

2024–25 Bulletin

School of Medicine



Washington University in St. Louis

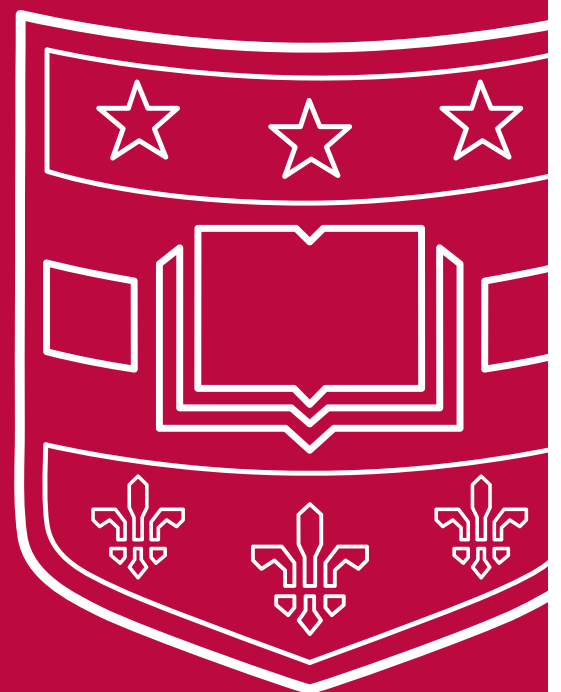


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About This Bulletin

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 *School of Continuing & Professional Studies Bulletin* is the catalog of the School of Continuing & Professional Studies (CAPS), 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 CAPS.

The *2024-25 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:

—The 2024-25 Bulletin PDFs are coming soon!—

- Architecture & Urban Design Bulletin (PDF)
- Art Bulletin (PDF)
- Arts & Sciences Bulletin (PDF)
- Business Bulletin (PDF)
- Engineering Bulletin (PDF)
- Law Bulletin (PDF)
- Medicine Bulletin (PDF)
- Social Work & Public Health Bulletin (PDF)
- School of Continuing & Professional Studies Bulletin (undergraduate & graduate) (PDF)

The degree requirements and policies listed in the *2024-25 Bulletin* apply to students entering Washington University during the 2024-25 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, 2024). To view a list of changes that have taken place after that date, visit the Program & Policy Updates page. 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 1, 2025. In the interim, semester course offerings will be found in Washington University's Course Listings; 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.

For the most current information about registration and available courses, visit WebSTAC and Course Listings, respectively. Please email the Bulletin editor, Jennifer Gann, (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.

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
EGS EGS	Engineering Graduate Studies

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 D	Interdisciplinary Studies
I52 IMSE	Institute of Materials Science & Engineering
I53 DCDS	Division of Computational and Data Sciences
I60 BEYOND	Beyond Boundaries

L (Arts & Sciences)

Code	Name
L01 Art-Arch	Art History and Archaeology
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 EEPS	Earth, Environmental, 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
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
L81 EALC	East Asian Languages & Cultures
L82 EnSt	Environmental Studies
L84 Lw St	Legal Studies
L85 MedH	Medical Humanities
L86 PBPM	Biological & Physical Sciences for PBPM Study
L87 SDS	Statistics and Data 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
LPH LPHS	Public Health and Society

M (Medicine)

Code	Name
M01 OT	Occupational Therapy Program
M02	Physical Therapy Program-Grad PhysTher
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	Internal Medicine Medicine
M26 FamMed	Family Medicine
M27 EMED	Emergency Medicine
M30 MolMB	Molecular Microbiology
M35 Neurol	Neurology
M40	Neurological Surgery NeurSurg
M45 ObGyn	Obstetrics and Gynecology
M50 Ophth	Ophthalmology and Visual Sciences
M55 Oto	Otolaryngology
M60 Path	Pathology
M65 Peds	Pediatrics
M70 MolBio/ Pha	Molecular Biology and Pharmacology
M75 CellBio	Cell Biology and Physiology
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	Medical Physics MedPhys
M92 RadOnc	Radiation Oncology

M93 NrsSci	Nursing Science
M95 Surgery	Surgery
M96 Ortho	Orthopedic Surgery
M99 Ind Stdy	Independent Study

S (Social Work and Public Health)

Code	Name
S10 SWCR	Core
S15 SWCR	MSW Foundation
S20 SWHS	Theory, Problems & Issues
S30 SWDP	Practice Methods
S31 SWDP	Practice Methods
S40 SWSP	Social Policy
S48 SWSP	Social Policy
S50 SWSA	Practice Methods
S55 MPH	Master of Public Health (MPH)
S60 SWCD	Practice Methods
S65 SWCD	Practice Methods
S70 SWPR	MSW Practicum
S81 SKILL	Skill Labs
S90 SWDT	Brown PhD
S91 PSTM	Post-Master Certificate

T (Engineering - Joint Program & Sever Institute)

Code	Name
T11 JCS	Joint Introduction to Computing
T54 PRJM	Project Management
T55 ETEM	Engineering Management
T64 CNST	Construction Management
T71	Health Care Operations
HLTHCARE	
T81 INFO	Information Management
T83 CYBER	Cybersecurity Management
T92 HCO	Health Care Operations (Online)
T93 CSM	Cybersecurity Management (Online)
T95 EMGT	Engineering Management (Online)

U (School of Continuing & Professional Studies)

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 German	Germanic Languages and Literatures
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 ComplLit	Comparative Literature
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
U71 DATA	Data Studies
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 HCARE	Health Care
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
W75 LAW	Law
W76 LAW	Law
W77 LAW	Law
W78 LAW	Law
W79 LAW	Law
W80 OLAW	Law Onlin

X (Design & Visual Arts)

Code	Name
X10 XCORE	Design & Visual Arts - Core
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) with specifics of the needed information.

2023-2024

The HTML archives of the 2023-24 *Bulletin* are coming soon.

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Business Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Law Bulletin (HTML) (PDF)
- Medicine Bulletin (HTML) (PDF)
- Social Work & Public Health Bulletin (HTML) (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- School of Continuing & Professional Studies Bulletin (HTML: Undergraduate, Graduate) (PDF)

2022-2023

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Business Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Law Bulletin (HTML) (PDF)
- Medicine Bulletin (HTML) (PDF)
- Social Work & Public Health Bulletin (HTML) (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- University College Bulletin (HTML: Undergraduate, Graduate) (PDF)

2021-2022

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Business Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Law Bulletin (HTML) (PDF)
- Medicine Bulletin (HTML) (PDF)
- Social Work & Public Health Bulletin (HTML) (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- University College Bulletin (HTML: Undergraduate, Graduate) (PDF)

2020-2021

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Business Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Law Bulletin (HTML) (PDF)
- Medicine Bulletin (HTML) (PDF)
- Social Work & Public Health Bulletin (HTML) (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- University College Bulletin (HTML: Undergraduate, Graduate) (PDF)

2019-2020

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Business Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Law Bulletin (HTML) (PDF)
- Medicine Bulletin (HTML) (PDF)
- Social Work & Public Health Bulletin (HTML) (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- University College Bulletin (HTML: Undergraduate, Graduate) (PDF)

2018-2019

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Law Bulletin (HTML) (PDF)
- Medicine Bulletin (HTML) (PDF)

- Social Work & Public Health Bulletin (HTML) (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- University College Bulletin (HTML: Undergraduate, Graduate) (PDF)

2017-2018

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Law Bulletin (HTML) (PDF)
- Medicine Bulletin (HTML) (PDF)
- Social Work & Public Health Bulletin (HTML) (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- University College Bulletin (HTML: Undergraduate, Graduate) (PDF)

2016-2017

- Graduate Architecture & Urban Design Bulletin (HTML) (PDF)
- Graduate Art Bulletin (HTML) (PDF)
- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Graduate Engineering Bulletin (HTML) (PDF)
- Medicine Bulletin (PDF)
- Undergraduate Bulletin (HTML) (PDF)
- University College Bulletin (HTML: Undergraduate, Graduate) (PDF)

2015-2016

- Graduate Arts & Sciences Bulletin (HTML) (PDF)
- Medicine Bulletin (PDF)
- Undergraduate Bulletin (HTML) (PDF)

2014-2016

- University College Bulletin (undergraduate & graduate) (PDF)

2014-2015

- Medicine Bulletin (PDF)
- Undergraduate Bulletin (HTML) (PDF)

2013-2014

- Medicine Bulletin (PDF)
- Undergraduate Bulletin (HTML) (PDF)

2012-2015

- Graduate Arts & Sciences Bulletin (PDF)

2012-2014

- University College Bulletin (undergraduate & graduate) (PDF)

2012-2013

- [Medicine Bulletin \(PDF\)](#)
- [Undergraduate Bulletin \(HTML\) \(PDF\)](#)

2011-2012

- [Medicine Bulletin \(PDF\)](#)
- [Undergraduate Bulletin \(HTML\) \(PDF\)](#)

2010-2011

- [Medicine Bulletin \(PDF\)](#)
- [Undergraduate Bulletin \(PDF\)](#)

2009-2012

- [Graduate Arts & Sciences Bulletin \(PDF\)](#)

2009-2010

- [Medicine Bulletin \(PDF\)](#)

2008-2010

- [Undergraduate Bulletin \(PDF\)](#)

2008-2009

- [Medicine Bulletin \(PDF\)](#)

2006-2009

- [Graduate Arts & Sciences Bulletin \(PDF\)](#)
and accompanying 2008 Update (PDF)

2006-2008

- [Undergraduate Bulletin \(PDF\)](#)

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 page of our website.

Enrollment by School

For enrollment information, 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 endorsed 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 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 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 2024

College of Arts & Sciences, McKelvey School of Engineering, Olin Business School, Sam Fox School of Design & Visual Arts, and the School of Continuing & Professional Studies

Date	Day	Description
August 26	Monday	First day of classes
September 2	Monday	Labor Day (no classes)
October 5-8	Saturday-Tuesday	Fall Break (no classes)
November 27-December 1	Wednesday-Sunday	Thanksgiving Break (no classes)
December 6	Friday	Last day of classes
December 9-11	Monday-Wednesday	Reading days
December 12-18	Thursday-Wednesday	Final exams

Spring Semester 2025

College of Arts & Sciences, McKelvey School of Engineering, Olin Business School, Sam Fox School of Design & Visual Arts, and the School of Continuing & Professional Studies

Date	Day	Description
January 13	Monday	First day of classes
January 20	Monday	Martin Luther King, Jr. holiday (no classes)
March 9-16	Sunday-Sunday	Spring Break (no classes)
April 25	Friday	Last day of classes
April 28-30	Monday-Wednesday	Reading days
May 1-7	Thursday-Wednesday	Final exams

Commencement

Date	Day	Description
May 12	Monday	Class of 2025 Commencement

Summer Semester 2025

Date	Day	Description
May 19	Monday	First Summer Session begins
May 26	Monday	Memorial Day (no classes)
July 4	Friday	Independence Day (no classes)
August 14	Thursday	Last Summer Session ends

Washington University recognizes the individual student's choice in observing religious holidays (PDF). Students are encouraged to make arrangements with instructors to complete work missed due to religious observance. 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 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 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.

Medical Student Support Services. For information about Medical Student Support Services, please visit the School of Medicine website.

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 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 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 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 or send an email to 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.

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 to file a report.

The Writing Center. The Writing Center — a free service — offers writing support 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 are preferred and can be made online, but walk-ins will be accepted if tutors are available.

Student Health and Well-Being Services, Danforth Campus

The Habif Health and Wellness Center provides medical, psychiatric, and health promotion services for undergraduate and graduate students on the Danforth Campus. Please visit the Habif Health and Wellness Center website 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.

Medical Services

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, sports medicine, travel medicine, and sexual health services. Psychiatry Services staff provide ongoing medication management for students to address their mental health concerns. 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 health insurance plans that have met waiver criteria for the Student Health Insurance Plan 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.

Appointments are also available for the assessment and referral of students struggling with substance use.

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. Some tests can be performed in house. 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 TB test in the past six months is required for students entering the university who screen positive on the TB questionnaire found on the student portal. 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, the HPV vaccine series, the meningitis B vaccine, and the varicella vaccine. Medical history forms 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 immunization requirements and deadlines.

Health Promotion Services

Health Promotion Services staff and Peer Health Educators provide free programs and risk reduction information related to mental health, sexual health, alcohol/other drugs, and community care. For more information, visit the Zenker Wellness Suite in Sumers Recreation Center, consult the Health and Wellness Digital Library, follow Habif on Instagram (@washu_habif), and/or email 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.

Center for Counseling and Psychological Services (CCPS)

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 mental health support, students should access TimelyCare.

Located in the Habif Health and Wellness Center, CCPS is staffed by licensed professional staff members who work with students to resolve personal and interpersonal difficulties. These may include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. Services include individual, group, and couples counseling; crisis counseling; and referral for off-campus counseling when students' needs can be better met outside of CCPS. Providers also offer self-help programs, including Therapy Assistance Online (TAO). All full-time students who pay the university health and wellness fee as part of their tuition are eligible for services. Visit the CCPS website or call 314-935-6695 to schedule an appointment during business hours. For additional information, visit the CCPS website or send an email to ccpscoordinator@wustl.edu.

Important Information About Health Insurance and Fees for Danforth Campus Students

All full-time, degree-seeking Washington University students are automatically enrolled in the Student Health Insurance Plan upon completion of registration. 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 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. In addition, WashU has a health and wellness fee designed to improve the health and well-being of the campus community. It is assessed by the university, and it is entirely separate from health insurance. It covers a membership to the Sumers Recreation Center, health education, prevention efforts, and other benefits, including no-cost counseling visits.

Student Health Services, Medical Campus

For information about student health services on the Medical Campus, please visit the Student & Occupational Health Services page 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, extensive lighting initiatives based on Crime Prevention Through Environmental

Design (CPTED) practices, 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 student walking/mobile escort service known as "Bear Patrol" 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, 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.

In compliance with the Campus Crime Awareness and Security Act of 1990, Washington University publishes an annual report 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 of the Washington University Operations & Facilities Management Department.

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 and on the university's Compliance and Policies page. 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.

Courses and Credit

Academic Calendar

Washington University in St. Louis primarily follows a standard semester-based academic calendar: a fall and spring semester of approximately 16 weeks, including sessions of half-semester lengths and intersessions beginning before the term start date, and a summer term of 13 weeks, including sessions of half-term length, an intersession beginning before the term start date, and 3-, 5- and 8-week lengths. The Doctor of Medicine program follows a yearlong calendar supporting modular curriculum delivery.

Credit Measure

Credit hours for undergraduate and graduate programs are awarded as "units." A semester-long 3-unit undergraduate lecture class may meet three times per week for 50 minutes per session or twice per week for 80 minutes per session. Teaching and learning take many forms; online and hybrid classes require considerable time in the form of digital engagements such as discussion board activities, asynchronous webinar-type instruction or other online interactions. For all modalities of learning, the University assigns 3 units of credit when at least 9 full hours of standard academic work per week are expected of students.

Washington University credit for School of Law programs on the semester calendar is awarded in credit hours as outlined by the "American Bar Association (ABA) Standards and Rules of Procedure for Approval of Law Schools" document, further noted on the School of Law website.

Courses in the Washington University School of Medicine MD program are scheduled in weeks, and credit is awarded as credit hours such that each week of instruction is valued at 1 unit of credit. A week of instruction represents at least 45 hours of direct instruction and out-of-class related academic work.

For the full policy, visit the Office of the Provost website.

Email Communication

Email is the mechanism for official communication with students at Washington University. Students are expected to read email communications from the university in a timely fashion.

All students will be individually assigned a University email address, which will be maintained in the University email directory. Official University communications will be sent to the student's University email address in order to ensure such communications reach the intended recipient.

With the exception of School of Medicine students, a student may have email forwarded from their assigned University email address to another email address of the student's choice. School of Medicine students are prohibited from forwarding their University-assigned email address to an email address external to the University other than @bjc.org and @va.gov email domains. Students who choose to have email forwarded to another email address do so at their own risk. The University is not responsible for email forwarded to any other email address. A student's failure to read official University communications sent to the student's University email address does not absolve the student of responsibility for awareness of and compliance with the content of the official communication. Faculty and administrators should use a student's University email address when communicating via email with the student. This policy will ensure that all students will be able to comply with course and other requirements communicated to them by email from course instructors and administrators.

Graduate Student Academic Integrity Policies

Authority of Schools Over Graduate and Graduate Professional Students

1. Each school at the university may establish an academic integrity officer and/or a panel to hear and decide cases of alleged academic or professional misconduct by its graduate or graduate professional students. Schools that so choose are required to create procedures to govern the process of investigating and adjudicating the complaints filed.
 - a. The school dean, or a designee, determines the composition of such a panel and the scope of the panel's authority, which will not exceed the parameters set out immediately below.
 - b. The panel has authority to impose or recommend appropriate sanctions to the school dean, including suspension or expulsion, if academic or professional misconduct is determined.
 - c. Appeals of decisions made by an academic and professional integrity panel of a school may be made to the school dean, whose decision is final. This includes decisions of a school's academic and professional integrity panel, where the panel is vested with such authority, and the panel's decision is to impose the sanctions of suspension or expulsion. Schools are permitted, but not required, to establish an intermediate level of appeal that must be completed before a final appeal to the dean.
 - d. Except for cases falling within the immediately preceding sub-bullet, any appeal from a decision of a dean of a school to suspend or expel a student will be made in accordance with the provisions of Section VI of the Code.

2. If a school does not establish an academic integrity officer or panel or if an established officer or panel fails to function, complaints of academic or professional misconduct against graduate or graduate professional students may be heard by Academic Integrity in the Office of the Provost, the Academic Integrity Board, or the Student Conduct Board.

Source: Washington University Student Conduct Code IVA.6

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 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 Coordinators

Chalana Ferguson, Associate Vice Chancellor, Office of Institutional Equity
Phone: 314-935-2846
chalana.ferguson@wustl.edu

Gillian Boscan, Director, Investigations and Conflict Resolution,
Office of Institutional Equity
Phone: 314-935-1139
oie-investigations@wustl.edu; gillian.boscan@wustl.edu

Office: The Link in the Loop
Address: 621 N. Skinker Blvd., Suite 300, St. Louis, MO 63130

WashU Confidential Concern Reporting Portal

Title IX Coordinator

Jessica Kennedy, Director & Title IX Coordinator, Office of the
Provost
Phone: 314-935-3118
jwkennedy@wustl.edu

Office: Umrath Hall, Room 001
Address: One Brookings Drive, MSC 1175-0153-0B, St. Louis, MO
63130

Inquiries or complaints regarding civil rights may also be submitted 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; or by calling 800-421-3481.

Statement of Intent to Graduate

Students are required to file an Intent to Graduate via WebSTAC 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.

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.

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.

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.

Student Conduct

The Washington University in St. Louis Student Conduct Code ("the Code") sets forth community standards and expectations for university students. These community standards and expectations are intended to foster an environment conducive to working, learning, and inquiry. Each student is held to the expectations outlined in the Code.

Freedom of thought and expression as well as respect for different points of view are essential to the university's academic mission. Nothing in the Code should be construed to limit the lawful, free, and open exchange of ideas and viewpoints, even if that exchange proves to be offensive, distasteful, or disturbing to some. However, such speech must conform to university policies.

The Code also describes general procedures that may be used to ensure that these standards and expectations are upheld by all students. The university is committed to ensuring that students adhere to university policies, take responsibility for their actions, and recognize how their choices may affect others.

Complaints against students that include allegations of sex-based discrimination — including sexual harassment, sexual assault, dating violence, domestic violence and stalking — in violation of the Student Conduct Code are governed by the procedures found on the Gender Equity and Title IX Compliance Office website. These procedures are also available in hard copy from the Title IX Coordinator or the director of the Office 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, visit the Student Affairs website.

For more information, visit the Student Conduct and Community Standards website.

