office of Medical Student Education (OMSE) for each Phase 1 course through canvassing of the learning management system and through internal and external surveys of students. In the event that there are concerns

regarding the adherence of a course to the WUSM Policy for Monitoring Student Time, data substantiating said concerns will be presented by OMSE to the appropriate course lead. If not corrected, information will be sent forth to the appropriate governance structure for evaluation, monitoring and change management. The Committee on Oversight of Medical Student Education and any relevant subcommittees will charge the appropriate individuals or offices with improvement plans as indicated.

### Guidelines

The above restrictions on student workload represent the upper limits of time that students can spend on required learning activities. Course directors are also welcome to utilize less time per week, as appropriate.

All course directors are encouraged to proactively communicate to students the expectations for required preparatory time for all learning activities (including immersions). These expectations can be informed through the use of course workload estimators. To ensure that the time devoted to scheduled instructional activities is accurately reflected in course plans, course directors are encouraged to use best practices, applicable Academy of Educator workshops, and/or consultation with the Instructional Design Studio.

Course directors are strongly encouraged to be considerate of the periodic need for breaks during scheduled required learning activities.

*Last approved on January 4, 2021*

## Narrative Assessment Policy

—*This policy applies to Gateway Curriculum students.*—

### Background

Washington University School of Medicine is committed to providing the highest quality education to medical students preparing to lead the future of health and medicine. Narrative assessment provides students with the critical guidance needed to improve performance. Acknowledging the importance of narrative assessment, Liaison Committee on Medical Education (LCME) standard 9.5 requires that students receive narrative assessment as a component of assessment in each required course and clerkship of the medical education program whenever student/teacher interactions permit this form of assessment. Narrative assessment is defined as written comments from faculty and others capable of providing important feedback that is aimed at supporting student achievement in meeting the Washington University School of Medicine Educational Program Objectives.

## Policy

Narrative assessment is a required component of the assessment of each student in the Gateway Curriculum at Washington University School of Medicine. Narrative assessments of a medical student's performance will be provided when the following curricular conditions are met:

- Students work in small groups of 12 members or fewer and small groups of the same composition are observed longitudinally by the same faculty member for at least three sessions, with a ratio of one faculty member to one student team.

or

- The student is observed performing duties in the clinical setting.

Narrative assessment can be provided in courses that do not meet these criteria if there is documentation that the nature of the interaction allows for meaningful feedback.

## Guidelines

In the Gateway Curriculum, small group teaching with a longitudinal faculty member primarily occurs in the coaching small groups, which generally meet at least twice per month during Phase 1 and continue to meet less frequently throughout Phases 2 and 3. While coaching does involve 1:1 review of the student assessment portfolio and general progress, these small groups are also where content related to ethics, health equity and justice, personal and professional identity, community engagement, and patient, student and clinical experiences are taught, discussed and debriefed. Because of the unique teaching and coaching roles of these faculty/student interactions, all assessment done by and with coaches must be purely formative in nature. The content of the narrative assessments performed by the coaches are not collected centrally as they are strictly for formative purposes. We do track the attestation of completion centrally to ensure that all students receive this important narrative assessment.

Clinical preceptors and peers are able to provide narrative assessment for inclusion in competency decisions. This narrative assessment will be collected centrally and incorporated into the competency portfolio.

*Last approved on October 3, 2022*

## Phase 1 Attendance Policy

*—This policy applies to Gateway Curriculum students.—*

## Background

The profession of medicine requires the utmost commitment of time and energy to learning/education, patient care, research and other scholarly activities. The development of this commitment begins during Phase 1 of the Gateway Curriculum.

Students must recognize that teaching, learning and assessment in both clinical and nonclinical settings are dependent on the student's presence and participation in their education. Time spent away from an educational experience may decrease learning and impede effective assessment.

In keeping with LCME standard 12.4, all students requiring access to necessary diagnostic, preventive, and therapeutic care for both acute and chronic health concerns are to be excused from required learning activities. Please refer to the Access to Healthcare Services Policy (p. 367) for additional details.

## Policies/Requirement

Students are expected to attend all required sessions within Phase 1 of the Gateway Curriculum as specified within the learning management system. In addition to personal emergencies, it is recognized that a student may, on a rare occasion, desire to be excused from clinical activities for professional or significant personal events, including religious holidays (PDF) ([https://bulletin.wustl.edu/pdf/Religious-Holiday-Class-Absence-Policy-Final\\_November-2021.pdf](https://bulletin.wustl.edu/pdf/Religious-Holiday-Class-Absence-Policy-Final_November-2021.pdf)). Travel prior to or following observed university holidays and breaks that occurs outside of the officially designated times/dates on the MD Program Academic Calendar does not constitute a significant personal event or unavoidable absence.

In the unusual circumstance that a student finds that they are unable to attend a required session, the student must complete an absence notification form in the learning management system that will be sent to the faculty lead, with a copy sent to the Office of Medical Student Education (OMSE). This form must be completed prior to the session that the student will miss or as soon as possible after the session if it is missed due to a sudden illness or an emergency. In addition, students unable to attend a team activity should notify their team members by email. In the case of immersions, students must also notify by email the clinical team to which they have been assigned.

In the event that an absence is unavoidable, students will work with the faculty leads to develop a remediation plan for the missed session. All required assignments associated with a missed session must be completed. Faculty directors may require additional makeup work for missed sessions. Faculty leads may also designate some sessions as those that cannot be missed except under extreme circumstances because they cannot be made up. These sessions will be noted in the learning

management system and should only be missed under extreme, unavoidable circumstances such as a medical illness or family emergency. Failure to attend a required learning activity without providing notification is considered an unprofessional behavior.

Attendance data will be tracked longitudinally by the OMSE within the learning management system for all phases of the curriculum. An absence will be recorded even when makeup work for a missed session is completed. Data will be monitored by the Director of Assessment in collaboration with the OMSE and will be reviewed by the Competency Attainment Committee as evidence contributing to the attainment of competency in PROF-2: Exhibit high standards of professional integrity.

## Guidelines

Central monitoring of absences will reside with the OMSE and the Assistant Dean of Assessment. A concerning trend of absences may be discussed with the Associate Dean of Student Affairs and the Director of Coaching and Student Success to ensure appropriate student support can be offered and provided. Faculty directors of required Phase 1 sessions will include a specific faculty contact in the learning management system associated with all required sessions.

*Last approved on January 9, 2023*

## Phase 2 Attendance Policy

*—This policy applies to Gateway Curriculum students.—*

### Background

The profession of medicine requires the utmost commitment of time and energy to learning/education, patient care, research and, when appropriate, other scholarly activities. The development of this commitment begins in Phase 1 of the Gateway Curriculum and extends into Phase 2 as students advance in their training to become physicians.

Students must recognize that teaching, learning and assessment in both clinical and nonclinical settings are dependent on the student's presence and active participation. Time spent away from educational experiences, in both clinical and nonclinical settings, may decrease learning and impede effective assessment.

The clerkships of Phase 2 of the Gateway Curriculum consist of a foundational week(s) period, a period of clinical assignments divided into individual rotations based on the specific clerkship, and a week of assessment, reflection, coaching and community (ARCC).

This document outlines the attendance policies and expectations for Phase 2 of the Gateway Curriculum while also recognizing that students may have legitimate reasons for absences. In keeping with Liaison Committee on Medical Education (LCME) element 12.4, all students requiring access to necessary

diagnostic, preventive, and therapeutic care for both acute and chronic health concerns are to be excused from required learning activities. Please refer to the Access to Healthcare Services Policy (p. 367) for additional details.

## Policies/Requirements

Students are expected to attend all required sessions within Phase 2 of the Gateway Curriculum as specified within the learning management system. In addition to illness and personal emergencies, it is recognized that a student may, on a rare occasion, desire to be excused from clinical activities for professional or significant personal events, including religious holidays (PDF) ([http://bulletin.wustl.edu/pdf/Religious-Holiday-Class-Absence-Policy-Final\\_November-2021.pdf](http://bulletin.wustl.edu/pdf/Religious-Holiday-Class-Absence-Policy-Final_November-2021.pdf)). Travel prior to or following observed university holidays and breaks that occurs outside of the officially designated times/dates on the MD Program Academic Calendar does not constitute a significant personal event or unavoidable absence.

In the unusual circumstance that a student finds themselves unable to attend a required session, the student must have a discussion with the clerkship director or associate clerkship director and then complete an absence notification form in the learning management system that will be sent to the faculty lead, with a copy sent to the Office of Medical Student Education (OMSE) and other individuals, as appropriate. This form must be completed prior to the session that the student will miss or as soon as possible after the session if it was missed due to sudden illness or emergency. Students unable to attend a team activity should notify their team members by email with as much advance notice as can reasonably be expected under the circumstances. This obligation also applies to correspondence with clinical teams for absences that occur during the clinical portion of the clerkship. If the unavoidable absence occurs during any scheduled competency-contributing assessment and the ARCC week and an assessment will be missed, the student must also complete the Request to Delay Assignment/Assessment form.

When students encounter an unavoidable absence for required events within the foundational week(s) of a clerkship or the ARCC week, students will work with the clerkship directors and/or other stakeholders to develop a remediation plan for the missed session, when possible. All required assignments associated with a missed session must be completed, and clerkship directors may require additional makeup work for missed sessions.

In keeping with the principles outlined above, students are expected to fully participate in their patient care assignments. If students find that they need to be absent from their responsibilities while rotating on clinical services, they will need to submit an absence notification form with as much advance notice as can be reasonably expected based on the circumstances. Students will still be accountable for meeting all

clerkship requirements, and any absences that compromise a student's ability to meet these requirements and/or other Phase 2 requirements will require a remediation plan at the discretion of the clerkship director.

Attendance data will be tracked longitudinally by the OMSE within the learning management system for all phases of the curriculum. An absence will be recorded even when makeup work for a missed session is completed. Data will be monitored by the Assistant Dean for Assessment (ADA) in collaboration with the OMSE and reviewed by the Competency Attainment Committee as evidence contributing to attainment of competency in PROF-2: Exhibit high standards of professional integrity.

## Guidelines

Students are encouraged to make up missed work on rotations in which this can result in meaningful learning and should discuss this option with the clinical course director.

Students are encouraged to notify clerkship leadership teams about any planned absences so that clinical assignments can be developed to minimize the educational impact of such absences.

If a student has absences that may impact assessment of competence or completion of clerkship requirements during their clinical assignment, the consequences rendered will be at the discretion of the clerkship director, the Associate Dean of Student Affairs (ADSA), the ADA, and the Associate Dean for Medical Student Education.

Central monitoring of absences will reside with the OMSE and the ADA. A concerning trend of absences may be discussed with the ADSA and the Associate Dean for Educational Strategy to ensure that appropriate student support can be offered and provided. Faculty directors of required Phase 2 sessions will include a specific faculty contact in the learning management system associated with all required sessions.

MSTP students are encouraged to do the following:

- Meet with the Assistant Dean for Career Development early for assistance with residency planning.
- Consider returning to the MD program to allow for maximum flexibility for interviewing and USMLE exams.
- Discuss planned absences with clerkship directors early and prior to clinical assignment development to better allow placement on a team to optimize the educational experience. We believe this guideline strikes an appropriate balance between increased flexibility for MSTP students and ensuring a meaningful educational experience occurs during the core clinical rotations.

*Last approved on October 3, 2022*

## Phase 3 Attendance Policy

*—This policy applies to Gateway Curriculum students.—*

## Background

The profession of medicine requires the utmost commitment of time and energy to learning/education, patient care, research and, when appropriate, other scholarly activities. The development of this commitment begins in Phase 1 of the Gateway Curriculum and extends into Phase 2 as students advance in their training to become a physician.

Students must recognize that teaching, learning and assessment in both clinical and nonclinical settings are dependent on the student's presence and active participation. Time spent away from educational experiences, both in the clinical and nonclinical settings, may decrease learning and impede effective assessment.

Phase 3 of the Gateway Curriculum consists of a variety of types of courses that include a range of clinical and nonclinical educational strategies. It is also recognized that students in Phase 3 of the Gateway Curriculum will also be participating in residency interviews. This document outlines the attendance policies and expectations for Phase 3 of the Gateway Curriculum while also recognizing that students may have legitimate reasons for absences. In keeping with LCME element 12.4, all students requiring access to necessary diagnostic, preventive and therapeutic care for both acute and chronic health concerns are to be excused from required learning activities. Please refer to the Access to Healthcare Services Policy (p. 367) for additional details.

## Policies/Requirements

Students are expected to attend all required sessions within Phase 3 of the Gateway Curriculum as specified within the learning management system. In addition to personal emergencies, it is recognized that a student may, on a rare occasion, desire to be excused from clinical activities for professional or significant personal events, including religious holidays and residency interviews. Travel prior to or following observed university holidays and breaks that occurs outside of the officially designated times/dates on the MD Program Academic Calendar (<https://registrar.med.wustl.edu/calendars/md-program/>) does not constitute a significant personal event or unavoidable absence.

In the unusual event that a student is unable to attend a required session, the student must have a discussion with the relevant course director(s) and then complete an absence notification form in the learning management system that will then be sent to the faculty lead, with a copy sent to the Office of Medical Student Education (OMSE). This form must be completed prior to the missed session or as soon as possible after the session if the absence is due to sudden illness or emergency. Students unable to attend a team activity—including activities scheduled during clinical assignments of Phase 3 courses—should also notify their team members by email with as much advance notice as can reasonably be expected under the circumstances. If the

unavoidable absence occurs during a scheduled assessment activity (excluding Just in Time clinical assessments), the student must also complete the Request to Delay Assignment/Assessment form.

When students encounter an unavoidable absence for required events within the clinical and nonclinical portions of Phase 3 courses, they will work with the relevant course director(s) and/or other stakeholders to develop a remediation plan for the missed session(s), when possible. All required assignments associated with a missed session must be completed, and the course director(s) may require additional makeup work for missed sessions.

Students are expected to fully participate in their patient care assignments. If students find that they need to be absent from their responsibilities while rotating on clinical services, they will need to submit an absence notification form with as much advance notice as can be reasonably expected based on the circumstances. Students will still be accountable for meeting all course requirements, including but not limited to assessment requirements, course objectives, and other assignments or required experiences, if applicable. Any absences that compromise a student's ability to meet these requirements and/or other Phase 3 requirements will require a remediation plan at the discretion of the relevant course director(s).

Attendance data will be tracked longitudinally by OMSE within the learning management system for all phases of the curriculum. An absence will be recorded even when makeup work for a missed session is completed. Data will be monitored by the Assistant Dean for Assessment (ADA) in collaboration with OMSE; it will be reviewed by the Competency Attainment Committee as evidence contributing to attainment of competency in PROF-2: Exhibit high standards of professional integrity.

## Guidelines

Students are encouraged to make up missed work on rotations when this can result in meaningful learning. They should discuss this option with the course director(s).

Students are encouraged to notify course leadership teams about any planned absences so that clinical assignments can be developed to minimize the educational impact of such absences, when relevant.

If a student has absences that may impact the assessment of competence or the completion of course requirements during their clinical assignment(s), the consequences rendered will be at the discretion of the course director(s), the Associate Dean of Student Affairs (ADSA), the ADA, and the Associate Dean for Medical Student Education.

Central monitoring of absences will reside with OMSE and the ADA. A concerning trend of absences may be discussed with the ADSA and the Associate Dean for Educational Strategy to ensure appropriate student support can be offered and provided.

All students are encouraged to discuss planned absences with their course director(s) early and prior to assignment development to better allow placement on a team to optimize the educational experience. For example, students are discouraged from scheduling required Phase 3 courses (e.g. ACRs, KISCs) during periods of time when planned absences are likely.

*Last approved on September 12, 2022*

## Policy for the Preparation of Non-Faculty Instructors for the WUSM MD Program

*—This policy applies to Gateway Curriculum students.—*

### Background

Washington University School of Medicine (WUSM) is proud to provide students with extensive training opportunities offered by a diverse community of educators. At the same time, we recognize that this privilege comes with the responsibility to ensure rigor and fairness throughout our students' curricular experiences. The Liaison Committee on Medical Education (LCME) element 9.1 requires that all residents, graduate students, postdoctoral fellows, and other non-faculty instructors in the medical education program who supervise or teach medical students be familiar with the learning objectives of the course or clerkship and that they are prepared for their roles in teaching and assessment. In keeping with this, WUSM is committed to ensuring that all parties who are assigned to supervise and/or assess medical students participate in orientation or other faculty development programs related to teaching and/or assessment.

### Policies

All residents and other non-faculty instructors who are assigned to supervise and/or assess medical students are required to participate in orientation or other faculty development programs related to teaching and/or assessment.

All residents and other non-faculty instructors will receive relevant course/clerkship objectives and other requirements. They will also review and abide by key policies related to the teaching, supervision, and assessment of medical students.

### Guidelines

Instructors are referred to WUSM's Office of Education Teaching Resources for a listing of offices and facilities that provide teaching and classroom support.

*Last approved on July 11, 2022*

## Procedure to Request an Alternate Educational Site or Clinical Assignment

—This procedure applies to Gateway Curriculum students.—

In compliance with LCME Standard 10.9, students may formally request an alternate educational site or clinical assignment. Such requests must be made in writing (email) to the Registrar's Office within two weeks of the release of the clinical assignment. Team assignments within individual clinical rotations or specific site concerns should be discussed with the appropriate Clerkship, ACR, Elective or Immersion Director. Students are also encouraged to contact Student Affairs at any time to help navigate unique circumstances or hardships. When necessary and appropriate, an alternate site will be assigned.

## Professional Behaviors for MD Students in the Gateway Curriculum

—This information applies to Gateway Curriculum students.—

Professional behaviors consist of fundamentally important qualities including altruism, compassion and empathy, respect for patients and health care workers, commitment to ongoing excellence, honesty, trustworthiness, integrity, accountability, recognition of limits, collaboration, and duty to society.

The WUSM Educational Program Objectives (p. 103) related to professional behaviors include the following:

### *Interpersonal and Communication Skills*

1. Demonstrate respectful and effective verbal and nonverbal interpersonal and communication skills with patients, families, colleagues, and all members of the educational and health care teams.

### *Professionalism*

1. Maintain a professionally appropriate demeanor.
2. Exhibit high standards of professional integrity.
3. Apply legal and ethical principles governing the physician-patient relationship.
4. Act in the patient's best interest, and serve as a patient advocate.

Specific professional behaviors include the following:

- Respectful and inclusive verbal and nonverbal communication and interactions
- Demonstrating respect and inclusion for all members of the educational and health care teams

- Resolving conflicts in a manner that maintains professional composure and respects the dignity of every person involved
- Maintaining professional manner in language, deportment, and appearance
- Respecting the confidentiality of others
- Establishing and maintaining appropriate boundaries in educational and work situations
- Professional use of social media
- Maintaining accountability by being punctual, meeting deadlines, and providing appropriate notification of absences
- Acceptance of feedback
- Recognition of limitations and willingness to seek help
- Adaptability to change
- Balancing the needs of others with personal needs
- Maintaining honesty and integrity
- Submitting personally performed and/or original work

The Professional Behavior Form ([https://wustl.az1.qualtrics.com/jfe/form/SV\\_aauBQzTenq9Qw98/](https://wustl.az1.qualtrics.com/jfe/form/SV_aauBQzTenq9Qw98/)) may be completed by students, staff, or faculty to highlight specific strengths or areas in which a student may need further support to successfully demonstrate competency in professional behaviors. Reported areas for further support will be reviewed by the Student Success Team to determine the appropriate next steps.

## Washington University School of Medicine Policy for Review of Student Attainment of Competency

—This policy applies to Gateway Curriculum students.—

### Background

In collaboration with the Office of Medical Student Education, the Office of Medical Student Affairs, and the Office of the Registrar and charged by the Committee for Academic Promotion, the Competency Attainment Committee (CAC) and the Clerkship Competency Committees (CCCs) at Washington University School of Medicine regularly review and render decisions of competency attainment and recommendations about the academic progress of all medical students in the Gateway Curriculum. This policy is in line with LCME element 9.9: Student Advancement and Appeals Process.

### Policy

Students for whom this policy applies include students enrolled in any phase of the Gateway Curriculum and students enrolled in dual and joint degree programs currently participating in the Gateway Curriculum.

In order to successfully complete their studies at the Washington University School of Medicine (WUSM), students must demonstrate the ability to become a safe and effective physician by demonstrating competence in the WUSM Medical Student Program Objectives (p. 103). Attainment of competence in these educational program objectives is determined by the CAC in partnership with the individual CCCs in Phase 2 of the curriculum based on the totality and sufficiency of evidence regarding a student's performance.

Competency decisions of not competent, competent, and competent with distinction (where applicable) and the subsequent promotion recommendations are presented to the Committee for Academic Promotion, which is the committee charged with ratifying final competency decisions and promotion recommendations. Promotion recommendations include one of the following for each student:

1. Promotion, with or without ongoing remediation
2. Remediation without promotion
3. Dismissal or other sanctions, including but not limited to probation or suspension, which may occur throughout the enrollment of a student
4. Qualification to receive the Doctor of Medicine degree

Students considering an appeal of any of the above decisions and/or recommendations are referred to the WUSM Policy for Student Promotion and Appeals (p. 386) and the Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 387).

Situations may exist in which a committee member has a conflict of interest such that the committee member is unable to perform their duties to objectively render a decision about a particular student. In such a case, the committee member must recuse themselves from participation in deliberations and decisions regarding that student. Please see the conflict of interest policy for full details.

The responsibility for maintaining and overseeing this policy resides with the Committee on the Oversight of Medical Student Education.

*Last approved on May 12, 2022*

## Committee for Academic Promotion Bylaws

*—This information is relevant to Gateway Curriculum students.—*

### 1. Charge

In order to successfully complete their studies at the Washington University School of Medicine, students must demonstrate the ability to become a safe and effective physician by the attainment of competency in the WUSM Medical Student Program Objectives which are organized into six domains:

- I. Foundational knowledge for practice
- II. Patient care
- III. Systems-based practice
- IV. Practice-based learning and improvement
- V. Interpersonal and communication skills
- VI. Professionalism

The Committee for Academic Promotion is charged by Academic Affairs Committee and has the responsibility to ratify decisions of competence (not yet competent, competent, competent with distinction where applicable) made by the Competency Attainment Committee (CAC), the Clerkship Competency Committees (CCCs), and the associated recommendations for academic promotion (promotion, delay, suspension, dismissal). This document describes the bylaws and procedures of the Committee for Academic Promotion (CAP).

### 2. Responsibilities

Review of the recommendations made by the competency committees occur at times of adverse student actions (i.e., remediation without promotion or dismissal), at the time of promotion to each phase of the curriculum, and at graduation. Students will be notified at least 10 days prior to such reviews. When an adverse student outcome is recommended (remediation without promotion, suspension, or dismissal) or when decisions of competence without distinction are made, students may present themselves, in person and/or in writing, to the CAP to state their case. The CAP reviews any details that the student provides in addition to minutes of the CAC or CCC deliberations and any additional evidence as needed leading to the recommendation. Based on this review, the CAP would take one of the following courses of action:

- Ratify and uphold the CAC and/or CCC decisions and recommendations
- Remand back to the original committee for re-review
- Overturn the decision of the original committee if the CAP perceives an inability for the original committee to make an unbiased recommendation

### 3. Membership

3.1 There will be a minimum of five voting members of the CAP representing leadership of the Gateway Curriculum plus a faculty member who represents the broader WUSM educational community. Each member will serve a three-year term with the possibility for two one-year extensions.

If a voting member is temporarily unable to serve in this role during their term, the Dean or the Dean's designee may appoint a faculty member to the CAP to fulfill that member's responsibilities as needed.

3.2 In addition, CAP membership will include non-voting, ex officio members based on their broad understanding of the competency-based program of assessment and their role in student advocacy and support. These members will include the Associate Dean of Student Affairs, the Director of Student Success, the Assistant Dean for Assessment, the Associate Dean for Medical Student Education, the Associate Dean for Admissions, and the Director of Student Health Services.

3.3 **Chair:** The chair of the CAP will be a voting member selected by other voting members. The chair will serve a two-year term and may be reappointed for up to two additional terms.

3.4 **Guests:** Any faculty, administrator, student, or staff member may be invited as a guest, at the discretion of the chair, if their presence is deemed important for providing additional evidence in support of decisions of competency attainment. Guests would be present to provide said evidence and/or answer questions but would not be present during nor participate in deliberations or voting.

## 4. Meeting Frequency and Quorum

4.1 CAP meetings occur at transitions in the curriculum (end of Phase 1, end of Phase 2, graduation) or on an ad hoc basis when adverse student outcomes are recommended by the CAC or CCC.

4.2 A quorum will constitute attendance, virtual or in person, of four of the five voting members, excluding those with conflicts of interest.\*

4.3 Decisions of the CAP must be supported by four of the five voting members, excluding those with conflicts of interest.\*

4.4 In the rare situation where a quorum cannot be met because too many members have a conflict of interest,\* an ad hoc committee will be convened by the Assistant Dean for Assessment.

\* The policy on conflicts of interest provides specific details.

## 5. Deliberations and Outcomes

CAP deliberations and outcomes will be summarized in the meeting minutes. Students will be notified in writing by the Registrar of all decisions, generally within 7 calendar days of the review. CAP outcomes include one of the following:

- Ratify and uphold the CAC and/or CCC decisions and recommendations
- Remand back to the original committee for re-review
- Overturn the decision of the original committee if the CAP perceives an inability for the original committee to make an unbiased recommendation

## 6. Notification of CAP Decisions

Decisions regarding remediation that would result in delays in education or individualized or modified schedules will also be communicated to the Associate Dean for Medical Student Education to ensure feasibility for re-entry and successful completion. Decisions regarding dismissal will be reported to the Senior Associate Dean of Education. Decisions of remediation without progression, dismissal, probation, or suspension will also be communicated to Financial Aid to support necessary alterations in aid.

## 7. Student Engagement With the CAP

Students may present themselves, in person or in writing, prior to the ratification of decisions of competency without distinction as an appeal of that decision. Students may also present themselves, in person or in writing, prior to the ratification of recommendations for adverse outcomes to state their case. This does not serve as a formal appeal, as appeals would only be made in the setting of CAP ratification and, as such a decision is made, for an adverse outcome. Further details for these procedures can be found in the Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 387).

## Competency Attainment and Clerkship Competency Committees' Bylaws

—This information is relevant to  
Gateway Curriculum students.—

### 1. Charge

In order to successfully complete their studies at the Washington University School of Medicine, students must demonstrate the ability to become a safe and effective physician by the attainment of competency in the WUSM Medical Student Program Objectives, which are as follows:

- I. Foundational knowledge for practice
- II. Patient care
- III. Systems-based practice
- IV. Practice-based learning and improvement
- V. Interpersonal and communication skills
- VI. Professionalism



As subcommittees of the Committee for Academic Promotion (CAP), the Competency Attainment Committee (CAC) and the Clerkship Competency Committees (CCCs) have the tasks of evaluating progress toward and attainment of competency and of making recommendations for promotion and remediation. This document describes the bylaws and procedures of these committees.

## 2. Responsibilities

Review of the evidence supporting progression toward and attainment of competence of students in the Gateway Curriculum will be made by the CAC in conjunction, in Phase 2, with the CCCs. The committees review evidence provided through multiple student assessments. Student progression toward successful competency attainment is reviewed by the committees at multiple times within each phase of the Gateway Curriculum to allow for early identification of students not on trajectory to meet competency attainment, thereby providing early support for successful competency attainment and timely release of financial aid (Standards for Satisfactory Academic Progress for Financial Aid Eligibility (p. 418)).

Based on the totality and sufficiency of evidence regarding a student's performance in each of the WUSM Medical Student Program Objectives, the committees determine if the evidence supports that a student has attained competency. The deliberations of the CAC and the CCCs are generally positive in approach and committed to the ultimate aim of assisting students in the successful completion of the courses of study.

The CAC and the CCCs have several important roles, including — but not limited to — the following:

2.1. Review of all assessment data, via individual student competency portfolios and compiled assessment summaries, to determine if a student has, or is on a trajectory to, attain competence.