Student Financial Responsibility

Communication

Washington University in St. Louis uses University-assigned email accounts and University-supported systems for communication with students and authorized users. Washington University will also contact students via personal email addresses, cellular phone numbers, or wireless devices from time to time regarding the Student Account or other general information. Students are responsible for reading University communications in a timely manner.

Promise to Pay

When students register for any course at or receive any service from Washington University in St. Louis, they accept full responsibility to pay all tuition, fees, and other associated charges assessed as a result of registration and/or receipt of services such as housing, dining, and other University-provided items that exceed financial support provided

by the University, the University payment plan, and/or third parties by the scheduled due dates shown on the WebSTAC student account. Failure to attend class or receive a bill does not absolve students of financial responsibility as described above.

Failure to Pay

University policies regarding Student Accounts (including payment options, late fees, holds, and refunds) are published on the University's Financial Services website. If a student fails to pay the Student Account balance by the scheduled due dates, the University will place a financial hold preventing the student from registering for future courses and could assess a late fee on the past due portion until the past due amount is paid in full. Failure to pay will result in a Delinquent Student Receivable Account. Delinquent Student Accounts will be referred to University's Collection Services department. Collection Services may report the Delinquent Student Account to one or more national credit bureaus, refer the Delinquent Student Account to a third-party collection agency, and pursue all legal and equitable remedies to collect the monies owed to the University.

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 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 is available on the Human Resources website.

Medical Information

Entering students in Danforth Campus programs 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 student portal on the Habif Health and Wellness Center website. All students who have completed the registration process should access the student portal on the website. Students should fill out the form and follow the instructions for transmitting it to the Habif Health and Wellness Center. Student information is treated securely and confidentially.

Entering students in Medical Campus programs must follow the requirements as outlined on the Washington University School of Medicine Student Health Services website.

Time Away and Reinstatement

Degree-seeking students may be eligible to request a leave of absence for health or other personal reasons (e.g., family, military service, professional obligations, religious mission). The mechanism and process are described on the Office of the University Registrar's website. Such leaves may exceed no more than two years from the effective date of the leave; individual programs' policies may limit students to shorter leaves. Students must verify their school and program policies and any other relevant requirements related to immigration or financial aid/support policies. Students who have not requested and received approval for reinstatement after two years will have their records withdrawn.

Required enrollment reporting to the federal government will reflect a leave of absence for 180 days after it is enacted; any longer duration of institutional leave is recorded in their systems as a withdrawal.

Students on approved leave of absence will have their Washington University email addresses remain active, and they will retain access to WebSTAC to review their records. Access to other University privileges such as recreation facilities and libraries as well as participation in activities are paused during a leave of absence.

Students are expected to request reinstatement to in-progress status to resume studies via the process outlined on the Office of the University Registrar's website. Depending on the nature of their leave, additional steps or documentation may be required and must be provided to appropriately consider the request. Students whose records have been withdrawn as a result of two years of inactivity may be allowed, depending on program-specific policies regarding the maximum time allowed to complete the program of study, to re-enter their programs.

In these cases, additional requirements or steps may be required of the student depending on the circumstances, the length of time away, and whether their program of study has undergone curricular revisions since their enrollment.

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 the work of a student 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 in St. Louis.

Scope and Purpose

This statement on academic integrity applies to all undergraduate students at Washington University. Graduate students may be governed by policies in each graduate school or division. To the extent a graduate school or program has not adopted its own academic integrity policy, the provisions of this policy will apply. 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 academic misconduct (the examples are only illustrative, *not* exhaustive).

This policy and statement were endorsed by the Faculty Senate Council. Any changes to the policy are to be reviewed by the Faculty Senate Council, as described in the Faculty Senate Council bylaws.

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 acknowledgement. To avoid even the suspicion of plagiarism, a student must always:

- 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 (name of the speaker, the occasion, the place and the date).
- Cite material from the internet or material generated by an artificial intelligence 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 or artificial intelligences 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, and 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:

- Use, copy, or paraphrase the results of another person's work or material generated by an artificial intelligence and represent that work as their own, regardless of the circumstances.
- Refer to, study from, or copy archival files (e.g., old tests, homework, solutions manuals, or backfiles) that were not approved by the instructor.
- Copy another's work or to permit another student to copy their 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, 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:

- 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 their own.

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

Under no circumstances is it acceptable for a student to:

- 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 their own. This includes but is not limited to sitting for another person’s exam; both parties will be held responsible.
- Violate any rules or conditions of test-taking or other course assessment (e.g., bringing materials or devices into an exam room when disallowed).
- 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 teaching assistant for guidance.

Reporting Misconduct Faculty Responsibility

If a student observes others violating this policy, they are strongly encouraged to report the misconduct to the instructor, to seek advice from the academic integrity coordinator in the Office of the Provost, or to address the student(s) directly.

Student Responsibility

If a student observes others violating this policy, they are strongly encouraged to report the misconduct to the instructor, to seek advice from the academic integrity coordinator in the Office of the Provost, 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 Resources, if applicable.

Procedure Jurisdiction

This policy covers all undergraduate students, regardless of their college of enrollment, as well as graduate and professional students whose schools and programs do not have a separate policy and procedure. Cases will be heard by a panel drawn from an Integrity Council made up of faculty, staff, and students representing the undergraduate schools and participating graduate programs.

Student Rights and Responsibilities in a Hearing

A student accused of an academic integrity violation, whether by a professor, teaching/graduate assistant, academic integrity coordinator or student is entitled to:

- A presumption of non-responsibility unless and until a panel determines that, based upon the evidence, it is more likely than not that the student engaged in a violation of academic integrity under this policy.
- Request a mediation/facilitation session prior to a hearing.
- Review the written evidence in support of the charge.
- Ask relevant questions.
- Offer an explanation as to what occurred.
- Present relevant material that would cast doubt on the correctness of the charge.
- Determination of the validity of the charge by an unbiased and objective panel and generally without reference to any past record of misconduct.

When responding to a charge of an academic integrity violation, a student may:

- Deny the charges and request a hearing in front of an Integrity Council panel.
- Admit the charges and request a hearing to determine recommended sanction(s).
- Admit the charges and accept the imposition of sanctions by the academic integrity coordinator without a committee hearing.
- Request a leave of absence from the university. The academic integrity matter must be resolved prior to re-enrollment. A notation will be placed on the student's transcript indicating there is an unresolved academic integrity matter pending.
- 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 in 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 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 responsible for violation of the academic integrity policy or if a student has admitted to the charges prior to a hearing, the academic integrity coordinator 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 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.
- Impose suspension or expulsion.

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

A hearing panel may also elect to refer their recommended sanctions to the SCB Chairperson for determination if, for example, the recommendation departs from their standard recommendations.

Withdrawing from the course will not prevent the academic integrity coordinator 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 and may be reported in accordance with the Policy on Reporting of Student Conduct Violations.

Appeals

If a student believes the panel did not conduct a fair hearing, or if a student believes the sanction imposed is excessive (i.e., suspension or expulsion), they may seek an appeal within 14 days of the original decision. For cases in which the decision was made by the panel and Academic Integrity Coordinator, the appellate officer will be the Chair of the Student Conduct Board. For cases in which the decision was made by the Panel and the Student Conduct Board Chairperson, the Vice Provost of Educational Initiatives or the Vice Provost for Graduate Education will serve as the appellate officer. Appeals are governed by Section VII of the university Student Conduct Code.

Administrative Record-Keeping Responsibilities

It is the responsibility of the academic integrity coordinators to keep accurate, confidential records concerning academic integrity violations. When a student has been found responsible for an academic integrity violation, a letter summarizing the allegation, the outcome, and the sanction will be placed in the student's official conduct file and may be reported out in accordance with the Policy on Reporting of Student Conduct Violations.

In addition, a report of the outcome of every formal accusation of student academic misconduct will be shared with the director of university student conduct programs, 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, the academic integrity coordinator shall query the Office of Student Conduct and Community Standards (OSCCS) about the student(s) accused of misconduct. OSCCS shall provide any information in the OSCCS records concerning prior code violations of that student to the integrity coordinator. Such information will be used in determining sanctions if the student is found responsible for an academic integrity violation in the present case. Evidence of past misconduct generally may not be used to resolve the issue of whether a student has committed a violation in a subsequent case unless the hearing chair deems it relevant.

Reports to Faculty and Student Body

Periodic (at least annual) reports will be made 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.

Endorsed by the Faculty Senate Council on March 16, 2010

Effective July 1, 2010

Updated December 4, 2014

Endorsed by the Faculty Senate Council on October 18, 2023

Updated April 18, 2024

University Affiliations

The accrediting organizations and memberships of the different areas of Washington University are listed below.

Additional information about professional and specialized accreditation can be found on the Office of the Provost website.

Washington University in St. Louis

Accreditation

- Higher Learning Commission

Memberships

- American Academy of Arts & Sciences
- American Association of Colleges & Universities
- American Council of Learned Societies
- American Council on Education
- Association of American Universities
- Hispanic Association of Colleges and Universities
- Independent Colleges and Universities of Missouri
- National Association of Independent Colleges and Universities
- National Council for State Authorization Reciprocity Agreements
- Universities Research Association

College of Arts & Sciences

Memberships

- American Academy of Physician Associates
- American Camp Association
- Association for Pre-College Program Directors
- Association of University Summer Sessions
- Diversity Abroad
- Forum on Education Abroad
- Higher Education Protection Network
- International Center for Academic Integrity

- International Educational Exchange
- Midwest Association of Pre-Law Advisors
- National Academic Advising Association
- National Association of Advisors for the Health Professions
- National Association of Fellowships Advisors
- North American Association of Summer Sessions
- Professional and Organizational Development Network

Office of Graduate Studies, Arts & Sciences

Memberships

- American Academy of Physician Associates
- Association of Graduate Schools
(Founding member)
- Council of Graduate Schools
(Founding member)
- Midwest Association of Pre-Law Advisors
- Pod Network
- Student Affairs Administrators in Higher Education
- The Council of Independent Colleges

Sam Fox School of Design & Visual Arts

Accreditation — College of Art

- National Association of Schools of Art & Design
(Founding member)

Accreditation — College of Architecture

- Master of Architecture: National Architectural Accrediting Board
- Master of Landscape Architecture: Landscape Architectural Accreditation Board

Membership — College of Architecture

- Association of Collegiate Schools of Architecture

Accreditation — Mildred Lane Kemper Art Museum

- American Alliance of Museums

Membership — Mildred Lane Kemper Art Museum

- Association of Academic Museums and Galleries
- Association of Art Museum Directors
- College Art Association

Olin Business School

Accreditation

- Association of MBAs
- Association to Advance Collegiate Schools of Business International
(Charter member since 1921)
- 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.

Membership

- American Society for Engineering Education

School of Law

Accreditation

- American Bar Association
- Media Law Resource Center

Memberships

- American Association of Law Libraries
- American Society of Comparative Law
- American Society of International Law
- Association of Academic Support Educators
- Association of American Law Schools
- Central States Law Schools Association
- Clinical Legal Education Association
- Equal Justice Works
- Mid-America Association of Law Libraries
- Mid-America Law Library Consortium
- National Association for Law Placement
- National Association of Law Student Affairs Professionals
- Southeastern Association of Law Schools

School of Medicine

Accreditation

- Liaison Committee on Medical Education

Membership

- Association of American Medical Colleges

Brown School

Accreditation

- Council on Education for Public Health
- Council on Social Work Education

School of Continuing & Professional Studies

Memberships

- American Association of Collegiate Registrars and Admissions Officers
- Council for Adult and Experiential Learning
- International Center for Academic Integrity
- National Academic Advising Association
- National Association of Student Personnel Administrators
- University Professional and Continuing Education Association

Note: Business-related programs in the School of Continuing & Professional Studies are not accredited by the Association to Advance Collegiate Schools of Business International.

University Libraries

Membership

- Association of Research Libraries

Graduate Study

Policies & Guidelines

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.

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) 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), creates a lively postdoctoral community. Washington University in St. Louis is an institutional member of the National Postdoctoral Association.

For more information, visit the OPA website.

Registration in Courses

Registration dates are published in advance on the Office of the University Registrar's website. Late registration after the term begins is permitted only until the "add/drop" deadline relevant to a student's program. Students will not earn credit for courses in which they are not duly registered. Students may not register in courses that have conflicting meeting times.

Students may drop a course by the published deadline found on the Office of the University Registrar's website; dropped courses do not appear on the permanent academic record, and no grade is recorded. Students may withdraw from a course after the drop deadline and until the published withdrawal deadline. A withdrawal will result in a W notation associated with the course on the permanent record, including the transcript. Students who wish to drop or withdraw from a course are expected to follow steps to do so by the appropriate deadline. Failure to drop a course or withdraw by the published deadline may result in a failure of the course, and the transcript will reflect the failing grade.

Transfer Credit

Transfer credit is recorded on a student's permanent record. Courses transferred from other institutions of higher education do not have grades or grade points awarded and therefore do not apply toward a student's GPA.

Institutionally, Washington University participates in the Inter-University Exchange Program. Courses taken at Saint Louis University and the University of Missouri–St. Louis, according to the parameters documented, are approved to transfer to Washington University. The School of Law has a specific agreement in place with Saint Louis University for JD students only and under certain circumstances. Other transfer credit policies vary by school and program. Details may be found in the relevant academic sections of this *Bulletin*.

Tuition and Cost of Attendance

The cost of a Washington University education varies by school and, in some cases, by program. Tuition rates and fees are available through the Office of Financial Planning and Budget and are typically listed in greater detail (including fees and financial support options and procedures) on school websites.

Withdrawals and Refunds

If a student withdraws from Washington University after classes have begun, they must promptly file a request to withdraw in order to have appropriate registration and refund policies apply. These timelines vary by school and, in some cases, by program. Students should refer to the appropriate sections of this *Bulletin* for details.

University PhD Policies & Requirements

Academic PhD Programs

The following university-wide policies and practices apply to all PhD students regardless of school affiliation. They are specific to PhD program administration and PhD student experience. Schools/divisions may set stricter standards for students within their ambit, but they may not set standards that fall below university-wide policies. This page *does not* include those policies and practices that apply to the student community as a whole (e.g., the University Student Conduct Code).

Academic and Professional Integrity for PhD Students

The Academic and Professional Integrity Policy for PhD Students (PDF) 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 that applies to undergraduates was adopted to apply to all PhD students in 2014.

PhD Student Support Policies and Resources

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 and will receive their current stipend support during this 60-day period. Students may request additional time off via a leave of absence without receiving a stipend (for up to a full semester) if approved by the student's department/program. A leave of absence pauses the academic clock.

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 date of birth or adoption. Students should contact their department/program to request a New Child Leave. Students who receive support from external agencies should consult the policies and guidelines of the sponsor as well as their Vice Dean or designee before requesting a New Child Leave.

Child Daycare Subsidy

The Child Daycare Subsidy is sponsored by Washington University in St. Louis, and its purpose is to help PhD students with children under their care (who meet the requisite eligibility criteria) to meet the costs of child daycare while they pursue their studies.

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

- For one child, the maximum award is \$3,550 per Fall/Spring semester.
- For two children, the maximum award is \$4,550 per Fall/Spring semester.
- For three or more children, the maximum award is \$5,550 per Fall/Spring semester.

The subsidy amount cannot exceed the cost of the daycare facility.

The application is available on the Office of the Provost website.

Financial Policies

PhD Student Minimum Financial Award

The education of PhD students represents a significant commitment on the part of both Washington University in St. Louis and the students admitted/enrolled. Washington University in St. Louis typically funds most full-time PhD students for a minimum of five years (with the exception of post-professional PhD programs in the School of Medicine). Funding typically consists of full tuition scholarship and financial support to defray living expenses. Financial support may also be referred to as stipends or fellowships. Such financial support may be sourced internally from university-wide fellowships such as the Olin Chancellor's Fellowship, the McDonnell International Scholars Academy, or school/program/department funds or from external sources (e.g., external research contracts and grants, external fellowships such as NSF GRFP).

The minimum PhD financial support rate for the 2024-25 academic year is \$36,050 annually, dispersed on a monthly basis while the student is enrolled full time. The rate applies to all PhD programs with the exception of post-professional specialty programs in the School of Medicine. Departments, schools, cross-school interdisciplinary programs, and other fellowship programs may choose to offer a rate higher than the established minimum, but they must do so for all students in their cohort. The eligibility criteria for PhD students receiving such financial support are outlined in the PhD Student Funding section below.

Students admitted to a part-time PhD program or on a part-time basis are not usually eligible for this minimum financial award.

PhD Student Funding

Financial support at or above the university-wide PhD minimum stipend rate allows PhD students to focus on their programmatic requirements, enabling them to make expeditious progress toward degree completion. This section predominantly pertains to PhD students, but it may apply to other graduate and professional students receiving financial support from the university.

Eligibility and Status

Students receiving university financial support must do the following:

- Enroll and maintain full-time student status in a graduate or professional program during the academic year;
- Make satisfactory academic progress in accordance with their degree program requirements; and
- Report to their degree program and university fellowship program (if applicable) any additional financial award(s) they receive or employment they engage in as outlined in this policy.

Because graduate students sometimes receive funding from multiple sources, it is the responsibility of the student, the student's department/degree program, and the Principal Investigator (if applicable) to understand and abide by the terms and conditions of each funding source.

Funding From Multiple Sources

Eligible students are encouraged to seek additional fellowships from external agencies. In addition to the funding amount, which can be more generous than that of a university financial award, these external fellowships are prestigious; they provide valuable training, experiences, and resources, and they enhance future career opportunities. In addition, securing external funding to support training and research is often an important component of the professional development of graduate students.

PhD students receiving university financial support who also receive an external fellowship or stipendiary award **may not** combine or "stack" the external award with the university financial support.* Students receiving an external fellowship or stipendiary award have two options.

Option 1: Supplementation of an External Fellowship or Stipendiary Award

If the sum of all external fellowship or stipendiary awards is less than the university financial support, the university funds may supplement the total amount of external funding to bring the student up to their guaranteed university fellowship or to the minimum university financial support for PhD students.

Students who receive external fellowship or stipendiary awards providing annual stipends that total more than the university financial support will retain the full external award(s) and will receive no additional university financial support for the duration of the external award.

- *Example One:* A student has a university award of \$38,000. The student receives a \$34,000 external award; the university will supplement the external award by \$4,000 to bring the student up to their university award of \$38,000.
- *Example Two:* A student has a university award of \$38,000. The student receives an external foundation award of \$42,000. Since the external award is greater, no university funds will be distributed while the student is supported by the external award.

Option 2: Deferral of University Fellowship or Stipendiary Award

Students receiving an external fellowship or stipendiary award during years one through five of study may, with program approval, defer up to one year of the university fellowship or stipendiary award made at the time of admission, if permissible based upon the award criteria from the external funding agency.

The university fellowship program and/or the student's home department or program can assist students when considering the benefits of each option. For cases in which a student has access to multiple sources of funding, external funds must be used before university funds are applied. University, school, and degree program funds will be the last source of funds to be applied to a student's financial support.

Schools and departments/programs may choose to offer an additional financial incentive to students who are awarded competitive external funding. Any such incentives must be uniformly awarded to all qualifying students within a degree program. Incentive awards given by school or degree programs to students who win external awards do not count toward the total university financial support; these incentive awards are in addition to the fellowship or stipendiary award.

All financial support will be applied in accordance with the terms and conditions of each funding source. In consultation with the student, departments/programs should ensure financial support is dispersed in the correct amount and in accordance with applicable policy.

- * Limited exceptions may occur for instances in which the external award is explicitly contingent on the continuation of the university stipendiary award. In such instances, the decision on stacking is at the discretion of the school dean or their designee for support provided by the school or by a cross-school interdisciplinary program and at the discretion of the fellowship administrator for university-wide fellowships (e.g., OCF, MISA).