2.2. Evaluation of competency attainment based on the review of the totality of a student's assessment data to support competency decisions of not competent, competent, or competent with distinction (where applicable).

2.3. Make recommendations regarding a student's academic progress to the CAP based on competency decisions, including the following:

2.3.a. Promotion to the next phase of training.

2.3.b. Remediation, with or without promotion. When a student has not demonstrated competency or is on trajectory toward failure to attain competence in any Educational Program Objective, the committees will recommend that student for academic support.

In some instances, a student's trajectory can be addressed through informal means such as discussion with their coach, alternative educational

methods that can be accomplished prior to transition, or additional educational or social supports. Failure to improve to the extent that they are on trajectory to meet competence in time for transition to the next phase will require formal remediation and a delay in transition to the next phase. Formal remediation recommendations will be submitted, along with the student's assessment evidence and committee deliberations, to the Student Success Team for review and for the development of a formal remediation plan. The CAC will make recommendations to the CAP regarding when details of a formal remediation should be included within the Medical Student Performance Evaluation.

2.3.c. Dismissal or other sanctions, including but not limited to probation or suspension. When warranted, such as in situations including but not limited to the persistence of dyscompetence despite remediation or marked critical deficiency, the committees may recommend a student warrants dismissal, suspension, probation, or other sanctions. While the committees encourage the use of progressive actions and opportunities for remediation, the nature or severity of the dyscompetence may prompt, at their discretion, more immediate or severe actions.

2.3.d. For the CAC only, qualification to receive the Doctor of Medicine degree for those students who have successfully completed all prescribed requirements of the School of Medicine.

2.4. Review of any remediation processes to determine if competency has been attained following remediation efforts.

2.5. For the CAC only, approval of any leave of absence greater than one year, not inclusive of those students enrolled in a dual degree program, owing to the impact on competency attainment as competence is a longitudinal process.

2.6. For the CAC only, recommendations to the CAP and Executive Faculty those students who have successfully completed all prescribed requirements of the School of Medicine and who are qualified to receive the Doctor of Medicine degree.

In circumstances wherein the committees recommend an adverse outcome (remediation without promotion, suspension, or dismissal) or competency without distinction (where applicable), students will be notified of this recommendation to allow for an opportunity to present themselves to the CAP, as another source of information alongside review of the original committee's

minutes and recommendations, prior to ratification and/or final decisions by the CAP. Further details of these processes can be found in the Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 387).

## Competency Attainment Committee Specific Details

### 1. Membership

1.1. There will be a minimum of eight voting members of the CAC representing leadership from each phase of the Gateway Curriculum plus a faculty member from the broader faculty community representing any area of study or training in which students participate. Each member will serve a three-year term with the possibility for two one-year extensions.

1.2. **Chair:** The chair of the CAC will be a voting member selected by other voting members. The chair will serve a two-year term and may be reappointed for up to two additional terms. During the initial implementation of the CAC, the Assistant Dean for Assessment will serve as chair.

1.3. **Guests:** Any faculty, administrator, student, or staff member may be invited as a guest, at the discretion of the chair, if their presence is deemed important for providing additional evidence in support of decisions of competency attainment. Guests would be present to provide said evidence and/or answer questions but would not be present during nor participate in deliberations or voting.

### 2. Meeting Frequency and Quorum

2.1. CAC meetings occur throughout each phase of the Gateway Curriculum with sufficient frequency to do the following:

2.1.a. Allow for the review of assessment data to determine if a student is on trajectory to achieve competence in each Educational Program Objectives.

2.1.b. Allow reasonable opportunities for early support and remediation to be completed, if required.

2.1.c. Make recommendations near the completion of each phase regarding promotion, remediation with or without promotion, suspension, or dismissal with sufficient time to for students to present themselves to the CAP.

2.2. CAC meetings may be called ad hoc when significant concerns regarding competence occur.

2.3. A quorum will constitute attendance, virtual or in person, of three of the four voting members, excluding those who face a conflict of interest.\*

2.4. Decisions of the CAC must be supported by three of the four voting members, excluding those with conflicts of interest.\*

2.5. In the rare situation in which a quorum cannot be met because too many members have conflicts of interest,\* an ad hoc committee will be convened by the Assistant Dean for Assessment.

\* The policy on conflicts of interest provides specific details.

### 3. Deliberations and Outcomes

CAC deliberations, decisions, and associated recommendations will be summarized in the meeting minutes. All deliberations will be presented to the CAP. Students will be notified, in writing, by the Registrar of all recommendations and no less than 10 days prior to CAP review. Students wishing to present themselves to the CAP must follow the appropriate process as outlined in the Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 387).

Recommendations regarding remediation that would result in delays in education or individualized or modified schedules will also be communicated to the Associate Dean for Medical Student Education to ensure feasibility for re-entry and successful completion.

Recommendations regarding dismissal will be reported to the Senior Associate Dean of Education. Recommendations by the CAC of remediation without progression, dismissal, probation, or suspension will also be communicated to Financial Aid to support necessary alterations in aid.

## Clerkship Competency Committee Specific Details

### 1. Membership and Quorum

Members of the CCC must be at the Instructor faculty level or higher. The Clerkship Director serves as a non-voting chair of the CCC. Any CCC member who had a longitudinal supervisory role for a student may participate in deliberations but not voting for that student. Deliberation and voting require at least three voting members to be in attendance.

Any faculty, administrator, student, or staff member may be invited as a guest, at the discretion of the chair, if their presence is deemed important for providing additional evidence in support of decisions of competency attainment. Guests would be present to provide said evidence and/or answer questions but would not be present during nor participate in deliberations or voting.

## 2. Meeting Frequency

CCC meetings occur at the conclusion of each clerkship block with sufficient time to meet the LCME requirement of grade return, which is defined as both the completion of the End-of-Clerkship narrative (which is what notifies the students, via the electronic learning management system, of their competency outcomes) and the return of competency outcomes to the Registrar for posting in the transcript.

## 3. Deliberations and Outcomes

CCC deliberations, decisions, and associated recommendations will be summarized in the meeting minutes. All deliberations will be presented to the CAP.

Recommendations regarding remediation that would result in delays in education or individualized or modified schedules will also be communicated to the Associate Dean for Medical Student Education to ensure feasibility for re-entry and successful completion.

Recommendations regarding dismissal will be reported to the Senior Associate Dean of Education.

# Washington University School of Medicine Policy for Student Promotion and Appeals

—This policy applies to Gateway Curriculum students.—

## Background

In collaboration with the Office of Medical Student Education, the Office of Student Affairs, and the Office of the Registrar and charged by the Academic Affairs Committee, the Committee for Academic Promotion (CAP) reviews the recommendations of the Competency Attainment Committee (CAC) and the Clerkship Competency Committees (CCCs) and renders final decisions regarding student advancement and graduation. This policy is in line with LCME element 9.9: Student Advancement and Appeals Process.

## Policy

Students for whom this policy applies include students enrolled in any phase of the Gateway Curriculum and students enrolled in dual and joint degree programs currently participating in the Gateway Curriculum.

The CAP is charged with the ratification of all competency decisions and promotion recommendations, which include the following:

1. Not competent/competent/competent with distinction (where applicable)
2. Promotion, with or without ongoing remediation
3. Remediation without promotion

4. Dismissal or other sanctions, including but not limited to probation or suspension, which may occur throughout the enrollment of a student
5. Recommendation to Executive Faculty those students who have successfully completed all prescribed requirements of the school and are qualified to receive the Doctor of Medicine degree

Students will be notified of competency decisions and promotion recommendations 10 days prior to the CAP meeting in which those recommendations will be discussed. Students may present themselves at the CAP, in person or in writing, to be heard on any of the following:

- Decisions of competency without distinction
- Recommendation for an adverse outcome (remediation without promotion, sanctions, or dismissal)

In the case of decisions of competency without distinction, student presentation before the CAP constitutes a formal appeal of that decision. In the case of recommendations for adverse outcomes, any student presentation prior to CAP ratification is not considered a formal appeal. Further details for student presentation and appeal procedures can be found in the Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 387).

Following the review and consideration of the CCC's evidence and the student's information, when provided, the CAP will take one of the following actions:

- Ratify and uphold the competency decision and promotion recommendation
- Remand back to the CCC for further review
- Overturn the decision of the CCC if the CAP perceives an inability for the original committee to make an unbiased recommendation

Students may formally appeal decisions of the CAP that impact their ability to progress through the standard curriculum (remediation without promotion, suspension, or dismissal). Appeals must be filed within seven days.

The scope of all appeals shall be limited to (i) bias and/or failure to follow the standard processes used for reviewing evidence and competency determination that materially affected the outcome; and/or (ii) new information or evidence exists that was not reasonably available at the time of the decision and that could affect the outcome of the decision.

Decisions that would result in delays in education or individualized or modified schedules will be communicated to the Associate Dean for Medical Student Education to ensure feasibility for re-entry and timing for successful completion of the degree requirements. Decisions regarding dismissal will be reported to the Senior Associate Dean of Education. Decisions of remediation without progression, dismissal, probation,

or suspension will also be communicated to Financial Aid to support necessary alterations in aid. All decisions will be recorded by the Registrar, including decisions as to whether information will be included within the formal academic record.

The responsibility for maintaining and overseeing this policy lies with the Committee on the Oversight of Medical Student Education.

*Last approved on May 12, 2022*

## Contesting Individual Assessments Procedure

*—This procedure applies to Gateway Curriculum students.—*

Students wishing to dispute a specific assessment, not a competency decision, do so using the Qualtrics ([https://wustl.az1.qualtrics.com/jfe/form/SV\\_3HlmgMLSHZ4XQV0/](https://wustl.az1.qualtrics.com/jfe/form/SV_3HlmgMLSHZ4XQV0/))<sup>XM</sup> form within seven calendar days of formal notification of the assessment outcomes being posted to the electronic learning management system (Keystone) or the review of the assessment during a proctored review. The form will require the student to complete the following details:

- Assessment being disputed
- Reason for or description of dispute

Dispute forms will be sent to the Assistant Dean for Assessment and the OMSE, who will then forward to the appropriate party (see list below) who has final authority to make determinations on changes at the individual assessment or assessment item level.

The appropriate parties with whom dispute forms will be shared are as follows:

1. Observed Structured Clinical Examination (OSCE) and Standardized Patient disputes are directed to the Clinical Skills and Communication Thread Leaders.
2. Individual foundational knowledge for practice assessment disputes are directed to the specific course/module leadership.
3. Individual patient care assessment disputes are directed to the appropriate course (Immersion or clerkship) leadership.
4. Disputes for all other individual phase assessments are directed to the Chair of the Competency Attainment Committee.

Students will be notified of the final outcome of the dispute no later than six weeks after the conclusion of the course.

## Additional Guidelines

- Students are advised that feedback from any one individual frontline assessor does not guarantee a specific competency outcome. Frontline assessors are not in a position to render such decisions.

- Students are advised **not** to engage directly with individual assessors or instructors when concerns about an assessment arise. Instead, they should discuss the issue with the appropriate party as identified above in this document.
- The perceived absence of formative or constructive feedback does not guarantee a specific outcome.
- Receiving insufficient feedback cannot be the sole basis for an appeal. If a student feels that they are not receiving sufficient feedback, even after asking for it, they are encouraged to discuss this with the appropriate course director before the end of the curricular period.
- Mid-clerkship feedback is not a guarantee of any specific final outcome.
- Clinical performance assessments returned more than 21 calendar days after the conclusion of a clerkship will not be considered credible sources of assessment information/evidence.

Students wishing to file a formal appeal should refer to the Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 387).

## Formal Appeal Procedures for Competency Attainment and Promotion Decisions

*—These procedures apply to Gateway Curriculum students.—*

The School of Medicine recognizes that the primary responsibility for academic evaluation with respect to student competency attainment resides within the Competency Attainment Committee (CAC) in partnership with the Clerkship Competency Committees (CCCs). Final decisions regarding promotion resides with Committee for Academic Promotion (CAP).

## Procedures of Competency Attainment and Subsequent Decisions

The interests of competency attainment are best resolved with early identification and support. Thus, concerns regarding student trajectory that may not support competency attainment should be recognized early and referred to the Student Success Team by the appropriate and responsible parties including but not limited to the Assistant Dean for Assessment, a coach, the Associate Dean for Student Affairs (ADSA), the CAC, the CCCs, or the course or clerkship lead.

For further details of the policies surrounding student promotion and review of competency attainment, please refer to the Policies & Guidelines of the School of Medicine (p. 356) in this *Bulletin*.

## Decisions and Recommendations for Which Students May Appeal

- CAP decisions to ratify recommendations of adverse promotion outcomes which include remediation without promotion, suspension, or dismissal
- Decisions of competence without distinction (where distinction is available)

The appeal shall be limited to determining whether (i) bias and/or failure to follow the standard processes of competency determination occurred or (ii) new information or evidence exists that was not reasonably available at the time of the decision and that could affect the outcome of their decision.

Students are encouraged to present themselves, in person or writing, to the Chair of the CAC and/or the Clerkship Director, as appropriate, when questions or concerns around decisions and recommendations surface to gain clarity. Students may also present themselves, in person or in writing, to the CAP prior to their final ratification. All of these steps occur prior to a formal appeal.

## Process for Students Wishing to File Appeals for Decisions of Competence Without Distinction

When the CAP receives a decision for competence without distinction, students may file a formal appeal of that decision if they feel that bias and/or failure to follow the standard processes occurred or new information or evidence exists that was not available at the time of the decision and that affected the outcome or decision. The procedure for appeals in these circumstances is as follows:

- Students complete the Qualtrics ([https://wustl.az1.qualtrics.com/jfe/form/SV\\_71KNQ2o9LB6J7ee/](https://wustl.az1.qualtrics.com/jfe/form/SV_71KNQ2o9LB6J7ee/))<sup>XM</sup> form within seven calendar days of notification of the decision of competence without distinction. The form, which will be sent to the Registrar, the ADSA, and Chair of the CAP, with a copy to the student, will require the student to complete the following details:
  - Decision being appealed
  - Reason for appeal (i.e., bias and/or failure to follow the standard processes of competency determination or new information or evidence exists that was not reasonably available at the time of the decision and that could affect the outcome)

- The ADSA or their representative will contact the student to support the full development of the appeal, which will provide a detailed description of the basis for the appeal and pertinent documentation to support the basis for the appeal, including, in the situation of new information not available at the time, an explanation as to why that information was not available, when possible.
- Completed appeal documentation must be received by the Chair of the CAP within 14 calendar days of the original notification of a decision for competency without distinction.
- The ADSA shall provide the request and documentation (student documentation and all meeting minutes and written recommendations/decisions) to the CAP for review.
- The student may present themselves to the CAP, in person or in writing, prior to CAP ratification.
- Following review, the CAP may make any of the following recommendations: 1) ratify and uphold the decision; 2) remand back to the original committee for re-review; or 3) overturn the decision if the committee perceives an inability for the original committee to make an unbiased recommendation.
- This is the final level of appeal for a decision of competence without distinction.

## Process for Students Wishing to File Appeals for Decisions of Adverse Outcomes

Given the significant nature of decisions of adverse outcomes, when the CAP ratifies such recommendations, students may file a formal appeal of that decision if they feel that bias and/or failure to follow the standard processes or new information or evidence exists that was not available at the time of the decision that would have affected the outcome or decision. The procedure for appeals in these circumstances is as follows:

- Students complete the Qualtrics ([https://wustl.az1.qualtrics.com/jfe/form/SV\\_71KNQ2o9LB6J7ee/](https://wustl.az1.qualtrics.com/jfe/form/SV_71KNQ2o9LB6J7ee/))<sup>XM</sup> form within seven calendar days of notification of the CAP decision. The form, which will be sent to the Registrar, the ADSA, and the Chair of the CAP, with a copy to the student, will require the student to complete the following details:
  - Decision being appealed
  - Reason for appeal (i.e., bias and/or failure to follow the standard processes of competency determination or new information or evidence exists that was not reasonably available at the time of the decision and that could affect the outcome)
- The ADSA or their representative will contact the student to support the full development of the appeal, which will provide a detailed description of the basis for the request and pertinent documentation to support the basis for the appeal, including, in the situation of new information not available at

the time, an explanation as to why that information was not available, when possible. Completed appeal documentation must be received by the Chair of the Appeal Committee within 14 calendar days of the original CAP decision.

- The ADSA will convene an ad hoc three-member Appeal Committee. Members involved in the original CAC, CCC, or CAP decisions shall not be involved in the appeals process. Appeal Committee members should have familiarity with the curricular and/or assessment processes of the Gateway Curriculum.
- The ADSA shall provide the request and documentation (i.e., student documentation and CAC, CCC, and/or CAP meeting minutes and written recommendations/decisions) to the Appeal Committee for review.
- The student will be allowed to present themselves before the ad hoc committee. The committee may request additional materials or discuss processes for decision making and recommendations with appropriate persons. The Chair of the Appeal Committee may also limit the information to be considered based on the scope of the appeal. No representatives from outside the School of Medicine, family members, or individuals with a conflict of interest\* are permitted to participate in or communicate with any members of the Appeal Committee regarding the process or final decision. The student may be accompanied by a support person, which may be a School of Medicine faculty member, staff member, or student. The support person may not present information or make comment.
- Following review, the Appeal Committee may make any of the following recommendations: 1) ratify and uphold the CAP decision; 2) remand back to the CAP for re-review; or 3) overturn the decision of the CAP if the committee perceives an inability for the original committee to make an unbiased recommendation.
- The ad hoc Appeal Committee will communicate its final decision within 14 calendar days of the conclusion of the appeal meeting to the student, the ADSA, the Assistant Dean for Assessment, the CAP Chair, the Registrar, and any other parties deemed necessary. In the case of dismissal, this will be communicated to the Dean or their designee for final review and approval.

\* For a full explanation of what constitutes a conflict of interest, please see the conflict of interest policy.

Please review the Steps in the Formal Appeal Process for CAP Decisions (PDF) ([http://bulletin.wustl.edu/medicine/policies/md-cap-decisions/Steps\\_in\\_the\\_Formal\\_Appeal\\_Process\\_for\\_CAP\\_Decisions.pdf](http://bulletin.wustl.edu/medicine/policies/md-cap-decisions/Steps_in_the_Formal_Appeal_Process_for_CAP_Decisions.pdf)) for more information.

## Course Credit Procedures

*—These procedures apply to Gateway Curriculum students.—*

In the Gateway Curriculum, students attain competency based on the totality and sufficiency of evidence regarding their performance in each of the WUSM Medical Student Program Objectives in each of the Competency Domains. The School of Medicine also has a requirement to provide transcript evidence of the successful completion of each course. This document describes the procedures for the determination and documentation of course credit that is independent of the Competency Attainment Committee (CAC) and Clerkship Competency Committee decisions of competency attainment.

In the Gateway Curriculum, Phase 1 and 3 courses include the Foundational Modules, Clinical Immersions, EXPLORE Immersions, Advanced Clinical Rotations, Keystone Integrated Science Courses, Capstones, and Electives. Course leads will be responsible for submitting "credit/no credit" determinations to the Registrar within 10 business days of the completion of the final course requirement. For each course, a determination of "credit/no credit" will be made based on the full completion of required course elements as outlined in the syllabus via the learning management platform for each course. "No credit" will be recorded on the transcript until such time as a student has completed all required elements, when the "no credit" will be replaced with "credit." End-of-course "no credit" determinations and the circumstances, when known, will be monitored and brought forward during CAC deliberations.

In Phase 2, clerkships are required to provide competency decisions in patient care, rather than "credit/no credit," to the Registrar within 6 weeks of clerkship completion in line with LCME element 9.8, Fair and Timely Summative Assessments. Students who have not completed a required element of the clerkship will receive an "incomplete" (I) on the transcript until all required elements are completed.

## Legacy Curriculum Students CAPES - Assessing Academic Achievement & Professionalism

*—This information applies to Legacy Curriculum students.—*

The policies and procedures listed below are adopted by the faculty and administration of the School of Medicine concerning review of student academic performance and professional integrity.

Overall academic and professional evaluation of students at the Washington University School of Medicine (WUSM) will be made by the Committee on the Academic and Professional Evaluation of Students (CAPES). The Committee on the Academic and Professional Evaluation of Students operates under the Rules Governing Review of Student Performance. Please visit the CAPES (p. 390) section below for more information.

## Rules Governing Review of Student Performance

### Preface

This document describes procedures adopted by the faculty and administration of the School of Medicine concerning review of student academic performance and professional integrity. Students are encouraged to read this information for a thorough understanding of the contents. Any questions arising from the procedures laid out herein should be directed to the Office of Student Affairs or the Office of the Registrar.

Major revisions to this document will be approved by the Academic Affairs Committee.

Questions about this document may be directed to:

Lisa Moscoso, MD, PhD  
Associate Dean for Student Affairs

Michael Donlan, PhD  
Assistant Dean for Academic Affairs, Registrar

Updated Jan. 25, 2018

## CAPES - Committee on the Academic and Professional Evaluation of Students

### Purpose and Jurisdiction

Students at the Washington University School of Medicine must demonstrate the ability to synthesize and apply knowledge and the capability of becoming a safe and effective physician. In addition, they must demonstrate the principles of professionalism including sound judgment, honesty, integrity, responsibility, a sensitivity and compassion for individual needs, and compliance with applicable laws, policies and regulations.

Serious or repeated academic failures or breaches of these principles in professionalism will be referred to the Committee on the Academic and Professional Evaluation of Students (CAPES) for review. Throughout the enrollment of a student, it is within the jurisdiction of the CAPES to terminate the enrollment of a student who has demonstrated serious academic failure or a breach of professionalism. The deliberations of the CAPES are generally positive in approach and are committed to the ultimate aim of assisting students to successfully complete the courses of study required by the school. The principle that careful selection of students will minimize attrition from the school is strongly endorsed by the CAPES.

The text contained herein outlines rules governing the review of student performance. For further information, refer to the Professionalism & Conduct Policies (p. 360) section of this *Bulletin*.

### Responsibility of the Committee

The ultimate responsibility of the Committee on the Academic and Professional Evaluation of Students (CAPES) is to assess whether each student meets the academic and ethical standards necessary to enter the profession of medicine. To accomplish this mission, CAPES undertakes the following tasks:

- **Student Advancement:** The CAPES annually recommends promotion of students who have successfully completed all requirements of the current academic year to the studies of the subsequent year.
- **Degree Recommendations:** The CAPES recommends to the Executive Faculty those students who have successfully completed all prescribed requirements of the school and are qualified to receive the Doctor of Medicine degree.
- **Academic Remediation Reviews:** When a student is in need of academic support services, the CAPES will recommend student status and remediation measures, which may include entry of a student into an Individualized Study Program.
- **Disciplinary Action:** The CAPES will review cases requiring disciplinary action due to unprofessional behavior or a breach of integrity.

### Students for Whom the Rules Apply

- All students engaged in preclinical and clinical education requirements for the MD degree
- Students in all years of the Five-Year MD program
- All students in joint and dual degree programs including but not limited to MD/MPH, MD/MSCI and MD/PhD (MSTP) programs taking preclinical or clinical portions of their MD education

#### Joint or Dual Degree Students:

When a student enrolled in a joint or dual degree program is found in violation of the other program's academic or professional integrity policy or is found to have committed any disciplinary violations, including violations of the University Student Conduct Code, such matters may be brought to the attention of the CAPES for review and further action. Notwithstanding decisions made by the other schools or programs, the CAPES reserves the right to take further action when a student is found in violation of such policies. If a student enrolled in a joint or dual degree program is not meeting academic performance expectations of the other program or school such that the student's status in that program or school may be impacted, the CAPES reserves the right to determine whether any action should be taken with respect to the student's status at WUSM.

## CAPES Membership

- **Appointed and ex officio membership:** Twelve voting faculty members of the CAPES are appointed for a four-year term by the dean of the School of Medicine following nomination by the department heads and/or associate deans. Faculty members may be reappointed to serve on the CAPES. Membership will include both clinical and preclinical department faculty. In addition, the CAPES membership will include, in ex officio capacity, the registrar (nonvoting) and the associate dean for student affairs (nonvoting). The senior associate dean, the associate deans for medical education, admissions and diversity programs, and the director of Student Health Services may attend the CAPES meetings as nonvoting participants.
- **Chair:** A faculty member will be appointed by the dean from within the CAPES committee to serve as chair. The term of the chair will be four years and may be reappointed.
- **Guests:**
  1. When the committee is addressing issues related to academic performance, a course director who is not a member of the CAPES but who submitted a Fail/Incomplete grade for a student who is to be discussed at the meeting will be present at the meeting to provide information regarding the student's performance. A course director may send a designated representative or may submit information in writing. In the event that a course director or designated representative is not present or sufficient information has not been forwarded, final action for the student will be deferred until adequate information is available.
  2. Similarly, when the committee is addressing issues of professionalism, the individual filing the professionalism concern form will be present for the meeting or in some instances may be allowed to submit information in writing.
  3. Any faculty, administrator or staff may be invited at the discretion of the chair.

## Meeting Frequency and Quorum

The CAPES meetings must occur in a timely manner after final examinations or re-examinations, as soon as practical after grades are submitted to the registrar. Generally grades will be submitted to the registrar within 10 days of completion of an examination. A meeting of the CAPES may also be convened at any time such that timely review of a matter is deemed necessary.

Seven voting members must be present to consider academic or disciplinary actions.

## Grades

### Grade Scales

Courses in the first- and second-year curriculum are evaluated on a pass/fail basis. Third- and fourth-year courses use a graded scale. Specific grades for each grade level are detailed elsewhere in this *Bulletin*.

### Grade Submission

Final grades will be submitted online within 10 business days of the final examination or final class meeting for the first two years. For the third and fourth years, grades are due within four weeks of the receipt of standardized examination scores or the last day of the rotation if no examination was given.

### Grade Appeals

Students may appeal a grade with the course director by filing a grade appeal request form (<https://registrar.med.wustl.edu/resources/#Forms>). Grade appeals must be filed within 10 business days after the grade has been posted.

If reasons beyond the student's control delay the appeal past the July 15 deadline, the registrar must be notified so that the final transcripts, grade distributions and class rankings for the match process can be held pending resolution of the matter. If this notice is not received by the registrar prior to the deadline, the new grade cannot be accepted. Students participating in the residency match process should also notify the office of career counseling whenever a grade appeal is in process. After the course director considers any appeal, they will indicate the resolution for the appeal on the grade appeal form and forward it to the registrar and the associate dean for student affairs.

**No grade changes are permitted for the prior academic year after July 15.**

### Grade Remediation

The CAPES may invoke remediation requirements for individual courses that are different from those determined by the course director. In such cases, the CAPES determination will supersede that of the course director. The CAPES may also require the student to repeat a full academic year or portion thereof if it is judged necessary given the academic history. Occasionally, in order to remediate a failed course in the first or second year, students are permitted to complete equivalent course work at other institutions with the permission of the responsible department and written notification to the registrar.

### Grade Point Average, Ranking and Distribution

The School of Medicine does not calculate grade point averages. Hours of credit appearing on the transcript reflect clock hours scheduled for the course or clinical rotation. For the purpose of residency applications only, students are placed in the upper, middle or lower third of the class according to a formula which considers weighting of courses in each academic year. This



ranking is not recorded on the permanent academic record and does not appear on transcripts. It may appear in the Medical Student Performance Evaluation (MSPE). At the conclusion of the academic year, when all the official grades have been received, the official transcript, in addition to listing courses and grades achieved, gives the grade distribution in each course with the exception of elective and selective courses.

## Academic Support and Accommodations

### Tutoring

Students experiencing difficulty in any course may request tutorial assistance. Such requests should be initially directed toward the course director and thereafter to the associate dean for student affairs. Students who are repeating courses will be offered tutorial assistance, and the CAPES may also require it. There is no charge to the student for tutorial assistance.

### Individual Study Program

Students who have difficulty handling the normal academic course load will enter an Individual Study Program (ISP) requiring five years to complete rather than four years. The intent of an ISP is to optimize the prospect that the student will successfully complete the curriculum. An ISP may be requested by the student or recommended or required by the committee.