PhD Student Employment

Full-Time Employment

University financial support that is provided at or above the university-wide PhD minimum stipend rate is intended to enable students to focus exclusively (i.e., full time) on their studies. Students who receive university financial support at or above the university-wide minimum PhD stipend rate are not permitted to hold full-time employment.

Students who perform full-time employment during the summer term will have their university fellowship or stipendiary award stopped for the duration of their full-time employment. Students are also subject to any school or program-based policies regarding employment, which may be more restrictive. Students should consult their school and degree program for approval.

Part-Time Employment

To ensure that students receiving university financial support can focus on their programmatic requirements and make expeditious progress toward degree completion, part-time employment should not exceed an average of 10 hours per week. This allowance may be restricted by schools/departments/programs to a smaller number of hours per week to conform with a student's funding source policies and with federal time and effort reporting guidelines (as applicable).

If a student and that student's advisor(s) believe that additional part-time employment will enhance the student's outcomes and is unlikely to hinder timely progress toward degree completion, the student may request approval for an exception through their school's graduate program office. Any such exceptions will be documented and kept on file in the school. For students supported on federal grants, it is the school's responsibility to ensure adherence to any constraints derived from time and effort reporting.

To reiterate, students are also subject to any school or department/program-based policies regarding employment, which may be more restrictive. Students should consult their school and degree program for approval prior to undertaking any part-time employment.

Implications for International Students

International students attending Washington University in St. Louis on a visa must consult with the Office for International Students and Scholars (OISS) before accepting any external or internal employment, either full-time or part-time.

Tax Implications

Please visit Washington University in St. Louis's Financial Services site for more information about the taxability of stipend payments. Students are encouraged to consult a personal tax advisor to ensure that they are adhering to federal and state laws and Internal Revenue Service (IRS) regulations.

PhD General Requirements and Policies

To earn a PhD at Washington University in St. Louis, 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.

Note: Individual schools and departments/programs may have more restrictive policies than the university-wide policies stated herein.

Residence Requirement

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

Students admitted to a part-time PhD program must be enrolled in at least 3 units for each Fall/Spring semester until the unit requirements for their program are satisfied.

Time Limit for PhD Enrollment Eligibility

Full-time PhD students are eligible for enrollment at Washington University in St. Louis for a maximum of 14 Fall/Spring semesters (seven years). Enrollment includes traditional course registration and 0-unit courses that carry a full-time enrollment status. Semesters of approved leaves of absence do not count toward this time limit.

Students admitted to a part-time PhD program are eligible for enrollment at Washington University in St. Louis for 18 Fall/Spring semesters (nine years). Semesters of approved leaves of absence do not count toward this time limit.

Full-time PhD students and those admitted to part-time PhD programs may petition for an enrollment eligibility extension for a maximum of one academic year. Petitions must be directed to the student's dean or their designee. Supplemental petitions will not be permitted. In unusual circumstances, the dean or their designee may appeal to the Vice Provost for Graduate Education on behalf of a particular student.

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 examination process varies considerably according to the department/program, and the structure and schedule of the qualifying exam are set by the department/program in accordance with best practices within their field. The department/program is responsible for documenting the process properly and ensuring the process is clearly outlined to their students. Each PhD program is responsible for notifying the school registrar or the appropriate record custodian of the student's outcome, whether successful or unsuccessful.

Mentored Experience Requirement

All PhD students at Washington University in St. Louis must complete a department/program-defined Mentored Experience. The Mentored Experience Requirement is a doctoral degree milestone that is notated on the student's transcript when complete. Each department/program 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/programs 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.

The Mentored Experience Requirement will be altered for the 2025-26 academic year and will be documented in the *Bulletin*. Some programs are piloting changes for the 2024-25 academic year and will independently communicate with their students regarding any changes.

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/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 in St. Louis 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. Full-time students must submit the Title, Scope and Procedure form 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. Students enrolled in a part-time PhD program must submit the Title, Scope and Procedure form 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 of the sixth year of 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; 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 department/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 in St. Louis faculty members or, for programs offered by Washington University in St. Louis–affiliated partners, full-time members of a Washington University in St. Louis–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 in St. Louis, 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 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. Washington University in St. Louis community members and guests of the student 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.

Attendance by a minimum of four members of the Doctoral Dissertation Committee, including the committee chair and an outside member, is required for the defense to take place. This provision is designed to permit the student's defense to proceed in case of a situation that unexpectedly prevents one of the five members from attending. Students should not plan in advance to only have four members in attendance; if one of those four cannot attend, the defense must be rescheduled. The absence of all outside members or of the committee chair would necessitate rescheduling the defense.

Students, with the support of their Doctoral Dissertation Committee chair, may opt to hold their dissertation defense in-person or by utilizing a virtual or hybrid format.

Dissenting Vote(s) at a Dissertation

Faculty members of the Doctoral Dissertation Committee normally will examine the PhD candidate and vote on whether 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 which therefore result in dissenting (negative) vote(s), the committee chair will refer the case to the Vice Provost for Graduate Education 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 Vice Provost for Graduate Education. After consulting with these and other members of the committee, the Vice Provost for Graduate Education 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 Vice Provost for Graduate Education 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 Vice Provost for Graduate Education may then decide to decline to approve the dissertation. Alternatively, they may ask the department or graduate program to name a Resolution Committee, consisting of three tenured or tenure-track professors at Washington University in St. Louis or elsewhere who did not serve on the original committee, to reexamine the dissertation and the candidate. A unanimous positive recommendation from this committee will be required in order for the Vice Provost for Graduate Education to approve the dissertation. 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.

Dissertation Submission

After the successful defense of their dissertation, the student must submit an electronic copy of the dissertation online to the university by the established deadline for their graduation term. Dissertations must be submitted no later than three months after the oral defense of the dissertation. Petitions for an extension to the three-month limit may be submitted to the Director of Graduate Studies for consideration and approval. The submission website requires students to choose from among publishing and copyrighting services offered by ProQuest ETD Administrator, but the university permits students to make whichever choices they prefer. Students are asked to submit the Survey of Earned Doctorates separately. The degree program is responsible for delivering the final approval form, signed by the committee members at the defense and then by the department/program chair or director, to the school registrar or the appropriate record custodian. Students who complete all degree requirements and 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.

Degree Candidacy Extension (DCE)

Degree Candidacy Extension (DCE) refers to a non-enrolled status available, under exceptional circumstances, to full-time PhD students who have completed all PhD degree requirements with the exception of the dissertation.

Extended degree candidates are not registered for any courses, have no enrollment status, and are ineligible for financial awards or support, benefits, and resources available to enrolled Washington University in St. Louis students. Once a student enters DCE, they may not register or enroll with Washington University in St. Louis as a student in their intended degree program in a future term.

DCE status may be assigned to full-time students in a variety of situations, including but not limited to the following:

- PhD students who do not complete their dissertation after exhausting the time allowable for PhD enrollment status due to circumstances beyond their control (see Time Limit for PhD Enrollment Eligibility earlier on this page);
- PhD students who secure full-time employment prior to the completion of their dissertation and who have established a timeline for the completion of the dissertation requirement; and
- PhD students who have exhausted their university financial support period as defined by their school or program prior to the completion of their dissertation and who have established a timeline for the completion of the dissertation requirement.

DCE status may be inappropriate for international students dependent on a U.S. visa, and such students may not be eligible for this status. International students should always consult with an OISS advisor prior to making an enrollment status change. In addition, students admitted as part-time PhD students are not eligible for DCE status.

DCE status is not the rule. Rather, it is assigned as an exception. Students must obtain the recommendation of their department/program leadership and petition the Vice Dean for Graduate Education (or equivalent) within their school to request to enter DCE status. If the petition is successful, the DCE status is conferred for the period of one year, after which an additional petition should be made and approved. Students seeking to remain in DCE status are obligated to provide a written report on their dissertation's progress annually to their department to secure their approval for subsequent petitions. Individual departments may require additional checkpoints to ensure progression. Students may remain a PhD candidate in this status for a maximum of three calendar years.

If three calendar years pass from the first semester in which a student was placed on DCE and the student has not successfully completed all degree requirements, then that student has officially forfeited their eligibility to earn the PhD degree. Under these circumstances, the student may petition the Vice Provost of Graduate Education with the support of their department chair and school vice dean to be allowed to complete the degree outside of the three-year extension period. The petition will include a timeline for completion. The Vice Provost of Graduate Education reserves the right to deny any such request.

PhD Mentored Experiences

Mentored Experience Requirements

Doctoral 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 transcript, when complete. Each department has an established Mentored Experience Implementation Plan in which the number of semesters in which a student must engage in a Mentored Teaching or 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 Mentored Professional Experiences as an avenue to complete one or more semesters of the Mentored Experience Requirement. Doctoral students will enroll in LGS 600 (Mentored Teaching Experience) or LGS 603 (Mentored Professional Experience) to signify progression in completing the overall Mentored Experience Requirement for the degree. *Please note: A committee is looking into the MTE and there may be updates to the policy.*

Mentored Experience Implementation Plans

A department defined requirement for PhD students to engage in mentored teaching activities and/or other mentored professional activities. The requirement includes information related to the role of teaching or professional experiences within the discipline, the department's plan for supporting and offering pedagogical training, the normal sequence of opportunities for a PhD student, and the number of semesters required. Departments have the opportunity to send updated Mentored Experience Implementation plans to the Vice Provost for Graduate Education and International Affairs each academic year.

Current Departmental Plans

- Anthropology
- Art History & Archaeology
- Biology & Biomedical Sciences
- Biomedical Engineering
- Business
- Chemistry
- Classics
- Comparative Literature
- Computer Science & Engineering
- Earth, Environmental, & Planetary Sciences
- East Asian Languages & Cultures
- Economics

- Education
- Electrical & Systems Engineering
- Energy, Environmental, & Chemical Engineering
- English
- French
- Germanic Languages & Literature
- Hispanic Studies
- History
- Materials Science & Engineering
- Mathematics & Statistics
- Mechanical Engineering
- Movement Science
- Music
- Nursing Science
- Performing Arts – Dance
- Philosophy
- Physics
- Political Science
- Psychological & Brain Sciences
- Rehabilitation & Participation Science
- Sociology
- Speech & Hearing
- Writing

Mentored Experience Student FAQs

Am I able to teach as a primary instructor as part of the Mentored Teaching Experience (MTE)?

Yes, once students have completed the minimum pedagogical competencies associated with mentored teaching, the department may assess the students' ability and interest to determine if the opportunity to teach as a primary instructor (with faculty support), proves advantageous for the doctoral student. A faculty member must be listed as a support person with the label Mentor. Students will enroll in LGS 600.

I completed my department's defined mentored experience requirement. Can I continue to teach or engage in a professional experience?

Yes, students who completed the department's mentored experience may continue to teach if they are hired as an adjunct instructor. Students who completed the department's mentored experience may continue to engage in a professional experience either as an extracurricular activity or as an internship, either paid or unpaid. Students may not enroll in LGS 600 and LGS 603 after the Mentored Experience requirement is complete.

Can I use a paid experience to count toward my department's Mentored Experience requirements?

No, paid experiences may not be counted toward your degree requirements. However, professional experiences that encourage the exploration of diverse careers are certainly supported by the the Vice Provost for Graduate Education and International Affairs. Students should always heed the part-time employment policy when considering engagement in a paid professional experience. Students are also encouraged to meet with the Director of Institutional Development for guidance on how these experiences fit into individualized career goals.

My department does not offer the Mentored Professional Experience as an option to fulfill the Mentored Experience requirement. Can I still engage in an MPE?

No, MPE is an academic endeavor that is applied toward a degree requirement.

Can I participate in a paid mentored professional experience?

Students may participate mentored experience as part of an internship, externship, or other similar experience. Students may not enroll in LGS 603 for a professional experience that is paid; this includes paid Curricular Practical Training (CPT) experiences.

Mentored Experience Department FAQs

How often should Mentored Experience Implementation Plans be reviewed and updated?

Departments may update their Mentored Experience Implementation Plans (formally Teaching Implementation Plans) at any time. Generally, students should be held to the defined plan that was in effect when the student was admitted. However, plans that are expanded to become more inclusive of diverse options may be offered as the guideline to students who were admitted in a previous term. Under no circumstance should a student be required to complete more semesters of the Mentored Experience than what was defined by the department when the student was admitted to the PhD program.

The Director of Institutional Development will send a call for review to the Mentored Experience plan during the Spring term of each academic year. Departments are encouraged to review the plan to determine if any changes are needed.

Are AM students allowed to complete a Mentored Experience?

AM students are not eligible for enrollment in LGS 600 (MTE) or LGS 603 (MPE). AM students engaged in teaching activities must be compensated by the department.

Can we count a student's previous semester's engagement in a mentored professional experience toward the Mentored Experience requirement?

Yes, the department has the right to apply those experiences toward the students' semester requirements for Mentored Experiences. Note that students will not be retroactively enrolled in LGS 603 to account for these activities. The department will need to track any activities completed in a previous semester independently of SIS.

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. 72), occupational therapy, physical therapy and audiology are considered to be among the nation's best. Faculty lead a robust research enterprise, supported by \$583.4 million from the National Institutes of Health during the fiscal year ending June 30, 2023. The school's physicians provide care in partnership with the nationally ranked Barnes-Jewish Hospital and St. Louis Children's Hospital.

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

Diversity Statement

Washington University School of Medicine's culture of collaboration and inclusion is the foundation for success in everything it does. The School of Medicine recognizes that — by bringing together people from varying backgrounds, experiences, and areas of expertise — it can develop richer solutions to complex scientific questions, train culturally sensitive clinicians, and provide health care in a way that best serves our diverse patient population. To support these values, the School of Medicine is deeply committed to building a diverse and inclusive community in which everyone is welcomed and valued. As the School of Medicine engages more fully with the community around it and appeals more broadly to student talent, it has adopted a clearer priority on diversifying its own ranks. Washington University encourages and gives full consideration to all applicants for admission, financial aid, and employment regardless of race, color, ethnicity, age, religion, sex, sexual orientation, ability, gender identity or expression, national origin, veteran status, socioeconomic status, or genetic information. We implement policies and practices that support the inclusion of all such potential students, trainees, and employees, and we are committed to being an institution that is accessible to everyone who learns, conducts research, works, and seeks care on our campus. We provide reasonable accommodations to those seeking that assistance.

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

The diversity statement was revised and endorsed by the School of Medicine Academic Affairs Committee on December 10, 2020. It was approved by the Executive Faculty on January 6, 2021.

Areas of Study

- Applied Health Behavior Research (p. 35)
- Audiology and Communication Sciences (p. 38)
- Biology and Biomedical Sciences (p. 44)
- Biomedical Informatics (p. 59)
- Biostatistics & Genetic Epidemiology (p. 62)
- Clinical Investigation (p. 66)
- Genetic Counseling (p. 69)
- Medical Education (MD, GME, CME) (p. 72)
- Medical Physics (p. 72)
- Nursing Science (p. 75)
- Occupational Therapy (p. 79)

- Physical Therapy (p. 86)
- Population Health Sciences (p. 100)
- Public Health (p. 103)

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) 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

Amy McQueen, PhD

Program Director
Email: amcqueen@wustl.edu

Sara O'Neal, PhD, M.Ed

Associate Director of Education
Email: ahbr@wustl.edu

Shelby Cripe, MA

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

Email: ahbr@wustl.edu
Website: <https://ahbr.wustl.edu>

Degrees & Offerings

- Master of Science in Applied Health Behavior Research (p. 105)
- Graduate Certificate in Applied Health Behavior Research (p. 105)

Research

The graduate programs in Applied Health Behavior Research (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 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 mentored research option 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 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

Melissa Chapnick, RD, MS, MPH

Research Affiliate, AHBR Lecturer
PhD student at Emory University

Ling Chen, PhD, MSPH

Assistant Professor
Department: Biostatistics

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

Licensed Professional Counselor and DBT Clinician

Michael Elliott, PhD

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

Matthew Ellis, MPE

Instructor in Psychiatry
Department: Psychiatry

Mark Fiala, PhD, MSW

Assistant Professor
Department: Oncology

Robert Fitzgerald, PhD, MPH

Assistant Professor
Department: Psychiatry (Child)

Emily Hawkins, MS, CCRP

Clinical Research Education Specialist
Department: Oncology

Cindi Inman, MS, RD, LD

Lecturer, AHBR
Department: Applied Health, Southern Illinois University Edwardsville

Julia López, PhD, MPH, LCSW

Instructor in Medicine
Department: Obstetrics & Gynecology

Ragini Maddipati, MSW, MPH

Lecturer, AHBR

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.

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.

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 PowerPoint. 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.

M88 AHBR 505 Mentored Research

Students are paired with faculty researchers to obtain hands-on experience and exposure to directed research.
Credit 3 units.

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.

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.

M88 AHBR 512A Counseling Skills for Health Care Professionals

This course focuses on the counseling skills necessary to promote self-care behaviors in individuals, including techniques for adapting communications style to cultural needs and developmental differences. Methods for incorporating family members and significant others into the counseling process are also included.
Credit 3 units.

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.

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.

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.

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. Coursework 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 presentation, emphasizing proper use of language and effective communication.
Credit 3 units.

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.

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.
Credit 3 units.

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.

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.

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.

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.

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.

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.

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. UColl: OLI

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; methods of data collection and 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, TBD.

Credit 3 units.

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.

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 (p. 107).

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

Degrees & Offerings

- Doctor of Audiology (p. 106)
- Master of Science in Deaf Education (p. 106)
- PhD in Speech and Hearing Sciences (p. 107)
- Minor in Speech and Hearing Sciences (p. 107)

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 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

Director of Audiology Studies
Assistant Professor of Otolaryngology

Casey Reimer

Director of Deaf Education Studies
Assistant Professor of Otolaryngology

Faculty and Staff List

For a full list of faculty and staff, please visit the PACS website.

Courses

Visit online course listings to view offerings for M89 PACS.

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.

M89 PACS 343 Observation in Audiology

Provides students with an introduction to clinical methods and observation experiences in audiology. Prerequisite: Permission of department required. Important note: Students must complete screening requirements to be eligible to observe in clinical spaces. Visit <https://hr.wustl.edu/non-appointee-visitor-observer/> for information.
Credit 3 units.

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. Important note: Students must complete screening requirements to be eligible to observe in clinical spaces. Visit <https://hr.wustl.edu/non-appointee-visitor-observer/> for information.
Credit 3 units.

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.

M89 PACS 401 Anatomy and Physiology of Speech and Hearing

Comprehensive introduction to anatomy (structure) and physiology (function) of the auditory, vestibular, and speech production systems, including organ systems of audition, articulation, and phonation (nervous, respiratory, and musculoskeletal systems). Covers normal and disordered structure and function. Prerequisite: Educ 234 or PACS 234. All undergraduate students should register for Section 01.
Credit variable, maximum 3 units.

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.

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.

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.

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.

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

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

M89 PACS 4303 Sign Language III

Continues development of American Sign Language with additional vocabulary, emphasis on expressive and receptive abilities, conversational skills. Expands knowledge of deaf culture/history specific to D/deaf Education and American Sign Language. This is a highly interactive and participatory course. Prerequisite: PACS 4302 or instructor permission.
Credit 2 units.

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.

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.

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.

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 videos, live demonstrations and in-class activities. Direct contact with children and technological devices will also be used to support lectures and discussions. Prerequisites: Permission of department required.
Credit 2 units.

M89 PACS 4511 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 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 8 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

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 0.5 units.

M89 PACS 4601 Clinical Skills

Credit 0.5 units.

M89 PACS 4611 Practicum in Audiology

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

Credit 1 unit.

M89 PACS 4612 Practicum in Audiology

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

Credit 1 unit.

M89 PACS 4613 Practicum in Audiology

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

Credit 4 units.

M89 PACS 4621 Practicum in Audiology

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

Credit 2 units.

M89 PACS 4622 Practicum in Audiology

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

Credit 2 units.