#### 1. ISP: Scope and Sequence

The content and sequence of courses will be determined by the associate dean for student affairs with the input from the student, relevant course directors and the CAPES. The plan for execution of an ISP will be recorded in the student's file in the Registrar's Office and a copy will be provided to the student.

#### 2. ISP: Examination Schedules

Unless extenuating circumstances exist, ISP students are required to take the examinations for a particular course in their usual temporal relationship to the course work. Requests for exceptions should be recorded in the student's file in the Office of the Associate Dean for Student Affairs. Approval of such requests is considered according to the Washington University School of Medicine guidelines for exam administration found elsewhere in this *Bulletin*.

#### 3. ISP: Single Fail or Incomplete Grade

In the event that a single Fail or Incomplete grade is recorded for a student after entry into an ISP, the CAPES will again review the student's record. Consequences may include remediation, repeat of the course or dismissal from the school.

#### 4. ISP: Grounds for Dismissal

Students on an ISP who have not successfully completed and received a grade of Pass or above in all required courses of the first- and second-year curricula by the start of the second six-week period in the year of the clinical clerkship may be dismissed from the school.

### Accommodations

It is the responsibility of students to alert the CAPES regarding personal concerns, health problems, or any other factors that may be adversely affecting their academic performance, and to bring such matters to the attention of the director of Student Health Services or the associate dean for student affairs for possible accommodations.

### Indications for Review of Academic Performance

"Indications for Review of Academic Performance" refers to the guidelines used at the school in the event a student either fails exams or a course or fails to complete a course in the requisite time. **In general, the school guidelines for the "Indications for Review of Academic Performance" are as follows:**

#### Exam Failure

Exam failures can warrant meeting with the associate dean for student affairs (ADSA) and/or lead to referral to the CAPES. Consult the conditions below for further details relevant to each student-year level.

#### Single Course Failure – Meeting with the ADSA

In the event of any initial failure of a course the student will meet with the associate dean for student affairs (ADSA) to formulate a remediation plan in coordination with the course director.

#### Multiple Course Failures – Referral to the CAPES

##### Two or more courses in one year

- If either a failing or incomplete grade in two or more courses occurs in a single year, the student's academic performance will be referred to the CAPES for review and determination of a course of action.

##### Three courses (cumulatively across multiple years)

- If either a failing or incomplete grade in three courses occurs across multiple years, the student's academic performance will be referred to the CAPES for review and determination of a course of action.

### Individualized Study Program (ISP)

Refer to the ISP section (p. 392) within this CAPES policy for full details on guidelines pertaining to the review of students engaged in an ISP.

## Time Constraints

### Three-year rule:

No student may take more than three years to complete the course work required for the first two years of study. Time periods included in an approved leave of absence are not counted in these three years.

### Two-year rule:

In the absence of extenuating circumstances or an approved leave of absence, no student may take more than two academic years to complete the course work required in any individual curricular year. Time periods included in an approved leave of absence are not counted in these two years.

## Maximum Attempts at Passing a Course

Students have a maximum number of three attempts to pass any individual course during enrollment in the school.

## Joint or Dual Degree Program Students

If a medical student enrolled in a joint or dual degree program is not making satisfactory academic progress or is not meeting academic performance expectations of the other program or school such that the student's status in that school or program may be impacted, the CAPES reserves the right to determine whether any action should be taken with respect to the student's status within the School of Medicine. Further details pertaining to joint or dual degree program students are listed in the section describing students for whom the rules governing student performance apply.

**Note:** Specific conditions warranting review of academic performance are detailed below for each student-year level. Conditions for review of student performance due to professionalism issues are found in the policy section regarding professionalism.

## First-Year Students – Indications for Review of Academic Performance

All first-year courses must be completed before the start of the second-year curriculum. Failure to meet this requirement typically means one of the following conditions has occurred:

### Failure of a Single Exam (for First-Year Medical Students)

Failure of a single exam is not an immediate indication for review of academic performance by the CAPES. However, failure of a single exam that comprises a significant portion of the final grade (typically 20% or more) must be reported by the course director to the associate dean for student affairs (ADSA). The course director may allow one attempt at remediation of the exam at a time the course director prescribes. The scheduling of the remedial exam will be agreed upon by the course director and the student, but it should generally not extend beyond 30 days after the end of the course. Days of recess for winter and spring

break will not be counted in the 30 days. A grade of "E" (i.e., temporary grade signifying the pending make-up of a failed exam) will be submitted by the course director if the remedial exam is not accomplished within the course dates. This grade will stand on the academic record until it is replaced with a valid final grade of Pass or Fail. Grades of "E" that are not resolved within 30 days will be replaced with a grade of Fail (F). In rare circumstances, the ADSA may approve an extension of this deadline. If the student successfully remediates the exam, and has otherwise passed the course, a Pass (P) will be recorded by the registrar. A student may remediate only one examination in any course.

## Failure of Two or More Exams

The ADSA may request that the CAPES reviews performance of a student who has failed two or more examinations. In such cases, the CAPES will recommend a course of action.

## Failure of a Course

If a student receives a Fail/Incomplete grade in a single first-year course, the ADSA will meet with the student to formulate a remediation plan in coordination with the course director. The remediation plan may include the following options:

- Take a re-examination as approved by the course director.
- Enroll in and successfully complete, at the level designated by the course director, a summer course at a different institution, such a course being completed and passed by the beginning of the second year.

If a student fails to successfully complete an approved summer course or fails the re-examination taken to remediate a failed course, they will be referred to the CAPES for review and recommended course of action. The CAPES may require the student to enter an ISP or be dismissed from the school. The CAPES may permit a second re-examination. If the second re-examination is failed, the student will be dismissed from the school.

## Failure of Two or More Courses

A student for whom the registrar has recorded a Fail/Incomplete grade in two or more courses during the first year will be referred to the CAPES for determination of a course of action. The committee may decide to permit the student to take re-examinations, if a re-examination has not already been taken. Such re-examinations will generally occur during the inter-academic year break. If a re-examination is failed the student may be required to enter an ISP or be dismissed from the school.

## Second-Year Students – Indications for Review of Academic Performance

Students in their second year will be referred to either the associate dean for student affairs (ADSA) or the CAPES for review and resolution of a recommended course of action when any one of the following conditions has occurred:

### Conditions for Meeting with the ADSA for Second-Year Students

**Failure of a single interval exam within a year-long course or failure of one block-long course (for Second-Year Students):**

- An initial failure of a single exam does not signal an automatic referral to the CAPES.
- A second-year student who receives a final grade of Fail or Incomplete in a single interval exam in a year-long course will first meet with the ADSA.
- A second-year student receiving a failing/incomplete grade in one block-long course must first meet with the associate dean for student affairs (ADSA).

### Re-examination Scheduling and Resolution

- Re-examinations for year-long courses will generally be offered during the inter-academic year break, prior to entry into the third year.
- Re-examinations for individual block-long courses will generally be offered at a time determined by the course director and the ADSA. All such re-exams must be offered to students and completed prior to the start of the next academic year.
- Students failing the re-examination of a single block-long course (or failing a re-examination of a single year-long course) will be referred to the CAPES to determine a course of action. If the examination is failed for a third time, enrollment will be terminated.

### Deferral of Clinical Rotation Start Date

The CAPES may allow the student to defer beginning the clinical rotations so that re-examinations may be taken up to six weeks after the beginning of the usual cycle of clinical clerkships. Such extra time used for study and preparation will ordinarily mean that the student will not have the usual unscheduled time in the elective year.

*Note:* No student is permitted to begin Clinical Rotations of the Third Year until all first- and second-year courses have been successfully completed.

### If Re-examinations Are Not Allowed

- **ISP:** In the event that the CAPES decides to not permit re-examination, an ISP may be recommended.
- **Dismissal/Termination:** The CAPES has the option to recommend any such student be dismissed.

## Conditions for Referral to the CAPES for Second-Year Students

**Second-year students will be referred to the CAPES for review and resolution under any of the following categories:**

1. Failure of an interval exam in one year-long course and one block-long course
2. Failure of two interval exams in year-long courses
3. Failure or Incomplete recorded in any re-examination
4. Failure or Incomplete grade in one year-long course
5. Failure or Incomplete grades in two or more block-long courses

## Remediation for Second-Year Students Reviewed by the CAPES

**Re-examinations allowed:**

The committee may permit the student to take re-examinations in the courses for which a Fail or Incomplete has been recorded (provided that a re-examination has not already been taken for a given course). Such re-exams will generally occur during the inter-academic year break. *Note:* In the event that a Fail/Incomplete grade is recorded after a re-examination, the CAPES may require that a student enter an ISP or that enrollment in the School of Medicine be terminated. The CAPES may decide that a second re-examination may be offered.

## Cumulative Academic Review (at End of Second Year)

Prior to promotion to the clerkship year, the CAPES will review the cumulative academic record of each student brought forth by the associate dean for student affairs (ADSA) to determine whether the student's academic performance justifies advancement to the clinical phase of the medical education without warning. Typically, multiple remediated examinations and/or failing grades during the first two years of the curriculum will raise concerns about the student's knowledge and readiness to participate in clinical care of patients.

**Students with overall records indicating globally poor performance may have one of the following actions taken upon them with written notification:**

- Required to repeat specific preclinical course work
- Advancement to Clinical Year with Academic Warning, with a required meeting with the ADSA in order to –
  - Review and pursue available resources for academic intervention
  - Review and plan an effective clerkship schedule to consider schedule changes helping to facilitate successful clinical experiences
- Recommend students seek tutorial assistance through each clerkship director and address any additional or unique circumstances

- Probation – Contingencies for continued enrollment on probationary status and for return to good standing will be specified by the CAPES.
- Dismissal – Globally poor performance may be deemed grounds for dismissal by the CAPES. In addition, a third-year student who is advanced with academic warning and then fails any component of a clinical clerkship may be dismissed from the school.

## Indications for Review of Academic Performance for Third and Subsequent Years

Failure of any core clinical rotation without successful remediation will prevent proper advancement toward the student's degree and may result in significant consequences for career planning. For these reasons, the following list itemizes the conditions under which the CAPES committee will convene.

### Failure of One Course Required for *Third or Subsequent Years*

The ADSA will meet with any student for whom a single Fail/Incomplete/E grade has been recorded for a course beyond the second year of the MD curriculum. Discussion will include the requirements stipulated by the relevant course director in order to remediate the academic encumbrance. Options will generally include a re-examination or the repeating of all or a portion of the course. If a single failing grade for a clerkship course or elective has been recorded, the student *may be* referred to the CAPES for review and course of action. **If a Fail grade has been entered following the prescribed remediation, the student will always be referred to the CAPES to determine a course of action.** When such a student is referred to the CAPES, the committee may permit a re-examination or retaking/repeating of all or any portion of the course. If the course is failed a third time, the student will be dismissed from school.

### Failure of any Component of a Clerkship while on Academic Warning

A student who advances to the clinical years under academic warning, and who fails any component of a clerkship will be referred to the CAPES for action including possible dismissal from the school.

### If Poor Academic Performance is Reported for Two or More Courses

The ADSA **may** request that the CAPES review performance of a student who has been reported as having demonstrated poor academic performance in two or more courses at interval evaluations conducted throughout the courses. In such instances, the CAPES may determine a course of action.

## Failure of Two or More NBME Subject/Shelf Examinations

Any student who fails to achieve a passing grade on any two or more NBME subject/shelf examinations conducted as part of any clerkship evaluation will be referred to the CAPES for review and course of action. *Note:* A passing grade for any subject/shelf examination is defined as any score greater than or equal to the 10th percentile as reported by the NBME.

## Recording of Failed Grades, Remediation, Re-examinations, Repercussions, or Dismissal (for Students in their *Third Year and Beyond*)

A student who fails any clinical component of a clerkship or elective will have a Fail grade recorded on the permanent academic record. At the discretion of the course director or the CAPES, the student must repeat either the portion failed or the entire clerkship or elective in order to remove the academic degree encumbrance. The failing grade will, however, remain visible on the permanent academic record. Any new passing grade for any such remediated course will display on the transcript; thus, both the original failing grade and the newly recorded grade for the course will be visible on the permanent academic record.

In addition, a failing grade for clinical clerkships will be officially recorded onto the permanent academic record whenever a student fails the subject/shelf examination for the second time. A failing grade is defined as a score of less than the 10th percentile as reported by the NBME.

For students referred to the CAPES for failed/incomplete grades, the committee may endorse or amend the remediation recommendations of the corresponding course director(s). In the event a student fails a course remediation defined by the course director and approved by the CAPES, the CAPES may require that the clerkship rotation be repeated or that enrollment of the student in the school be terminated. Students will generally be permitted three attempts to achieve a passing grade in any clerkship course. If three failing NBME subject examination grades or final clerkship grades have been submitted for a course, the student will be dismissed from the school.

## Procedures Concerning Review of Academic Performance

### A. Convening a Meeting

Actions for Academic Review of students shall be referred to the CAPES for consideration by way of the associate dean for student affairs (ADSA) or registrar. The ADSA will convene a meeting of the CAPES, notifying the student in writing regarding the reason for the review and the date, time, and place of the meeting. A meeting of the CAPES may be convened at any time when a timely review of an issue is deemed necessary.

## B. Attendees

The associate dean for student affairs, the registrar, and the course director(s) or their designated representatives shall present the matter to the CAPES in a closed and confidential CAPES meeting.

## C. Student Responsibility

All students will be asked to be available to appear before the committee to provide additional information relevant to the concern. If the student fails to be available to appear at the meeting, the committee may postpone the meeting or may conduct the meeting and impose sanctions without the student present. Failure of a student to appear or provide information requested by the CAPES may result in the committee's filing a professionalism concern form. Meetings may be rescheduled at the discretion of the CAPES chair.

It is the responsibility of the student to alert the CAPES of any extenuating circumstances or contributing factors that should be considered regarding the student's status. The student shall be permitted, upon request in advance of the CAPES meeting, to appear before the CAPES on their own behalf. At the student's request, they may be accompanied by a member of the faculty, staff or fellow student of the school.

## D. Student Record Considered

A student's entire academic and professionalism record will be considered in deliberations regarding student status.

## E. Meeting Minutes

A record of the CAPES meeting shall be preserved and will be available for review by the School of Medicine's Appeals Committee, as necessary.

## F. Outcomes Possible

Actions taken by the CAPES may include but are not limited to dismissal, suspension, probation, defined penalty, advancement with academic warning, remediation, and/or additional oversight. The CAPES may also rule that the MSPE/Dean's Letter should include a citation regarding the matter. The CAPES decision shall be made by simple majority unless the vote is for dismissal which requires a three-fourths majority.

## G. Notifying Students of Final Committee Decisions

The associate dean for student affairs will inform the student verbally of the decision of the CAPES. The registrar will inform the student in writing within 10 business days.

## Indications for Review of Professional Integrity

Matters involving a possible breach of professional integrity shall be brought to the attention of the associate dean for student affairs. The individual(s) raising the questions of possible misconduct shall present a Professionalism Concern Form (<https://registrar.med.wustl.edu/resources/#Forms>) providing detailed written information as necessary. Individuals submitting such forms are reminded of the need for complete confidentiality regarding all matters of conduct.

Behaviors inappropriate to the medical profession shall include but are not limited to:

- cheating or unauthorized use of materials during examinations
- abuse
- misrepresentations
- other seriously improper conduct in relation to patients or colleagues
- breach of confidentiality and trust
- misconduct in violation of university policies
- violation of the University Student Conduct Code
- illegalities
- substance abuse
- failure of judgment including that related to noncompliance in the treatment of any personal medical condition
- misrepresentation or failure in personal actions or meeting obligations
- any combination of the above items, and others which might raise serious unresolved doubts about the integrity of the student with regards to entering the practice of medicine

For more information, consult the Professionalism & Conduct Policies (p. 360) section of this *Bulletin*.

## Procedures Concerning Review of Professional Integrity

At the discretion of the associate dean for student affairs, in cases of serious or repeated breaches of professional integrity, the associate dean for student affairs will convene a meeting with the associate dean for admissions, the associate dean for medical student education, or the senior associate dean for medical education to review the complaint(s) and to decide whether further action is necessary.

If further inquiry is deemed necessary, the associate dean for student affairs and either the associate dean for medical student education, the associate dean for admissions, or the senior associate dean for medical education will discuss the complaint with the student. If the two associate deans deem that further action is warranted, the following procedure will occur:

## A. Convening of Meeting

The associate dean for student affairs will convene a meeting of the CAPES. Whenever possible, the CAPES shall convene within two weeks after the initial meeting between the student and the associate dean for student affairs. If the person bringing the complaint is a member of the CAPES, they will not vote but may participate in the discussion. If the person bringing the complaint is not a member of the CAPES, they will be asked to present the complaint and will then be excused. The CAPES chairperson will oversee the procedures of the meeting. The registrar will record the minutes.

## B. Gathering of Pertinent Information and Meeting Attendees

Prior to the meeting, the associate dean for student affairs will forward information concerning the matter to the committee. In addition the associate dean for student affairs will inform the student in writing regarding the time, date and place of the meeting. A copy of the complaint will be provided to the student. The notification shall state that the proceedings are confidential. The student may bring a faculty member, staff member or fellow student for guidance and support. If this person is not a fact witness to the complaint, they may not address the committee.

## C. Student Responsibility

Any student to be considered at a CAPES meeting will be asked to be available to appear before the committee to provide additional information relevant to the concern. If the student fails to be available for the meeting, the committee may postpone the meeting or may conduct the meeting and impose sanctions without the student present. Failure of a student to appear or provide information requested by the CAPES may result in the committee's drawing adverse conclusions. Meetings may be rescheduled at the discretion of the CAPES chair.

## D. Student Record and Pertinent Documentation/Materials

The CAPES will consider evidence which tends to prove or disprove the alleged conduct. If the CAPES finds that the student engaged in misconduct, it may consider additional evidence of prior conduct, evidence as to the charged student's character, the student's entire academic and disciplinary record, or any other evidence which would assist the CAPES in determining appropriate action. The chair of the CAPES will rule on whether or not evidence or testimony will be considered. The CAPES has neither the advantages nor limitations inherent in a court of law. During the meeting the student will have access to the written evidence presented and may present evidence and fact witnesses on their own behalf. The student should be prepared to discuss the circumstances of the complaint after which the CAPES will excuse the student from the room.

## E. Objective Approach By Committee

The purpose of the CAPES meeting is to provide fair and prompt review of the inquiry. The committee is not positioned in an adversarial role against the student, but simply serves to review the evidence as presented and determine a decision regarding disciplinary action if necessary. The decision as to whether the student committed the alleged act will be made solely on the basis of evidence and testimony presented at the meeting. Innocence of the student will be presumed. A CAPES member must find in favor of the student unless the member is persuaded that it is more likely than not that the student engaged in the alleged misconduct.

## F. Outcomes Possible

Actions taken by the CAPES may include but are not limited to dismissal, suspension, probation, defined penalty, fine and restitution, advancement with academic warning, remediation and/or additional oversight. Contingencies for continued enrollment on probationary status and for return to good standing will be specified by the CAPES in each individual case. The CAPES may also rule that the MSPE/Dean's Letter should include a citation regarding the matter. The CAPES decision shall be made by simple majority unless the vote is for dismissal which requires a three-fourths majority.

## G. Notifying Student of Committee Decisions

The associate dean for student affairs will inform the student verbally of the decision of the CAPES. The registrar will inform the student in writing within 10 business days.

## H. Meeting Minutes and Confidentiality

The record of such proceedings will be held confidentially with access restricted to committee members, the student involved and relevant members of the administration.

## I. Disclaimers

- The university does not tolerate retaliation against individuals who bring forward complaints or who participate in the CAPES process.
- Unless determined by the associate dean for student affairs that extraordinary circumstances exist, the student will be permitted to continue in the usual academic activities during CAPES proceedings. However, if there is a reasonable basis for believing that the continued presence of the student on campus or in clinical rotations poses a substantial threat to the student, to patients, or to the rights of others to engage in their normal university functions and activities, the procedure outlined under the school's Leave of Absence Policy (p. 404) will apply.

## J. Both Academic Performance and Professionalism Concerns Exist

Should a student be referred to the CAPES for an issue involving both academic performance and professionalism concerns, the procedures for Professionalism Concerns will be followed.

### Appeals Process

The School of Medicine has the right and responsibility to assure that each student, during the time of enrollment, demonstrates levels of academic achievement and ethical stature appropriate to the practice of medicine. The school must also ensure provision of fairness in discharging those rights and responsibilities. As such, an appeals process is in place as outlined below:

#### A. Request for an Appeal

Within 14 working days of the date on which an academic or disciplinary decision is rendered by the CAPES, the student may request in writing to the registrar, that the School of Medicine's Appeals Committee review the record of the CAPES decision to determine that the appropriate CAPES procedures were followed or that the Appeals Committee requests that the CAPES consider additional, new relevant information which was not previously presented to the CAPES for good cause. The letter to the registrar should include the basis for appeal as well as any new relevant information and an explanation as to why it was not timely presented to the CAPES.

#### B. Establishing an Appeals Committee

An Appeals Committee, composed of faculty members appointed by the dean of the School of Medicine, shall be created to review appeal of decisions by the CAPES. Members of the CAPES may not be appointed to the Appeals Committee. A quorum of this committee shall consist of five members.

#### C. Review by the Appeals Committee

The Appeals Committee shall review the record of the CAPES decision solely to determine whether the pertinent CAPES procedures were followed and whether all relevant information was considered by the CAPES. If the appeal is based on a contention that all relevant information was not presented to the CAPES, the written appeal must provide the Appeals Committee with adequate reason why the student did not present this information at the CAPES meeting in question. In all cases, the Appeals Committee shall not substitute its judgment of the facts or its opinions of the merit of the matter for those of the CAPES.

## D. Appeals Committee Decision Types

#### 1. Remand the case to the CAPES

The Appeals Committee may decide to remand the matter to the CAPES for reconsideration with its explanation for the remand. If the matter is remanded to the CAPES, all documents, minutes of the Appeals Committee meeting, and information submitted by or for the student in support of the appeal will be made available to the CAPES.

#### 2. Denial

The Appeals Committee may decide to deny the appeal.

## E. Decision Notification to the Student

The Appeals Committee shall provide its decision in writing to the student, the dean of the School of Medicine, the associate dean for student affairs and the registrar. The associate dean for student affairs shall determine whether the student may continue their curriculum pending the Appeals Committee review of a CAPES decision.

## F. Student Appeal to the Dean

Within 10 business days of the date of an Appeals Committee decision, the student may request in writing that the dean of the School of Medicine review the decision of the Appeals Committee. The decision of the dean of the School of Medicine shall be final.

## Glossary

The following definitions are applied when the indicated terms are used in relation to the foregoing rules concerning review of academic performance and professional integrity:

#### Academic Warning, Advancement with

A supervised status that may be imposed if a student's cumulative academic review indicates that special oversight is warranted. Refer to the sections on Cumulative Academic Review and Academic Warning for additional information.

#### Action, Disciplinary

An action, including counseling and penalties, taken by the School of Medicine, after consideration of the disciplinary problem.

#### Administrative Withdrawal

Termination of a student's enrollment from or eligibility to return to the School of Medicine by the university where the student has:

A. failed to register and has not sought a leave of absence; or

B. not returned from an approved leave of absence within the designated period of time and where an extension of the leave of absence has not been timely requested and approved by the CAPES.

### Dismissal, Academic

Involuntary separation of a student from the School of Medicine because they have not met the academic requirements.

### Dismissal, Disciplinary

Involuntary separation of a student from the School of Medicine as a result of action taken because of misconduct.

### Good Standing

As a record or transcript notation, it signifies that the student is eligible to continue, to return, or to transfer elsewhere. It implies good academic standing as well as good citizenship and replaces such terms previously used as honorable dismissal, honorable withdrawal, withdrawn, voluntary withdrawal, eligible to return and clear record.

### Grade, Incomplete

Indicates there is still a possibility of credit after further work. Used when the instructor is not prepared to give a final mark for the term in view either of sickness of the student or some justifiable delay in the completion of certain work. It is accompanied by a note that explains the circumstances and indicates how and when the incomplete may be resolved. A definitive mark for the term is recorded on the official transcript when the work is completed and the incomplete grade is removed. In case the work is not completed within the time allowed, the recorded grade will be changed to fail.

### Permanent Academic Record

The all-inclusive abstract of academic achievement. This is also commonly referred to as the official educational record or official transcript.

### Probation

Probation status may be for academic and for disciplinary reasons. Academic probation is the result of unsatisfactory scholarship. It is not a penalty but a warning and provides an opportunity to improve. Usually the student is required to make regular specified improvement in his record in order to avoid dismissal.

Disciplinary probation is the middle status between good standing and suspension or dismissal. The student remains enrolled but under stated conditions according to school policies. Disciplinary probation covers a stated trial period during which it is determined whether the student is returned to good standing having met the stated requirements or dismissed from enrollment at the end of the period for failure to meet the stated requirements.

### Professionalism Concern Form

A form completed by a member of the university community to communicate an instance of unprofessional behavior to the associate dean for student affairs. Serious or repeated instances of unprofessional behavior may be referred to the CAPES by the associate dean for student affairs.

### Suspension

Suspension is an involuntary separation of the student from the school but it differs from dismissal from enrollment in that it implies and states a time limit when return will be possible. Thus, suspension may extend for a specified time, until a specified date or until a stated condition is met.

### Withdrawal

A release from enrollment. A student may request that they be allowed to withdraw from enrollment. Such requests are directed to the registrar or the associate dean for student affairs. When a student has requested withdrawal status, the school, by action of the CAPES, will determine whether the withdrawal will be annotated with good standing or not in good standing in the official academic record. Such annotations may be accompanied by explanations in the official educational record.

## Appendices

### Evaluations and Grades

Please visit the Evaluation and Grades section of this *Bulletin* for more information.

### Grade Appeal Form

Please visit the Office of the Registrar (<https://registrar.med.wustl.edu/resources/#Forms>) website for more information.

### Professionalism Concern Form

Please visit the Office of the Registrar (<https://registrar.med.wustl.edu/resources/#Forms>) website for more information.

### CAPES Booklet

A booklet of this information (PDF) ([http://bulletin.wustl.edu/medicine/policies/md-assessment/CAPES\\_Booklet.pdf](http://bulletin.wustl.edu/medicine/policies/md-assessment/CAPES_Booklet.pdf)) that includes a table of contents and an index is also available.

## Grade Point Average, Class Ranking, and Grade Distributions

—*This information applies to Legacy Curriculum students.*—

For more information about grade-point average, class ranking, and grade distributions, please visit the Assessing Academic Achievement & Professionalism (p. 389) section of this *Bulletin*.



## Grading System

—This information applies to  
Legacy Curriculum students.—

### I. First and Second Year

Courses in the first-year and second-year curriculum are evaluated on a Pass (P) or Fail (F) basis. For purposes of the final official grade records of the School of Medicine, grades used for the first year and second year are as follows:

- P = Pass, indicating satisfactory performance
- F = Fail; any grade of F remains on the student's academic record. When the course is repeated or remediated the new grade will appear as a separate entry in addition to the failing grade.
- L = Successful audit
- NG = Course credit earned, students not graded
- W = Withdrawal from a course
- Z = Unsuccessful audit

Valid temporary grades include the following:

- E = Temporary grade, makeup of failed exam pending
- I = Incomplete, temporary grade pending completion of course requirements, replaced with an F if not removed within one year (In rare instances, the Committee on the Academic and Professional Evaluation of Students [CAPES] may grant an extension. Incomplete indicates that, because of a delay excused by the course director, the student has not completed the requirements to pass a course.)

### II. Subsequent Years

For purposes of the final official grade records of the School of Medicine, the following grades are used for subsequent years:

- H = Honors, reflecting a truly outstanding performance
- HP = High Pass, awarded for excellent/very good work
- P = Pass, indicating satisfactory performance
- F = Fail (Any grade of F remains on the student's academic record. In clinical clerkships that have a subject examination, students must score at or above the 10th percentile of the national pool of students taking the examination to pass the clerkship. If a student fails a shelf examination for the second time in a third-year clerkship, an F is recorded on the permanent record.)

When the course is repeated or remediated, the new grade will appear as a separate entry in addition to the failing grade.

- Cr/NCr = Credit/No Credit for select second- and fourth-year courses
- L = Successful audit
- NG = Course credit earned, students not graded
- W = Withdrawal from a course
- Z = Unsuccessful audit

Valid temporary grades include the following:

- E = Temporary grade, makeup of failed exam pending (In clinical clerkships that have a subject examination, students must score at or above the 10th percentile of the national pool of students taking the examination to pass the clerkship. If a student fails the subject examination once, the grade of E will be recorded. Upon successfully retaking the subject examination, the new grade will replace the grade of E on the permanent academic record. If the shelf examination is failed a second time, the grade of F is recorded on the permanent academic record.)
- I = Incomplete, temporary grade pending completion of course requirements, replaced with an F if not removed within one year (In rare instances, the CAPES may grant an extension. Incomplete indicates that, because of a delay excused by the course director, the student has not completed the requirements to pass a course.)

## Professionalism

—This information applies to  
Legacy Curriculum students.—

### Preamble

Medicine is one of the oldest of the learned professions. A professional is one who is in command of a specialized body of knowledge and skills, and is given specific rights not typically allowed to the public. Along with those rights, the professional has specific responsibilities or duties not generally expected of the public.

The singularity of medicine is that it deals with human health. Patients are potentially at their most vulnerable when establishing a relationship with a physician. That the patient's relationship with their physician involves a dependency that encompasses life and death adds further to the uniqueness of this relationship.

The label of professional is not a right but must be earned. The special contract physicians have with society has professionalism as its foundation. Professionalism consists of fundamentally important qualities including altruism, compassion and empathy, respect for patients and health care workers, commitment to ongoing excellence, honesty, trustworthiness, integrity, accountability, recognition of limits, collaboration, and duty to society.

Professional development is an ongoing process at all levels of training and practice. The purpose of this document is to outline those elements of professionalism expected of our medical students. It is not meant to be all-encompassing, providing exact guidelines for all possible situations. While this document was developed with medical students in mind, it is generally applicable to all medical professionals.

The goal of the Washington University Medical Center is to provide patient care, medical education, and biomedical research of the highest quality. Accomplishing this goal depends in part, also, on an atmosphere of mutual respect and collegiality among all those who work and study here. This document focuses on the special issues presented by the teacher/learner relationship, as well, and applies to all years of the medical school curriculum.

## Guiding Principles of Professionalism

### Professional Responsibility

1. Students have a responsibility to actively participate in their education and to work to improve the educational environment for future students.
2. Students should have a willingness to pursue lifelong, self-directed learning, which is an essential attribute of any professional.
3. Students should act responsibly in their personal and academic lives with regard to meeting deadlines, financial obligations and other comparable responsibilities.
4. Preparation for class and during clinical rotations sets a good example for peers, maximizes every student's learning opportunity, and demonstrates respect for the teachers and peers.
  - a. Respecting one's peers in a classroom or in the hospital setting includes behaviors such as arriving on time, exhibiting respectful body language, listening attentively, turning off cell phones and allowing all present to engage in discussion.
5. Students should report to the appropriate supervisor potentially serious errors that others have committed.
6. Students should contribute to their community.
  - a. Students are encouraged to participate in the first- and second-year teaching groups.
  - b. These provide a service to the larger St. Louis community, while teaching students how to communicate with people of diverse backgrounds.
  - c. Students are encouraged to serve at the Saturday Neighborhood Health Clinic and other community service and teaching activities.
7. Students should be aware of the larger social and economic context in which disease occurs, and take advantage of opportunities to deepen their knowledge about this topic.

### Competence and Self-Improvement

1. In order to function at the expected level, students should attend to their own physical and emotional health.
  - a. The experience of being a medical student can be physically and emotionally challenging. Students need to be able to identify when they are overwhelmed to the point where they may not be able to function appropriately. Students are encouraged to seek educational assistance and/or the emotional support of others in these instances.
2. Recognizing and admitting errors in patient care are key to being a good physician.
  - a. Students should view mistakes as part of learning. Assuming responsibility for mistakes is critical for professional development.
  - b. Developing productive strategies for dealing with mistakes and non-confrontational ways of correcting them is essential.
3. Feedback, advice and criticism from residents, fellows and faculty fosters personal and professional development, and should be taken in the context of mentoring.
  - a. Students should assume that opinions of their faculty/residents/fellows that may seem unclear are usually solidly founded, and accept feedback regarding their performance openly and maturely from individuals more experienced than they.
  - b. Students should provide suggestions and examples for improving the mentoring environment by forthrightly evaluating their instructors.
4. Students should identify and correct errors in patient care as soon as possible or notify those who can correct it.
5. Students should balance personal and professional interests.
  - a. Students should not over-commit.
  - b. Students should communicate schedule conflicts to course directors, lecturers, and/or house staff.

### Respect for Others and Professional Relationships

1. Students should conduct themselves with manners and consideration of all others, and be respectful of others' time.
2. While individual effort is important in developing a medical knowledge base, much of what students learn in medical school will depend on a collaborative effort with their peers.
  - a. From the first day of medical school, students should encourage each other and collaborate with their peers when appropriate in the learning environments of lectures, small group discussions, and lab sessions. In doing so, they are laying the foundation for the truly collaborative nature of medicine.

- b. During the clinical years, students should understand that their peers are a valuable resource. Likewise, a student should assist peers in patient care responsibilities.
  - c. In all cases, students should respect the work and learning opportunities of their classmates and they should share educational opportunities with their peers. Professional behaviors include listening to other's presentations, and encouraging others' opportunities to present, ask/answer questions, admit patients, participate in surgical cases/procedures, or perform duties.
3. Respect for the ethnic and cultural diversity of classmates provides for a more nurturing environment for all.
    - a. Students should be aware that their classmates come from a wide variety of religious and ethnic backgrounds and that they will have differing lifestyles and viewpoints. This diversity is an important resource in our community, contributing to the personal and professional growth of all.
    - b. Students should be sensitive to the importance of these issues and should seek opportunities to enhance appreciation of multiple cultures through dialog, educational opportunities, etc.
  4. Students should be supportive of peers during difficult times in their personal and professional lives.
    - a. Students must appreciate that their peers may have issues in their personal or professional lives (e.g., family, medical, academic, or administrative problems) that may affect their interactions with others. In these circumstances, students should make every attempt to be sympathetic and to offer their support to those students.
  5. Participation and teamwork enhances the educational experience.
    - a. The learning process is a partnership between students and faculty. Students should actively participate in this partnership by providing feedback to professors by way of evaluations and surveys.
    - b. Contributing to the overall functioning of the team maximizes both learning and patient care in the clinical setting.
  6. Understanding the appropriate venues for feedback to house staff/fellows/faculty is critical to successfully resolving conflicts. Students should be aware of the hierarchy of the team, and appropriate mechanisms for handling disagreement with faculty/residents/fellows. Conflicts can be translated into productive outcomes if handled appropriately. For additional helpful information, reference the university Code of Conduct (<https://universitycompliance.wustl.edu/code-of-conduct/>).
7. Maintaining a professional relationship with teachers (including faculty/residents/fellows and TAs) is important, especially during times when these teachers are in a position to grade or evaluate the student.
    - a. Students should avoid behaviors that could potentially be construed as attempting to influence the faculty, for example running personal errands.
    - b. The university has specific codes and regulations regarding romantic relationships between a student and a teacher, including faculty/resident/fellows outlined in the Consensual Relationships Policy (<https://hr.wustl.edu/items/consensual-relationships/>). Students engaged in such relationships should review these codes and avoid any situation that can cause potential conflict of interest in the academic setting.
  8. Patients should be treated as individuals in the context of their family, culture and community. Personal bias should be subordinated when possible to further the therapeutic relationship.
    - a. Use of offensive language or gestures is unacceptable.
    - b. At times, some religious beliefs will require the use of alternative care approaches.
    - c. Students, like practicing physicians, should not refuse to participate in the care of a patient with a communicable disease unless this represents a meaningful threat to the student's own health. In contrast, a student who is verbally or physically threatened by a patient may ask to be excused from care of that patient.
  9. Students should treat hospital staff with appreciation and respect as they are vital members of the health care team.
- ## Honesty and Integrity
1. Student work should be original.
    - a. Only authorized resources should be used during examinations, quizzes or graded course work. WUSM has a zero tolerance policy for plagiarism (<https://studentconduct.wustl.edu/academic-integrity/>).
    - b. When students are aware that a classmate has submitted work that is not their own (cheated), they should discuss this situation with the course director and/or the associate dean for student affairs.
  2. Students must respect patients' rights and maintain confidentiality, in accordance with HIPAA guidelines.
    - a. Students should be ever aware that patients are ill and have the right to refuse care, particularly when poorly provided.
    - b. Patient information should only be discussed with appropriate people at appropriate times.
    - c. Patient records should not be photocopied carelessly or removed from appropriate areas.
    - d. Patient information should be disposed of appropriately to prevent careless transmission of patient information.

3. Students should clearly communicate their abilities and level of training to patients.
  - a. If a student does not know the answer to a patient's question, it is the student's responsibility to admit this lack of knowledge.
  - b. Even if other members of the health care team introduce students to patients as "doctor," the student should never do so as it leads to a false perception of expertise on the patient's part.
  - c. Students should always be truthful with the house staff and other medical staff in terms of patient care and never compromise patient care as a consequence of personal gain.
4. Students should not participate in any aspect of patient care if under the influence of a substance that may compromise the student's judgment or otherwise cause the patient harm. Likewise, students should report any member of the health care team who may be participating in patient care while under the influence of a judgment-impairing substance.
5. Any student who is impaired by physical or psychological illness should excuse themselves from patient care responsibilities, and should also respect recommendations to do so from colleagues or supervisors.
6. Although students are often tired or under stress, they should attempt to maintain an appropriate level of composure at all times.
7. Students should be appropriately attired for all patient care duties.
8. Students should carefully consider their participation in benefits provided by pharmaceutical companies or other medically-related businesses.
9. Students should respect the laws of federal, state and local governments in both professional and private life.

## Related Policies

Washington University Discrimination and Harassment Policy (<http://hr.wustl.edu/policies/Pages/DiscriminationAndHarassment.aspx>)

Washington University Sexual Assault Policy (<https://wustl.edu/about/compliance-policies/governance/usaib-procedures-complaints-sexual-assault-filed-students/>)

Washington University Abusive Conduct Policy (<https://hr.wustl.edu/items/abusive-conduct-policy/>)

Washington University Diversity Bias Report Form (<http://diversity.wustl.edu/students/mosaic/bias-report-support-system/bias-report-form/>)

Assessing Academic Achievement & Professionalism (MD Program) (p. 389)

## Remediation

—*This information applies to Legacy Curriculum students.*—

For more information about remediation, please visit the Assessing Academic Achievement & Professionalism (p. 389) section of this *Bulletin*.

## Clerkship Grade Appeals

—*This information applies to Legacy Curriculum students.*—

## Background

Washington University School of Medicine (WUSM) is committed to rigorous, equitable, and credible processes for the assessment and grading of our students. Students who do not feel their grade accurately reflects their performance because of (1) a failure to follow a course's stated processes for gathering and judging assessment evidence or (2) unfair bias have the right to appeal the grade.

The Grade Appeal Policy at WUSM is in place to allow for the identification and — if confirmed — remediation of a systematic error in the assessment and/or grading process outlined in the relevant course syllabus and/or policies. In keeping with LCME standards 9.9, 10.3, and 11.6, we adhere to the following policy for the appeal of all clerkship grades at WUSM.

## Policy

If a student believes there was a systematic error in the assessment and/or grading process or the presence of bias as stated above, they may file a formal appeal. Students wishing to appeal their grade must do so by filing a Grade Appeal Form ([https://wustl.az1.qualtrics.com/jfe/form/SV\\_6YFTYDqu115c5ds](https://wustl.az1.qualtrics.com/jfe/form/SV_6YFTYDqu115c5ds)) within 10 business days after final grades are due for a given course per WUSM's Grade Notification Policy (p. 371). Grade appeals received after this deadline will not be accepted unless approved by the Director of Student Assessment and the Registrar in the case of unusual circumstances outside the student's control (e.g., a clerkship posts a final grade after WUSM's deadline).

The student must provide a detailed explanation of the basis for the appeal and pertinent documentation. Any factors not directly relevant to the assessment of performance within the specific course/clerkship (e.g., a student's stated career goals) cannot be taken into consideration when processing a grade appeal.

The Clerkship Director, Associate/Assistant Clerkship Director, and/or their designee will investigate the basis of the student's appeal. They will meet with the student (either in person or via virtual meeting) and any other stakeholders as needed to investigate the appeal, following which they will render a decision.

If the student still perceives systematic flaws in the process or bias impacted the final outcome of the grading and/or appeals process, they can submit a second appeal to the Associate Dean for Medical Student Education. They must do so within 10 business days of the decision of the Clerkship Director/ Associate/Assistant Clerkship Director during the original appeal. The Associate Dean for Medical Student Education will convene an ad hoc appeals committee to adjudicate the appeal based on adherence to the stated processes of the clerkship for assessment and grading. In the event that this ad hoc committee finds systematic flaws or bias in the grading process, they will render a new review of the assessment evidence and a new judgment. The appeals committee will reach a decision by majority vote ordinarily within 21 days of receipt of the second appeal. The Associate Dean for Medical Student Education retains discretion to make reasonable adjustments to this timeline as necessary. If identified, patterns of failure to adhere to procedures by a grading committee will be addressed by the Director of Student Assessment.

In the event that evidence of bias in the grading process is found, this will be considered a failure of the original grading decision to adequately adhere to the predetermined processes, and the appeals committee will issue a new grade. The appeals committee must also provide a summary of the evidence to the course director, the Associate Dean of Student Affairs, and the Director of Student Assessment. Further handling of the matter will take place according to WUSM's Policy Against Medical Student Mistreatment and other applicable policies.

## Guidelines

Students are advised that feedback from any one individual front-line assessor does not guarantee a specific grade. Front-line assessors are not in a position to grade students.

The perceived absence of formative/constructive feedback from any individual front-line assessor similarly does not guarantee a specific grade. Receiving insufficient feedback cannot be the sole basis for a grade appeal. If a student feels that they are getting insufficient feedback, even after asking, they are encouraged to discuss this with the course director *before* the end of the course.

When relevant, mid-course/clerkship feedback is not a guarantee of any specific final clinical grade.

Students actively participating in the residency match process should also notify the office of career counseling whenever a grade appeal is in process.

*Last approved on July 8, 2021*

## Absence Policy for Medical Students on Clinical Rotations

—This policy applies to Legacy Curriculum students.—

## Background

The profession of medicine requires the utmost commitment of time and energy to patient care and research activities. While the development of this commitment begins in the preclinical years, it is further practiced and developed during clinical training.

The clinical year at Washington University School of Medicine (WUSM) comprises 48 weeks of required core clinical experiences. The fourth year encompasses a 44-week time block and requires MD students take a minimum of 36 weeks of credit (32 weeks of electives plus four weeks of Capstone). MSTP students are required to take a minimum of 12 weeks of credit (eight weeks of electives plus four weeks of Capstone).

All students on clinical rotations have a scheduled two-week winter recess break and a three-day spring break. All clinical students have a two-week break between the end of the third-year clinical rotations and the start of the fourth-year elective rotations. During every clinical rotation, each student is expected to participate fully in all activities of the clinical rotation until the designated end time of the clinical rotation or the start time of a holiday break. This regularly requires participation beyond formal weekday hours to include evening and nighttime call and clinical responsibilities on weekends. In keeping with LCME standard 12.4, all students requiring access to necessary diagnostic, preventive, and therapeutic care for both acute and chronic health concerns are to be excused from clinical training per the Washington University School of Medicine Access to Healthcare Services Policy. (p. 367)

Students must recognize that clinical teaching, learning and evaluation are dependent on the student's presence and participation in every aspect of the clinical rotation. While students will not be graded down only because of an excused absence, time spent away from the rotation may decrease learning and impede effective evaluation.

## Policies

In the event that a student finds that an absence from a clinical rotation is unavoidable, they must complete an absence notification form that will be sent to the clinical course director and the Director of Medical Student Education and Student Affairs. Students must also notify their clinical supervisors by email.

If a student is ill or has a personal emergency, they are responsible for completing an absence notification form as soon as possible. If the absence extends beyond two consecutive days, the Director of Medical Student Education and the Office of Student Affairs will be notified.

It is recognized that a student may, on a rare basis, desire to be excused from clinical activities for professional or significant personal events. Travel prior to or following observed university holidays and breaks that occurs outside of the officially designated times/dates on the MD Program Academic Calendar does not constitute a significant personal event or unavoidable absence.

For all students on clinical rotations, the Clinical Curriculum Committee has agreed upon the following limitations on the maximum number of days of absences (both planned and unplanned) from clinical rotations.

Type of Course	MD Students	MSTP Students and Interviewing Fourth-Year MD Students*
2-week elective	1 day	1 day
3-week clerkship	1 day	1 day
4-week elective	3 days	5 days
4-week clerkship	3 days	3 days
5-week clerkship	3 days	3 days
8-week clerkship	4 days	4 days
9-week clerkship	4 days	4 days

\* Residency interviewing season is typically from mid-October through January. Any additional days off would require approval by the Associate Dean for Medical Student Education and the elective course director.

If a student misses more than the maximum number of allowable days of absences for a given clinical rotation, the consequence rendered will be at the discretion of the clinical course director and the Associate Dean of Student Affairs or the Associate Dean of the Office of Medical Student Education.

Failure of the student to notify the clinical course director of their absence after consideration of the particular circumstances of the absence will result in the filing of a professionalism concern form (PCF).

## Guidelines

All non-clinical electives and the Capstone course may have separate attendance requirements and absence procedures. Please refer to the course syllabus for details.

Students are encouraged to make up missed work on rotations in which this can result in meaningful learning and should discuss this option with the clinical course director.

At the discretion of the clinical course director, any student who misses portions of the clinical experiences due to planned and/or unplanned absences that exceed the maximum time may be required to utilize winter recess, spring break or free time at the end of the third-year clinical rotations to complete the 48 weeks of mandatory clinical rotations.

A concerning trend of absences may result in a review of professional integrity by the Committee on the Academic and Professional Evaluation of Students (CAPES), at the discretion of the Dean of Student Affairs.

MSTP students are encouraged to do the following:

- Meet with the Assistant Dean for Career Development early for assistance in residency planning.
- Consider returning to the MD program to allow for 18 to 24 months to complete MD training to allow flexibility for interviewing and USMLE exams.
- Discuss planned absences with clinical course directors early, prior to a clinical rotation, to better allow placement on a team to optimize the educational experience. We believe this guideline strikes an appropriate balance between increased flexibility for the MSTP students and assuring a meaningful educational experience on the core clinical rotations.

Last approved on May 3, 2021

## Exam Expectations for Faculty

—This information applies to  
Legacy Curriculum students.—

- Exams should be proctored by the course director or a designee appointed by the course director comfortable with proctoring and exam administration guidelines. NBME subject exams are proctored by or coordinated by the Office of Student Affairs.
- Administration should be fair to all students.
- If the faculty member answers a substantive question or clarifies an issue, the same should be communicated to *all* students, including those in separate rooms or at different times.
- Reasonable adjustments should be offered to students who require special accommodations, including a separate testing room or additional time. Course directors are notified of these students through the associate dean for student affairs.
- If a student behaves inappropriately, the course director should notify the associate dean for student affairs immediately.
- All requirements of students should be communicated to all students *prior* to the start of the exam.

## School of Medicine High-Stakes Exam Expectations for Students in All Phases of the Curriculum

—*This information applies to Legacy Curriculum students.*—

The term *high-stakes exams* is used to denote all summative assessments, which are those assessments that evaluate student learning against intended course outcomes at the conclusion of instruction. Within the preclinical curriculum, the term includes all events for which the activity type is listed as “Exam.” Within the clinical curriculum, the term includes NBME Shelf Exams.

- Students are required to take all examinations at the originally specified time. A student may be excused from this rule for extenuating circumstances at the discretion of the associate dean for student affairs (ADSA). Examples of extenuating circumstances include personal illness and personal or family emergency. Doctor appointments of a routine nature or personal obligations such as weddings, birthday celebrations, or other planned personal or family commitments are generally not considered to be extenuating circumstances for which students can be exempted from the regularly scheduled exam date.
- All makeup exam requests go through the ADSA. The ADSA then submits the approved request to the Office of Medical Student Education (OMSE), and the OMSE will then transfer and track the requests granted. Course directors should refer all makeup exam requests to the ADSA.
- Students who are unable to attend a scheduled examination should promptly contact the ADSA. Students should also notify the course director(s); in cases related to personal illness, students should also contact Student Health Services. The OMSE handles all exam rescheduling, and examinations will only be rescheduled after approval by the ADSA. The timing of the rescheduled examination will be determined by the OMSE in collaboration with the course director(s).
- Students are expected to be punctual and should be assembled in the designated exam area before the official start time of the exam. Tardiness will not be excused except in extenuating circumstances. For purposes of the exam, “tardiness” will be defined by the course director or exam proctor. The course director will set expectations and determine consequences for exam tardiness.
- Students are expected to place all personal items, including muted cell phones, in designated areas.
- Students are expected to follow all proctor instructions.

- Students must not share study materials, exchange information, or collaborate or communicate with others during the exam.
- After taking the exam, students must not share information about the exam with anyone who has not yet taken it.

## Leave of Absence (LOA) Policy

—*This policy applies to Legacy Curriculum students.*—

Return of students from involuntary leave of absence requires clearance of both the director of Student Health Services and the associate dean for student affairs.

- I. **Voluntary LOA:** A student may request a leave of absence for academic or personal reasons by submitting a statement in writing to the Office of Student Affairs. Such a statement should include indication of the beginning and anticipated ending dates and a brief statement of the reason (academic or personal). Requests for leaves of absence must be approved by the associate dean for student affairs. Leaves of absence shall be granted for no more than one year, but in unusual cases may be renewed by the Committee on the Academic and Professional Evaluation of Students (CAPES) for additional time after discussion with the associate dean for student affairs. Students requiring a personal leave of absence for medical reasons must submit a supporting letter from the director of Student Health Services. A written statement of medical clearance will be required before the student may return from such a leave.
- II. **Involuntary LOA:** If there is a reasonable basis for believing that the continued presence of the student on campus or in clinical rotations poses a substantial threat to the student, to patients, or to the rights of others to engage in their normal university functions and activities, the following procedures apply:
  - A. The chancellor or his designate may impose an involuntary leave of absence when there is evidence that a student has committed an offense under these rules or the University’s Judicial Code, and when there is evidence that the continued presence of the student on the university campus or as a participant in a clinical rotation poses a substantial threat to themselves, to patients, or to the rights of others to continue their normal university function and activities.
  - B. Imposition of the involuntary leave of absence may result in denial of access to the campus, prohibition of class attendance and/or prohibition of participation in clinical rotations.
  - C. If an involuntary leave of absence is imposed, the suspending authority shall prepare a written notice of the imposition and shall have the notice mailed certified or personally presented to the student. The written notice

shall include a brief statement of the reasons therefore and a brief statement of the procedures provided for resolving cases of involuntary leave of absence under these rules.

- D. The student shall be given an opportunity to appear personally before the suspending authority within five (5) business days from the date of service of the notice of imposition of the involuntary leave of absence. If the student asks to appear personally before the suspending authority, only the following issues shall be considered:
1. Whether the suspending authority's information concerning the student's conduct is reliable; and
  2. Whether under all the circumstances, there is a reasonable basis for believing that the continued presence of the student on campus or in clinical rotations poses a substantial threat to the student, to patients, or to the rights of others to engage in their normal university functions and activities.
- E. Within one week of the date of imposition of the involuntary leave of absence, the suspending authority shall either file a statement of charges against the student with the University Judicial Board, and shall have the statement or charges served, by mail or personal service, upon the student and the dean of the school or college or director of the program in which the student is enrolled, or initiate proceedings under these rules to convene a Disciplinary Committee.
- F. A temporary suspension shall end
1. when rescinded by the suspending authority, or
  2. upon the failure of the suspending authority to promptly file a statement of charges with the University Judicial Board or a Disciplinary Committee, or
  3. when the case is heard and decided by the University Judicial Board or the Disciplinary Committee.
- III. **LOA Impact on Financial Aid:** Students receiving financial aid should be advised that at the end of sixty (60) days or more leave of absence, the grace period for loan repayment during a leave of absence may be exhausted. In such cases there will be an obligation for the student to start payments. According to the federal rules under which loans are made, the use of a grace period during a leave of absence will generally mean that the schedule for loan repayment may be changed. Students who are receiving financial assistance should consult with the Financial Aid Office to determine the implications of a leave of absence for their financial aid.
- IV. **LOA Impact on Tuition:** A student returning from a leave of absence of one year duration or less will maintain the same tuition rate. Students returning after more than one year leave of absence will assume the tuition rate of the class they are rejoining. Appeals of this policy should be submitted in writing to the registrar. Please refer to the

Financial Information (p. 417) section on Registration, Payments, and Withdrawal & Refunds Policy and the effect of a leave of absence on tuition and other financially related matters.

For additional information please review the Student Information for Leave of Absence or Withdrawal (PDF) ([http://bulletin.wustl.edu/medicine/policies/md-leave-of-absence/Leave\\_of\\_Absence\\_Withdrawal\\_Handout\\_2018.pdf](http://bulletin.wustl.edu/medicine/policies/md-leave-of-absence/Leave_of_Absence_Withdrawal_Handout_2018.pdf)).

## Policy on Student Status and Benefits During Research Years or Leave of Absence

—*This policy applies to Legacy Curriculum students.*—

### MD/PhD

Student status is maintained while in the research phase of the MD/PhD programs. During research years, students are registered in either the graduate school or under the program granting the master's degree. Both student health and disability coverage are provided by the Division of Biology and Biomedical Sciences.

### Master's/MD

Student status is maintained while in the research phase of the MSCI and MPHS programs. Both student health and disability coverage are provided.

### Five-Year MD Program

#### Research Year at WUSM

Student status is maintained throughout the approved research year. In exceptional circumstances, a second research year may be permitted. The student may receive a stipend, but may not be considered an employee of the university. Students are registered in the School of Medicine. Both disability and student health coverage are required and are payable by the student. Outside funding often covers such fees.

#### Approved Research Year Away

Student status is maintained throughout the approved research year. Students are registered in the School of Medicine. Both disability and student health coverage are optional with proof of like coverage. The cost of either elected coverage is payable by the student. Outside funding often allows these costs.

### Leave of Absence

#### Leave of Absence Year at WUSM

Student status is not maintained during the leave of absence though benefits of student health coverage and disability insurance are optional throughout an approved leave. Costs are payable by the MD program students. MD/PhD students



may request support for these costs from the Division of Biology and Biomedical Sciences if funds are available. The Office of Financial Aid should be consulted for information regarding loan repayment and grace periods when on a leave of absence.

## Leave of Absence Year Away

Student status is not maintained during the leave of absence away from Washington University School of Medicine. Both disability and student health coverage are optional with proof of like coverage. The cost of either elected coverage is payable by the student.

## United States Medical Licensing Exam (USMLE)

*—This information applies to  
Legacy Curriculum students.—*

Students who matriculated prior to 2014 and who anticipate practicing clinical medicine are required to take the USMLE Step 1 and 2 examinations. Beginning with the class matriculating in 2014, all students are required to take the USMLE Step 1 and Step 2 prior to graduation.

The USMLE is designed to "assess a physician's ability to apply knowledge, concepts, and principles, and to demonstrate fundamental patient-centered skills, that are important in health and disease and that constitute the basis of safe and effective patient care."\* The USMLE represents a single uniform examination for medical licensure in the United States, and, as such, is a minimum requirement for obtaining a medical license.