M89 PACS 4623 Practicum in Audiology

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

Credit 4 units.

M89 PACS 4631 Practicum in Audiology

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

Credit 2 units.

M89 PACS 4632 Practicum in Audiology

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

Credit 2 units.

M89 PACS 4633 Practicum in Audiology

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

Credit 6 units.

M89 PACS 463A Pre-Clinical Externship

Clinical externship in audiology application process.

Credit 1 unit.

M89 PACS 4641 Clinical Externship in Audiology

Clinical externship in audiology. Prerequisite: permission of department required.

Credit 9 units.

M89 PACS 4642 Clinical Externship in Audiology

Clinical externship in audiology. Prerequisite: permission of department required.

Credit 9 units.

M89 PACS 466 Rehabilitative Audiology

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 required.

Credit 3 units.

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.

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.

M89 PACS 474 Leadership Skills and Precepting

Credit 1 unit.

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.

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.

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.

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.

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.

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.

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.

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 2 units.

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.

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.

M89 PACS 535 Geriatric Audiology

Study of general aging and age-related hearing loss. Will provide foundational knowledge in the fundamental concepts of aging common to most species, normal and pathological processes in auditory physiology across the lifespan, assessment and treatment of hearing loss in older adults, and non-auditory factors that affect clinical intervention and treatment strategies for older patients (e.g., cognition, mental health, physical limitations). Prerequisite: Permission of department required.

Credit 2 units.

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. See section description for information on specific topics by section. Prerequisite: Permission of department required.

Credit variable, maximum 1 units.

M89 PACS 552 Hearing and Communication Seminar

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

Credit 3 units.

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.

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.

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.

Prerequisites: Permission of department required.

Credit 1 unit.

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.

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.

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.

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. Prerequisites: Permission of department required.

Credit 3 units.

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. Prerequisites: Permission of department required.

Credit 2 units.

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.

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.

M89 PACS 5700 Capstone Project

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

Credit variable, maximum 6 units.

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.

M89 PACS 573 Research Design and Methods

A review of statistical concepts learned and discussion of their application in research projects. Will include selection of statistical tests in different projects with different types of data and data distributions, as well as the interpretation of the results of the statistical analysis in lieu of clinical importance and generalizability of results. Course will also include a critical review of statistical methods used in published articles chosen for discussion. Prerequisite: Permission of department required.

Credit variable, maximum 2 units.

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.

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.

M89 PACS 576 Introduction to Scientific Literature

Credit 0.5 units.

M89 PACS 577 Research in Speech and Hearing

Independent research (pre-dissertation). Prerequisites: Permission of department required. Credit variable, maximum 12 units.

M89 PACS 587 Dissertation Research

Dissertation research. Prerequisites: Permission of department required. Credit variable, maximum 12 units.

Biology & 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 12 doctoral programs:

- Biochemistry, Biophysics, & Structural Biology
- Biomedical Informatics & Data Science
- Cancer Biology
- Computational & Systems Biology
- Developmental, Regenerative, & Stem Cell Biology
- Ecology & Evolutionary Biology
- Immunology
- Molecular Cell Biology
- Molecular Genetics & Genomics
- Molecular Microbiology & Microbial Pathogenesis
- Neurosciences
- Plant & Microbial Biosciences

A collaborative, interdisciplinary approach to research and education is a hallmark of Washington University and the Division. As a university-wide 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 over 700 PhD and MD/PhD students, with more than 700 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, the Tyson Research Center, and the Donald Danforth Plant Science Center.

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.

DBBS students can reference the DBBS Student Handbook for student guidelines across all Division programs.

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

Faculty

Associate Directors

Eric Herzog

Professor of Biology, Professor of Neuroscience, Viktor Hamburger Distinguished Professor
PhD, Syracuse University

Heather True

Professor of Cell Biology and Physiology, Associate Director of the Division of Biology and Biomedical Sciences, David English Smith Professorship in Medicine
PhD, University of Illinois-Urbana-Champaign

Faculty Program Directors: Biochemistry, Biophysics, & Structural Biology

Thomas Brett

Associate Professor of Medicine, Associate Professor of Biochemistry and Molecular Biophysics, Associate Professor of Cell Biology and Physiology
PhD, University of Nebraska – Lincoln

Eric Galburt

Associate Professor of Biochemistry and Molecular Biophysics
PhD, University of Washington

Faculty Program Director: Biomedical Informatics & Data Science

Philip Payne

Professor of Medicine, Director, Institute for Informatics, Professor, Professor of Computer Science and Engineering, Associate Dean for Health Information and Data Science for the School of Medicine, Chief Scientist for the School of Medicine, Janet and Bernard Becker Professor of Medicine
PhD, Columbia University

Faculty Program Directors: Cancer Biology

Jason Weber

Professor of Medicine, Professor of Cell Biology and Physiology, Adjunct Instructor, Adjunct Lecturer
PhD, Saint Louis University

Julie Schwarz

Professor of Radiation Oncology, Director - Cancer Biology Division, Vice Chair - Research, Professor of Cell Biology and Physiology
MD/PhD, Washington University School of Medicine

Faculty Program Directors: Computational & Systems Biology

Gautam Dantas

Professor of Pathology and Immunology, Co-Division Chief - Division of Laboratory and Genomic Medicine, Professor of Biomedical Engineering, Professor of Molecular Microbiology, Professor of Pediatrics, Conan Professorship in Laboratory and Genomic Medicine
PhD, University of Washington – Seattle

Nancy Saccone

Associate Professor of Genetics, Associate Professor of Biostatistics
PhD, Brown University

Faculty Program Directors: Developmental, Regenerative, & Stem Cell Biology

Helen McNeill

Professor of Developmental Biology, Larry J Shapiro and Carol-Ann Uetake-Shapiro Professor
PhD, Stanford University

Andrew Yoo

Professor of Developmental Biology
PhD, Columbia University

Faculty Program Director: Ecology & Evolutionary Biology

Jonathan Myers

Associate Professor of Biology
PhD, Louisiana State University

Faculty Program Director: Immunology

Eynav Klechevsky

Assistant Professor of Pathology and Immunology
PhD, Israel Institute of Technology, Haifa, Israel and The Baylor Institute for Immunology Research

Faculty Program Directors: Molecular Cell Biology

Roberta Faccio

Professor of Orthopedic Surgery, Professor of Cell Biology and Physiology
PhD, University of Bari Aldo Moro

Zhongsheng You

Professor of Cell Biology and Physiology, Professor of Medicine
PhD, University of California – San Diego

Faculty Program Directors: Molecular Genetics & Genomics

Jim Skeath

Professor of Genetics, Assistant Dean Academic Pathway Programs
PhD, University of Wisconsin – Madison

John Edwards

Associate Professor of Medicine
PhD, Columbia University

Faculty Program Directors: Molecular Microbiology & Microbial Pathogenesis

Christina Stallings

Professor of Molecular Microbiology
PhD, Columbia University

Megan Baldrige

Associate Professor of Medicine, Associate Professor of Molecular
Microbiology
MD/PhD, Baylor College of Medicine

Faculty Program Directors: Neurosciences

Joe Dougherty

Professor of Genetics, Professor of Psychiatry
PhD, University of California – Los Angeles

Daniel Kerschensteiner

Professor of Ophthalmology and Visual Sciences, Vice Chair -
Research Division, Professor of Biomedical Engineering, Professor of
Neuroscience, Janet and Bernard Becker Professor of Ophthalmology
MD, Georg-August University of Göttingen

Faculty Program Director: Plant & Microbial Biosciences

Hani Zaher

Professor of Biology
PhD, Simon Fraser University

DBBS mentors and educators are key to our training mission. Those who serve as primary mentors are DBBS Program Members, and others who participate in the educational mission are General Members.

Visit the DBBS website to learn about DBBS Faculty Membership or to search DBBS Faculty by last name, program or expertise.

Degree Requirements

- Biochemistry, Biophysics, & Structural Biology, PhD (p. 108)
- Biomedical Informatics & Data Science, PhD (p. 110)
- Cancer Biology, PhD (p. 113)
- Computational & Systems Biology, PhD (p. 115)
- Developmental, Regenerative, & Stem Cell Biology, PhD (p. 117)
- Ecology & Evolutionary Biology, PhD (p. 119)
- Immunology, PhD (p. 121)
- Molecular Cell Biology, PhD (p. 123)
- Molecular Genetics & Genomics, PhD (p. 126)
- Molecular Microbiology & Microbial Pathogenesis, PhD (p. 128)
- Neurosciences, PhD (p. 130)
- Plant & Microbial Biosciences, PhD (p. 132)

Courses

For a full listing of courses offered through the Vagelos Division of Biology & Biomedical Sciences, please visit the University's online course listings.

For questions about course listings, please email
dbbscurriculum@wustl.edu.

L41 Biol 4023 How Plants Work: Physiology, Growth, and Metabolism

This course introduces students to the fundamentals of how plants grow, metabolize and respond to their environment. Topics to be covered include the conversion of light energy into chemical energy through photosynthesis and carbon fixation, nitrogen assimilation, water and mineral uptake and transport, source-sink relationships and long-distance transport of carbon and nitrogen, cell growth and expansion, hormone physiology and physiological responses to a changing environment. Prerequisite: Bio 2960 and Bio 2970, or permission of instructors. (Biology Major Area B)
Credit 3 units. A&S IQ: NSM Arch: NSM Art: NSM BU: SCI

L41 Biol 4181 Population Genetics

An introduction to the basic principles of population and ecological genetics. Mechanisms of microevolutionary processes; integrated ecological and genetic approach to study the adaptive nature of the evolutionary process. Prerequisite: Bio 2970.
Credit 3 units. A&S IQ: NSM Arch: NSM Art: NSM

L41 Biol 4183 Molecular Evolution

A rigorous introduction to the study of evolution at the molecular level. Topics include the origin, amount, distribution and significance of molecular genetic variation within species, and use of molecular data in systematics and in testing macroevolutionary hypotheses. Prerequisite: Bio 2970, or permission of instructor.
Credit 3 units. A&S IQ: NSM Art: NSM

L41 Biol 419 Community Ecology

Community ecology is an interdisciplinary field that bridges concepts in biodiversity science, biogeography, evolution and conservation. This course provides an introduction to the study of pattern and process in ecological communities with an emphasis on theoretical, statistical and experimental approaches. Topics include: ecological and evolutionary processes that create and maintain patterns of biodiversity; biodiversity and ecosystem function; island biogeography, metacommunity dynamics, niche and neutral theory; species interactions (competition, predation, food webs), species coexistence and environmental change. The class format includes lectures, discussions, and computer labs focused on analysis, modeling and presentation of ecological data using the statistical program R. Prereq: Bio 2970 required, Bio 381 recommended, or permission of instructor. (Biology Major Area C)
Credit 3 units. A&S IQ: NSM Arch: NSM Art: NSM

L41 Biol 4195 Disease Ecology

Disease ecology is an interdisciplinary field that bridges concepts from fields including population ecology, community ecology, landscape ecology, and evolutionary biology. This course provides an introduction to the study of infectious diseases with an emphasis on theoretical, experimental, and quantitative approaches. The course will integrate studies of infectious diseases from across disciplines including human

epidemiology, veterinary medicine, wildlife epidemiology, plant pathology, parasitology, and ecology. Principles of Biology II (Bio 2970) required, Introduction to Ecology (Bio 381) recommended, or permission of instructor.

Credit 4 units. A&S IQ: NSM Arch: NSM Art: NSM BU: SCI

L41 Biol 4522 Laboratory in Protein Analysis, Proteomics, and Protein Structure

In this laboratory course, students learn principles and methods of protein quantitation, protein purification, assessment of purity using SDS-polyacrylamide gel electrophoresis, separation of complex protein mixtures by two-dimensional gel electrophoresis, definition of units of enzymatic activity, and identification of proteins using antibodies and/or mass spectrometry. The final part of the course introduces students to concepts of structural biology including protein crystallization, x-ray crystallography and computer modeling of protein structures. Fulfills the upper-level laboratory requirement for the Biology major. Prerequisites: Chem 252 and either Bio 451 or Bio 4501/Chem 456. Permission of instructor required. Limit: 8 students. Eight hours of laboratory/lecture per week.

Credit 3 units. A&S IQ: NSM Arch: NSM Art: NSM BU: SCI

L41 Biol 472 Behavioral Ecology

This course examines animal behavior from an evolutionary perspective and explores the relationships between animal behavior, ecology, and evolution. Topics include mating systems, sexual selection, parental care, kin selection, and cooperation. There is a strong active - learning component. Prerequisite: Bio 2970 or permission of instructor.

Credit 4 units. A&S IQ: NSM Arch: NSM Art: NSM

L41 Biol 500 Independent Research

Research under the supervision of a faculty mentor. Prerequisites: junior or senior standing and permission of mentor and the department. Credit/No Credit or Audit grade options; credit to be determined in each case, usually 3 units/semester and not to exceed 3 units/semester; may be repeated for credit. Because this course has a large number of sections, some sections are listed and enrolled as Bio 500A. If work is to be submitted for Latin honors, see p. 3 of the Department of Biology Handbook for Majors, Latin Honors Through a Biology Major Program. The handbook can be found online at: <https://wustl.app.box.com/s/d63rx5o0kygqtsv899eyhax5v31gvy1a>. Arrangements for registration should be completed during the preregistration period through the Bio 500 course website https://pages.wustl.edu/Bio_200-500_independent_research.

Credit variable, maximum 3 units.

L41 Biol 500A Independent Research

Research under the supervision of a faculty mentor. Prerequisites: junior or senior standing and permission of mentor and the department. Credit/No Credit or Audit grade options; credit to be determined in each case, usually 3 units/semester and not to exceed 3 units/semester; may be repeated for credit. 500A is equivalent to Bio 500. If work is to be submitted for Latin honors, see p. 3 of the Department of Biology Handbook for Majors, Latin Honors Through a Biology Major Program. The handbook can be found online at: <https://wustl.app.box.com/s/d63rx5o0kygqtsv899eyhax5v31gvy1a>. Arrangements for registration should be completed during the preregistration period through the Bio 500 course website: https://pages.wustl.edu/Bio_200-500_independent_research.

Credit variable, maximum 3 units.

L41 Biol 500N Independent Research in Neuroscience

Research in neuroscience under the supervision of a faculty mentor. Prerequisites: junior or senior standing and permission of mentor and the department. Credit/No Credit or Audit grade options; credit to be determined in each case, usually 3 units/semester and not to exceed 3 units/semester; may be repeated for credit. If work is to be submitted for Latin honors, see p. 3 of the Department of Biology Handbook for Majors, Latin Honors Through a Biology Major Program. The handbook can be found online at: <https://wustl.app.box.com/s/d63rx5o0kygqtsv899eyhax5v31gvy1a>. Arrangements for registration should be completed during the preregistration period through the Bio 500 course website: https://pages.wustl.edu/Bio_200-500_independent_research.

Credit variable, maximum 3 units.

L41 Biol 500S Summer Independent Research

Summer research under the supervision of a faculty mentor. Prerequisites: junior or senior standing and permission of mentor and the department. Credit to be determined in each case, usually 3 units/summer; may be repeated for credit in different summers. Because this course has a large number of sections, some sections are listed and enrolled as Bio 500T. Credits are received in the fall semester following the summer research. If work is to be submitted for Latin honors, see p. 3 of the Department of Biology Handbook for Majors, Latin Honors Through a Biology Major Program. The handbook can be found online at: <https://wustl.app.box.com/s/d63rx5o0kygqtsv899eyhax5v31gvy1a>. Arrangements for registration should be completed no later than the end of Summer Session I through the Bio 500 course website: https://pages.wustl.edu/Bio_200-500_independent_research. Credit/No Credit or Audit grade options. Course may not be taken for a letter grade. 1-3 units

Credit variable, maximum 3 units.

L41 Biol 500U Summer Independent Research in Neuroscience

Summer research in neuroscience under the supervision of a faculty mentor. Prerequisites: junior or senior standing and permission of mentor and the department. Credit to be determined in each case, usually 3 units/summer; may be repeated for credit in different summers. Credits are received in the fall semester following the summer research. If work is to be submitted for Latin honors, see p. 3 of the Department of Biology Handbook for Majors, Latin Honors Through a Biology Major Program. The handbook can be found online at: <https://wustl.app.box.com/s/d63rx5o0kygqtsv899eyhax5v31gvy1a>. Arrangements for registration should be completed no later than the end of Summer Session I through the Bio 500 course website: https://pages.wustl.edu/Bio_200-500_independent_research. Credit/No Credit or Audit grade options. Course may not be taken for a letter grade. 1-3 units

Credit variable, maximum 3 units.

L41 Biol 501 Human Anatomy & Development

Study of the human body primarily by dissection; extensive use of X-rays and CT scans. Emphasis on functional and clinical aspects of anatomy. Prerequisite: This course is restricted to first year medical students. Same as L48 Anthro 502 and M05 AnatNeuro 501A.

Credit 6 units.

L41 Biol 5011 Ethics & Research Science

Exploration of ethical issues which research scientists encounter in their professional activities. Topics will include, but are not limited to: student-mentor relationships, allegations of fraud, collaborators' rights and responsibilities, conflicts of interest, confidentiality, publications. Case study and scenario presentations will provide focus for discussions. Prerequisite, open to graduate students engaged in research. Six 90 minute sessions.

Credit 1 unit.

L41 Biol 5014 Biotech Industry Innovators

Late one Friday afternoon in April 1976, the late venture capitalist Robert Swanson met with biochemist Herb Boyer, PhD, at his UCSF lab. Swanson had requested 10 minutes of Boyer's time; when the meeting ended, three hours later, the foundations had been laid for the formation of Genentech, the first biotechnology company, and the beginnings of the biotechnology industry. This course, The Basics of Bio-Entrepreneurship, investigates issues and choices that inventor/scientists encounter when considering the applications and commercialization of early stage scientific discoveries. This course is intended for anyone interested in working in the medical device, life-, bio-, or pharma-sciences industries as a founder, scientist, entrepreneur, manager, consultant, or investor. It focuses on the decision processes and issues that researchers and their business partners face when considering how a discovery might best be moved from academia to successful commercialization.

Credit 3 units.

L41 Biol 502 General Physiology

This course applies the fundamental physiological mechanisms of cell biology to the functions of the major organ systems of the body, namely, the cardiovascular, renal, respiratory, gastrointestinal, and endocrine systems. The course is intended primarily for first-year medical students. The Physiology and Microscopic Anatomy courses are closely coordinated within the same schedule. Course continues into the spring semester with a different schedule. Prerequisite, Biol 5061 or the equivalent and permission of course director.

Credit 6 units.

L41 Biol 5053 Immunobiology I

Immunobiology I and II are a series of two courses taught by the faculty members of the Immunology Program. These courses cover in depth modern immunology and are based on Janeway's Immunobiology 8th Edition textbook. In Immunobiology I, the topics include: basic concepts in immunology, innate immunity: the first lines of defense, the induce responses of innate immunity, antigen recognition by B-cell and T-cell receptors, the generation of lymphocyte antigen receptors, antigen presentation to T lymphocytes and signaling through immune system receptors. In Immunobiology II the topics include: the development and survival of lymphocytes, T cell-mediated immunity, the humoral immune response, dynamics of adaptive immunity, the mucosal immune system, failures of host defense mechanisms, allergy and allergic diseases, autoimmunity and transplantation, and manipulation of the immune response. These courses are open to graduate students. Advanced undergraduate students may take these courses upon permission of the coursemaster. Prereq: DBBS students and advanced undergraduates with permission.

Credit 4 units.