The USMLE consists of three separate examinations:

"Step 1 assesses whether you understand and can apply important concepts of the sciences basic to the practice of medicine, with special emphasis on principles and mechanisms underlying health, disease, and modes of therapy. Step 1 ensures mastery of not only the sciences that provide a foundation for the safe and competent practice of medicine in the present, but also the scientific principles required for maintenance of competence through lifelong learning." Step 1 is taken after completing the second year at Washington University School of Medicine.

"Step 2 assesses whether you can apply medical knowledge, skills, and understanding of clinical science essential for the provision of patient care under supervision and includes emphasis on health promotion and disease prevention. Step 2 ensures that due attention is devoted to principles of clinical sciences and basic patient-centered skills that provide the foundation for the safe and competent practice of medicine." Step 2 exams are taken after completing the third year but prior to graduation from Washington University School of Medicine.

"Step 3 assesses whether you can apply medical knowledge and understanding of biomedical and clinical science essential for the unsupervised practice of medicine, with emphasis on patient management in ambulatory settings. Step 3 provides a final assessment of physicians assuming independent responsibility for delivering general medical care." Step 3 is taken following graduation and during internship/residency training.

Further information can be obtained from the USMLE Bulletin of Information (<https://www.usmle.org/bulletin/>) published by the National Board of Medical Examiners. This is available, along with application forms and additional information, on the USMLE website (<http://www.usmle.org>).

\* The quoted material throughout this section is from the USMLE website (<https://www.usmle.org/>).

## Non-Curricular-Related Policies Advanced Standing Transfers Policy for Medical Students

### Background

LCME Standard 10.7 calls upon accredited schools to ensure that any student accepted for transfer demonstrates characteristics comparable to the other students in the class that they will join. Further, the school must accept transfers into the final year only in rare and extraordinary circumstances. Washington University School of Medicine has historically offered a third-year advanced standing (transfer) program that conformed to the LCME standard. Curricular reform has led us to re-examine this policy.

Unlike the Legacy curriculum, which had a 2+2 structure that mapped readily onto other schools' curricula, the Gateway Curriculum is both unique and integrated. A transfer student would not have an experience substantially equivalent to that of their classmates. Designing custom alternative programs for each transfer student would be impractical and contrary to the program's philosophy. The Gateway Curriculum involves continuous benchmarking of progress against competencies and program objectives. A transfer student would not have this continuous benchmarking. It is therefore not possible to offer transfers into the Gateway Curriculum.

### Policies/Requirement

Washington University School of Medicine does not accept advanced standing (transfer) students from other medical schools.

## Guidelines

It is not possible to transfer into the MD degree program at Washington University, either as an MD-only candidate or as an MD-PhD. This policy does not preclude Washington University medical students from transferring internally into the Medical Scientist Training Program.

*Last approved on May 13, 2021*

## Non-University-Affiliated Speaker Compensation

### Background

Washington University School of Medicine (WUSM) recognizes the importance of having individuals from outside of the WUSM community contribute to the educational goals of students in the MD program. The following policies apply to the financial compensation of individuals who do not have formal ties to Washington University in St. Louis and who function as speakers to medical students in the core curriculum of the MD program. In keeping with element 9.1, WUSM ensures that all non-university-affiliated instructors are familiar with the relevant learning objectives of the course or clerkship and that they are prepared for their roles in teaching.

### Policies/Requirements

All requests for external speakers should be presented for review by the Senior Manager in the Office of Medical Student Education at least 21 days prior to their inclusion in learning sessions. The Office of Medical Student Education may exercise discretion in accepting late requests made under rare extenuating circumstances.

Speakers who require little to no advanced preparation for their involvement (e.g., someone sharing their lived experience as a patient) will be compensated \$50 per session in addition to reimbursement for parking or public transportation.

Speakers who will have a leadership role in an instructional session (e.g., via a lecture or facilitated discussion) that will require substantive advanced preparation of more than 5 hours will be compensated \$200 per session in addition to reimbursement for parking or public transportation.

For situations in which the requested speaker compensation exceeds the rates established above, requests should be submitted for review by the Office of Medical Student Education; final approval will be given by the Executive Director for Education Administration and Finance in the Office of Education Administration & Finance unit at least 60 days prior to the speaker engaging in any session-related activities. In all cases,

a narrative explaining the need for a higher rate — along with supporting documentation demonstrating that an effort to negotiate the speaker's rates to remain within the WUSM policy parameters has occurred — must be submitted.

For any guest speaker sessions to be recorded and any other artifacts captured (e.g., photos) and to be later made available through the WUSM Office of Medical Student Education, explicit permission from the guest speaker must be provided, with details on where these materials will be housed and how they will be used in the future.

*Last approved on September 13, 2021*

## Policy on External Factors

### Background

LCME Element 10.2 requires that the final responsibility for selecting medical students must reside with a formally constituted faculty committee and that the selection of individual medical students for admission is not influenced by any political or financial factors. This policy, together with the Policy on the Final Authority of the Admission Committee, is intended to clarify the role that external factors may play.

### Policy

Persons or groups external to the Committee on Admissions may assist with the identification of applicants, but they do not have decision-making authority. The selection of individual students at WUSM must not be influenced by factors exogenous to the admissions process, such as political or financial factors.

*Last approved on August 12, 2021*

## Policy on the Final Authority of the Committee on Admissions

### Background

LCME Element 10.2 requires that the "final responsibility for accepting medical students" rest with a formally constituted admission committee, with specified authority, composition, and rules of operation.

### Policy

The Committee on Admissions (COA) has final authority for determining the acceptance of all candidates for the MD degree at Washington University School of Medicine. The COA is assembled by the Associate Dean for Admissions and is drawn from the faculty and staff of the School of Medicine, with the majority drawn from the full-time faculty.

Final decisions for the acceptance of an applicant during the regular season (prior to May 1) are made by the Steering Committee, a committee of the whole at which all COA members have seat, voice, and vote. Five voting COA members must be

present at Steering, and the majority of voting members present must be members of the faculty for a quorum to be reached at Steering. After May 1, during the waitlist phase, final decisions are made by the Leadership Subcommittee on behalf of the COA.

The selection of individual medical students is not influenced by political or financial factors, in accordance with our policies on external factors and conflicts of interest.

*Last approved on August 12, 2021*

## Policy on the Selection of Students

### Background

LCME Element 10.3 calls upon the faculty to establish criteria for student selection and to develop and implement effective policies and procedures regarding medical student application, selection, and admission and to make available to all interested parties its criteria, standards, policies, and procedures.

### Policy

The selection process that has been developed by the Committee on Admissions identifies applicants whose life experiences, personal attributes, academic achievement, and career goals align with the mission and vision of WUSM (<https://medicine.wustl.edu/about/mission/>) and the guiding principles of the Gateway Curriculum (<https://sites.wustl.edu/gatewaycurriculum/about/guiding-principles/>). The purpose is to identify candidates who will contribute to the medical profession and who are most likely to enrich and benefit from our learning environment. Our process follows the AAMC principles of holistic review (<https://students-residents.aamc.org/choosing-medical-career/holistic-review-medical-school-admissions/>). Furthermore, the AAMC Core Competencies for Entering Medical Students (<https://www.aamc.org/services/admissions-lifecycle/competencies-entering-medical-students/>) are the overall dimensions on which students are evaluated. All of the committee's rubrics and forms have been linked to these Core Competencies.

*Last approved on August 12, 2021*

## PhD and Joint Degree Program Policies and Guidelines

### PhD Program Policies & Guidelines

The following policies apply to the PhD programs offered by Washington University School of Medicine:

## Confidentiality & Records Retention Policy (Leaves of Absence)

The university will strive to protect, to the greatest extent possible, the confidentiality of students involved in matters of voluntary or involuntary leave. Because the university has an obligation to preserve the security of its community, the university cannot guarantee confidentiality where it would conflict with the university's obligation to investigate meaningfully matters that may threaten a student's health or safety or the safety and security of the university community. When some disclosure of the university's information or sources is necessary, that disclosure will be limited to the extent possible. Medical records of a student will be protected in accordance with the Washington University School of Medicine Student Health Services Notice of Privacy Practices. The university will, to the extent permitted by law, keep confidential all records of committee reviews. The records maintained by the Case Conference Committee will be available only to the administrator and other university officials in accordance with the Family Educational Rights and Privacy Act (FERPA). All records will be destroyed after a period of 10 years from the date of the final decision on involuntary leave or the student's decision to take voluntary leave or 10 years from the date of graduation or the last semester of enrollment.

More general university policies on records retention can be found on the Records Management Policy page of the Washington University Financial Services website (<https://financialservices.wustl.edu/wfin-topic/other/records-management-retention/>).

## Course Level Policy

Undergraduate courses (399 and below), University College courses, and courses taken for pass/fail or audit grade options do not count in cumulative units toward any graduate degree. Graduate courses (400 and above) taken in other graduate divisions of the university will count in cumulative units unless specified otherwise by the student's home department or program.

## Dissenting Vote(s) at a Dissertation

Faculty members of the Dissertation Examination Committee will normally examine the student candidate and vote to approve the dissertation. In the vast majority of cases, these votes are unanimously for approval. In the rare case that there are faculty concerns that cannot be resolved through subsequent revisions and therefore result in dissenting (negative) vote(s), the Committee Chair will refer the case to the Graduate Program Council (GPC) for resolution.

In the case of a single dissenting vote, the Committee Chair and the dissenting voter will be asked to explain the reasons for the dissent in a letter to the GPC. After consulting with these and other members of the committee, the GPC may then decide to accept the majority opinion and approve the dissertation, or they may seek the opinion of an additional reader. After considering this additional evidence, the GPC may approve or decline to approve the dissertation.

In the case of two or more dissenting votes, the Committee Chair and the dissenting voters will again be asked to explain the reasons for the dissent. The GPC may then decide to decline to approve the dissertation or to ask the department or graduate program to name a Resolution Committee. This committee will consist of three faculty members who will reexamine the dissertation and the candidate; members must be authorized to supervise PhD students, have appropriate expertise in the proposed field of study at Washington University or elsewhere, and have not served on the candidate's original committee. A unanimous positive recommendation from this committee will be required in order for the GPC to approve the dissertation. The failure of a department or graduate program to identify three faculty members to serve on this Resolution Committee will be tantamount to a rejection of the dissertation.

## English Proficiency

International students considering application to Washington University School of Medicine for graduate study should have a general familiarity with academic practices and university customs in the United States. All international students are required to present evidence of their ability to support themselves financially during graduate study. International students whose native language is not English must submit score reports from the TOEFL offered by ETS (<https://www.ets.org/>) or the International English Language Testing System (IELTS (<https://www.ielts.org/en-us/>)) Academic. The test should be taken in time for results to reach Washington University directly from ETS before the application deadline. Each PhD program within the School of Medicine must follow the guidelines for minimum score requirements established by the Office for International Students and Scholars (<https://students.wustl.edu/international-students-scholars/>). Interested applicants should refer to each specific program's handbook for the minimum scores required for consideration of admission.

To be eligible for a TOEFL waiver, the applicant must have completed at least three years of study toward their degree from a regionally accredited university located in an English-speaking country. Please also note that the entire length of study must have been completed at the institution.

## Enrollment Extension

Students may be permitted to register for one additional year beyond their program length limit. When recommended by their department and approved by the School of Medicine Graduate Program Council, these students will be registered in a zero-unit, 9000-level course that confers full-time enrollment status. Students registered for that zero-unit course may or may not receive stipend support, but they are eligible to receive other benefits available to full-time PhD students, including health insurance and wellness fee subsidies.

Students may be registered for this extension for a maximum of two semesters. There will be no exceptions to this limit. Students who do not complete their programs within this time limit must withdraw from the program.

## Grading Option Policy

Credit-conferring grades for students in the School of Medicine are as follows: A, outstanding; B, good; C, conditional (an A, B or C grade may be modified by a plus or minus); S, satisfactory; and U, unsatisfactory (used almost exclusively for credit units earned by doing research). Other grades are F, failing; N, not submitted yet; X, final examination missed; and I, incomplete. The mark of I becomes a permanent part of the student's record after the lapse of one calendar year unless the program in which the mark was assigned requests an extension of time.

The School of Medicine uses a 4-point scale for calculating grade-point averages, with A = 4, B = 3, and C = 2. A plus adds 0.3 to the value of a grade, whereas a minus subtracts 0.3 from the value of the grade.

Zero-unit program-specific 9000-level courses will have only the satisfactory/unsatisfactory grade option.

## Graduate Student Vacation and Time Off Policy

Students working toward School of Medicine graduate degrees are entitled to all official University holidays (<https://hr.wustl.edu/items/holidays/>). To the extent that responsibilities essential to the maintenance of research, such as managing the care of laboratory animals, must be done on university holidays, graduate students may be required to share in this responsibility.

Faculty mentors should approve other planned absences, and unplanned absences should be reported to them. "Faculty mentors" during the graduate years are program directors and research rotation or dissertation advisors, as appropriate.

The total amount of excused absence should be consistent with that of academic employees in the same area. (Assistantship or stipend payments are not subject to reduction as they represent agreed-upon financial aid.) Decisions regarding the granting of time off will not be based upon the existence of or source(s) of funding.

The program director should address disagreements between faculty mentors and students over absences. If the director cannot resolve the dispute, the Vice Chancellor for Medical Education or their designee will serve as the final arbiter.

## Health Fees

The Student Health Service is a mandatory program of services available to full-time students enrolled in the medical or allied professional schools of Washington University in St. Louis School of Medicine. Students do not have the option to decline the Student Health Plan. The service is supported solely by the fees paid by full-time students of the School of Medicine. The health care coverage is in accordance with the minimum essential coverage mandate under the Affordable Care Act (<https://www.healthcare.gov/glossary/minimum-essential-coverage/>). The School of Medicine subsidizes costs for all full-time students, including disability insurance. All current medical and allied professional programs as well as all new incoming students receive long-term disability insurance. Details can be found on the Student Health Services website (<https://studenthealth.med.wustl.edu/>).

## In Absentia Registration

During a student's period of regular registration, they may have a need or opportunity to study away from Washington University. Requests for registration in absentia will be considered on a case-by-case basis by the student's designated faculty graduate program director. If approved, the student will be registered in a program-specific 9000-level course indicating full-time graduate study in absentia. Students may be allowed to register for that program-specific 9000-level course for up to four consecutive or nonconsecutive fall/spring semesters. Semesters in which a student is registered in absentia are counted as part of the student's program length.

## Leaves of Absence

A student may request and be approved for a leave of absence during their regular registration period if they are not registered in absentia. Leaves of absence must be endorsed by the degree program and approved by the School of Medicine for up to one year. Extensions must be reapproved.

Approved leaves of absence are not counted as part of a student's program length and will not be approved for semesters beyond the program length, including enrollment extension. While on a leave of absence, the student is not registered and has no student status at Washington University. Students who begin a leave during any semester will be dropped from all course registration for that semester and will receive no course credit for work completed during that semester prior to the leave.

Leaves of absence may be personal or medical. In the case of a medical leave, the student must present authorization from Student Health Services at the beginning and again at the end of the leave. At the end of any leave of absence, a

student is reinstated into the School of Medicine under the conditions prevailing at the time the leave was granted. Being on leave suspends student status and financial support from the university. Taking a leave may therefore adversely affect loan deferment, visa status, the right to rent university-owned housing, and so on. Most visa types would prevent international students from remaining in the United States while taking a leave of absence; such students should consult the Office for International Students and Scholars (<http://oiss.wustl.edu>) as well as their faculty advisor, their program's director of graduate studies, and perhaps a dean.

Prior to taking a leave of absence, students should consider their need for health insurance coverage. The continuation of access to Student Health Services depends on such factors as the kind of leave (medical or personal) and the student's location during the leave. Students should consult their program leads, Student Health Services, and the School of Medicine registrar and financial aid office before making a decision regarding leave whenever possible.

## Part-Time Employment of Full-Time PhD Graduate Students

If a full-time supported PhD graduate student in the School of Medicine accepts part-time employment within Washington University or outside of the university, the following guidelines must be followed. The Internal Revenue Service, the Washington University Human Resources Office, and US Citizenship and Immigration Services all make important distinctions between students and employees. These guidelines are designed to assist graduate students in retaining their status as students.

*Fall & Spring Semesters:* During a semester in which a School of Medicine PhD graduate student receives, as a student, any form of full-time fellowship or assistantship, that student may, as an employee, obtain employment up to a maximum of 220 total hours during the fall semester (Aug. 1-Dec. 31) and 220 total hours during the spring semester (Jan. 1-May 31) (i.e., 10 hours per week for 22 weeks). International students on F-1 and J-1 visa status must further limit their employment to a maximum of 6 hours during any individual week.

*Summers:* Restrictions on summer employment depend on whether the student retains their status as a Washington University student during this time. Students on 12-month awards are limited to 80 total hours of employment for the period from June 1-July 31 (equivalent to 10 hours per week for 8 weeks).

The number of additional hours refers to the time engaged in discretionary employment. It does not include time spent as a research assistant (RA) during the fall or spring semesters. A short list of some types of work to which these limitations do apply include the following: instructor in University College; part-time lecturer; employment by university libraries, museums, computer centers or the Alumni and Development Office; and

tutoring, paid research assistance to a faculty member outside of a full-semester RA award, summer RA awards to students on 10-month support, or paid hourly work assisting at department events. The maximum number of hours may be further restricted (but may not be expanded) by external granting agencies, by department policies, or by individual dissertation advisors and dissertation committees. International students on F-1 and J-1 visas may not teach in University College during the fall or spring semesters or during summers if they are on 12-month support.

## Probation and Dismissal for Academic Reasons

This policy describes guidelines and procedures for probation and dismissal because of poor academic performance (Academic Dismissal) for students enrolled in PhD programs in the School of Medicine.

Academic Dismissal is distinct from withdrawal (initiated by the student), deactivation of a student's record by a failure to register, and dismissal or other sanctions associated with the Academic and Professional Integrity Policy for PhD Students or the University Student Conduct Code. Dismissals are recommended by the degree program and are not final until approved by the Dean of the School of Medicine or their designee.

Students may be dismissed immediately for extreme academic underperformance. Examples of extreme underperformance might be two grades of C or below in one semester or three unfinished courses (I, X or N) in one semester. Students who encounter personal situations that contribute to academic underperformance during a semester should be informed of the option to request a leave of absence rather than continuing enrollment with poor performance. The ability to complete mentored teaching responsibilities is not a sufficient basis for remaining enrolled.

Most academic difficulties are not of the severity associated with immediate dismissal. The School of Medicine's explicit criteria for maintaining minimal standards for satisfactory academic progress are as follows: (1) a cumulative grade-point average of 3.0 or greater; (2) no more than 9 units of incomplete (I), final examination missed (X) and/or not yet submitted (N) on the transcript at any one time; and (3) submission of a dissertation proposal. A completed Title, Scope, and Procedure Form, signed by the Research Advisory Committee members and by the Program Chair, must be submitted to the School of Medicine Registrar or the appropriate record custodian at least 6 months before the degree is expected to be conferred or before beginning the ninth semester (fifth year) of continuous enrollment, whichever is earlier. A program may add requirements for good standing (e.g., the completion of comprehensive or qualifying examinations by a certain time) but may not relax the School of Medicine or university-wide requirements. Faculty are also responsible for evaluating

the ability of the student to identify and undertake an original scholarly project at the level of excellence expected for a Washington University PhD as well as whether the student is making timely progress toward completion of the degree. The program may place a high value on the quality of performance in mentored teaching and or other professional activities. The judgment of the faculty on these issues can lead to Academic Dismissal for students who meet other criteria for good academic standing. Programs are expected to maintain written guidelines that help students understand the major categories of expectations for satisfactory progress. Such guidelines should be provided to students at the beginning of their academic program and reviewed with students on a regular basis.

## Guidelines for Academic Probation and Dismissal

Except for circumstances justifying immediate dismissal, a student cannot be dismissed on the basis of academic performance without the opportunity to return to good standing during an identified period of probation. The purposes of probation are as follows: (1) to explicitly warn the student of their status; (2) to provide the student with clear guidelines regarding the performance that will be necessary to return to good standing; and (3) to provide the student with reasonable time to meet these expectations. To meet these objectives, probation normally should be designated for a minimum of 3 months. When the probation criteria involve course work, then the probation period would normally correspond to a semester's duration. A student on probation must receive a detailed letter from the director of their program stating the reasons for the probation and explicitly identifying the steps necessary for the student to return to good standing by the end of the probation period. A copy of this letter should be sent to the registrar and to the chair of the School of Medicine Graduate Program Council. If a student does not meet all criteria for good academic standing but the department does not wish to place the student on probation, an appeal for this exception can be made to the chair of the School of Medicine Graduate Program Council.

At the end of a first probation, one of three things will occur: (1) the student will be returned to good standing; (2) the student will be placed on a second consecutive probation, which generally will be for a full semester; or (3) the student will be dismissed from the program. A second consecutive probation must be accompanied by a new letter identifying the steps required to return to good standing. While the purpose of the probationary period is to provide the student with time to improve, the decision of the program at the end of a probationary period could involve immediate notification of dismissal.

At the end of a second continuous probation, the student will be either returned to good standing or dismissed. A third probation will be allowed only if it is not continuous. A fourth probation will not be allowed. A student whose performance would result in a fourth probation will be dismissed immediately. A leave of absence cannot be used by a student to delay or nullify the consequences of a third consecutive or fourth probation.

Each program must have a standard procedure (e.g., a Graduate Advisory Committee or similar) to manage decisions regarding placement on probation, removal from probation, recommendations for dismissal after a probationary period, and recommendations for immediate dismissal due to extreme underperformance. The procedure for managing such decisions must be applied to all students in the program and cannot be managed solely by an individual faculty member, including the student's research mentor, although input provided by the research mentor may play a key role in the process.

Stipend support should continue during a probationary period unless the student is failing to meet the basic expectations of their position (e.g., repeatedly misses classes, repeatedly absent from the lab and fails to carry out lab assignments). If a program or school decides to suspend stipend support under these circumstances, the student must be given a minimum of 2 weeks' notice prior to the withholding of such support. If the student's performance improves and they begin meeting the basic expectations of the program, stipend support should resume at that time. During all probationary semesters, tuition remission will remain as offered at initial enrollment.

## Notification Procedures for Academic Probation

1. The explanation of academic performance issues leading to probation should be specific (e.g., low grade-point average, failed exam) and contain a clear statement of what must be done within a specified period of time for the student to return to good standing. This includes probation associated with faculty judgments of research potential, timely progress toward the degree, teaching performance or professional activities. The expectations will be consistent with those held for all students in the program. They must be communicated in writing, accompanied by the opportunity to meet with the program director or designated departmental faculty representatives for a clarifying discussion, and copied to the chair of the Graduate Program Council and the registrar.
2. If the student does satisfactorily meet the requirements of the probation, a written notice of reinstatement, including the date that the student has returned to good standing, will be provided to the student. Students may be reinstated before the end of the probation period if they have met the requirements for reinstatement.

3. Copies of any letter or e-mail to the student or summary notes of discussions with the student regarding the student's placement on probation should be placed in the student's file in the School of Medicine with the registrar, which the student has the right to review.

## Notification Procedures for Academic Dismissal

1. If the student does not meet the requirements of the probation by the specified time and the program recommends dismissal, the program will send a request for dismissal and a draft of the dismissal letter to the Graduate Program Council and the registrar, along with copies of all previous communications and/or warnings. The draft dismissal letter will include the grounds for dismissal, the effective date of dismissal, and advice to the student that voluntary withdrawal from the program is an option. All academic dismissals require approval by the Dean of the School of Medicine or their designee.
2. If the student is an international student on a visa, the program should consult with the Office of International Students and Scholars prior to drafting the dismissal letter. It is often advisable for an international student to withdraw ahead of a dismissal to avoid an adverse impact on future entry into the United States.

## Appeal Procedures

In cases of probation or dismissal, a student may appeal within 14 calendar days to the School of Medicine Graduate Program Council.

### Probation

Appeals of probation end with the Graduate Program Council (i.e., placement on probation cannot be appealed to the Dean of the School of Medicine). For cases in which there is a conflict of interest with a member of the Graduate Program Council, the chair of the Council can identify an appropriate designee to serve on the Council to consider the appeal. If the chair has a conflict of interest, the Dean of the School of Medicine or their designee may identify appropriate persons to serve on the Council and to serve as chair of the Council for purposes of addressing the appeal.

### Dismissal

For academic dismissal decisions, a graduate student in the School of Medicine may submit a final appeal of the dismissal to the Dean of the School of Medicine or their designee. Appeal requests to the Dean must be submitted within 14 calendar days of formal notification of dismissal from the Graduate Program Council. Responses to appeals generally occur within the next 14 calendar days after the appeal is requested. Stipend support is discontinued at the time the student is notified of dismissal. The student is not eligible to receive stipend support during an appeal of dismissal; however, if the appeal is upheld, the student

is eligible for stipend support covering the period of the dismissal appeal process. Students who have chosen to withdraw from their program (as opposed to taking an authorized leave) cannot appeal or seek reconsideration of this decision.

## Refunds

A student who withdraws or takes a leave of absence from the school will receive a pro rata refund of tuition, of other payments made for health and disability insurance, and of other fees that they themselves have paid. For situations in which students elect to continue to receive student health benefits, they will not receive a refund for payments made for health and disability insurance for the term in which they are enrolled. The refund will be based on the ratio of the number of weeks enrolled (from the first day of classes to the termination date) to the total number of class weeks in the term for which tuition and fees were paid. There is no point in the semester at which a student would have \$0 refunded in tuition. It is understood that the date on which a student formally notifies the Office of the Registrar in writing of the decision to withdraw or to take a leave of absence from the School of Medicine shall be regarded as the termination date, with no retroactive clause to be accepted. A prospective date will be accepted, however. If tuition and fees were paid entirely or in part by financial aid from the school, the refund will be applied first to the total repayment of the accounts from which financial aid was drawn, with any remaining refund balance given to the student. Financial aid received in excess of the costs of tuition and fees must be refunded by the student to the school on the same pro rata basis as calculated for the tuition refund outlined above, per federal guidelines regarding the return of Title IV funds. Any questions about these policies may be directed to either the Office of the Registrar (<https://registrar.med.wustl.edu/>) or the Office of Student Financial Planning (<https://finaid.med.wustl.edu/>).

## Reinstatement

A student who has left the School of Medicine for a period of time or who has neglected to register for more than two semesters must apply for reinstatement. The reinstatement form must be endorsed by the student's department or program, signed by the department chair, and submitted four weeks prior to the start of the term. A reinstatement fee will be charged based on the length of time the student was absent.

A reinstatement from an approved medical leave of absence requires clearance from Student Health Services before it can be processed.

## Satisfactory Academic Progress

Satisfactory academic progress for students in PhD programs is monitored by the School of Medicine as well as by the degree program. Failure to maintain satisfactory academic progress may result in a student's immediate dismissal or in their placement on academic probation for the ensuing year. Most financial

awards — and all federally funded awards — are contingent on the maintenance of satisfactory academic progress. Moreover, satisfactory academic progress is a prerequisite for service on any committee authorized by the School of Medicine or the Graduate Council. The following are minimal standards of satisfactory academic progress for PhD students; degree programs may set stricter standards but must not relax these.

1. Students are expected to proceed at a pace appropriate to enable them to finish within the time limits set forth by the program. Students are expected to have completed all PhD requirements except for the dissertation by no later than the end of the fourth year of full-time graduate study.
2. Students are expected to maintain a cumulative grade-point average of at least 3.0 on a 4.0 scale. Note that plus and minus marks alter the numerical value of a letter grade.
3. Students are expected not to carry at one time any more than 9 credit units for which the grades of I (incomplete), X (final examination missed), or N (not yet submitted) are recorded. The School of Medicine may deny a student with more than 9 unfinished credits permission to register.
4. After four years of full-time graduate study, doctoral students who cannot identify three faculty members who are willing to serve on their Research Advisory Committee are not considered to be making satisfactory academic progress. The Title, Scope and Procedure form (PDF) (<http://bulletin.wustl.edu/pdf/SOM-Title-Scope-Procedure-PhD-Form.pdf>) must be filed before the fifth year in order to identify the membership of the student's Research Advisory Committee.