L41 Biol 5054 Immunobiology II

Immunobiology I and II are a series of two courses taught by the faculty members of the Immunology Program. These courses cover in depth modern immunology and are based on Janeway's Immunobiology 8th Edition textbook. In Immunobiology I, the topics include: basic concepts in immunology, innate immunity: the first lines of defense, the induce responses of innate immunity, antigen recognition by B-cell and T-cell receptors, the generation of lymphocyte antigen receptors, antigen presentation to T lymphocytes and signaling through immune system receptors. In Immunobiology II the topics include: the development and survival of lymphocytes, T cell-mediated immunity, the humoral immune response, dynamics of adaptive immunity, the mucosal immune system, failures of host defense mechanisms, allergy and allergic diseases, autoimmunity and transplantation, and

manipulation of the immune response. These courses are open to graduate students. Advanced undergraduate students may take these courses upon permission of the coursemaster. Prereq: DBBS students and advanced undergraduates with permission.

Credit 4 units.

L41 Biol 5068 Fundamentals of Molecular Cell Biology

This is a core course for incoming graduate students in Cell and Molecular Biology programs to learn about research and experimental strategies used to dissect molecular mechanisms that underlie cell structure and function, including techniques of protein biochemistry. Enrolling students should have backgrounds in cell biology and biochemistry, such as courses comparable to L41 Biol 334 and L41 Biol 4501. The format is two lectures and one small group discussion section per week. Discussion section focuses on original research articles. Same as M15 5068 and M04 5068.

Credit 4 units.

L41 Biol 5075 Fundamentals of Biostatistics for Graduate Students

This course is designed for first-year DBBS students who have had little to no prior experience in programming or statistics. The course will cover common statistical practices and concepts in the life sciences, such as error bars, summary statistics, probability and distributions, and hypothesis testing. The class will also teach students basic programming skills for statistical computation, enabling them to retrieve and analyze small and large data sets from online databases and other sources.

Credit 2 units.

L41 Biol 5077 Pharmaceutical Research and Development: Case Studies

The course will provide an overview of the history of pharmaceutical research and development activities, with emphasis upon understanding a blend of the scientific, public health, regulatory and business decisions that have shaped the pharmaceutical industry over the past eight decades. Particular emphasis will be placed on understanding how past trends have raised questions about the sustainability of the enterprise. Although no prerequisites are formally required, the course will blend basic understanding of scientific and medical terminology with an understanding of the commercial and policy decision-making processes that govern the pharmaceutical and biotechnology enterprises. The course will provide an overview of the history of pharmaceutical research and development activities, with emphasis upon understanding a blend of the scientific, public health, regulatory and business decisions that have shaped the pharmaceutical industry over the past eight decades. Particular emphasis will be placed on understanding how past trends have raised questions about the sustainability of the enterprise. Although no prerequisites are formally required, the course will blend basic understanding of scientific and medical terminology with an understanding of the commercial and policy decision-making processes that govern the pharmaceutical and biotechnology enterprises.

Credit 2 units.

L41 Biol 5079 The Science, Medicine and Business of Drugs & Vaccines

The course will provide an overview of the history of research and development in the biotechnology and pharmaceutical industries, with emphasis upon understanding a blend of the scientific, public health, regulatory and business decisions that have shaped the pharmaceutical industry over the past eight decades. Particular emphasis will be placed on understanding how past and ongoing trends have raised questions about the sustainability of the enterprise.

Although no prerequisites are formally required, the course will blend basic understanding of scientific and medical terminology with an understanding of the commercial and policy decision-making processes that govern the pharmaceutical and biotechnology enterprises.

Credit 2 units.

L41 Biol 5084 Single Molecule Biophysics Journal Club

Molecular motors in the cell harness chemical energy to generate mechanical work in a host of processes including cell motility, DNA replication and repair, cell division, transcriptional regulation, and intracellular transport. The purpose of this course is to discuss recent advances in the field of molecular motors. Special emphasis will be placed on understanding and critically evaluating single molecule studies. The course will consist of both journal club presentations and small group discussions.

Credit 1 unit.

L41 Biol 5098 Graduate Research Fundamentals

This course introduces first-year Ph.D. students to the foundational skills, knowledge, and habits of mind required of successful independent biological scientists: 1) Social dynamics in the scientific research enterprise 2) Epistemology and ethics of bio research methods 3) Development and communication of research questions and results 4) Interdisciplinary scientific thinking. Class sessions and homework introduce these topics; major assignments prompt student to connect them with the broader scope of graduate training in lab rotations, course work, and interdisciplinary scientific seminars. The interactive, student-driven class structure facilitates autodidactic development while integrating small group activities and peer mentoring from advanced DBBS students. Prerequisite: Students must be enrolled in a graduate program through the Division of Biology & Biomedical Sciences.

Credit 0.5 units.

L41 Biol 5123 Experimental Hematopoiesis Journal Club

Journal club in which papers that describe significant advances in the field of experimental hematopoiesis are discussed. Students are expected to present one paper per semester and attend the weekly (1 hour) session. No prerequisites.

Credit 1 unit.

L41 Biol 5128 Cell Biology of Extracellular Matrix Journal Club

This journal club covers a broad range of topics related to extracellular matrix and cell-cell communication, including the fields of biochemistry, molecular biology, cell biology, and developmental biology. Speakers give a brief background to introduce the topic and then focus on one paper from the current literature. Presentations are given by students, faculty, and post-doctorates. Students receive 1 unit of credit for regular participation and for making one presentation.

Credit 1 unit.

L41 Biol 5137 Ion Channels Journal Club

Weekly presentations of recent papers on mechanisms of ion channel function and membrane excitability, as well as the role of channel defects in human and model diseases, with lively group discussions the norm! Once per semester, each participant will choose a paper and present it to the group.

Credit 1 unit.

L41 Biol 5138 Journal Club for the Molecular Mechanism of Aging

Why do we age? What causes aging? How is our life span determined? This journal club will address such fundamental, but challenging questions of aging and longevity. Recent studies on aging and longevity are now unveiling regulatory mechanisms of the complex biological phenomenon. We'll cover the latest progress in this exciting field and stimulate discussions on a variety of topics including aging-related diseases. One hour of paper presentation or research talk and discussion per every two weeks. Prerequisite: Basic knowledge of molecular biology and genetics of model organisms, such as yeast, *C. elegans*, *Drosophila* and mouse. Registered students are expected to have at least one presentation for 1 unit credit.

Credit 1 unit.

L41 Biol 5146 Principles and Applications of Biological Imaging

Principles and Applications of Biological Imaging will introduce the interdisciplinary nature of the imaging sciences and conduct a comprehensive survey of the array of interrelated topics that define biological imaging. The course will cover the basics of the optical, magnetic resonance, CT, SPECT and PET imaging modalities, and microscopy, while focusing on applications of imaging to different disease states, such as oncology, neurology, cardiology and pulmonary diseases. Prereqs. One year each of Biology, Chemistry, Physics and Calculus.

Credit 3 units.

L41 Biol 5147 Contrast Agents for Biological Imaging

Contrast Agents in Biological Imaging will build the chemistry foundations for the design and use of contrast agents in imaging applications such as nuclear medicine, magnetic resonance imaging (MRI) and optical imaging. The course will include lectures on the design of radiopharmaceuticals for gamma scintigraphy and positron emission tomography, MRI contrast agents and agents for optical imaging, including bioluminescence and fluorescence microscopy. Prereqs: one year of general chemistry, one semester of organic chemistry.

Credit 3 units.

L41 Biol 5148 Metabolism Journal Club

The purpose of the Metabolism Journal Club is to introduce the graduate students to advanced topics spanning the biochemistry, cell biology and genetics of cellular and whole body metabolism. Under the guidance of the course directors (Drs. Ory and Schaffer), students will select recent topical articles for discussion in the weekly journal club. Students will be expected to provide a succinct introduction to the topic and lead discussion of the data presented in the journal article. Students will be evaluated on the basis of their presentation and their participation in the seminar throughout the semester. Prerequisites: Successful completion of Fundamentals of Molecular Cell Biology (Bio 5068) and Nucleic Acids and Protein Biosynthesis (Bio 548).

Credit 1 unit.

L41 Biol 5151 RNA Biology Journal Club

The purpose of the RNA Biology Journal Club is to introduce the graduate students to advanced topics spanning the bioinformatics, biochemistry, cell biology and genetics of RNA biology. Under the guidance of the course directors (Drs. Ory and Schaffer), students will select recent topical articles for discussion in the weekly journal club. Students will be expected to provide a succinct introduction to the topic and lead discussion of the data presented in the journal article. Students will be evaluated on the basis of their presentation and their participation in the seminar throughout the semester. Prerequisites: Successful completion of Fundamentals of Molecular Cell Biology (Bio 5068) and Nucleic Acids and Protein Biosynthesis (Bio 548).

Credit 1 unit.

L41 Biol 5152 RAD Journal Club (Regeneration, Aging, and Development)

Focuses on developing a dialog around current topics in developmental and regenerative biology at the molecular, cellular and systems levels.
Credit 1 unit.

L41 Biol 5171 Medical Immunology

An introduction to basic concepts in immunology and immunopathology. Lectures focus on antigen-antibody interactions, immunoglobulin structure and genetics, the cellular basis of the immune response and immune regulation, T cell effector mechanisms, the inflammatory response, complement, the positive and negative roles of hypersensitivity, and immune deficiency. Prerequisite, some background in biochemistry and genetics helpful. Restricted to medical students only except in unusual circumstances, with permission of coursemaster. Offered during the first half of the second medical semester. Three-four lecture hours a week, two 2-hour lab periods, four 1-hour clinical discussion groups.
Credit variable, maximum 3 units.

L41 Biol 5191 Pathobiology of Human Disease States

Three human disease states will be discussed in detail. Topics will include background clinical and epidemiological information, followed by a detailed examination of the molecular and cellular events that underlie the disease state. Examples of pertinent topics include Alzheimer's disease, AIDS, leukemia, cystic fibrosis, sickle cell anemia, diabetes, etc. Prerequisite: Must be a Markey Pathway student.
Credit 2 units.

L41 Biol 5192 Cancer Biology Journal Club

This journal club covers current papers in molecular oncology, cancer genetics and contemporary molecular biology. Presentations will be given by students, post-docs and faculty, then discussed.
Credit 1 unit.

L41 Biol 5196 Special Emphasis Pathway in Cancer Biology

This course is designed to present pre- and postdoctoral trainees with an organized educational format to explore major contemporary topics in cancer biology. The elective will provide an integrated view of cancer research including basic science, translational science, and clinical investigation. Approximately 60 minutes will be devoted to a didactic presentation by a faculty member with interaction by the participants. The remaining 30 minutes will be used to discuss a pivotal research paper from this field, preselected by the faculty member. Outside reading (30-60 min/week) will be required.
Credit 2 units.

L41 Biol 5201 Membrane Protein Biophysics Journal Club

Cells are encapsulated by lipid bilayers providing a physical barrier for the passage of charged molecules and ions in and out of the cell. The proteins that reside within this layer of oil are called membrane proteins, and they act as the molecular gatekeepers, controlling the passage of ions, nutrients, waste products and signaling elements, across cell membranes. This journal club focuses on examining key literature in the field that investigates how membrane proteins fold, adopt certain structures, and how they function inside of the strange environment of the lipid membrane. The papers will be selected from biophysical studies that combine new and notable research with key historical work, for a broad perspective of the science being conducted in this complex and emerging field. Special emphasis will be placed on emerging topics, such as regulation of protein function by lipid

composition, membrane protein synthesis and folding, cutting-edge developments in membrane biophysics. The course will consist of both journal club presentations, as well as small group discussions in the form of "chalk-talks."

Credit 1 unit.

L41 Biol 5217 Special Topics in Microbial Pathogenesis

Primarily for graduate and MSTP students, this course involves oral presentation and discussion of current research articles on pathogenic microorganisms (bacteria, viruses, parasites, and fungi). Discussion will include design of specific aims for research proposals. Emphasis will be on literature that addresses the cellular and molecular basis of host-pathogen interactions. Students are expected to prepare all articles covered and to participate actively in each discussion. Prerequisite: advanced elective course "Molecular Microbiology and Pathogenesis" or permission of instructors. Class meets twice per week for 1.5 hours each.

Credit 2 units.

L41 Biol 5224 Molecular, Cell and Organ Systems

This course will introduce Ph.D. and MSTP students to fundamental problems in cell and molecular biology at the systems level. The course is divided into 5 themes: 1) microbial systems; 2) organ development and repair; 3) cardiovascular system and disease; 4) tumor & host systems; and 5) metabolic systems and disease. Topics within each theme highlight current research concepts, questions, approaches and findings at the molecular, cellular and physiological levels. Students will write an original research grant proposal on a topic of their choosing in one of the 5 themes. Students will critique proposals anonymously in an NIH-like study section. Prereqs; Fundamentals of Molecular Cell Biology and Nucleic Acids and Protein Synthesis.

Credit 3 units.

L41 Biol 5235 Genetics Journal Club

This journal club will be focused on the Genetics department seminar series. Students will present one or a few recent papers by the seminar speaker scheduled for that week. Students will provide a brief written evaluation (on a form that will be provided) of their peers' presentations, and the faculty advisors will meet with each student after the presentation to provide feedback.

Credit 1 unit.

L41 Biol 5255 Experimental Skeletal Biology Journal Club

The journal club, which meets weekly, focuses on cellular and molecular biology of the skeleton. Emphasis is placed on gaining insights into normal skeletal homeostasis as well as systemic disorders of bone. Papers presented for review are selected from the most competitive journals. Participants are encouraged to "think outside of the box" and discuss novel molecular discoveries that may impact bone cell function. Prerequisite, permission of instructor.

Credit 1 unit.

L41 Biol 5272 Advanced Topics in Immunology

This course uses a journal club format to discuss contemporary issues in the cell and molecular biology of the immune system. Discussions focus on the use of current approaches to analyze the cellular and molecular basis of immunity. Topics include mechanisms of antigenic specificity, diversity, cell communication, differentiation, activation, and effector activity. Prerequisite, Bio 5051 and permission of instructor.

Credit 2 units.

L41 Biol 5282 Chromatin Structure and Gene Expression

This special topics course will use "Epigenetics" ed. By Allis, Jenuwein, Reinberg, and Caparros (2007, Cold Spring Harbor Laboratory Press) as the organizing text. Each week a faculty member will provide a background lecture on an important topic or model system, and a student will present and lead discussion of a paper from the current scientific literature related to the previous week's background lecture. Topics to be considered will include background on chromatin structure, histone modifications and histone variants; epigenetic regulation in yeast, other fungi, ciliates, flies, mammals and plants; dosage compensation in different systems; DNA methylation and imprinting in mammals; stem cells, nuclear transplantation and reprogramming; and the epigenetics of cancer and other human diseases (some variation in topics in different years). Students enrolled in the course will be required to present one paper and to come prepared to each session, with a question for discussion. Prerequisite, BIO 548 Nucleic Acids and Protein Biosynthesis. Credit 2 units.

L41 Biol 5284 Current Research in Chromatin, Epigenetics and Nuclear Organization

This journal club considers papers from the current literature on chromatin structure and function, with an emphasis on regulation of transcription, epigenetics and genomics. Presentations are given by students, postdocs and faculty, with discussion by all. Students enrolled for credit are expected to attend regularly, and to present a minimum of one paper during the term, with consultation and critique from the faculty. Credit 1 unit.

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.

L41 Biol 5288 Special Topics in Molecular Genetics

A special topics course with lectures and discussion on the molecular basis of cancer including cell cycle regulation, tumor suppressor genes, tumor invasion, angiogenesis, immune evasion, resistance to apoptosis, signaling, imaging, gene expression, chromosomal translocations, and viral oncology. Credit 2 units.

L41 Biol 5303 Protein NMR Journal Club

This journal club covers the recent literature on protein NMR with a focus on using NMR to study protein function, NMR dynamics, and novel methods that expand the range of systems accessible to solution NMR studies. Students, postdocs and faculty discuss a recent paper and present background information on the relevant technical aspects of NMR. Students receive 1 credit for participation and presenting one paper. Credit 1 unit.

L41 Biol 5304 Introduction to Biomedical Data Science I

This course is designed primarily for individuals who wish to learn the research tools and approaches required for biomedical informatics-based research and who have little or no computational experience using command line shells, programming, and databases. Credit 4 units.

L41 Biol 5311 Dynamics in Mesoscopic Molecular Systems

This course will provide a background in the theory of the dynamics of mesoscopic systems and introduction to methods for measuring the dynamics of these systems. It will include measurement methods, some of which are in common use and others that have only recently been introduced. This course would be useful for biophysics students and others that are interested in molecular processes and mechanisms in small systems such as cells. Prerequisites, Physical Chemistry. Credit 3 units.

L41 Biol 5312 Macromolecular Interactions

This course will cover equilibria, kinetics and mechanisms of macromolecular interactions from a quantitative perspective. Thermodynamics, multiple binding equilibria (binding polynomials), linkage phenomena, cooperativity, allostery, macromolecular assembly, analysis of binding isotherms, enzyme catalysis and mechanism, steady-state and pre-steady-state kinetics, kinetic simulation, and isotope effects. Prerequisite, physical chemistry, biochemistry, calculus, and organic chemistry. 3 class hours per week. Credit 3 units.

L41 Biol 5318 DNA Repair

This course is an advanced graduate course that explores all aspects of DNA damage and the cellular responses to DNA damage. It is designed for graduate students who have a working knowledge of Chemistry, Molecular Biology and Cellular Biology, and for interested postdocs and researchers. Specific topics that will be covered are: The chemical basis of DNA damage, specific DNA repair mechanisms, cell cycle responses to damage, translesion DNA replication and mutagenesis, and human diseases related to defects in DNA damage response. The course consists of a lecture module, open to all, and a discussion module for registered students. In addition, several invited speakers in the field of DNA repair will give seminars and meet with registered students for discussion. Students will present and discuss research papers. Grades will be given based on student presentation and participation. Prerequisite; Permission of instructor. Credit 2 units.

L41 Biol 5319 Molecular Foundations of Medicine

This course will cover fundamental aspects of biochemistry and cell biology from a medical perspective. 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. Prerequisite: Two semesters of organic chemistry. Coursemaster approval is required. Please note: This course is given on the medical school schedule and so it begins 8 days before the grad school schedule. Credit 3 units.

L41 Biol 5327 Optical Spectroscopy: Theory and Applications

Spectroscopic methods to be covered include fluorescence, both ensemble and single molecule, and absorption (circular dichroism); fluorescence correlation spectroscopy will also be discussed. The quantum chemistry /physics behind these methods will be reviewed. Prerequisite: Consent of instructor.

Credit 2 units.

L41 Biol 5328 Structural Biology Journal Club

Multi-laboratory research colloquia for DBBS graduate students focused on structural biology and complementary biophysical techniques. Course credit requires student presentation for credit.

Credit 1 unit.

L41 Biol 5336 Computational Biophysics Journal Club

This course covers a combination of classic and recent publications on computational methods for studying biomolecules. Students participating for credit will be required to present at least once.

Credit 1 unit.

L41 Biol 5352 Developmental Biology

Analysis of a selected set of key processes in development, such as pattern formation, cell-cell signaling, morphogenesis, etc. The focus is on molecular approaches applied to important model systems, but framed in classical concepts. The discussion section provides instruction in presenting a journal club and writing a research proposal. Prerequisites, Molecular Cell Biology (Bio 5068) and Nucleic Acids (548).

Credit 3 units.

L41 Biol 5357 Chemistry and Physics of Biomolecules

This course covers three major types of biomolecular structures: proteins, nucleic acids, and membranes. Basic structural chemistry is presented as well as the biophysical techniques used to probe each type of structure. Selected topics covered include protein folding, protein design, X-ray crystallography, NMR spectroscopy, nucleic acid bending and supercoiling, nucleic acid:protein interactions, RNA folding, membrane organization, fluidity, permeability and transport, and membrane channels. The weekly discussion section will cover problem sets and present current research papers. This is one of the required courses for the biochemistry and for the molecular biophysics graduate programs. Prior course work in biochemistry and physical chemistry is recommended but not required.