## Student Grievance

Students with complaints regarding academic matters should initially seek resolution from their faculty advisor, then from their program director, and finally from the director of their degree program or department/program head, if applicable. The final court of appeal for all students in School of Medicine areas of study (p. 30) is the Senior Associate Dean for Education. The Senior Associate Dean may follow up with the complainant, with faculty in the student's degree program, or with other stakeholders on campus or within the university to review and investigate the grievance and work toward a resolution. Faculty involved in the process of receiving or reviewing a complaint should treat the information and relevant conversations as highly confidential.

Students with complaints regarding nonacademic matters (including but not limited to unprofessional behavior, a hostile learning environment, and abusive or offensive language and/or behavior) — whether by faculty, staff, or fellow students — should refer to the Student Mistreatment Reporting and



Monitoring Policy (p. 364). That policy contains mechanisms and protocols for students to report mistreatment against them or for other individuals to report student mistreatment they have observed.

All complaints regarding academic and professional integrity should be first addressed with the graduate program director or the respective program head(s). The program, with the counsel of the Senior Associate Dean for Education, can submit a report of academic and professional integrity through the appropriate mechanism (i.e., the Vice Provost for Graduate Education Academic and Professional Integrity Officer; see the Academic and Professional Integrity Policy for PhD Students (PDF) ([http://bulletin.wustl.edu/pdf/Academic and Professional Integrity Policy for PhD Students\\_2022.pdf](http://bulletin.wustl.edu/pdf/Academic%20and%20Professional%20Integrity%20Policy%20for%20PhD%20Students_2022.pdf)) for more information). It is recommended that all grievances be reviewed and monitored by the Senior Associate Dean for Education to ensure the consistency of the process.

## Transfer Credit

Credit for previous courses will be transferred to a student's Washington University record only to fulfill departmental course/credit requirements. Departments may request transfer credit from official transcripts after a student's admission to a PhD program.

## Tuition Remission

The School of Medicine will approve tuition remission for up to 72 course units. The 72-unit calculation includes courses transferred from other graduate programs.

Students pursuing a certificate or an unrelated master's degree in addition to their PhD must consult the departments and advisors about credit sharing between the programs. Tuition remission for units in excess of 72 will not be provided by the School of Medicine.

To be eligible for tuition remission, courses must be offered at the graduate level, taken for a grade, and approved in advance by the student's advisor and program as necessary for the student's degree. Depending on the program, graduate-level courses begin with courses numbered in the 400s or 500s. Audited courses and courses taken pass/fail are not eligible for tuition remission. Students should consult their advisors regarding course selection.

When certain conditions apply, graduate students may be permitted to register for courses numbered below 400, but they may not ordinarily be covered by tuition remission unless approved by the program director. Full-time students in the School of Medicine who wish to take graduate courses in University College or Summer School must obtain the approval of both their academic advisor and the program director. Tuition remission may be available for such approved courses.

## Resources

The School of Medicine is fully dedicated to providing an outstanding learning environment in which students are supported in meeting their individual professional goals. Services include the following:

- Academic Assistance (p. 416)
- Academic Calendars (<https://registrar.med.wustl.edu/calendars/>)
- Advising and Career Counseling (<https://mdstudentaffairs.wustl.edu/academic-support/advising/>)
- Diversity, Equity & Inclusion, Office of (<https://diversity.med.wustl.edu/>)
- Diversity Programs, Office of (<http://medschooldiversity.wustl.edu/>)
- Housing (<https://facilities.med.wustl.edu/housing/>)
- Education, Office of (<https://education.med.wustl.edu/>)
- Medical Student Affairs, Office of (<https://mdstudentaffairs.wustl.edu/>)
- Medical Student Education, Office of (<https://md.wustl.edu/contact/medical-student-education/>)
- Medical Student Research, Office of (<https://mdstudentresearch.wustl.edu/>)
- Student Financial Planning, Office of (<https://finaid.med.wustl.edu/>)
- Protective Services (<http://facilities.med.wustl.edu/security/>)
- Registrar, Office of the (<https://registrar.med.wustl.edu/>)
- Student Health Services (<https://wusmhealth.wustl.edu/students/>)

## Academic Assistance

### Tutorial Assistance Program

Students experiencing difficulty in any course may request tutorial assistance. Such requests should initially be directed toward the course directors and thereafter to the associate dean for student affairs. Students who are repeating courses will be offered the opportunity for tutorial assistance. The Committee on the Academic and Professional Evaluation of Students (CAPES) (p. 389) or the Competency Attainment Committee may also require it. There is no charge to the student for tutorial assistance.

### Tutoring

**Phase 1 Students:** Tutoring for individual content areas is available, and it is offered either in small groups or one-on-one from teaching assistants or other graduate students. Interested students should contact the appropriate course lead or the Office of Medical Student Education (OMSE).

**Phase 2 and Clerkship:** Residents and interns are available to tutor students one-on-one to develop clinical skills, including talking with patients, team communication, physical examination, and solidifying core clinical concepts in preparation for the NBME Subject Exams (Shelf). Interested students should contact their clerkship director.

## Learning Specialist

Professional learning specialists can meet with students privately to assess and improve upon individual learning styles. Specialists also conduct lunchtime learning sessions. Contact Sarah Fowler-Dixon, PhD, Education Consultant and Learning Specialist, by phone at 314-503-5169 or by email at sbahdixon@gmail.com.

## Exam Preparation

**Becker Medical Library Resources:** Visit the Becker Medical Library website (<http://becker.wustl.edu/>) for free online exam preparation tools. For more information, contact the Becker Library at [askbecker@wustl.edu](mailto:askbecker@wustl.edu) or 314-362-7080. For subject-specific preparation in clinical neurology, medicine, obstetrics/gynecology, pediatrics, psychiatry and surgery, please visit the National Board of Medical Examiners (NBME) website (<http://www.nbme.org/students/sas/MasterySeries.html>).

UWorld access is provided to students as a resource to prepare for USMLE Step 1, Step 2, and subject exams. For questions about this resource, please contact the Office of Medical Student Education at [omsecurriculum@wustl.edu](mailto:omsecurriculum@wustl.edu).

## Financial Information for the School of Medicine

This page presents financial information for the programs and degrees offered by the School of Medicine. Refer to the tabbed sections for specific financial information about individual programs.

## Medical Students Financial Assistance

The ability to finance a medical education at Washington University does not influence the student selection process. As all students accepted for admission have proven scholastic ability, financial assistance is awarded to qualifying U.S. citizens and permanent residents solely on the basis of documented financial need that cannot be met by student and family resources. Students who consider themselves financially independent of their parents must arrange for loans to replace the amount of support parents are analyzed to have the potential to contribute. The School of Medicine's Office of Student Financial Planning (<https://finaid.med.wustl.edu/>) will assist students with making these arrangements.

In responding to the Admissions Committee's offer of admission, an accepted student will be directed to the student financial aid portal, Net Partner (<https://netpartnerstudent.wustl.edu/>), to indicate what type of aid they are applying for. The Financial Aid Office acknowledges the student's intent and provides instructions for completing the Free Application for Federal Student Aid (FAFSA). Everyone applying for financial aid must complete a FAFSA and designate Washington University School of Medicine, School Code #G24620, as a recipient. Medical school financial aid application documents and detailed instructions are made available after January 1.

The financial aid application materials solicit information about the applicant and their parents, including a detailed description of resources and liabilities. If an applicant's parents are separated or divorced, the financial information is required from both biological parents, excluding the income and assets of their spouses, if remarried. If the applicant is married, similar information is required of the spouse. The school expects the applicant to complete and submit the financial aid documents within two weeks from the date the applicant receives them. Official copies of both biological parents' individual U.S. income tax returns and the applicant's official IRS transcripts complete the data required for financial aid consideration.

While "permanent residents" of the United States are eligible for most federal financial aid programs, need-based financial aid from Washington University is only awarded if the applicant and both biological parents can provide official, audited documents with the same detailed information as provided on a U.S. income tax return. All information is held in strict confidence.

Financial aid awards are credited toward the payment of tuition and fees. If there is an excess of funds on a student's account after tuition and other charges, the Registrar's Office will issue a refund check. The loan portion of an award will be funded through the resources of the School of Medicine or through the Federal Direct Loan program. Financial aid awards are made for a given academic year. Beginning with the 2019-20 academic year, any need-based scholarship awarded will be fixed for all future years. Students may reapply for federal loans in succeeding years if they remain in good academic and personal standing.

The committee holds that students receiving assistance have an obligation to notify the committee in writing if their financial situation changes, for example, through employment or the receipt of a scholarship not anticipated at the time the application was submitted.

First- and second-year students are urged not to accept employment during the academic year. A number of fourth-year students find employment in hospitals within the Medical Center. The personnel office may provide assistance to students' spouses seeking employment.

## Tuition Stabilization Policy for Medical Students

### Background

LCME standard 3.2 indicates that the medical program should offer sufficient opportunities, encouragement, and support for medical student participation in research and other scholarly activities. The proposed policy aligns with standard 3.2 and a student-centered learning environment. The School of Medicine encourages student research and participation in additional study outside of the traditional medical curriculum.

### Policies

As of July 1, 2020, all matriculating students will benefit from a tuition stabilization plan, which provides that the tuition rate at matriculation will remain constant for up to 10 consecutive years. The stabilized rate will expire ten academic years after matriculation. Therefore, students whose medical education is interrupted for any reason for more than six years will be charged at the rate of the class they rejoin. Appeals of this policy should be submitted in writing to the Medical School Registrar prior to the 10-year limit and any required increase in tuition. Appeals will be considered on a case-by-case basis, with the ultimate decision resting with the Registrar/Assistant Dean for Academic Affairs.

*The Washington University School of Medicine Tuition Stabilization Policy for Medical Students was last approved by the Academic Affairs Committee on April 9, 2020. All substantive edits to this policy require approval by the Academic Affairs Committee.*

## Standards for Satisfactory Academic Progress for Financial Aid Eligibility

When a student is enrolled in the curriculum of the MD program, the following policy applies regarding standards for Satisfactory Academic Performance (SAP). Federal regulations require that students receiving Title IV financial aid maintain SAP.

The minimum GPA requirements needed to maintain eligibility for Satisfactory Academic Progress are dictated by the specific program of study. In each case, per the requirements of 34 C.F.R. 668.34(a)(4)(ii), the federal student aid program requires a minimum of a C average to maintain eligibility for aid, but an individual degree or certificate program may have a higher minimum GPA for federal Satisfactory Academic Progress.

This policy presents the standards adopted by the Washington University School of Medicine and applies to all MD students.

SAP is evaluated annually, at the end of each academic year. If a student is not maintaining progress, they will be notified by the Committee on Academic and Professional Evaluation of Students (CAPES) and the director of financial aid via their

WUSM e-mail, and they will be ineligible, or "suspended," for federal aid for future terms unless they appeal their status and it is approved by CAPES and the director of financial aid. An appeal must contain the extenuating circumstances surrounding the failure to meet SAP, such as illness, injury, or other circumstances beyond the student's control.

In order to be compliant in maintaining SAP and thus eligible for federal financial aid, students must be satisfactorily progressing toward their academic objectives. Federal regulations require the following measurements for determining SAP: time frame and quantitative/qualitative requirements.

### Time Frame Requirement

The maximum time frame of full-time enrollment for the completion of each program is as follows:

- Four-year MD program: 6 years
- Five-year MD program: 7.5 years

Periods of non-enrollment are *not* counted in the measurement of satisfactory academic progress; however, all periods of attendance, regardless of whether or not the student received Title IV aid, are counted.

This policy is applied in the context of each individual student's enrollment status in order to accommodate the student who does not enroll on a full-time basis. For example, if a student enrolls in a four-year program, the full-time student would meet the 150% maximum rule (as per Title IV guidelines) after six years of full-time enrollment, and the half-time student is expected to complete the program within 12 years. If a student vacillates between full-time and half-time enrollment, that student would have a maximum time frame of between six and 12 years, and the maximum time frame for that student would be continuously adjusted.

If a student reaches a point where they cannot complete their program within the 150% maximum, that student becomes ineligible for federal aid for all future semesters.

### Quantitative/Qualitative Requirement

Academic requirements for the MD degree include the satisfactory completion of the curriculum designated by the faculty. The progress of each student working toward an MD degree is monitored carefully by the Committee on Academic and Professional Evaluation of Students (CAPES). Refer to the Assessing Academic Achievement (p. 389) section of this *Bulletin* for more information.

A student failing to meet the standards of satisfactory progress as determined by CAPES shall be placed on financial aid suspension. The student will be eligible for aid when they achieve SAP, or the student may appeal. Students who choose to appeal must state the reasons for failing to meet SAP (e.g., injury/illness of the student, death in the family or other special circumstance) and what has changed in the student's situation

so that they can now make SAP. If the student successfully appeals, the student will be placed on financial aid probation and may receive financial assistance for one term. At the conclusion of this period, the student must have achieved compliance with each standard or be progressing per their individual academic plan to receive additional aid. A student who does not achieve compliance with each standard by the conclusion of the probationary period is suspended from financial aid eligibility.

The Office of Student Financial Aid must notify a student of implementation of probationary status and/or suspension.

The Director of Student Financial Aid shall have primary responsibility for enforcement of this policy. The Office of Student Financial Planning shall ascertain at the time of each disbursement of funds and prior to certification of a financial aid application that the student is in compliance with the policy.

## Cost of Education

For the first-year class matriculant, tuition and estimated expenses for the 2022-23 academic year are listed below. Students will benefit from a tuition stabilization plan, which provides that their annual tuition and fees of \$69,250 will be constant for up to 10 consecutive years. The stabilized rate will expire 10 academic years after matriculation. The items listed below provide an estimate of the expenses for a single student in the 37-week first-year class. The total of these figures suggests a basic minimum budget of approximately \$90,361. Allowances for entertainment, travel, clothing and other miscellaneous items must be added to this estimate.

**Tuition and fees** (includes Student Health Services and Microscope Lending Plan): \$69,250

**Books and supplies:** \$700

**Medical instruments:** \$462

**Housing and food:** \$14,865

**Miscellaneous:** \$2,534

**Travel and personal:** \$2,550

## Policy for International Students

The admission decision at Washington University School of Medicine is based on academic and personal merit and not on the ability of the student to pay the costs of education. However, individuals who are not citizens of the United States of America or who do not hold U.S. Permanent Resident Visa status, including DACA students, are not eligible for financial aid due to regulations covering many programs used by the school to fund financial assistance. Therefore, in order for the school to complete the required documents which are necessary for issuance of a visa, the student must document, by a date and in a manner designated by the school, that the necessary amount of funds, as established by the school, is available to pay the costs of education (tuition and living expenses)

for the anticipated period of enrollment, normally four years. Documentation of the required amount of financial resources may be by a letter of credit or by deposit of funds in an escrow account with a bank designated by the school.

## Awards and Prizes

At two annual events, Washington University School of Medicine publicly recognizes and rewards outstanding scholarship, research accomplishments and community service of individual students. In December, the Student Awards Luncheon acknowledges academic excellence earned during the first three years of study. As part of the festive commencement activities in May, graduates are recognized for meritorious research and clinical achievements accomplished during their medical school careers.

**Morris Alex, MD Prize.** Awarded each year to the medical student who is outstanding among their peers in the second-year Practice of Medicine course.

**Alpha Omega Alpha Book Prize.** Awarded to a member of the graduating class who has performed outstandingly for the entire medical course.

**Alpha Omega Alpha Initiates.**

**American Academy of Neurology Medical Student Prize for Excellence in Neurology.** Awarded to a member of the graduating class for excellence in clinical neurology and outstanding personal qualities of integrity, compassion and leadership.

**American College of Physicians Michael M. Karl, MD Book Award.** Presented annually to a member of the graduating class committed to a career in internal medicine, in recognition of highest achievement in the field of internal medicine.

**American College of Physicians Award for Excellence in Physical Diagnosis.** Given to a student annually for outstanding performance in the second-year Practice of Medicine course.

**American College of Physicians Clerkship Award.** Established in 1992 to be awarded to a student completing the third year of study with meritorious achievement in the Internal Medicine Clinical Clerkship.

**American Medical Women's Association Glasgow-Rubin Award for Academic Achievement.** Presented to the women graduating first in their class.

**American Medical Women's Association Glasgow-Rubin Citation for Academic Achievement.** Presented to women medical students graduating in the top 10% of their class.

**The Ruth Bebermeyer Award.** Established in 2001 by the WUMCAA executive council to honor Ruth Bebermeyer for her many years of dedicated service to WUMCAA (1990-2000) and to the students of the School of Medicine. The award is given to "a student who has shown extraordinary kindness and sensitivity to the needs of others," whether those others be fellow students, patients or just people in general.

**Alexander Berg Prize.** Awarded to the students presenting the best results in research in molecular microbiology.

**The James and Philip Brasington Memorial Prize.** Awarded to a medical school student who has demonstrated excellent preclinical and clinical academic performance in psychiatry and who has the potential to make significant contributions to the field.

**Jacques J. Bronfenbrenner Award.** Provided by Dr. Bronfenbrenner's students in memory of his inspiration as a teacher and a scientist, and awarded to the member of the graduating class who, as judged by the Department of Medicine, has done the most outstanding work in infectious diseases or related fields.

**Dr. Richard S. Brookings and Robert Carter Medical School Prizes.** Provided through a bequest of Robert S. Brookings to recognize academic and personal achievements, including but not limited to exemplary academic performance, leadership, community service and research.

**Dr. Harvey Butcher Prize in Surgery.** Awarded annually in memory of Dr. Harvey Butcher to the members of the graduating class who, as judged by the Department of Surgery, show the greatest promise for general surgery.

**Kehar S. Chouke and George Gill Prize in Anatomy.** Awarded annually to a first-year medical student who has demonstrated superior scholarship in Human Anatomy.

**Class of 2001 Award.** Established by the Class of 2001 as its gift to the medical school. Awards are to be given to third-year medical students in recognition of outstanding performance in the areas of community service and student group activities in the first two years of medical school.

**Class of 2003 Award.** Dedicated to the memory of three classmates who died in a car accident, and awarded to a first-year student recognized by peers as being selfless, exceptionally kind to others and dedicated to the highest standards in medicine, traits for which these classmates will be remembered.

**F. Sessions Cole Award.** The inaugural Cole award is presented to a senior medical student entering the field of pediatrics who exhibits honest and thoughtful patient care, who gives generously with their time, and who welcomes emerging technology. A masterful clinician who continually advocates for our smallest patients.

**Carl F. and Gerty T. Cori Prize in Biochemistry.** Awarded at the end of the first year to the class member who has demonstrated superior scholarship in biochemistry.

**Edmund V. Cowdry Prize in Histology.** Established in 1969 to honor Dr. Cowdry; awarded to a medical student in the first-year class who has performed meritoriously in microscopic anatomy.

**Antoinette Frances Dames Award in Cell Biology and Physiology.** Awarded annually to members of the first-year class who have demonstrated superior scholarship in these fields.

**Elisabeth L. Demonchaux Prize in Pediatrics.** Established in 1985, the prize is awarded annually to a graduating student who has done outstanding work in pediatrics.

**Steven Dresler Prize.** Awarded to a graduating student who has demonstrated a commitment to promoting social good, civil rights and civil liberties through social action and volunteerism.

**Dr. William Ellis Award.** Established in 1990 by Dr. Ellis and awarded to a senior student in recognition of meritorious research in ophthalmology

**The Endocrine Society Medical Student Achievement Award.** Recognizing a graduating medical student who has shown special achievement and interest in the general field of endocrinology.

**The Family Health Foundation of Missouri Scholarship Award.** Awarded to the top graduating student entering the specialty of family medicine.

**George F. Gill Prize in Pediatrics.** Awarded to a member of the graduating class who has demonstrated superior scholarship in pediatrics.

**Gold Humanism Honor Society.**

**Alfred Goldman Book Prize in Diseases of the Chest.** Created in 1972 as an annual award to be given to a student selected by the faculty for outstanding clinical work or research in diseases of the chest or pulmonary physiology.

**Max and Evelyn Grand Prize.** Established in 1985 by Dr. M. Gilbert Grand, the prize is awarded annually to a member of the graduating class for excellence in ophthalmic research or clinical ophthalmology.

**Peter Halstead Hudgens Award.** Established by Dr. Richard W. Hudgens in memory of his son, this award recognizes a graduating student for excellence in research and clinical psychiatry.

**Nathan Edward Hellman, MD, PhD, Memorial**

**Award.** Recognizes second-year students selected through a vote of fellow classmates. The recipients are distinguished as students with a strong track record of accomplishments and an interest in academic medicine, and whose humanism, collegiality, humor and compassion are an inspiration to members of the class.

**Herrmann Prize.** Created by Dr. Paul Herrmann (MD '61) and his wife, Susan, to recognize a student who is considered a thoughtful and sensitive communicator in the clinical arena and whose listening and communication skills every patient hopes their physician will possess.

**Dr. John Esben Kirk Scholastic Award.** Established in 1975 and awarded to graduating students of high scholastic standing.

**Rosalind Kornfeld Student Leadership Award.** Presented to a woman or women in the graduating class who has or have demonstrated outstanding leadership in service to or advancement of women in the community.

**Louis and Dorothy Kovitz Senior Prize in Surgery.** Senior award in surgery recognizing members of the graduating class who have shown the most outstanding ability, zeal and interest in surgical problems.

**I. Wallace Leibner Award.** Established in 1988 in memory of Dr. Leibner, the award is given to the member of the graduating class who has not only demonstrated excellence in diagnosis and therapeutics, but also an understanding of human nature and needs, and an active nurturing of both patient and family.

**Irwin Levy Prize in Neurology and Neurological Surgery.** Established in 1980 by friends of Dr. Levy as a tribute to his commitment to clinical teaching. Provides a prize for the student who presents the best performance in the neurology and neurological surgery clerkships.

**Edward Massie Prize for Excellence in Cardiology.** Awarded to the member of the graduating class, selected by the director of the Division of Cardiovascular Disease in the Department of Medicine, who has done the most outstanding clinical or basic research work in the field of cardiovascular disease.

**Howard A. McCordock Book Prize in Pathology.** Awarded at the end of the second year to a member of that class for general excellence in pathology.

**Medical Center Alumni Scholarship Fund Prize.** Given annually to students who have shown excellence in their work during the preceding year.

**Medical Fund Society Prize in Medicine.** One prize awarded annually to a graduating student who has excelled in the study of internal medicine.

**Medical Fund Society Prize in Surgery.** One prize awarded annually to a graduating student who has excelled in the study of surgery.

**Merck Academic Excellence Award.** Given to three graduating medical students for scholastic achievement in medical studies.

**Missouri State Medical Association Award.** Presented annually to honor School of a Medicine graduate for outstanding achievement in the study of medicine.

**The Missouri State Medical Association Student Scholarships.** Awarded annually to first-year medical students who graduated from Missouri high schools in recognition of their high undergraduate academic achievement.

**Dr. Helen E. Nash Academic Achievement Award.** Given annually to a student who has exhibited to an unusual degree the qualities of industry, perseverance, determination and enthusiasm. The prize is given in honor of Dr. Helen Nash, a pediatrician noted in the St. Louis community for her commitment to excellence, tireless advocacy on behalf of children and endless enthusiasm for the field of medicine.

**The Dr. Philip Needleman Pharmacology Prize.** Established by his family in 1989 to honor Dr. Needleman, who was chairman of the Department of Pharmacology from 1976-89. This annual award is given to a member of the graduating class for outstanding research in pharmacology.

**The Doctor James L. O'Leary Neuroscience Prize.** Awarded annually to a student who demonstrates the best accomplishment in the Neuroscience course.

**The Roy R. Peterson Prize in Anatomy.** Awarded for outstanding performance in the Human Anatomy course in recognition of Dr. Peterson's many contributions as a teacher in the School of Medicine.

**The Richard and Mildred Poletsky Education Fund.** Established in 1995 by the family of Mr. Richard Poletsky, an alumnus of Washington University. A prize is awarded annually to a professional student in the health sciences whose interest is in research on dementia and care of demented patients.

**The Dr. Frank O. Richards Medical Student Scholarship Prizes.** Provided by African-American alumni and friends of Washington University School of Medicine. The prizes embrace diversity efforts and are awarded in recognition of achievements in the first and second year of the curriculum.

**Dr. Philip Rosenblatt Award in Pathology.** Given to a senior medical student for distinguished performance during an elective in pathology or laboratory medicine.

**Dr. William A. Rubenstein Award in Medicine.** Awarded to a fourth-year student who shows a serious interest in pursuing a career in internal medicine and who demonstrates the exceptional qualities of a gifted physician, including compassion, caring, and the pursuit of scientific knowledge.

**St. Louis Pediatric Society Senior Prize.** Presented to the senior student showing the greatest promise in clinical pediatrics.

**David F. Silbert Outstanding Teaching Assistant**

**Award.** Established in memory of Dr. David Silbert, it is awarded to a teaching assistant in a medical school course in recognition of a commitment to teaching.

**John R. Smith Memorial Fund Award.** Created in 1982, it is awarded to a medical student who has done meritorious clinical and/or research work in the Division of Cardiovascular Disease within the Department of Medicine.

**Dr. Margaret G. Smith Award.** Given to a woman medical student for outstanding achievement in the first two years of medical school.

**Society for Academic Emergency Medicine Excellence in Emergency Medicine Award.** Based on demonstrated excellence in the specialty of emergency medicine, it is awarded to a senior medical student at Commencement.

**Samuel D. Soule Award in Obstetrics and Gynecology.** Presented to a member of the fourth-year class for meritorious achievement in either basic or clinical investigation in obstetrics and gynecology.

**Jessie L. Ternberg Award.** Presented to a woman graduating from the School of Medicine who best exemplifies Dr. Ternberg's indomitable spirit of determination, perseverance and dedication to her patients.

**Washington University Internal Medicine Club Research Award.** Awarded to the member of the graduating class who has done the most significant research in any area of internal medicine.

**Washington University Summer Research Prize.** The award recognizes students for meritorious research in the Summer Research Fellowship Program at Washington University School of Medicine.

**Samson F. Wennerman Prize in Surgery.** Donated by his wife, Zelda E. Wennerman, and awarded annually to the fourth-year student who has demonstrated promise in the field of surgery.

**Doris P. and Harry I. Wexler Prize.** Established in 1998 by a bequest from Mrs. Wexler, the prize is awarded annually for research in multiple sclerosis and in alternate years research in eye disease.

**The Park J. White, MD Prize.** Created in 1992 in honor of the centennial of the birth of Dr. White, who was a distinguished pediatrician, social activist and pioneer teacher of medical ethics. He introduced the first course on medical ethics to students in 1927. The prize is awarded to students for outstanding performance in the ethics elective offered by the Program for the Humanities in Medicine.

**Hugh M. Wilson Award in Radiology.** Given annually to a graduating medical student in recognition of outstanding work in radiology-related subjects, either clinical or basic science.

**The Wynder Prize in Preventive Medicine.** An annual prize established in 1994 and awarded to senior medical students who have done the best research in preventive medicine.

**James Henry Yalem Prize in Dermatology.** Established by Charles Yalem in memory of his son and awarded annually to members of the fourth-year class for outstanding work in dermatology.

## Registration, Payments, and Withdrawal and Refunds Policy

The university billing system provides a central financial account against which most student expenses incurred at the university will be posted, including but not limited to tuition, housing charges, parking and library fines. This policy, when referring to tuition and other charges, includes any and all charges posted to this account.

All payments of tuition and other university charges are due and payable on the dates specified in the published calendars of the programs in the School of Medicine. Failure of a student to register when required, and pay tuition and other charges incurred on or before the date specified in the published calendar, may result in a late fee of \$50 to be added to the amount due. The late fee may be imposed seven days after the due date if full payment has not been received. Tuition and other charges are usually payable twice a year, at the start of the academic year, and again at the middle of the academic year, as listed on the schedule on the academic calendar.

In addition to the \$50 late fee, any payment due from the student and not paid by the specified date will accrue interest at the current market rate in effect on the first business day of the month in which the payment is due. This fee will be imposed on any accounts not paid in full within 30 days of the due date. Any amount not paid when due (plus accrued interest thereon) must be paid in full within three months of the due date to avoid potential suspension from classes, unless a deferred payment is approved by the registrar due to extenuating circumstances.

If a student fails to make payments within three months of the original due date, the school will not release the student's academic record, grade reports or transcript, pending settlement of the unpaid account. A student who has not satisfied all of their delinquent financial obligations to Washington University (e.g., tuition, university housing, parking) one month before the end of the academic year will not be allowed to progress to the next academic year, nor can they be issued a diploma.

Federal financial aid funds for the next academic year cannot be disbursed until all prior year balances are paid in full.

Students who rely on financial aid funds to meet their obligations should submit their applications for processing according to application deadlines published by the Office of Student Financial Planning. Deadlines allow for receipt of financial aid

funds by payment due dates if applications are filed by the deadline. The Office of Student Financial Planning will assist students with loan applications and financial planning upon request.

A student who withdraws or takes a leave of absence from the school will receive a pro rata refund of tuition and appropriate fees. The refund will be based on the ratio of the class days enrolled (from the first day of classes to the termination date) to the total number of class days in the term for which tuition and fees were paid. It is understood that the date on which a student formally notifies the Registrar's Office in writing of the decision to withdraw or take a leave of absence from the School of Medicine shall be regarded as the termination date, with no retroactive clause to be accepted. A prospective date will be accepted, however. If tuition and fees were paid entirely or in part by financial aid from the school, the refund will be applied first to the total repayment of the accounts from which financial aid was drawn, with any remaining refund balance given to the student. Financial aid received in excess of the costs of tuition and fees must be refunded by the student to the school on the same pro rata basis as calculated for the tuition refund outlined above, per "Return of Title IV" federal guidelines. Any questions about these policies may be directed to either the Office of the Registrar or Student Financial Planning.

## Merit-Based Scholarships

In 1978, the School of Medicine established a scholarship program that based selection on merit rather than financial need. As one of the first merit scholarship programs for medical students, the Distinguished Student Scholarship Program has recognized and rewarded academic excellence and personal achievement for 33 years. And, to honor outstanding alumni of Washington University, the Medical Center Alumni Association created in 1989 the Distinguished Alumni Scholarship Program. In 1998, the Barnes-Jewish Hospital Medical Staff Association committed to funding one full-tuition, four-year scholarship to a student in each entering class. Beginning with the 2002-03 academic year, one additional "named" scholarship was made available through the generosity of a donor.

Most merit-based scholarships are awarded to students in the first-year class and are subject to annual renewal. Recipients of these scholarships are expected to maintain academic excellence. If a scholarship is not renewed, the student may file for financial aid from the school. For scholarship recipients who document financial need above the full-tuition scholarship, additional funds are available to provide support up to the total cost of education. Scholarship recipients may not concurrently participate in the school's Medical Scientist Training Program, the Armed Forces Health Professions Scholarship Program, or the National Health Service Corps Scholarship Program.

Now known collectively as the Distinguished Scholars Program, its aim is to attract and enroll the most outstanding students in the School of Medicine, thus enriching the scholarly environment and broadening the scope of learning for all students.

Scholarship recipients are selected on intelligence, character, personal accomplishments and goals, motivation for medicine, aptitude for science, leadership potential, communication skills and diversity of life experience. Scholarships awarded under this program include the Barnes-Jewish Hospital Scholars, Danforth Scholars in Medicine, Distinguished Alumni Scholars (DAS), Distinguished Faculty Scholars (DFS), and Distinguished Student Scholars (DSS).

## Barnes-Jewish Hospital Medical Staff Association Scholarship

One full-tuition, four-year scholarship will be awarded to a student in each entering class beginning in 1999. Selection of the Barnes-Jewish Hospital Medical Staff Association Scholar is the same as for the Distinguished Student Scholarship.

## Danforth Scholars in Medicine

Named in honor of William H. and Elizabeth Gray Danforth, the chancellor and first lady of the university from 1971 to 1995, the Danforth Scholars Program is a tribute to their legacy of exemplary leadership and service.

## Distinguished Alumni Scholarships

Up to four full-tuition scholarships are awarded annually to members of the entering first-year class. The application procedure and selection process are the same as for the Distinguished Student Scholarships. Since 1989, Distinguished Alumni Scholarships have been named in honor of the following individuals:

- Leonard Bacharier, MD
- Thomas Bailey, MD
- Thomas Baranski, MD, PhD
- Walter F. Benoist, MD
- Leonard Berg, MD
- Grace E. Bergner, MD
- Laura Bierut, MD
- Ellen F. Binder, MD
- Stanley J. Birge, MD
- Eugene M. Bricker, MD
- Keith H. Bridwell, MD
- Angela Brown, MD
- Elmer B. Brown, MD
- J. William Campbell, MD
- David B. Clifford, MD
- C. Robert Cloninger, MD



- Jennifer W. Cole, MD
- John N. Constantino, MD
- Justin J. Cordonnier, MD
- Michael Crowder, MD, PhD
- Carlos Daughaday, MD
- John D. Davidson, MD
- Louis P. Dehner, MD
- Brian Dieckgraefe, MD, PhD
- Bradley Evanoff, MD, MPH
- Ronald G. Evens, MD
- Lewis C. Fischbein, MD
- I.J. Flance, MD
- James W. Fleshman, MD
- James Forsen Jr., MD
- Bernard T. Garfinkel, MD
- Deborah J. Gersell, MD
- Jerome J. Gilden, MD
- Harvey S. Glazer, MD
- David Goldring, MD
- Sidney Goldring, MD
- Samuel B. Guze, MD
- Paul O. Hagemann, MD
- Marc R. Hammerman, MD
- Alexis F. Hartmann, MD
- Alexis F. Hartmann Jr., MD
- John C. Herweg, MD
- Scott G. Hickman, MD
- Richard W. Hudgens, MD
- David Hunstad, MD
- Robert S. Karsh, MD
- John M. Kissane, MD
- Ira J. Kodner, MD
- Allan E. Kolker, MD
- Stuart A. Kornfeld, MD
- Lawrence M. Kotner Jr., MD
- Nicholas T. Kouchoukos, MD
- William M. Landau, MD
- Timothy J. Ley, MD
- Virgil Loeb, MD
- Maurice Lonsway, MD
- Robert H. Lund, MD
- Alan P. Lyss, MD
- Philip W. Majerus, MD
- Mark J. Manary, MD
- Paul R. Manske, MD
- Gerald Medoff, MD
- Paul A. Mennes, MD
- J. Neal Middelkamp, MD
- Benjamin Milder, MD
- Barbara S. Monsees, MD
- Carl V. Moore, MD
- George E. Murphy, MD
- David G. Mutch, MD
- D. Michael Nelson, MD, PhD
- Robert C. Packman, MD
- Charles W. Parker, MD
- Mary L. Parker, MD
- Alan L. Pearlman, MD
- M. Alan Permutt, MD
- Frederick D. Peterson, MD
- Gordon W. Philpott, MD
- Gary A. Ratkin, MD
- Edward H. Reinhard, MD
- Fred C. Reynolds, MD
- William J. Ross, MD
- Will R. Ross, MD, MPH
- Joseph F. Ruwitch Jr., MD
- Llewellyn Sale Jr., MD
- George Sato, MD
- Bradley Schlaggar, MD, PhD
- Mark E. Frisse, MD
- Gustav Schonfeld, MD
- Clay F. Semenkovich, MD
- Hyman R. Senturia, MD
- Donald Sessions, MD
- Gary D. Shackelford, MD
- Penelope G. Shackelford, MD
- Larry Shapiro, MD
- Bernard L. Shore, MD
- Barry A. Siegel, MD
- Emily L. Smith, MD
- William F. Stenson, MD
- Arnold W. Strauss, MD
- Robert A. Swarm, MD
- Steven L. Teitelbaum, MD
- Jessie L. Ternberg, PhD, MD
- Bradley T. Thach, MD
- Mildred Trotter, PhD
- Stanley Wald, MD
- Stuart Weiss, MD
- Alison J. Whelan, MD

- Rakhee Bhayani, MD '99
- Tessa Madden, MD '01
- Eugene Rubin, MD, PhD '78
- Garry Tobin, MD '85

## Distinguished Faculty Scholars

The Distinguished Faculty Scholar Program provides merit-based scholarships (up to full-tuition for four years) to students who demonstrate their commitment to bringing diverse people together and to enhancing service to disadvantaged groups.

These awards are for students who have done the following:

- Been recognized as scholars from groups that are historically underrepresented in medicine
- Challenged themselves and excelled academically
- Demonstrated leadership
- Engaged in or shown a commitment to community service
- Demonstrated their commitment to bringing diverse people together (for example, by having been involved in diversity initiatives in their schools or communities)
- Demonstrated a commitment to serving historically underprivileged populations, and/or demonstrated achievement and determination in the face of personal challenges

## Distinguished Student Scholarships

Distinguished Student Scholarships are awarded annually (up to full-tuition for four years) to selected members of the entering first-year class based on meritorious academic and personal accomplishments. Final selection of scholarship recipients is made by a committee of the faculty based on demonstrated superior intellectual achievement as well as an assessment of the applicant's character, attitude, motivation and maturity.

## Scholarship Funds

**Grace Bergner Abrams Scholarship.** Established in 1995 through the bequest of Dr. Grace Bergner Abrams, MD '43. Friends and patients also contributed to this endowed scholarship.

**Helen M. Aff-Drum Scholarship Fund.** Established in 1988 to provide scholarship support to financially deserving medical students.

**Anderson Student Scholarship.** Established through bequest in 2001 by Rolf L. Anderson, MD '62.

**Franz and Harriet I. Arzt Student Loan.** Established by the estate of Dr. and Mrs. Franz Arzt in 2013.

**Isak and Breine Ascher Scholarship Fund.** The late Dr. Eduard Ascher, MD, '42, established this scholarship through a trust to memorialize his parents, who were lost in the Holocaust during World War II. He chose Washington University School of Medicine because of their willingness to "give a chance" to an Austrian refugee.

**Arthur I. Auer, MD 1956 and Marian D. Auer, NU 1955 Scholarship.** Established in 2012 by Dr. and Mrs. Auer to provide scholarship assistance to worthy students.

**Dr. William Monroe Baker Fund.** Established in 1988 under the will of Miss Lola Braxton in memory of Dr. Baker to provide scholarship assistance to worthy students.

**Barnes-Jewish Hospital Medical Staff Association Scholarship.** Established in 1998 by the Barnes-Jewish Hospital Medical Staff Association to provide financial assistance to students based on academic excellence.

**Floyd A. and Rita Sue Barnett Scholarship.** Established in 1994 from a trust agreement (1989) of Floyd and Rita Sue Barnett for scholarships for students who are academically well-qualified and financially deserving.

**Dr. Frederick Barry Scholarship.** Established in 2009 through the estate of Dr. Frederick Barry for medical student education.

**The Dr. Joseph A. and Helene H. Bauer Scholarship.** Created in 1987 by Dr. and Mrs. Joseph A. Bauer to provide scholarship support to academically well-qualified and financially deserving medical students.

**Edward Baumhardt Scholarship.** Established in 2014 through the estate Dr. Edward Earl Baumhardt.

**William L. Becker, MD Scholarships.** Established in 2012 by Dr. William Becker, MD '87 and awarded based on financial need.

**Albert G. Blanke Jr. Endowed Scholarship.** Established by a generous gift in 1982, the fund provides scholarship assistance for deserving students in the School of Medicine.

**Dr. John A. Bowers Scholarship Fund.** Established through the estate of Dr. and Mrs. John Bowers. The scholarship is awarded based on need.

**Warren Bowersox, MD Scholarship Fund.** Established in 2005 by Mrs. Warren Bowersox in memory of her husband, who was a member of the MD class of 1943, to support scholarships.

**Isabel Valle Brookings Scholarship.** Established in 1957 by Isabel Valle Brookings (Mrs. Robert S.) for scholarships and loans in the School of Medicine.

**The Seymour Brown, MD and Rose Tropp Brown Scholarship.** Established by the estate of Dr. Seymour and Mrs. Rose Tropp Brown.

**Jane Stewart and Robert S. Brua, MD Scholarship Fund.** Established in 1996 through the generosity of Dr. Brua.

**The Bruce Family Scholarship.** Established in 2012 by Robert and Suzanne Bruce to commemorate three generations of physicians: Helen L. Bruce, MD; her son, Robert M. Bruce, MD; and her grandson, Carl T. Bruce, Washington University School of Medicine, Class of 2015.

**Robert W. Butcher, MD Scholarship.** Established in 2012 by an anonymous donor.

**Ruth Elizabeth Calkins Scholarship Fund.** Established by Dr. Delevan Calkins in honor of his granddaughter.

**Dr. Richard Brookings and Mr. Robert Carter Medical School Scholarship.** Established through a bequest of Robert S. Brookings.

**Gilbert L. Chamberlain, MD Scholarship Fund.** Created in 1971 by Dr. Gilbert L. Chamberlain to be used to aid worthy students in acquiring their medical education.

**Cecil M. Charles – Nu Sigma Nu Medical Student Scholarship Fund.** Established by the Nu Sigma Nu Medical Fraternity in memory of Dr. Charles.

**Tien Hsin Cheng, MD Endowed Scholarship in Medicine.** Established in 2007 by Dr. Tien Hsin Cheng, MD '76, for deserving medical students with financial need.

**Dr. Kehar S. Chouke Loan.** Established by the estate of Dr. Kehar Singh Chouké.

**Class of 1945 Scholarship.** Established by the alumni from the Class of 1945 in honor of their 45th reunion.

**Class of 1954 Scholarship In Memory of Dan Nathans.** Established in 2000 by the alumni from the Class of 1954 in memory of their classmate, Daniel Nathans, who was awarded the Nobel Prize in Medicine in 1978. Members of the Nathans family also contributed to the establishment of the fund.

**Class of 1956 Scholarship.** Established in 1996 by members of the Class of 1956 in honor of their 40th reunion.

**Class of 1959 50th Reunion Scholarship.** Established in 2008 by members of the Class of 1959 in honor of their 50th reunion.

**Class of 1960 Scholarship.** Established in 2010 by the members of the Class of 1960 in honor of their 50th reunion.

**Class of 1961 Scholarship.** Established in 2001 by the members of the Class of 1961.

**Class of 1964 Scholarship.** Established in 1993 by the alumni from the Class of 1964 to support scholarships.

**Class of 1968 Scholarship.** Established in 1998 by the alumni from the Class of 1968 in honor of their 30th reunion to support student scholarships.

**Class of 1969 Scholarship.** Established in 1994 by members of the Class of 1969 in honor of their 25th reunion.

**Class of 1970 Scholarship.** Established in 1996 by members of the Class of 1970 in honor of their 25th reunion.

**Class of 1971 Scholarship.** Established in 1999 by members of the Class of 1971 in honor of their 25th reunion.

**Class of 1972 Scholarship.** Established in 1999 by members of the Class of 1972 in honor of their 25th reunion.

**Class of 1973 Scholarship.** Established in 2000 by members of the Class of 1973 in honor of their 25th reunion.

**Class of 1974 Scholarship in Honor of Dr. Jonathan Mann.** Established in 2002 by members of the Class of 1974 for their 25th reunion and to honor the memory of their classmate, Dr. Jonathan Mann, a pioneering AIDS researcher, who died in the Swissair Flight 111 accident in 1998.

**Class of 1975 Scholarship.** Established in 2000 by members of the Class of 1975 in honor of their 25th reunion.

**Class of 1976 Scholarship.** Established in 2000 by members of the Class of 1976 in honor of their 25th reunion.

**Class of 1977 Scholarship.** Established in 2002 by members of the Class of 1977 in honor of their 25th reunion.

**Class of 1978 Scholarship.** Established in 2002 by members of the Class of 1978 in honor of their 25th reunion.

**Class of 1979 Scholarship.** Established in 2003 by members of the Class of 1979 in honor of their 25th reunion.

**Class of 1980 Scholarship.** Established in 2004 by members of the Class of 1980 in honor of their 25th reunion.

**Class of 1981 Scholarship.** Established in 2005 by members of the Class of 1981 in honor of their 25th reunion.

**Class of 1982 Scholarship.** Established in 2006 by members of the Class of 1982 in honor of their 25th reunion.

**Class of 1983 Scholarship.** Established in 2007 by members of the Class of 1983 in honor of their 25th reunion.

**Class of 1984 Scholarship.** Established in 2008 by members of the Class of 1984 in honor of their 25th reunion.

**Class of 1985 Scholarship.** Established in 2016 by members of the Class of 1985.

**Class of 1986 Scholarship.** Established in 2011 by members of the Class of 1986 in honor of their 25th reunion.

**Grace Strong Coburn Scholarship.** Created in 1962 through the bequest of Mrs. Grace Strong Coburn for scholarships in the School of Medicine.

**Jack W. Cole, MD Scholarship Fund.** Established in 2002 by Mrs. Ruth Kraft Cole, in memory of her late husband, a 1944 graduate of WUSM, and to recognize Dr. Cole's deep appreciation for the education he received. Preference will be given to a student pursuing a career in academic medicine.

**T. Griswold Comstock Scholarships.** Established under the will of Marilla E. Comstock for students who would otherwise be unable to obtain a medical education.

**Robert Emmet Connor Family Scholarship Fund.** Established in 2010 by Dr. Robert Connor in appreciation for the medical education he received at Washington University.

**Clark and Mildred Cox Scholarship for Women.** Established in 1998 with a donation from the Clark Cox Trust.

**Arpad Csapo, MD Memorial Scholarship Fund.** Established in 1982 by Elise Csapo in memory of her husband, and by his friends and colleagues to provide assistance for students who have shown promise in fields relating to reproductive medicine.

**William H. and Elizabeth Gray Danforth Scholars Program.** Established in 1998 in honor of Chancellor Danforth's retirement. The Scholarship recipients must demonstrate outstanding academic promise and a record of community service that reflects Dr. Danforth's values and actions.

**Harriet Arey and John D. Davidson Scholarship.** Established in 2000 by Harriet Arey and John D. Davidson for scholarships in the School of Medicine.

**Davie Family Endowed Scholarship.** Established by Joseph Davie, MD '68, and his family to support scholarships for deserving medical students.

**Paul H. and Ruth K. DeBruine Endowed Scholarship.** Established in 1994 by Dr. and Mrs. Paul DeBruine in honor of his 35th medical school reunion to provide scholarship support to academically well-qualified and financially deserving medical students.

**The Melvin DeHovitz Scholarship.** Established by the estate of Mr. DeHovitz in honor of his mother, Jeanette DeHovitz.

**Distinguished Alumni Scholarship.** These scholarships are made available by generous donations from our alumni. The Washington University Medical Center Alumni Association Executive Council names the scholarships for alumni each year to honor their outstanding contributions and leadership.

**Distinguished Faculty Scholarship.** These scholarships are for students who have challenged themselves and excelled academically, demonstrated leadership, engaged in or shown a commitment to community service, demonstrated their commitment to bringing diverse people together, and enhanced service to disadvantaged groups. In addition, it links each of the scholarship recipients with a faculty mentor who has contributed to the diversity of the medical school.

**Distinguished Student Scholarship.** These scholarships are awarded to students who are selected primarily on the basis of merit (demonstrated superior intellectual and personal achievements, and an assessment of the applicant's character, attitude, motivation and maturity).

**Dr. Charles Drabkin Scholarship.** Created in 1964 to provide financial assistance to medical students.

**Hazel B. Duncan Scholarship Fund.** Established in 2003 through the bequest of Hazel B. Duncan, NU '26.

**Eichner-Dominguez Family Scholarship.** Established in 2005 by Lora Eichner, MD '93, to make it easier for students to attend medical school.

**Dr. Howard Eisen and Dr. Judith Wolf Scholarship.** Established in 2013 by Dr. Howard Eisen and Dr. Judith Wolf, who both completed their residencies at Washington University School of Medicine. Provides support to medical students based on need or merit.

**Dr. and Mrs. Max Elliott Scholarship.** Established in 2000 by Dr. Elliott, MD '64, to assist medical students.

**Robert B. Fickel, DDS Scholarship Fund.** Established by a 1941 graduate of Washington University School of Dental Medicine.

**Carl Fisch Scholarship Fund.** Created in memory of Dr. Fisch by his daughter, Marguerite F. Blackmer. Provides support to students who demonstrate financial need.

**Flance Medical Scientist Traineeship.** Established in honor of faculty member and alumnus I. Jerome Flance, MD '35 by the Harry Edison Foundation for support of a student in the Medical Scientist Training Program.

**Ann Randolph Flipse, MD Scholarship in Medicine.** Established in 2007 by Dr. Ann Randolph Flipse to support deserving medical students with a preference for students whose undergraduate degree was in English, history, philosophy, music, arts or a graduate degree in the humanities.

**George F. Gill Scholarship in Pediatrics.** Instituted in memory of a former clinical professor of pediatrics.

**Helen H. Glaser Scholarship for Women Medical Students.** Established in 1999 by Robert J. Glaser, MD, emeritus trustee and former faculty member, in memory of his wife, Helen H. Glaser, MD '47.

**Anne T. and Carl Goetsch Scholarship.** This fund was established in 2003 through the bequest of Dr. Anne T. Goetsch, MD '41, HS '44, and Dr. Carl Goetsch, HS '43, to support medical students.

**Norman M. and Eleanor H. Gross Scholarship Fund.** Established in 2001 through a bequest from Mr. Gross to provide financial assistance to qualified medical students.

**Paul H. and Lila L. Guttman Scholarship Fund.** Established in 1976 to provide financial assistance to qualified medical students.

**Paul O. and Nancy P. Hagemann Scholarship Fund.** Established by Dr. and Mrs. Hagemann to assist academically well-qualified students with documented financial need.

**Donald R. and Mary N. Harkness Family Scholarship.**

Established in 2004 by Drs. Donald and Mary Harkness, both MD '58, in memory of their daughter, Laurel, MD '86.

**Lee B. and Virginia G. Harrison Scholarship.** Established in 1996 for scholarships for students who intend to pursue a career in internal medicine or family practice. Dr. Harrison was a 1927 graduate of the School of Medicine.

**Thomas James Hartford Jr. Scholarship.** Established in 2008. Priority is given to a medical student who is considering a career in health administration.

**Harvielle-Bailey Scholarship for Medicine or Surgery.**

Established in 1970 under the will of Miss Isabel Bailey Harvielle as a memorial to Dr. Charles Poplin Harvielle and Dr. Steele Bailey Jr., alumni of the school.

**Ronald C. and Nell W. Hertel Endowed Scholarship for the School of Medicine.** Established in 1995 and endowed in 2005 in memory of Mrs. Nell Hertel to provide financial aid to medical students.

**Raymond F. Holden Jr. and Gertrude K. Holden Scholarship.** Established in 2009 by the Estate of Dr. Raymond F. Holden Jr., MD '33, to provide scholarship support to medical students.

**Allan O. and Doris M. Holtzman Scholarship.** Established by Dr. David and Mrs. Tracy Holtzman in honor of Dr. Holtzman's parents.

**Donald J. Horsh Scholarship.** Established in 1985 to honor Dr. Donald J. Horsh, former associate professor and deputy director for the Health Administration Program. Provides support to medical students.

**Dr. and Mrs. Charles Y. (Yueh-Gin Gung) Hu Scholarship.** Established in 2002 to provide a scholarship to medical students.

**Dr. Grace Huse Memorial Fund.** Provides scholarship awards for deserving Washington University medical students.

**Justan Icks Scholarship.** Established in 2008 by anonymous donor to support students with high academic achievement.

**Jackson Johnson Scholarship.** Provided through a bequest in 1930 from Jackson Johnson.

**Dr. Lorraine A. Johnsrud Scholarship.** Established in 1983 as a memorial to Lorraine from her classmates, friends and family to assist deserving medical students in the funding of their medical expenses.

**Henry J. Kaiser Family Foundation – Medical Century Club Scholarship Endowment.** Following the foundation's generous gift in 1980 for medical student scholarships, the Medical Century Club accepted the challenge to raise new scholarship funds to match an additional gift from the foundation.

**Jay and Ronnie Kaiser Endowed Scholarship.** Established in 2004 by Dr. Jay Kaiser, MD '72, and Mrs. Ronnie Kaiser in appreciation of the financial aid Dr. Kaiser received as a student and to provide support for medical students.

**George D. Kettelkamp Scholarship.** Established in 1969 by Mrs. Kettelkamp in memory of her husband, an alumnus of the School of Medicine.

**M. Kenton King, MD Scholarship.** Created by the Executive Faculty to honor Dr. King at the time of his retirement in 1989 as dean of the School of Medicine after having served in that position for 25 years.

**Saulo Klahr Endowed Scholarship.** Established in 2010 by Mrs. M. Carol Klahr in memory of her husband, Dr. Saulo Klahr, a WUSM professor of kidney disease for 46 years, to provide scholarship support to medical students.

**Ira J. Kodner Scholarship.** Established in 2014 to honor Dr. Ira Kodner, MD, professor emeritus of surgery.

**Albert F. Koetter, MD Scholarship Fund.** Established in 1978 by Mrs. Stella Koetter Darrow in memory of her father, an alumnus and former faculty member of the School of Medicine.

**Nicholas T. Kouchoukos, MD '61 and Judith B. Kouchoukos Scholarship.** Established in 2011 by Dr. Nicholas T. and Mrs. Judith B. Kouchoukos, to provide scholarship support to medical students.

**Helen Hoerr Kurtz Endowed Scholarship in the School of Medicine.** Established by the estate of Mrs. Helen Hoerr Kurtz.

**Anne L. Lehmann Scholarship Fund.** Established in 1983 to grant continued scholarship support to medical students.

**Life Insurance Medical Scholarship Fund.** Created in 1972 from residual funds in the Life Insurance Medical Research Fund. Scholarship support is now awarded to students in the MD degree program.

**Maude L. Lindsey Memorial Scholarships.** Created in 1976 to assist students in the School of Medicine.

**John R. Lionberger Jr. Medical Scholarship Endowment Fund.** Created in 1982 by Dr. John R. Lionberger to be used to aid worthy students in acquiring their medical education.

**E.A. Marquard Memorial Student Scholarship.** Established in 1994 from the E. Alfred Marquard Memorial Student Loan Fund to provide scholarships for deserving medical students.

**Alma Mavis Scholarship.** Created in 1988 under the will of Alma Mavis to assist students intending to practice family medicine.

**Eliza McMillan Scholarship.** Provides assistance to young women in any of several schools of the university to secure an education.

**Medical Alumni Scholarship Fund.** Awarded on the basis of academic achievement and financial need.

**Edith and Martin Meltzer Scholarship.** Established in 2004 by the Meltzer Family Foundation to honor Dr. Gerald Meltzer's (MD '63) parents, who established the foundation.

**Dr. Charles Miller Jr. and Florence Noland Miller Scholarship.** Established in 2014 to support medical students.

**Roy B. and Viola R. Miller Memorial Fund.** Created in 1963 through the bequest of Roy B. Miller to provide scholarships for medical students.

**The Warren S. and Dorothy J. Miller Scholarship Fund.** Established in 1982 through the bequest of Dorothy J. Miller to provide scholarships for any students engaged in studies leading to the degree of Doctor of Medicine.

**Joseph J. and Ernesta G. Mira Scholarship Fund.** Established in 1988 by Dr. and Mrs. Mira to provide assistance to students from the Alton, Illinois, area. Available to others when there are no students from the Alton/Madison County area.

**George and Elizabeth Ann Neilson Scholarship.** Established by the estate of George and Elizabeth Neilson.

**David and Janine Nelson Scholarship in Medicine.** Established in 2011 by Dr. David Nelson, a 1963 graduate of Washington University School of Medicine, and his wife, Janine.

**Nancy S. Newlin, MD and Henry H. Newlin, JD Scholarship Fund.** Established by Dr. Newlin and her late husband.

**Norland Endowed Scholarship.** Established in 2015 by Dr. Charles C. Norland, a 1959 graduate of Washington University School of Medicine, and Mrs. Dorothy Norland.