Credit 3 units.

L41 Biol 5358 Biochemical and Biophysical Investigations of Infectious Diseases Journal Club

Biochemical and biophysical approaches continue to advance as powerful approaches to the understanding of human disease processes. This journal club covers recent papers in which these approaches address aspects of infectious diseases or inflammation. Students who enroll for credit will be expected to participate in weekly presentations and to present one to two papers along with accompanying background information. Prerequisites: Graduate standing in DBBS; prior introductory course work in biochemistry, physical chemistry, or Chemistry and Physics of Biomolecules (Biol 5357). Course work in microbiology or immunology is not required.

Credit 1 unit.

L41 Biol 5392 Molecular Microbiology & Pathogenesis

Course is devoted to studying microorganisms, particularly those that cause disease, with an emphasis on the molecular interactions between pathogens and hosts. First third of the course focuses on virology, second third on bacteriology and the last third on eukaryotic pathogens. Prereq, first semester core curriculum for Programs in Cell and Molecular Biology.

Credit 3 units.

L41 Biol 5393 Molecular Virology Journal Club

Journal club covering a broad range of topics in virology with an emphasis on pathogenesis or molecular biology of medically important viruses. A minimum of one student presentation with faculty critique. Prerequisite: Permission of instructor.

Credit 0.5 units.

L41 Biol 5397 Current Literature in Microbiology

Presentations by students on a broad range of topics of current interest in microbiology. The course will emphasize presentations and discussion skills. Credit requires attendance and participation at all sessions and one presentation. Prerequisites: L41 Biology and Biomedical Science Microbiology (349) and laboratory (3491).

Credit 1 unit.

L41 Biol 5401 Introduction to Bioinformatics I

This year-long course for first-year BIDS PhD students introduces a broad spectrum of biomedical informatics theories and methods that support and enable translational research and, ultimately, precision health care. The course is organized into modules spanning levels of inquiry from biomolecules to patients to populations. For each module, a relevant set of biomedical informatics frameworks will be introduced and then demonstrated via experiential learning involving the analysis of a variety of biological, clinical, and population-level data sets.

Credit 4 units.

L41 Biol 5403 Introduction to Biomedical Data Science I

This course provides a hands-on introduction to fundamental principles of informatics and data analysis tools and methods. It is designed primarily for individuals who wish to learn the research tools and approaches required for biomedical informatics-based research and who have little or no computational experience using command line shells, programming, and databases.

Credit 4 units.

L41 Biol 5412 Tropical and Molecular Parasitology

Graduate level seminar course focusing on current scientific literature in molecular parasitology. The journal club will meet biweekly during the Fall and Spring semesters. Students will attend both semesters in order to receive one credit. The seminar series will run jointly with a research conference in Tropical and Molecular Parasitology. Outside speakers will be invited for the seminar series to emphasize important developments in tropical medicine and molecular parasitology. In advance of the invited speakers, topics will focus on their previous research publications. Prerequisites, BIO 5392 Molecular Microbiology & Pathogenesis.

Credit 0.5 units.

L41 Biol 5417 Hematology Division Journal Club: Current Topics in Biochemistry, Cellular, and Molecular Biology

This journal club covers a broad range of topics of current interest, including the fields of biochemistry, molecular biology, cell biology, developmental biology, and immunology. Speakers usually give a brief background to introduce the topic and then focus on one-two

papers from the current literature. Presentations are given by graduate students, post-doctorates, and faculty. Each attendee presents two-three times per year. Participants are expected to attend all the sessions. This journal club was founded in 1966.
Credit 1 unit.

L41 Biol 5425 Immunology of Infectious Diseases Journal Club

The goal of this Journal Club (JC) is to provide 2nd year students in MMMP program a platform to discuss new and emerging concepts on mechanisms by which host immune responses mediate protection against infectious diseases. This exercise will also enable the student who attend the fundamental Immunology course to apply their knowledge to understand the basis for immunology of infectious diseases. The format will include faculty who will select cutting-edge papers and head the discussion during the JC session.
Credit 1 unit.

L41 Biol 5426 ID Gateway: Translational and Public Health Aspects of Basic Infectious Disease Research

This course provides an opportunity for students, postdoctoral fellows, infectious disease fellows and faculty to explore issues at the interface between patient care, public health and basic research in the area of microbial pathogenesis. Prerequisites, Application and L41 Bio 5392 or M30 526, or permission of instructor.
Credit 2 units.

L41 Biol 5445 DNA Metabolism Journal Club

Presentation of current research papers in DNA replication, DNA repair, and DNA recombination, with an emphasis on basic biochemical and biophysical approaches.
Credit 1 unit.

L41 Biol 5456 Advanced Crystallography

The advanced course in Protein Crystallography will address all aspects of modern protein crystallography including fundamentals of crystallography, the derivation of the structure factor and electron density equation, symmetry and space groups, direct methods, isomorphous replacement, molecular replacement, data collection, and crystal growing theory and techniques. Prerequisite, Physical Chemistry & Bio 5325 Protein Structure and Function. Two class hours per week.
Credit 2 units.

L41 Biol 5466 Current Topics in Biochemistry

Special topics course offered every other week involving the discussion of research papers covering a broad range of topics in the field of biochemistry. Papers selected from the primary literature will be presented and discussed by students with guidance from the instructor. Emphasis will be placed on papers that illustrate the application of chemical approaches to important biological processes. Designed primarily for first- and second-year graduate students in the Biochemistry Ph.D. program. Prerequisites: coursemaster permission.
Credit 0.5 units.

L41 Biol 5469 Biochemistry, Biophysics, and Structural Biology Seminar

Student presentation of Biochemistry, Biophysics or Structural Biology topic. Second Year Students present from literature; senior students give formal research seminar. Attendance required of all BBSB Graduate Students. Prerequisites: BBSB Graduate Student.
Credit 0.5 units.

L41 Biol 548 Nucleic Acids & Protein Biosynthesis

Fundamental aspects of the structure, biosynthesis, and function of nucleic acids and the biosynthesis of proteins. Emphasis on mechanisms involved in the biosynthetic processes and the regulation thereof. Lecture course supplemented with student discussions of research papers. Prerequisites: Biol 3371, Biol 451, Chem 481 or equivalent, or permission of instructor.
Credit 3 units.

L41 Biol 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, multi-point analysis, non-parametric 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 bases 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 Coursemaster contact the MSIBS Program Manager (biostat-msibs@email.wustl.edu or telephone 362-1384).
Credit 3 units.

L41 Biol 5484 Genetics and Development of *C. elegans* Journal Club

Students will present a research paper (or present their current thesis research) and the appropriate background material.
Credit 1 unit.

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.

L41 Biol 5488 Genomics

This course is designed for beginning students who want to become familiar with the basic concepts and applications of genomics. The course covers a wide range of topics including how genomes are mapped and sequenced as well as the latest computational and experimental techniques for predicting genes, splice sites, and promoter elements. High throughput techniques for ascribing function to DNA, RNA, and protein sequences including microarrays, mass spectrometry, interspecies genome comparisons and genome-wide knock-out collections will also be discussed. Finally, the use of genomic techniques and resources for studies of human disease will

be discussed. A heavy emphasis will be put on students acquiring the basic skills needed to navigate databases that archive sequence data, expression data and other types of genome-wide data. Through problem sets the students will learn to manipulate and analyze the large data sets that accompany genomic analyses by writing simple computer scripts. While students will become sophisticated users of computational tools and databases, programming and the theory behind it are covered elsewhere, in Michael Brent's class, Bio 5495 Computational Molecular Biology. Because of limited space in our teaching lab, enrollment for lab credit will be limited to 24 students. Priority will be given to students in the DBBS program. Others interested in the course may enroll for the lectures only. If you have previous experience in computer programming, we ask that you do not enroll for the laboratory credit. Prerequisites, Molecular Cell Biology (Bio 5068), Nucleic Acids (Bio 548) or by permission of instructor. Lecture 3 units of credit; lab 1 additional unit, space limited. Credit variable, maximum 4 units.

L41 Biol 5489 Human Genetics Journal Club

In this biweekly journal club on Human Genetics we will present and discuss current cutting edge papers in human and mammalian molecular genetics. Students learn presentation skills, how to critique a paper and how to interact with a very active and critical audience. Prerequisites; Any person interested in the current state of the art in Human Genetics may attend this course. It is a requirement that all students wishing to earn credit in this course must present a 1.5 hour journal club talk and must regularly attend and participate in the journal club throughout the year. Credit 0.5 units.

L41 Biol 5491 Advanced Genetics

Fundamental aspects of organismal genetics with emphasis on experimental studies that have contributed to the molecular analysis of complex biological problems. Examples drawn from bacteria, yeast, nematodes, fruit flies and mammalian systems. Prerequisite, graduate standing or permission of instructor. Credit 3 units.

L41 Biol 5495 Computational Molecular Biology

This course is a survey of algorithms and mathematical methods in biological sequence analysis (with a strong emphasis on probabilistic methods) and systems biology. Sequence analysis topics include introduction to probability, probabilistic inference in missing data problems, hidden Markov models (HMMs), profile HMMs, sequence alignment, and identification of transcription-factor binding sites. Systems biology topics include the discovery of gene regulatory networks, quantitative modeling of gene regulatory networks, synthetic biology, and (in some years) quantitative modeling of metabolism. Prerequisite: CSE 131 or CSE 501N. Credit 3 units. EN: BME T, TU

L41 Biol 5496 Seminar in Computational Molecular Biology

Students present current research papers and the appropriate background material in the field of Computational Biology. **Arts and Sciences students must take this course for credit; Engineering students must take this course Pass/Fail.** Credit 1 unit.

L41 Biol 5499 Cancer Informatics Journal Club

This journal club will explore current topics in cancer informatics. Current literature will be reviewed for advanced cancer genome analysis methods, statistics, algorithms, tools, databases, and other informatics resources. Credit 1 unit.

L41 Biol 550 Medical Genetics

A significant portion of the first-year course in basic medical genetics devoted to human and clinical genetics, with emphasis on how genomic information will transform the practice of medicine. Topics covered include population genetics; molecular basis of mutations; human functional genomics; mouse models of human disease; pharmacogenomics; metabolic defects. Lectures, small group discussions, patient information session. Prereq, an introductory genetics course and permission of the instructor. Credit 2 units.

L41 Biol 5501 The Biology and Pathology of the Visual System

The purpose of the course is to provide a fascinating view of vertebrate eye development, anatomy, physiology and pathology. Topics to be covered include the molecules that control eye formation, ocular stem cells, the physiology of transparency, hereditary ocular diseases, phototransduction, the neurobiology of the retina and central visual pathways, age-related eye diseases, and many others. The course is open to all second year graduates students and above. Ophthalmology residents and postdocs with an interest in vision are strongly encouraged to attend. Credit 3 units.

L41 Biol 5504 Algorithms for Biosequence Comparison

This course surveys algorithms for comparing and organizing discrete sequential data, especially nucleic acid and protein sequences. Emphasis is on tools to support search in massive biosequence databases and to perform fundamental comparison tasks such as DNA short-read alignment. Prerequisite: CSE 347 or permission of instructor. These techniques are also of interest for more general string processing and for building and mining textual databases. Algorithms are presented rigorously, including proofs of correctness and running time where feasible. Topics include classical string matching, suffix array string indices, space-efficient string indices, rapid inexact matching by filtering (including BLAST and related tools), and alignment-free algorithms. Students complete written assignments and implement advanced comparison algorithms to address problems in bioinformatics. This course does not require a biology background. Prerequisites: CSE 347 or instructor permission Revised: 2019-02-21 Same as E81 CSE 584A Credit 3 units. EN: BME T, TU

L41 Biol 5505 Independent Study in Fundamentals of Molecular and Microbial Genetics

This literature-based course will introduce students to seminal and current studies in molecular and microbial genetics. Students will read and present a minimum of 12 landmark papers that helped shape our understanding of molecular and microbial genetics. Emphasis will be placed on students' ability to comprehend and explain these studies via chalk talks. All presentations will be given by students. Prerequisites: L41 5491 Advanced Genetics and permission from instructor. Credit 2 units.

L41 Biol 5507 Genome Engineering Methods and Applications

This course will cover the basic principles of genome engineering with emphasis on Cas9/CRISPR technology. It will consist of discussion sessions in which students will present assigned manuscripts followed by a general discussion of the topic directed by the instructor. The course will cover the mechanisms of genome editing using host DNA repair systems, the function of Cas9, and how Cas9 can be harnessed to introduce defined mutations into almost any genome. The use of Cas9 to activate or repress genes, alter chromatin modifications, and the application of these Cas9 systems to conducting genome-scale screens in mammalian cells as well as its use in studying cell fate will

be highlighted. Finally, we will study how Cas9 methodologies can be used to introduce disease-associated variants into pluripotent stem cells (e.g. iPSCs) that can be differentiated into disease-relevant cell for use in functional genomic studies.
Credit 1 unit.

L41 Biol 5512 Diseases of Membrane Transport & Excitability

Classes will consider the molecular basis of the disease as well as animal models and current clinical studies. Addressing studies from the level of basic biophysical and molecular properties of the underlying ion channels/transporters, to the cellular defects, to organ and animal outcomes and therapies., which will encourage and force students to develop their ability to integrate understanding at multiple levels. Students will be introduced to emerging ideas in clinical diagnosis, management and treatment, when appropriate, clinical specialists will allow student participants to directly observe and participate in the clinical experiences. Prerequisites, Bio 5068 Fundamentals of Molecular Cell Biology.
Credit 2 units.

L41 Biol 554 Neural Sciences

An integrated course dealing with the structure, function and development of the nervous system. The course will be offered in the Spring of the first year Medical School calendar. Prerequisite: Biol 3411 or Biol 501 and approval of the instructor.
Credit 5 units.

L41 Biol 5565 Oral Presentation of Scientific Data

Practical course on how to prepare and present scientific data to an audience. Prerequisite: First year neuroscience program courses. Meets once a week for 90 minutes.
Credit 1 unit.

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.

L41 Biol 5577 Synapses Journal Club

Synaptic function and malleability are fundamental to nervous system function and disease. This is an advanced seminar in the development, structure, and function of the synapse in health and disease. It is a natural extension of topics covered in Bio 5571. It may be primarily of interest to students in the Neurosciences Program, but also to students in MCB, Development, Biochemistry, Computational Biology, and Molecular Biophysics. Generally a topic for the semester helps focus the group; past topics have included Synapses and Disease, Neurotransmitter Transporters, Glutamate Receptors, Dendrites, GABA receptors. Participants (students, postdocs, and faculty) alternate responsibility for leading critical discussion of a current paper. Active participation offers the opportunity for students to hone their critical thinking and presentation skills. Students enrolling for credit will be expected to attend each week, to lead discussion once per semester and to provide written critiques (1-2 pages each) of two papers. Prerequisites, Graduate standing in DBBS; Bio 5571 preferred.
Credit 1 unit.

L41 Biol 560A Special Topics in Nuclear Chemistry: Radiochemistry for the Life Sciences

This course will provide an introduction to nuclear science (e.g. radioactive decay, nuclear stability, interactions of radiation with matter) and followed by an overview of how radiochemistry is used in the life sciences. Lectures on radiolabeling chemistry with radionuclides used in medical imaging (single photon emission computed tomography (SPECT) and positron emission tomography (PET) and their applications will be presented. In addition, lectures on radiochemistry with tritium (H-3) and C-14 will also be included. Additional applications include environmental radiochemistry as applied to nuclear waste disposal and biofuels.
Same as L07 Chem 536
Credit 2 units.

L41 Biol 5617 Development Biology PhD Program Seminar

In response to student feedback for additional training in Developmental Biology obtained from surveys and group meetings, we propose a new seminar course in Developmental Biology. This once a week course will introduce student in the Developmental, Regenerative, and Stem Cell Biology PhD Program both to the classical embryological experiments that defined key concepts in developmental biology, such as cellular fields, equivalence groups, cytoplasmic determinants, and the more modern experiments that uncovered the genetic and molecular basis of these processes. In general, the classes will be individual sessions on professional development, such as scientific presentation, how to navigate graduate school, etc.
Credit 1 unit.

L41 Biol 5619 Advanced Cognitive, Computational, and Systems Neuroscience

This course will develop critical thinking and analysis skills with regard to topics in Cognitive, Computational and Systems Neuroscience. Course format will be a series of modules composed of intensive, faculty-led case studies on interdisciplinary topics at the intersection of psychology, computation and neuroscience. The goal will be to highlight the benefits of integrative, interdisciplinary approaches, by delving into a small set of topics from a variety of perspectives, rather than providing a survey-level introduction to a broader set of topic areas. Modules will involve a combination of lectures and student-led discussion groups, with students further expected to complete a multi-disciplinary integrative final review paper. Case-study topics will vary somewhat from year to year, but are likely to include some of the following: temporal coding as a mechanism for information processing, coordinate transformations in sensory-motor integration, mechanisms of cognitive control, motor control strategies including application to neural prosthetics, and memory systems in health and disease.
Same as L33 Psych 519
Credit 3 units.

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.

L41 Biol 5646 First-Year Fundamentals

This course will provide a two-part introduction to neuroscience research fundamentals. Namely, it will introduce elementary statistical analysis for neuroscience research as well as grant writing to support neuroscience-related research. Enrollment is limited to first-year neuroscience students.
Credit 0.5 units.

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 3 units.

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.

L41 Biol 5657 Biological Neural Computation

This course will consider the computations performed by the biological nervous system with a particular focus on neural circuits and population-level encoding/decoding. Topics include, Hodgkin-Huxley equations, phase-plane analysis, reduction of Hodgkin-Huxley equations, models of neural circuits, plasticity and learning, and pattern recognition & machine learning algorithms for analyzing neural data. Note: Graduate students in psychology or neuroscience who are in the Cognitive, Computational, and Systems Neuroscience curriculum

pathway may register in L41 5657 for three credits. For non-BME majors, conceptual understanding, and selection/application of right neural data analysis technique will be stressed. Hence homework assignments/examinations for the two sections will be different, however all students are required to participate in a semester long independent project as part of the course. Calculus, Differential Equations, Basic Probability and Linear Algebra Undergraduates need permission of the instructor. L41 5657 prerequisites: Permission from the instructor
Same as E62 BME 572
Credit 3 units. EN: TU

L41 Biol 5663 Neurobiology of Disease

This is an advanced graduate course on the pathology of nervous system disorders. This course is primarily intended to acquaint Neuroscience graduate students with a spectrum of neurological diseases, and to consider how advanced neuroscientific approaches may be applied to promoting recovery in the brain. Topics will be presented by Washington University faculty members and include: neurooncology, stroke, retinal disease, perinatal brain injury, neurodegenerative disorders, neuroinflammation, epilepsy, and psychiatric disorders. The class will meet for 2 hours each week. Each session will be led by a faculty guest with expertise in a specific neurological or psychiatric disease. In the first hour, the speaker will discuss clinical manifestations and pathophysiology. Where possible, the clinical presentation will be supplemented with a patient demonstration or videotape. After a 30 minute break for pizza and soda, the second hour will follow a journal club format. Two or three students will review current papers assigned by the speaker or course director. This course is offered in alternate years. Prerequisite: Introductory neuroscience course at the graduate or medical school level.
Credit 2 units.

L41 Biol 5665 The Science of Behavior

The primary function of nervous systems is to control behavior. Understanding the links between brain and behavior requires an understanding of cognition—the computations performed by the brain, as well as the algorithms underlying those computations and the physical substrates that implement those algorithms. The goal of this course is to introduce students to the tools, concepts, and techniques for the experimental study of cognition and behavior in humans and nonhuman animals. We will focus on cognitive capacities that are well-developed in humans and can be compared with those of other species, to develop an understanding of how evolution shapes cognition and behavior. Students who complete this course will be able to ask questions and form hypotheses about the computations and algorithms underlying cognition and behavior, and to design experiments that test these hypotheses. PREREQ: Graduate standing or permission of the instructor
Same as L33 Psych 5665
Credit 3 units.

L41 Biol 5678 Clocksclub

Clocksclub focuses on recent advances in the study of biological timing including sleep and circadian rhythms. Participants discuss new publications and data on the molecules, cells and circuits underlying daily rhythms and their synchronization to the local environment. Students registered for this journal club will lead a discussion once during the semester. Prerequisites: BIO 2970 or permission of instructor.
Credit 1 unit.

L41 Biol 5702 Current Approaches in Plant and Microbial Research

This course is designed to introduce graduate students and upper-division undergraduates to contemporary approaches and paradigms in plant and microbial biology. The course includes lectures, in-class discussions of primary literature and hands-on exploration of computational genomic and phylogenetic tools. Evaluations include short papers, quizzes, and oral presentations. Over the semester, each student works on conceptualizing and writing a short NIH-format research proposal. Particular emphasis is given to the articulation of specific aims and the design of experiments to test these aims, using the approaches taught in class. Students provide feedback to their classmates on their oral presentations and on their specific aims in a review panel. Prereq: Bio 2970 or permission of the instructor. Credit 4 units.

L41 Biol 5703 Experimental Design and Analysis in Biological Research

In-depth exploration of landmark and current papers in genetics, molecular and cell biology, with an emphasis on prokaryotes and eukaryotic microbes. Class discussions will center on such key discoveries as the chemical nature of genetic material, the genetic code, oxygen producing light-spectrum, cell-cell signaling, transcriptional regulation, the random nature of mutation, and cell cycle regulation. Emphasis will be placed on what makes a good question or hypothesis, expedient ways to address scientific problems, and creative thinking. The last third of the course will consist of student-run seminars on selected topics to increase proficiency in the synthesis of new material and public presentation skills. Credit 2 units.

L41 Biol 580 Seminar in Population Biology

This weekly seminar, covering different topics each semester, should be taken by graduate students in the program. Prerequisite: graduate standing or permission of the instructors. Credit variable, maximum 3 units.

L41 Biol 5801 Biochemistry & Molecular Biophysics Seminar Journal Club

This will be a journal club-based seminar course mirroring the topics covered by Biochemistry and Molecular Biophysics (BMB) seminar speakers during the concurrent semester. Students will present a paper published by one of the BMB seminar speakers one-week ahead of that speaker's seminar. This will allow students and faculty to become more familiar with the research programs of BMB invited speakers, likely stimulating discussion within the Q&A period after the seminar, as well as during informal meet-the-speaker lunch sessions. Students will be evaluated on their journal club presentation, attendance and class participation. Credit 1 unit.

L41 Biol 584 Climate Change Reading Group

The Climate Change Reading Group is made up of multi-disciplinary faculty and students from multiple institutions in St Louis: WUSTL, UMSL, SLU, Missouri Botanical Garden, Danforth Center, and more. Many of us in different labs, departments, and institutions around STL are actively investigating aspects and effects of climate change; this reading group provides a venue for interacting with others in the community. Subject matter within the context of Climate Change will be chosen each week by a different presenter. Students can join this reading group for 1 credit if they agree to read all papers, actively participate in discussions, find and present one high quality scientific

paper on climate change in the field of their choice and moderate the discussion of this paper. The students will be evaluated on their participation, their understanding of the issues, and their presentation. Prerequisites: Contact the course coordinator. Credit 1 unit.

L41 Biol 585 Seminar in Floristic Taxonomy

This weekly seminar provides an introduction to/overview of Plants, each semester progressively covering orders and families in a sequence derived from the Angiosperm Phylogeny Website (<http://www.mobot.org/MOBOT/Research/APweb/welcome.html>); in Spring 2015, the seminar will cover several crown orders of the monocots, including grasses and relatives. Weekly presentations include a summary of all relevant information (molecular, chemical, anatomical, embryological, morphological, ecological, geographical, historical/paleontological, etc.) about the plant group under consideration, review of the classification/phylogeny of the group, examination of fresh and/or preserved specimens, and discussion of relationships, human uses, and other relevant aspects of the biology of that group. Credit will be contingent on one (or two) seminar presentation(s) per student, regular attendance and active participation in group discussions. Credit 1 unit.

L41 Biol 5862 Seminar on Professional Development for Graduate Students in Ecology, Evolution & Population Biology

This is a weekly discussion seminar course in which advanced graduate students and postdocs in STEM will discuss the practices of scientific teaching and basic professional development skills. Topics covered will include scientific teaching, active learning, assessment driven instruction, creation inclusive classrooms, preparing for job interviews, preparing grant proposals, and balancing family and work. There will be several panel discussions with invited speakers on a range of potential career options to STEM PhDs. Students will prepare or revise their professional portfolio materials over the course of the semester. The course is open to all DBBS graduate students and is required for GAANN fellows. Prerequisite: Graduate student status in the DBBS or permission of instructor. Credit 1 unit.

L41 Biol 5866 Communicating Science: Writing for Multiple Audiences

This course introduces strategies for writing effectively and communicating scientific research to a variety of audiences. Students will learn to reduce jargon, explain scientific concepts in common language, write clearly and concisely, and use sentence structure to maximum efficiency. Written assignments emphasize the significance and innovation in scientific research that appeal to broad audiences, including: the general public, students, policy makers, grant reviewers, and journal editors. This course meets biweekly and consists of lectures and small group sessions. You must enroll in both the lecture session (section 1) and a small group (section A, B, C, or D). Credit 1 unit.

L41 Biol 5867 Career Planning for Biological Scientists

This course will guide you through nationally recognized and evidence-based career exploration curricula. It is intended for DBBS Ph.D. students and bioscience postdocs who want to jump-start career planning and professional skills needed for a broad range of scientific careers. Topics include self-assessment, career exploration, and goal-setting for long-term success. You will work on a team to research the scientific career path of your choice. Each team will study the specific required knowledge, skills, and attributes of their career interest or

employment sector. As part of this research project, you will complete a simulated job exercise and network with alumni or local leaders in your chosen field, gaining valuable real-world insights and creating essential professional connections.

Credit 1 unit.

L41 Biol 590 Research

Credit to be arranged.

Credit variable, maximum 12 units.

L41 Biol 5902 Introduction to the Scholarship of Teaching and Learning

In this course, advanced graduate students and postdocs in STEM will 1) learn the fundamentals of the Scholarship of Teaching and Learning (SoTL)-which is the practice of developing, reflecting on, and evaluating teaching methods to improve student learning, 2) Develop a working knowledge of SoTL, which draws on research in education, STEM education, and cognitive science, 3) Understand how SoTL can lead to the dissemination of new knowledge to a broad audience of educators through publication and presentations., and 4) Develop the central elements of a SoTL project. These elements include articulating questions about classroom teaching that can be addressed in a SoTL research project; developing working hypotheses in response to the questions; designing an evaluative plan, including specific research methods, the type of data to be collected, and how the data will be analyzed in relation to the hypotheses; identifying and understanding necessary procedures to obtain IRB approval for the research. Prereqs: Must be an advanced graduate student or a postdoctoral appointee with some teaching experience, and must have completed 4 STEM Pedagogies workshops (2 are foundational topics) offered by The Teaching Center or received approval from one of the instructors. Same as U29 Bio 4902.

Credit 1 unit.

L41 Biol 5911 Seminar in Biology & Biomedical Sciences

These seminars cover the recent literature in various areas not included in other courses, or in more depth than other courses. Prerequisite: permission of instructor. Credit to be arranged.

Credit variable, maximum 12 units.

L41 Biol 5920 Foundations in Cancer Biology

This basic cancer biology class is designed to provide a didactic foundation into cancer biology principles. These will include tumor suppressors & oncogenes, DNA damage pathways, protein modifications, tumor progression, metastasis, tumor microenvironment and numerous other topics relevant to cancer biology.

Credit 3 units.

L41 Biol 5922 Entering Mentoring

This course is a series of facilitated discussions aimed at developing and improving mentoring skills for those involved in supervising undergraduate research experiences. It is designed for postdocs and graduate students who are or will be 'bench mentors' for undergraduates doing Bio 500 and/or Summer Research. Participants will receive "Entering Mentoring" materials, including articles and worksheets to facilitate mentoring interactions with their mentee, plus several resource books relevant to mentoring. They will develop a mentoring philosophy statement, work on specific assignments designed to improve their relationship with their mentee and share their present and past experiences as mentors and mentees. Bench mentors will be eligible for a travel award to help defray expenses for attending a meeting with their mentee, if that student wins one of the HHMI SURF travel awards (4-5 awarded annually) or is otherwise being supported to present at a scientific meeting. Prerequisite: open to graduate students and postdocs, with priority for those who plan to

mentor undergraduates in summer research experiences. Graduate students and postdocs do NOT need to be mentoring a student at the time of the course; it is open to all with an interest in mentoring now or in the future. Note: The sessions will be held either at the beginning of the day or the end of the day at the Danforth campus. Once registration closes, an email will be sent to those registered to poll for the best days & times.

Credit 1 unit.

L41 Biol 5929 Experimental Cancer Biology

This basic cancer biology class is meant to coincide with the Foundation course. Topics will be discussed in parallel with Foundation course topics but from the perspective of the laboratory experimentalist. Experimental details will provide the basis for understanding how to ask and answer important questions in the cancer biology laboratory.

Credit 3 units.

L41 Biol 5940 Foundations in Cancer Biology and Experimental Cancer Biology

This advanced course will teach the clinical perspective of cancer biology using topics from oncology, radiation biology, radiology, pathology, immunology and surgery. Students will learn to write a grant proposal that includes a clinical trial element while also shadowing physicians in a real cancer clinical setting.

Credit 3 units.

L41 Biol 598 Topics in Evolution, Ecology and Population Biology

This course will meet weekly to discuss ongoing research and future directions of the Evolution, Ecology, and Population Biology (EEP) graduate program. A different EEP faculty member will present each week. This course introduces new EEP students to the diversity of research questions and approaches undertaken by laboratories in the EEP program; it will also introduce new students to faculty and vice versa. The course will educate the students about the breadth of research in evolution, ecology, and behavior. It will also provide knowledge that students can use when choosing lab rotations and interdisciplinary exposure to enhance creativity in research.

Credit 1 unit.

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.

L41 Biol 5999 Independent Work

This course is designed for individual students wishing to explore indepth specialized areas of literature or technology with one or more faculty members. Credit will vary with the amount of work and discussion, but cannot be more than 3 credits.

Credit variable, maximum 3 units.

Policies

The Vagelos Division of Biology & Biomedical Sciences has more than 700 students with access to over 700 faculty mentors with whom they may perform their dissertation work. This unparalleled flexibility results from the joint governance of DBBS by the Washington University School of Medicine and the School of Arts & Sciences — a 50-year-old model that fosters the most impactful science executed at the boundaries of fields, programs, disciplines, schools and departments. This collaborative, interdisciplinary approach that transcends traditional boundaries is a hallmark of DBBS, and our training programs routinely rank among the top PhD programs nationally and internationally.

In this interdisciplinary environment, graduate students are governed by policies established by the university, the Office of Graduate Studies, Arts & Sciences, the School of Medicine and DBBS. The policies identified here and elsewhere in this *Bulletin* are not to be considered a complete list. However, every attempt has been made to identify the location of those policies that affect most or all students in DBBS.

In this *Bulletin*, the University Policies (p. 17) page covers many of the policies that apply to both graduate and undergraduate students, specifically in the areas of nondiscrimination, student health, student conduct, academic integrity, intent to graduate, and academic records and transcripts. In addition, it refers to the university's Compliance and Policies page. Graduate students should follow that page's links to the Information Technology, Computers and Internet Policies and to the Intellectual Property Policies and the Research Policies; most of the former and many of the latter will apply to all graduate students.

All DBBS students must follow the University PhD Policies & Requirements as set forth by the Provost's Office.

Degrees in DBBS are conferred by the School of Arts & Sciences; hence, students must follow the policies and procedures as set forth by the school. The website of the Office of Graduate Studies, Arts & Sciences, has a Policies & Procedures page that includes links to the full text of several of its policies, including those related to the following:

- Academic and Professional Integrity for Graduate Students
- Access to Student Academic Records
- Alcohol Service (at events sponsored by graduate students and organizations)
- Bias-Related University Policies
- Change of Student Status
- Confidentiality
- Consensual Faculty-Student Relationships
- Courses & Grades
- Dissenting Votes (at a dissertation defense)
- Enrollment & Registration
- Interdisciplinary Opportunities
- International Travel
- Leaves (Leave of Absence, Medical Leave of Absence, Involuntary Leave, New Child Leave)
- Part-Time Employment
- Probation & Dismissal for Academic Reasons

- Reinstatement
- Residency Requirement
- Student Grievance Procedures
- Time Off
- Transfer of Credit
- Tuition and Fees
- Withdrawal

Students should be familiar with the applicable policies (p. 357) as set forth by the School of Medicine, including the Student Mistreatment Reporting and Monitoring Policy (p. 362). The Student Mistreatment Reporting and Monitoring policy includes information about Supporting a Fair Environment (SAFE).

In addition, Student Health Services provides efficient, accessible, high-quality medical care to DBBS students.

Biomedical Informatics

The mission of the Institute for Informatics, Data Science and Biostatistics (I²DB) focuses on the informatics, data science, and biostatistics 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 I²DB is to serve as the academic and professional home for a preeminent interdisciplinary program of research, education, and service in informatics, data science, and biostatistics at Washington University by enabling advances in biomedical research and improvements in the quality of health care.

I²DB provides an academic and professional home for both research and practice. While sitting at the intersection of all three fields, I²DB spans the School of Medicine and works collaboratively with the McKelvey School of Engineering, the Institute for Public Health, the Brown School, the Olin School of Business, the Health Systems Innovation Lab and Center for Clinical Excellence at BJC HealthCare, and the Cortex Innovation Community.

I²DB 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; and
- 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.

Academic Calendar

The academic programs begin in early July each year. They start with preparatory workshops, which are followed by intensive summer semester courses. The program follows the Washington University Arts & Sciences academic calendar for fall and spring courses.

Location

The Biomedical Informatics program is located in the I²DB, which is on the fifth floor of the Bernard Becker Medical Library (660 S. Euclid Ave., St. Louis, MO 63110), rooms 500 through 508.

Additional Information

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Associate Professor of Medicine, Division of General Medical Sciences
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Washington University School of Medicine

Biomedical Informatics Education Program
Institute for Informatics, Data Science and Biostatistics (I²DB)
660 S. Euclid Ave., MSC 8067-0013-05
St. Louis, MO 63110-1093

Website: <https://i2db.wustl.edu/>

Degrees & Offerings

- PhD in Biomedical Informatics
- Master of Science in Biomedical Informatics (p. 134)
- Certificate Program in Biomedical Informatics (p. 135)

Research

Mentored Research

All students enrolled in the Mentored Research course will complete a master's thesis, which may involve conducting and reporting a comprehensive data analysis or conducting research and reporting on a focused methodological problem; the latter may include a computer simulation approach to solve a problem, an in-depth review of available methods in a certain topical area, or the development of new methods. Each student will work closely with a mentor with expertise in biostatistics or a related quantitative field. The grade for each student will be determined in consultation with the mentor.

Internship

The primary goal of the Internship program is for all students enrolled in the Internship 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 test-drive the job market, develop contacts, build marketable skills, and figure out likes and dislikes in the chosen field.

Faculty

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School of Medicine

Chih-Hung Chang, PhD

Professor of Occupational Therapy, Medicine and Orthopedic Surgery

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Mackenzie Hofford, MD

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Beth Prusaczyk, PhD, MSW

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Aristeidis Sotiras, PhD

Assistant Professor of Medicine, School of Medicine

Adam Wilcox, PhD, FACMI

Director, Center for Applied Clinical Informatics
Professor of Medicine, Division of General Medical Sciences

Courses

Visit online course listings to view offerings for M18 BMI.

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 I2DB education office to gain MS credit approval.

Credit variable, maximum 3 units.

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.

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.

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.

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.

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) healthcare information systems; (5) human factors and cognitive science; (6) 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.

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 3 units.

M18 BMI 5304 Introduction to Biomedical Data Science I

Biomedical Data Science I will provide students with an introduction to tools, theories and methods related to data modeling, management and query, data manipulation and analysis, and visualization that serve as the foundations for advanced topics in Biomedical Informatics and Data Science. The course consists of didactic lectures and experiential learning opportunities including hands-on laboratory sessions and

a culminating project. No assumptions are made about computer science or clinical background; however, prior experience with health and life sciences data, and data structures and algorithms are strongly encouraged. Lectures will be held asynchronous. Labs are in person. Credit 3 units.

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 3 units.

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.

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 & Genetic Epidemiology

The mission of the Institute for Informatics, Data Science and Biostatistics (I²DB) focuses on the informatics, data science, and biostatistics 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.

The Biostatistics education programs offered by I²DB include two master's degrees and two graduate certificates: the Master of Science in Biostatistics (MSIBS), the Master of Science in Biostatistics and Data Science (MSBDS), the Certificate in Genetic Epidemiology, and the Certificate in Biostatistics and Data Science. Interested students may pursue individual courses offered by the division.

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.

Academic Calendar

The academic programs begin in early July each year. They start with preparatory workshops, which are followed by intensive summer semester courses. The program follows the Washington University Arts & Sciences academic calendar for fall and spring courses.

Location

The Biostatistics & Genetic Epidemiology program is located in the Institute for Informatics, Data Science, and Biostatistics, which is on the fifth floor of the Bernard Becker Medical Library (660 S. Euclid Ave., St. Louis, MO 63110), rooms 500 through 508.

Additional Information

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Degrees & Offerings

- Master of Science in Biostatistics (p. 136)
- Master of Science in Biostatistics and Data Science (p. 136)
- Certificate in Biostatistics and Data Science (p. 137)
- Certificate in Genetic Epidemiology (p. 137)

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 I²DB as well as in other departments and research labs on the School of Medicine 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.

Mentored Research

All students enrolled in the Mentored Research course will complete a master's thesis, which may involve conducting and reporting on comprehensive data analysis or conducting research and reporting on a focused methodological problem; the latter may include a computer simulation approach to solve a problem, an in-depth review of available methods in a certain topical area, or the development of new methods. Each student will work closely with a mentor who has expertise in biostatistics or a related quantitative field. The grade for each student will be determined in consultation with the mentor.

Internship

The primary goal of the Internship program is for all students enrolled in Internship 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 test-drive the job market, develop contacts, build marketable skills, and figure out likes and dislikes in the chosen field.

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Robert Fitzgerald, PhD

Associate Professor of Psychiatry

Charles Gu, PhD

Associate Professor of Biostatistics

Aditi Gupta, PhD

Assistant Professor in Biostatistics

Daphne Lew, PhD, MPH

Instructor in Biostatistics

Ruijin Lu, PhD

Assistant Professor of Biostatistics

J. Phillip Miller, PhD

Professor of Biostatistics

Tara Payne, MA, FAMIA

Lecturer

DC Rao, PhD

Professor of Biostatistics

Ken Schechtman, PhD

Professor of Biostatistics

Yun Ju Sung, PhD

Associate Professor of Biostatistics

RJ Waken, PhD

Instructor of Biostatistics

Peter Wang, PhD

Assistant Professor of Biostatistics

Chengjie Xiong, PhD

Professor of Biostatistics

Linying Zhang, PhD

Assistant Professor of Biostatistics

Visit our website for more information about our faculty and their appointments.

Courses

Visit online course listings to view offerings for M21 MSB.

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.

Credit 2 units.

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.

Credit 2 units.