**Mr. and Mrs. Spencer T. Olin Fellowships for Women.** Provides for annual financial support to female graduates of an undergraduate institution in the United States in any of several disciplines. Application deadline is February 1.

**Spencer T. and Ann W. Olin Medical Fellowships.** Created in an effort to help fill the continuing shortage of physicians who pursue careers in biomedical research, the awards are primarily for students in the Medical Scientist Training Program.

**Dr. Roy W. Osterkamp Memorial Scholarship Fund.** Established in 2003 by Mrs. Linda Osterkamp Desloge and Mrs. Lila Osterkamp Haberberger, in memory of their father, Dr. Roy W. Osterkamp, DE '36. Preference will be given to a student pursuing a career in a medical field related to dental medicine, such as maxillo-facial surgery. If no student shares this interest, it will be awarded based on need.

**F. Thomas Ott (MD '65) and Mary Miller Ott (MSN '68) Scholarship.** Established in 2010 by Dr. F. Thomas and Mrs. Mary Miller Ott to provide scholarship support to medical students.

**Dr. Sidney F. (Class of '29) and Dora K. Pakula Scholarship.** Established in 2001 by Dr. and Mrs. Lawrence C. Pakula in memory of Dr. Pakula's parents to support student scholarships.

**Mary Langston Parker Scholarship.** Established in 2014 by The Parker Family to honor Dr. Mary Langston Parker, MD '53, professor emerita of preventive medicine and past director of Student Health Services.

**William B. Parker Scholarship.** Established in 1976 by the School of Medicine in honor of William B. Parker's 51 years of service.

**The Robert W. and Elise Hampton Parsons Scholarship Fund.** Established in 2014 by Dr. Robert W. Parsons, MD '54, to support medical students.

**William A. Peck, MD Scholars in Medicine.** Established in 2002 to recognize Dr. Peck's 14 years of service to the Medical Center and Washington University community. University trustees, faculty, staff, alumni and friends honored Dr. Peck with gifts to this scholarship.

**Peterson Group Scholarship.** Established in 2014 by Peterson Group to provide financial support to medical students.

**Philpott Family Scholarship.** Established in 1995 by the Philpott family to provide support for medical students with financial need and excellent academic achievement.

**Pi Beta Phi – Charles Ruggieri Scholarship Fund.** Established in 1985 by the Washington University alumni of the Pi Beta Phi medical fraternity to honor Charles Ruggieri and to assist deserving medical students enrolled in Washington University School of Medicine with the funding of their medical education.

**The Virginia Keck, George M. (MD '32) and George K. (MD '64) Powell Medical Student Scholarship Fund.** Established in 1984 by Mrs. George M. Powell in grateful appreciation for the medical education provided to her husband and son by Washington University School of Medicine, which so positively affected the lives of the Powell families.

**Henry and Louise Reller Scholarship.** To be given to medical students in the name of the parents of Louise Reller.

**Gennaro Resta Scholarship.** Established in 2014 by Dr. Regina M. Resta (Class of 1985) and Dr. Michael A. Kolodziej (Class of 1984) to honor Dr. Resta's father.

**Lyman K. Richardson, MD Scholarship Fund.** Established in 1993 by Mrs. Ellen Richardson to provide scholarship support to medical students.

**John E. Rittmann Scholarship.** Established in 2015 by Dr. John E. Rittman, a 1962 graduate of Washington University School of Medicine.

**Samuel Jennings Roberts Scholarship Fund.** Created to provide scholarships for any students engaged in study leading to the degree of Doctor of Medicine.

**Robert Allen Roblee Scholarship Fund.** Established in 1948 through a gift of Mrs. Joseph H. Roblee for students in the School of Medicine.

**Thomas W. and Elizabeth J. Rucker Scholarship Fund.** Created in 1956 through the bequest of Eugenia I. Rucker, in memory of her mother and father.

**J. Max Rukes Scholarship Fund.** Established in 1987, the fund provides scholarship support to deserving medical school students, with a preference for those who are interested in endocrinology.

**Joseph H. Scharf Scholarship Fund.** Provided in 1949 through the bequest of Dr. Joseph H. Scharf.

**Robert G. and Maxine W. Scheibe Scholarship.** Established in 1999 by Robert G. Scheibe, a 1960 Washington University graduate who also received his medical degree here in 1964 and his wife, Maxine, who is a 1966 graduate of the Washington University School of Nursing.

**William H. and Ella M. Schewe Scholarship.** Established to provide financial assistance to worthy students in the medical school.

**Dr. David Schlessinger Endowed Scholarship.** Created in 2006 by Dr. Dan Longo in honor of his mentor, Dr. Schlessinger, who was a professor of molecular microbiology, professor of genetics and professor of microbiology at Washington University School of Medicine.

**Dr. Gustav and Mrs. Miriam Schonfeld Scholarship.** Established in 2010 by Dr. Gustav and Mrs. Miriam Schonfeld to support medical students. Dr. Schonfeld, MD '60, was past chair of the Department of Internal Medicine and physician-in-chief at Barnes-Jewish Hospital.

**Edna Schrick, MD Scholarship Fund.** Established in 1992 by Dr. Schrick to provide scholarship support.

**Mordecai E. Schwartz Endowed Scholarship.** Established in 2006 by Dr. Mary R. Schwartz, Dr. David Cech and Alexander I. Schwartz in memory of their father, who was committed to the training of future physicians.

**Edward L. Schweich Scholarship.** Established in 2010 by Mr. and Mrs. Henry L. Schweich, in memory of Edward L. Schweich, for medical student scholarship support.

**Senior Merit Scholarship.** Established by an anonymous alumnus of the School of Medicine, it provides a scholarship to a senior student who has earned a distinguished record of academic and personal achievements during the first three years in the medical school.

**Charlie W. Shaeffer Jr. Endowed Scholarship Fund.** Established in 2008 by Charlie Shaeffer (MD '64) and his wife, Claire, for medical students, based on academic merit and/or financial need.

**Dr. John B. Shapleigh Scholarship Fund.** Established in 1926 through the bequest of Dr. John B. Shapleigh and supplemented by contributions from Mrs. Shapleigh and Miss Margaret Shapleigh.

**Alexander Balridge Shaw Scholarship Fund.** Created in 1958 through the bequest of Roy A. Shaw in memory of his father, Dr. Alexander Balridge Shaw.

**William T. Shearer and Lynn Des Prez Diversity Scholarship.** Created by William T. Shearer, MD '70, and his wife, Lynn Des Prez. Scholarships are awarded with a preference for under-represented students.

**Dr. Edward Hiroshi Shigeoka Scholarship Fund.** Created in 1988 by Dorothy F. Shigeoka in memory of her husband, Dr. Edward Hiroshi Shigeoka, to help disadvantaged and deserving students pursue their careers in medicine.

**Ernie Simms Scholarship Fund.** Founded in 1984 by friends, colleagues and former students of Professor Simms in recognition of his contributions to scholarly research and teaching in the Department of Microbiology and Immunology.

**Dr. and Mrs. Vergil N. Slee Endowed Scholarship Fund.** Established in 2012 through a bequest from 1941 graduate of the School of Medicine, Dr. Vergil N. Slee, and his wife.

**Stanley B. Smith, MD Scholarship.** Established in 2001 in memory of Samuel and Dora Smith, Dr. Smith's parents, to support student scholarships.

**Dr. Dwight H. Stone Scholarship.** Established by Mr. Dwayne Stone in honor of his brother, Dr. Dwight H. Stone, a 1959 graduate of the School of Medicine.

**Beulah B. Strickling Scholarship Fund.** Established in 1960 with a bequest from Mrs. Beulah B. Strickling.

**Marleah Hammond Strominger Scholarship.** Established in 1971 by Donald Strominger, MD, and supported by family and friends of Marleah Hammond Strominger. The recipient shall be a motivated student with need for financial assistance.

**Mary and Ernst Stuehrk Scholarship Fund.** Established in 1987 to assist medical students with documented financial need.

**Edwin H. and Virginia M. Terrill Scholarship Fund.** Established in 1964 with the bequest of Dr. Edwin H. Terrill, an alumnus.

**Betty L. Thompson Scholarship Endowment.** Established in 2001 by Anthony Thompson, in honor of his mother, Betty.

**Mildred Trotter Scholarship Fund.** For students with documented financial need, the fund was established in 1979 by Dr. and Mrs. Paul Guttman, and supplemented by former students of Dr. Trotter, as a tribute to her many years of teaching in the Department of Anatomy.

**Hironu Tsuchiya Scholarship Fund.** Created to provide scholarships in the School of Medicine.

**Tuholske-Jonas-Tuholske Medical Scholarship Fund.**

Established in 1974 by Rose T. Jonas in memory of her father, husband and brother. The recipient shall be a senior student preparing to enter the field of surgery, obstetrics and gynecology, or internal medicine.

**Cornelia Van Prooyen, MD Scholarship Fund.** Established in 1987, the fund provides scholarship support and other financial assistance to female medical students.

**George S. and Aspasia N. Vellios Scholarship.** Established by Frank Vellios, MD '46, in honor of his parents. Scholarships are awarded to deserving medical students with financial need.

**Louis H. Waltke and Marie Waltke Memorial Fund for Medical Education.** Created in 1984 to provide scholarships and fellowships at the School of Medicine.

**Dr. Robert A. Weiss Scholarship.** Established by Dr. and Mrs. Robert Weiss.

**George and Irene Wolf Medical Scholarship Fund.** Established by the donors to benefit students in the School of Medicine.

**Pamela F. Gallin Yablon, MD Scholarship.** Established in 2008 by Dr. Pamela F. Gallin Yablon and Mr. Leonard H. Yablon to support medical students.

**Dr. Mitchell and Elaine Yanow Scholarship Fund.** Established in 2002 by the children of Dr. and Mrs. Yanow to honor the memory of their parents and to provide support for deserving medical students.

**George Zografakis Memorial Scholarship Fund.** Created by the family and friends of Dr. Zografakis, a distinguished faculty member in the Department of Surgery.

## Loan Funds

**Auer-Rosenfeld Memorial Loan Fund.** Established by Mrs. Elizabeth Auer to be used for educational loans to students.

**Dr. John C. Boetto Loan Fund.** Established in 1993 by a bequest from Mrs. Josephine D. Boetto as a memorial to her son to provide loans for deserving medical students.

**Otto W. Brandhorst Loan Fund.** Created in 1985 by the estate of Fern Crawford. This fund supports loans to students in the School of Medicine.

**Dr. Harold A. Budke Loan.** Established in 1998 to provide financial assistance to needy and deserving medical students.

**Harold A. Budke, MD, Loan Fund II.** Established in 2001 with a bequest from the estate of Etta Elise Wedemeyer to provide loans to needy and deserving female students who will practice family medicine, internal medicine or obstetrics-gynecology medicine.

**Class of 1947 Loan Fund.** Established in 1996 by members of the class of 1947 in honor of their 50th reunion.

**Jess K. Goldberg Memorial Loan Fund by Ophelia H.**

**Kooden and Violet G. Sachs.** Created in 1970 to provide zero-interest loans for medical students in memory of the donors' brother who passed away while attending medical school.

**Health Professions Student Loan Fund.** Established by federal legislation for medical students with a demonstrated financial need. Loans are available for long terms at favorable rates.

**William Randolph Hearst Medical Scholars Loan Fund.** In 1989, the Hearst Foundation provided funding for a new and innovative loan program which provides interest-free loans to students in their last year of study.

**Ursula Hecker Loan Fund.** Established in 1967 by a bequest from Ursula Lee Hecker for the use and benefit of worthy, deserving and needy medical students.

**Kathy E. Holden Loan Fund.** Established by Mrs. Roland Holden and the Roland and Ruby Holden Foundation in honor of her granddaughter, Kathy E. Holden, and in recognition of W. Edwin Dodson, MD, to support loans to deserving medical students.

**Horncrest Foundation — School of Medicine Loan Fund.** In 1982, the trustees of the Horncrest Foundation approved a proposal on behalf of the School of Medicine to match up to a generous annual cap for five-year loan funds solicited by the school. The campaign was extremely successful and now provides loan funds to students with documented financial need.

**W.K. Kellogg Foundation Loan Fund.** Provides financial assistance to medical students in need of such aid.

**Gustel and Edith H. Kiewitt Scholarship Loan Fund.** Provides loan funds for medical students.

**Medical Scholars Loan Program.** Established in 1985 by members of the William Greenleaf Eliot Society, this fund provides an interest-free source of long-term student loans. Annual contributions from alumni and friends support this perpetual and growing resource upon which current and future medical students will draw.

**George W. Merck Memorial Loan Fund.** Established in 1959 by The Merck Company Foundation, the original purpose of the loan was modified in 1983 to provide loans to graduating students which would help bridge the transition from student to resident physician.

**Edward F. Musgrave Loan Fund.** Established in 1981 by Mrs. Jeannette L. Musgrave. The fund supports medical student loans.

**Dr. Lloyd L. Penn and Goldie H. Penn Student Loan.** Dr. Penn, MD '33, established the fund in 1977 to aid well-qualified and deserving students.



**Perkins Student Loan.** A federal program (formerly National Direct Student Loan) to provide loans to students with financial need. Permits repayment over an extended period at a favorable interest rate.

**Dr. William C. and Elva Pratt Loan Fund.** Established in 1982 for medical students with demonstrated financial need.

**G.H. Reinhardt Memorial Scholarship Loan Fund.** Established in 1947 through the bequest of G.H. Reinhardt.

**Aline Rixman Loan Fund.** Created in 1940 by William Rixman in memory of his wife, the fund is used to alleviate unexpected financial emergencies of medical students.

**James L. and Dorothy Rouner Loan Fund.** Established in 1997 by Dr. James and Mrs. Dorothy Rouner to be used for medical students pursuing a career in primary care—general internal medicine.

**Caroline O. Schlesinger Loan Fund.** Established in 1969 to provide financial support for medical students.

**School of Medicine Student Loan Fund.** Established to make loans to students with documented financial needs.

**Washington University Medical Center Alumni Association Loan Fund.** Provides emergency loans to medical students.

**The Alan A. and Edith L. Wolff Loan Fund.** Established in 1993 by Mrs. Edith L. Wolff to provide loans to students with demonstrated financial need who are in their final year of study for the Doctor of Medicine degree.

## Health Professions

The following policy applies to students pursuing graduate/professional training in Applied Health Behavior Research (p. 433), Audiology and Communication Sciences (p. 433), Biology and Biomedical Sciences (p. 433), Biomedical Engineering (p. 433), Biostatistics (p. 433), Clinical Investigation (p. 434), Medical Physics (<https://radonc.wustl.edu/education/master-of-science-in-medical-physics/>), Occupational Therapy (p. 434), Physical Therapy (p. 434), Population Health Sciences (p. 434), and Public Health (p. 434).

## General Information

### Registration, Payments, and Withdrawal & Refunds Policy

The university billing system provides a central financial account against which most student expenses incurred at the university will be posted, including but not limited to tuition, housing charges, parking and library fines. This policy, when referring to tuition and other charges, includes any and all charges posted to this account.

All payments of tuition and other university charges are due and payable on the dates specified in the published calendars of the programs in the School of Medicine. Failure of a student to register when required, and pay tuition and other charges incurred on or before the date specified in the published calendar, may result in a late fee of \$50 to be added to the amount due. The late fee may be imposed seven days after the due date if full payment has not been received. Tuition and other charges are usually payable twice a year, at the start of the academic year, and again at the middle of the academic year, as listed on the schedule on the academic calendar.

In addition to the \$50 late fee, any payment due from the student and not paid by the specified date will accrue interest at the current market rate in effect on the first business day of the month in which the payment is due. This fee will be imposed on any accounts not paid in full within 30 days of the due date. Any amount not paid when due (plus accrued interest thereon) must be paid in full within three months of the due date to avoid potential suspension from classes, unless a deferred payment is approved by the registrar due to extenuating circumstances.

If a student fails to make payments within three months of the original due date, the school will not release the student's academic record, grade reports or transcript, pending settlement of the unpaid account. A student who has not satisfied all of their delinquent financial obligations to Washington University (e.g., tuition, university housing, parking) one month before the end of the academic year will not be allowed to progress to the next academic year, nor can they be issued a diploma.

Federal financial aid funds for the next academic year cannot be disbursed until all prior year balances are paid in full.

Students who rely on financial aid funds to meet their obligations should submit their applications for processing according to application deadlines published by the Office of Student Financial Planning. Deadlines allow for receipt of financial aid funds by payment due dates if applications are filed by the deadline. The Office of Student Financial Planning will assist students with loan applications and financial planning upon request.

A student who withdraws or takes a leave of absence from the school will receive a pro rata refund of tuition and appropriate fees. The refund will be based on the ratio of the class days enrolled (from the first day of classes to the termination date) to the total number of class days in the term for which tuition and fees were paid. It is understood that the date on which a student formally notifies the Registrar's Office in writing of the decision to withdraw or take a leave of absence from the School of Medicine shall be regarded as the termination date, with no retroactive clause to be accepted. A prospective date will be accepted, however. If tuition and fees were paid entirely or in part by financial aid from the school, the refund will be applied first to the total repayment of the accounts from which financial aid was drawn, with any remaining refund balance given to the

student. Financial aid received in excess of the costs of tuition and fees must be refunded by the student to the school on the same pro rata basis as calculated for the tuition refund outlined above, per "Return of Title IV" federal guidelines. Any questions about these policies may be directed to either the Office of the Registrar or Student Financial Planning.

## Standards for Satisfactory Academic Progress for Financial Aid Eligibility

**All Non-MD Students:** The minimum GPA requirements needed to maintain eligibility for Satisfactory Academic Progress (SAP) are dictated by the specific program of study. In each case, per the requirements of 34 C.F.R. 668.34(a)(4)(ii), the federal student aid program requires a minimum of a C average to maintain eligibility for aid, but an individual degree or certificate program may have a higher minimum GPA for federal Satisfactory Academic Progress. If a student's grades fall below the required GPA for the program when the SAP review is performed, the student is not considered to be maintaining SAP. Students enrolled in various School of Medicine degree programs should refer to the specific policies of their primary program: Applied Health Behavior Research (<https://crtc.wustl.edu/programs/degrees/ahbr/>), Audiology and Communication Sciences (<https://pacs.wustl.edu/>), Biology and Biomedical Sciences (p. 433), Biomedical Engineering (p. 433), Biostatistics (<https://biostatistics.wustl.edu/>), Clinical Investigation (<https://crtc.wustl.edu/programs/>), Medical Physics (<https://radonc.wustl.edu/education/master-of-science-in-medical-physics/>), Genetic Epidemiology (<https://biostatistics.wustl.edu/education/>), Occupational Therapy (<http://www.ot.wustl.edu/>), Physical Therapy (<https://pt.wustl.edu/>), and Population Health Sciences (<http://www.mphs.wustl.edu/>).

SAP is evaluated at the end of each semester or term. To be considered to be maintaining SAP and thus be eligible for federal financial aid, a student must maintain the program's minimum program requirements for cumulative GPA and pace (i.e., credit earned for at least 67% of the credits attempted). The degree must also be completed within the maximum time frame allowed for the program (i.e., no more than 150% of the credits required). For example, if the program requires 120 credits to complete, the student must be able to complete the program by attempting no more than 180 credits. To determine how many credits are required to complete the program, the student should consult the school's *Bulletin*. If the student cannot complete the program without attempting more than 150% of the credits required, the student is not considered to be maintaining SAP.

Students who fail to meet SAP requirements after one semester will be placed on a "warning." Students on a warning will continue to be eligible to receive aid for the following semester or term. Students not meeting SAP at the end of the warning will be notified of their loss of aid eligibility by the Office of Student Financial Planning via their Washington University e-mail address. A student who becomes ineligible for aid by

failure to meet SAP requirements may also appeal to reestablish aid eligibility. The student's appeal will be reviewed by the school's dean's office and the Office of Student Financial Planning. An appeal must contain the extenuating circumstances surrounding the failure to meet SAP, such as illness, injury, or other circumstances beyond the student's control.

## Program Information

### Applied Health Behavior

The Applied Health Behavior programs follow the standard tuition rate for graduate programs offered through the School of Medicine, which increases incrementally each year. Additional information may be obtained by contacting the Applied Health Behavior program manager ([ahbr@email.wustl.edu](mailto:ahbr@email.wustl.edu)).

### Audiology and Communication Sciences

For more information about the Audiology and Communication Sciences program, including tuition and fees, please visit the Audiology and Communication Sciences (<https://pacs.wustl.edu/admissions/tuition-and-financial-aid/>) website.

### Biological and Biomedical Sciences

Students admitted to the Roy and Diana Vagelos Division of Biology & Biomedical Sciences (DBBS) graduate programs are guaranteed full stipend and tuition support contingent upon satisfactory performance. The stipend for the 2022-23 academic year is \$34,500. In addition, health coverage, disability, and life insurance are also provided. Please visit the DBBS website (<http://dbbs.wustl.edu/Pages/>) for additional information.

### Biomedical Engineering

For more information about the Biomedical Engineering (<http://bulletin.wustl.edu/grad/engineering/biomedical/>) program, including tuition and fees, please visit the McKelvey School of Engineering *Bulletin*.

### Biostatistics

For tuition information, please visit our Biostatistics website (<https://biostatistics.wustl.edu/education/master-of-science-in-biostatistics-msibs/tuition-and-financial-aid/>), contact the program manager at 314-362-1384, send an email to [biostat-msibs@email.wustl.edu](mailto:biostat-msibs@email.wustl.edu), or write to the following address:

MSIBS Program  
Division of Biostatistics  
CB 8067  
660 S. Euclid Ave.  
St. Louis, MO 63110-1093  
Fax: 314-362-2693

## Clinical Investigation

MSCI programs follow the standard tuition rate for graduate programs offered through the School of Medicine, which increases incrementally each year. MSCI courses are eligible for the Washington University Human Resources Tuition Assistance Program for qualifying staff and faculty. Visit the Clinical Research Training Center (<https://crtc.wustl.edu/courses/class-list/tuition/>) website for additional tuition information.

## Doctor of Philosophy

For more information about the Doctor of Philosophy program, including tuition and fees, please visit the website of the Office of Graduate Studies, Arts & Sciences (<https://gradstudies.artsci.wustl.edu/>).

## Genetic Epidemiology

For tuition information, please visit the Division of Biostatistics website (<https://biostatistics.wustl.edu/education/>), contact the program manager at 314-362-1384, send an email to [biostatmsibs@email.wustl.edu](mailto:biostatmsibs@email.wustl.edu), or write to the following address:

MSIBS Program  
Division of Biostatistics  
CB 8067  
660 S. Euclid Ave.  
St. Louis, MO 63110-1093  
Fax: 314-362-2693

## Occupational Therapy

The total cost of tuition for the incoming MSOT class in fall 2022 is \$102,000. This breaks down to \$17,000 x five semesters and \$8,500 x two fieldwork experiences.

The total cost of tuition for the incoming OTD class in fall 2022 is \$135,150. This breaks down to \$17,000 x six semesters, \$8,500 x two fieldwork experiences, and \$16,150 for one doctoral capstone.

Part-time tuition is \$1,275 per credit unit.

## Physical Therapy

- Professional DPT Curriculum = \$22,250 per semester
- PhD in Movement Science Curriculum = \$28,150 per semester

## Population Health Sciences

For more information about the Population Health Sciences program (<http://mphs.wustl.edu/>), including tuition and fees, please visit the Population Health Sciences website (<http://mphs.wustl.edu/Admissions/Tuition/>).

## Public Health

For more information about the Public Health program — including tuition, fees, and financial aid — please visit the website of the Office of Graduate Studies, Arts & Sciences (<https://gradstudies.artsci.wustl.edu/>).

## Joint Programs

The following policy applies to students pursuing graduate/professional training in the following joint programs: MD/PhD (p. 435), MD/MSCI (p. 435), MD/MPHS (p. 435) and MD/MPH (p. 435).

## General Information

### Registration, Payments, and Withdrawal & Refunds Policy

The university billing system provides a central financial account against which most student expenses incurred at the university will be posted, including but not limited to tuition, housing charges, parking and library fines. This policy, when referring to tuition and other charges, includes any and all charges posted to this account.

All payments of tuition and other university charges are due and payable on the dates specified in the published calendars of the programs in the School of Medicine. Failure of a student to register when required, and pay tuition and other charges incurred on or before the date specified in the published calendar, may result in a late fee of \$50 to be added to the amount due. The late fee may be imposed seven days after the due date if full payment has not been received. Tuition and other charges are usually payable twice a year, at the start of the academic year, and again at the middle of the academic year, as listed on the schedule on the academic calendar.

In addition to the \$50 late fee, any payment due from the student and not paid by the specified date will accrue interest at the current market rate in effect on the first business day of the month in which the payment is due. This fee may be imposed on any accounts not paid in full within 30 days of the due date. Any amount not paid when due (plus accrued interest thereon) must be paid in full within three months of the due date to avoid potential suspension from classes, unless a deferred payment is approved by the registrar due to extenuating circumstances.

If a student fails to make payments within three months of the original due date, the school will not release the student's academic record, grade reports or transcript, pending settlement of the unpaid account. A student who has not satisfied all of their delinquent financial obligations to Washington University (e.g., tuition, university housing, parking) one month before the end of the academic year will not be allowed to progress to the next academic year, nor can they be issued a diploma.

Federal financial aid funds for the next academic year cannot be disbursed until all prior year balances are paid in full.

Students who rely on financial aid funds to meet their obligations should submit their applications for processing according to application deadlines published by the Office of Financial Aid. Deadlines allow for receipt of financial aid funds by payment due dates if applications are filed by the deadline. The Office of Student Financial Aid will assist students with loan applications and financial planning upon request.

A student who withdraws or takes a leave of absence from the school will receive a pro rata refund of tuition and appropriate fees. The refund will be based on the ratio of the class days enrolled (from the first day of classes to the termination date) to the total number of class days in the term for which tuition and fees were paid. It is understood that the date on which a student formally notifies the Registrar's Office in writing of the decision to withdraw or take a leave of absence from the School of Medicine shall be regarded as the termination date, with no retroactive clause to be accepted. A prospective date will be accepted, however. If tuition and fees were paid entirely or in part by financial aid from the school, the refund will be applied first to the total repayment of the accounts from which financial aid was drawn, with any remaining refund balance given to the student. Financial aid received in excess of the costs of tuition and fees must be refunded by the student to the school on the same pro rata basis as calculated for the tuition refund outlined above, per "Return of Title IV" federal guidelines. Any questions about these policies may be directed to either the Office of the Registrar or Financial Aid.

## Program Information

### Doctor of Medicine and Doctor of Philosophy: MD/PhD (MSTP)

All MSTP students receive financial support in the form of a stipend (currently \$34,500 per year), health coverage, disability and life insurance, and full tuition remission for both the MD and PhD phases of training. Individuals who are awarded an NIH National Research Service Award individual fellowship receive an additional \$5,000 a year for the duration of the award. Please visit the MSTP website (<http://mstp.wustl.edu/Pages/>) for more information.

### Doctor of Medicine and Master of Science in Clinical Investigation: MD/MSCI

MSCI programs follow the standard tuition rate for graduate programs offered through the School of Medicine, which increases incrementally each year. MSCI courses are eligible for the Washington University Human Resources Tuition Assistance Program for qualifying staff and faculty. Visit the Clinical Research Training Center (<https://crtc.wustl.edu/courses/class-list/tuition/>) website for additional tuition information.

For information about tuition for the Medicine program, please visit the Medical Students section (p. 417) of this page.

### Doctor of Medicine and Master of Population Health Sciences: MD/MPHS

For more information about the Population Health Sciences program (<http://mphs.wustl.edu/Academics/MD-MPHS/>), including tuition and fees, please visit the Master of Population Health Sciences website.

For information about tuition for the Medicine program, please visit the Medical Students section (p. 417) of this page.

### Doctor of Medicine and Master of Public Health: MD/MPH

For more information about the MD/MPH program (<http://bulletin.wustl.edu/brownschool/financial/>), including tuition and fees, please visit the Brown School *Bulletin*.

For information about tuition for the Medicine program, please visit the Medical Students section (p. 417) of this page.

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