M21 MSB 507 R and Python For Biomedical Sciences

Students will explore data manipulation techniques using Pandas in Python, focusing on leveraging its native functionalities to efficiently handle and analyze biomedical data. Emphasis will be placed on transitioning from traditional looping methods to utilizing Pandas' powerful features for data manipulation tasks. In Python, students will delve into essential libraries including Pandas and NumPy using Jupyter Notebooks, gaining proficiency in data structuring, exploration,

and analysis. Through hands-on exercises and projects, students will learn to leverage Python's ecosystem for efficient data handling and visualization, preparing them for real-world applications in biomedical research and analysis. The course also introduces R programming within the tidyverse framework which includes a number of R packages designed to make data manipulation, visualization, and analysis easier and more intuitive. We will focus on the use of packages including dplyr and ggplot2 for data manipulation and visualization, respectively. Students will learn to harness R's capabilities for basic statistical analysis and visualization, complementing their Python skills and expanding their toolkit for biomedical informatics and biostatistics. Credit 2 units.

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.

Credit 2 units.

M21 MSB 515 Fundamentals of Genetic Epidemiology

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 as hands-on practice of fundamental concepts. Students will gain practical experience with various genetics computer programs (e.g. SOLAR, MERLIN, QTD, and PLINK). Auditors will not have access to the computer lab sessions. Prerequisite: R for Data Science (M21-506).

Credit 3 units.

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, multi-point analysis, non-parametric 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 bases 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 Coursemaster contact the MSIBS Program Manager (biostat-msibs@email.wustl.edu or telephone 362-1384).

Same as L41 Biol 5483

Credit 3 units.

M21 MSB 550 Introduction to Bioinformatics

Provide a 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 acquire understanding of mathematical algorithms in genome sequence analysis (alignment analysis, gene finding/predicting), gene expression microarray (genechip) analysis, and of the impact of recent developments in the protein microarray technology. Prerequisite: R for Data Science (M21-506).

Credit 3 units.

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, will introduce students to several of the most widely used probability distributions, and will 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, Statistical Computing with SAS®, or student must have good practical experience with SAS®. Students are required to participate in the "Computing/Unix" workshops offered free of charge prior to this course.

Credit 3 units.

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 towards 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 masters.

Credit 3 units.

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

Credit variable, maximum 6 units.

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 Instructor is required.

Credit 3 units.

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 Instructor required. Prerequisites: M21-560 Biostatistics I and M21-570 Biostatistics II.

Credit 3 units.

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)/model(s) developed as part of their thesis. 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, as well as how to derive, design and implement new statistical genetics models. The course also includes didactic instruction on haplotype estimation and 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, permission of the instructor.

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.

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.

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 and the Institute of Clinical and Translational Sciences.

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

- Engage in high-quality didactic courses (refer to the MSCI course list) 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, 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 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
Phone: 314-454-8936
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David Warren, MD, MPH

Program Director
Email: dwarren@wustl.edu

Dominic Reeds, MD

Program Director
Email: dreeds@wustl.edu

Washington University School of Medicine
Master of Science in Clinical Investigation Program
Clinical Research Training Center
660 South Euclid Avenue
Mail Stop Code 8051-021-2200
St. Louis, MO 63110

Email: crtcmsci@email.wustl.edu
Website: <https://crtc.wustl.edu>

Degrees & Offerings

- Master of Science in Clinical Investigation (p. 138)
- Graduate Certificate in Clinical Investigation (p. 139)

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

Research Assistant Professor
Brown School of Social Work

Stephanie Solomon Cargill, PhD

Adjunct Assistant Professor, Medicine
Department: Internal Medicine

Patricia Cavazos-Rehg, PhD

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

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

Elvin Geng, MD, MPH

Professor of Medicine
Department: Internal Medicine
Division: Infectious Diseases

Dorina Kallogjeri, MD, MPH

Research Statistician
Department: Otolaryngology

Jessica Mozersky, PhD

Assistant Professor in Medicine
Department: General Medical Sciences

Jay F. Piccirillo, MD, FACS

Professor of Otolaryngology
Department: Otolaryngology

Dominic Reeds, MD

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

Carl Siekmann, MBA

Adjunct Instructor
Department: School of Continuing & Professional Studies, Clinical
Research Management Program

Peter Takes, PhD, RAC, FRAPS

Adjunct Instructor
Department: School of Continuing & Professional Studies, Clinical
Research Management Program

David K. Warren, MD, MPH

Professor of Medicine
Department: Internal Medicine
Division: Infectious Diseases

Courses

Visit online course listings to view offerings for M17 CLNV.

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 coursework and seminars. Open to CRTC Predoctoral Program scholars only.
Credit variable, maximum 6 units.

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.

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 coursework and seminars. Open to CRTC Postdoctoral Program scholars only.
Credit variable, maximum 5 units.

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.

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 his or her 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 CRTCC Postdoctoral Program scholars only.
Credit 1 unit.

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. CRTCC scholars only.
Credit 2 units.

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

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.

M17 CLNV 524 Intermediate Statistics for the Health Sciences

This course builds upon Introduction to Statistics for the Health Sciences (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-master is Mark Walker, PhD, and Instructor is Brian Waterman, MPH. Prerequisite: M17-522
Credit 3 units.

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.

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.

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.

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.

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.

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.

M17 CLNV 5420 Designing for Dissemination, Implementation & Sustainability: How to Maximize Impact and Equity

This course will introduce students to modern concepts in design thinking and how they affect dissemination, implementation, and sustainability of health interventions in clinical and public health translational research practice. This course will provide students with methods in all stages of the design thinking process: 1) empathize; 2) define; 3) ideate; 4) prototype; and 5) test. The goal of this approach is to ensure that the products of research (interventions, materials, and findings) are developed in ways that match well with the needs, resources, workflows, and contextual characteristics of the target audience and setting to maximize impact and equity.
Credit 3 units.

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.

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.

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 Designing Outcomes for Clinical Research
Credit 3 units.

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). 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.

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 humble, 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) 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
Website: <http://geneticcounseling.wustl.edu>

Degrees & Offerings

- Master of Science in Genetic Counseling (p. 139)

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 King, MD

Course Director

Elizabeth Witthaus

Program Coordinator

Visit the Program in Genetic Counseling website for more information about our faculty and their appointments.

Courses

Visit online course listings to view offerings for M65 Peds.

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.

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.

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.

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.

M65 Peds 507 Genetic Counseling Research Methods 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.

M65 Peds 510 Clinical Genetics & Genomics I

This course is a seminar focusing on the fundamentals of clinical genetics and genomics. Attendance and active participation are expected and required. Course activities will include interactive lectures, class discussion, and class member presentations. This course is open to students in the Master's Program in Genetic Counseling. Admittance may be offered to other students by request.

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.

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.

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.

M65 Peds 604 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. 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 Program in Genetic Counseling. Admittance may be offered to other students by request. Prerequisites for this course are Human Embryology (taken online via University of Cincinnati during the first year of study).
Credit 2 units.

M65 Peds 605 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 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. 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. Prerequisite for this course is Advanced Genetic Counseling I (M65.601).
Credit 4 units.

M65 Peds 606 Clinical Fieldwork Rotations III

This course covers clinical fieldwork rotations. Participation as requested by supervisors is required. This includes two 14-day clinical rotations during the spring semester of the second year. This course is open to students in the Master's Program in Genetic Counseling. Prerequisites for this course are successful completion of Clinical Fieldwork Rotations I and II (M65.509 and M65.603).
Credit 3 units.

M65 Peds 607 Research Project III

The primary objective of the 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 III is taken during the spring semester of the second year. This course is open to students in the Master's Program in Genetic Counseling.
Credit 2 units.

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.

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.

Elective Course (to be approved by Program Director)

Medical Education

Degrees & Offerings

MD and Joint MD Degrees

- Doctor of Medicine (MD) (p. 140)
- Doctor of Medicine Five-Year Program (p. 149)
- Doctor of Medicine and Master of Science in Clinical Investigation (p. 149)
- Doctor of Medicine and Master of Population Health Sciences (p. 149)
- Doctor of Medicine and Master of Public Health (p. 149)
- Doctor of Medicine and Master of Business Administration (p. 150)
- Doctor of Medicine and Doctor of Philosophy (p. 150)

Postgraduate Medicine

- Graduate Medical Education (p. 150)
- Continuing Medical Education (p. 151)

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), the Doctor of Philosophy (PhD) in Medical Physics, and the 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. 151)
- Doctor of Philosophy (PhD) in Medical Physics
- Post-PhD Graduate Certificate in Medical Physics (p. 153)

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

Started 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

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

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

Dean Hobbis, PhD

Instructor of Radiation Oncology Radiation Oncology
BS, Physics, Eckerd College, 2015
MS, Physics, University of South Florida, 2018
PhD, Applied Physics, University of South Florida, 2020
Certificate Program, Medical Physics, University of Chicago, 2021
Residency, Medical Physics, Mayo Clinic Arizona, 2023

Zhongwei Zhang, MD, PhD

Assistant Professor of Radiology
MD, Taishan Medical University, 2000
PhD, Clinical Medicine, Sun Yat-sen University, 2009

Joseph O'Sullivan, PhD

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

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

Courses

Visit online course listings to view offerings for M91 MedPhys.

M91 MedPhys 500 Structure and Function of the Human Body for Medical Physics

TBA
Credit 3 units.

M91 MedPhys 501 Clinical Imaging Fundamentals

This course will discuss the main imaging modalities used in the clinic. This includes x-ray, magnetic resonance, ultrasound, and nuclear imaging. Applications with an emphasis on diagnostic imaging and image-guided radiotherapy will be covered. The focus of this course is on the underlying physical principles, technical implementations, image reconstruction algorithms, and quality assurance. In addition to the didactic component, there will be hands-on laboratory sessions on CT, cone-beam CT, planar x-ray imaging, mammography, MRI, ultrasound, and nuclear medicine. Prerequisite: ESE589; permission of the program director.
Credit 2 units.

M91 MedPhys 502 Radiological Physics and Dosimetry

This class is designed to construct a theoretical foundation for ionizing radiation dose calculations and measurements in a medical context and prepare graduate students for proper scientific presentations of in the field of x-ray imaging and radiation therapy. This course will cover the fundamental concepts of radiation physics, how ionizing radiation interact with matter, and how the energy that is deposited in the matter can be measured in theory and practice. Specifically, a student completing this course will be able to do the following: 1. Understand and apply key concepts specific to energy deposition for both ionizing photon interactions and transport in matter and for energetic charged particle interactions and transport in matter. Radiation sources include radioactivity, x-ray tubes, and linear accelerators. 2. Understand the theoretical details of ion-chamber based dosimetry and of cavity-theories based clinical dose measurement protocols. 3. Perform and present real world style research projects as a group, and present these projects in a typical professional scientific format and style. 4. Achieve an appreciation of the history and potential future developments in ionizing radiation detection and dosimetry. Prerequisite: Physics and calculus; permission of the program director
Credit 3 units.

M91 MedPhys 503 Independent Study

The independent study 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.
Credit 1 unit.

M91 MedPhys 503C Clinical Project

Students will complete a clinically-focused, hands-on project under the supervision of a faculty mentor. Students will learn background as to the impetus of this project, will develop a plan or procedure for completing the project, and will take a major role in performing and completing the developed tasks. The goal of this is to simulate and gain an understanding of the workflow needed to achieve advancements in the clinic and/or patient care, as well as for students to gain a deeper understanding about a clinically focused topic. An oral presentation and written report describing the completed project work is required. Prerequisite: 2 semesters of MP503; Permission of the program director
Credit 3 units.

M91 MedPhys 503P PhD Thesis Research

Doctor of Philosophy in Medical Physics students will work on their thesis research under the guidance of their thesis advisor(s). Students will work on various elements of their thesis including research, writing, and other relevant tasks. Student progress will be assessed regularly throughout their doctoral thesis, including the achievement of required tasks and milestones. Prerequisite: MP503R and/or permission of the program director Prerequisite: MP503R and/or permission of the program director
Credit variable, maximum 9 units.

M91 MedPhys 503R Phd Research Rotation

The PhD Research Rotation course is designed to provide students with an experience working with one or more potential thesis mentors on a focused research opportunity. Students will gain insight into an aspect of the field of medical physics and a program of academic research, as well as cultivating a relationship with a potential thesis mentor. PhD 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: Permission of the program director.
Credit 3 units.

M91 MedPhys 503T MS 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. The goal of this project is to gain an in-depth understanding about an area of development or research in the medical physics field, as well as to gain an understanding about how to structure, perform, and present academic work. Students may also learn about academic publication composition and submission. An oral presentation and written report describing the completed project work are required. Prerequisite: two semesters of MP503; Permission of the program director.
Credit 3 units.

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.

M91 MedPhys 505 Radiobiology

This class 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, radiation therapy fractionation and related concepts. The effects of ionizing radiations on living cells and organisms, including physical, chemical, and physiological basis of radiation cytotoxicity, mutagenicity, and carcinogenesis are also covered. Prerequisite: College level biology or BIOL4581; Permission of the program director.
Credit 2 units.

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. Prerequisite: MP502; Permission of the program director.
Credit 3 units.

M91 MedPhys 521 Radiation Protection and Safety

This class is designed to further the concepts of radiation interactions and dosimetry to radiation protection and safety and biological consequences of radiation exposure in humans. Protection and safety of the radiation worker and patient, as well as detection equipment and shielding analysis will be main focus. This course will briefly cover regulations, and radiological protection in various clinical environments. Prerequisite: Physics and calculus; Permission of the program director
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. Prerequisite: MP502, MP506, and MP521; Permission of the program director
Credit 1 unit.

M91 MedPhys 523 Advanced Clinical Medical Physics Laboratory

The objective of this course is to reinforce and enhance the understanding concepts developed in didactic medical physics courses through practica, laboratory work, and/or special lectures. Students will gain a deeper understanding of the physics and methods involved in clinical imaging and/or radiation therapy treatment processes. The various practica will cover an array of topic areas including absolute dosimetry, relative dose measurements, patient QA, imaging QA, radiation beam modeling, treatment planning, proton therapy, brachytherapy, stereotactic radiotherapy, and adaptive radiation therapy. Prerequisite: MP502, MP506, and MP521; permission of the program director.
Credit 2 units.

M91 MedPhys 883 Master's Continuing Student Status

M91 MedPhys 884 Doctoral Continuing Student Status

E35 ESE 589 Biological Imaging Technology

This class will develop a fundamental understanding of the physics and mathematical methods that underlie biological imaging and critically examine case studies of seminal biological imaging technology literature. The physics section will examine how electromagnetic and acoustic waves interact with tissues and cells, how waves can be used to image the biological structure and function, image formation methods and diffraction limited imaging. The math section will examine image decomposition using basis functions (e.g. Fourier transforms), synthesis of measurement data, image analysis for feature extraction, reduction of multi-dimensional imaging datasets, multivariate regression, and statistical image analysis. Original literature on electron, confocal and two photon microscopy, ultrasound, computed tomography, functional and structural magnetic resonance imaging and other emerging imaging technology will be critiqued. Credit 3 units. EN: BME T, TU

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: Judith Frain
Phone: 314-362-3316
Email: jfrain@wustl.edu
Website: <https://www.barnesjewishcollege.edu/doctoral-degree/phd-nursing-science/>

Degrees & Offerings

- PhD in Nursing Science (p. 153)

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

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

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

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

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

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

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

Associate Dean for Research

Dominic Reeds

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

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

Maryann Bozzette

Associate Professor
PhD, University of Washington–Seattle

Mary Curtis

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

Sarah Farabi

Assistant Professor
PhD, University of Illinois–Chicago

Heidi Holtz

Assistant Professor
PhD, Indiana University–Purdue University Indianapolis

James Kennett

Assistant Professor
PhD, University of San Diego

Pamela Newland

Associate Professor
PhD, University of Missouri–Columbia

MaryAnn Niemeyer

Assistant Professor
PhD, University of Missouri–Columbia

Tamara Otey

Assistant Professor
PhD, Indiana University

Amy Piontek

Assistant Professor
PhD, Southern Illinois University–Carbondale

Nancy Ridenour

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

Mayola Rowser

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

Judy Smith

Assistant Dean and Professor, Undergraduate Nursing Program
PhD, Saint Louis University

Po-Yin Yen

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.

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.

M93 NrsSci 511 Philosophy 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.

M93 NrsSci 512 Literary 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: L88 510.
Credit 3 units.

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: L88 512.
Credit 3 units.

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: L88 513.
Credit 3 units.

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: L88 513 and L88 534.
Credit 3 units.

M93 NrsSci 520 Research I: Research Designs and Measurement 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.

M93 NrsSci 521 Research II: Research Design and Measurement for Scientific Inquiry: Qualitative Methods

This is an introductory course in qualitative research with particular focus on the health sciences. The course focuses on 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.

M93 NrsSci 522 Research III: Research Designs and Measurement for Scientific Inquiry: Psychometrics

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. Prerequisite: L88 520.
Credit 3 units.

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 gain 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 his/her research team. In courses III and IV, under the supervision of both nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will

then develop a research plan integrating methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors in developing their dissertation research proposal.
Credit 1 unit.

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 gain 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 his/her research team. In courses III and IV, under the supervision of both nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan integrating methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors in developing their dissertation research proposal. PREREQUISITE: L88 530
Credit 1 unit.

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 gain 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 his/her research team. In courses III and IV, under the supervision of both nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan integrating methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors in developing their dissertation research proposal. PREREQUISITE: L88 531
Credit 1 unit.

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 gain 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 his/her research team. In courses III and IV, under the supervision of both nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will then develop a research plan integrating methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors in developing their dissertation research proposal. PREREQUISITE: L88 532
Credit 1 unit.

M93 NrsSci 534 Mentored Research Experience V

This course is the 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 gain 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 his/her research team. In courses III and IV, under the supervision of both nursing and non-nursing mentors, students will identify a scientific challenge that is significant to nursing. Students will

then develop a research plan integrating methods from a non-nursing discipline to address the challenges. In course V, students will work closely with the nursing and non-nursing mentors in developing their dissertation research proposal. PREREQUISITE: L88 533
Credit 1 unit.

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.

M93 NrsSci 550 Dissertation

Original investigation research experience designed by student to prepare for completing proposed research, public defense, and publication of dissertation as based on student's substantive areas of interest and program of research. Offered every semester.
Credit variable, maximum 4 units.

M93 NrsSci 9000 Full-time Graduate Research/Study

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.

Email: wuotinfo@wustl.edu
Website: <http://www.ot.wustl.edu>

Degrees & Offerings

- Master of Science in Occupational Therapy (p. 154)
- Clinical Doctorate of Occupational Therapy (p. 154)
- Post-Professional Doctorate of Occupational Therapy (p. 154)
- PhD in Rehabilitation and Participation Science (p. 155)

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 page of our website.

Faculty

Lisa Tabor Connor, PhD, MSOT, OTR/L

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

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

Associate Professor of Occupational Therapy and Neurology
Director, Division of Clinical Operations

Visit our website for more information about our faculty and their appointments.

A

Kaylee A Abeln, M.S.

Course Association
Bachelor of Science, Saint Louis University, 2016

Master of Science, Saint Louis University, 2017

Cami Antonacci

Course Association

Lisa Avery

Course Association

Bachelor of Science, Washington University in St Louis, 1987

B

Salma Hussain Bachelani, O.T.D.

Instructor in Occupational Therapy (primary appointment)

Instructor in Pediatrics

Bachelor of Science, Missouri State University, 2013

Doctor of Occupational Therapy, Washington University in St Louis, 2016

Peggy Barco, O.T.D.

Professor of Occupational Therapy (primary appointment)

Professor of Medicine

Doctor of Occupational Therapy, Washington University in St Louis, 1987

M. Carolyn Baum, M.A., Ph.D.

Professor Emeritus of Occupational Therapy

Bachelor of Science, University of Kansas, 1966

Master of Arts, Webster University, 1979

Doctor of Philosophy, Washington University in St Louis, 1993

Jessie Lynne Bricker, M.S., O.T.D.

Assistant Professor of Occupational Therapy (primary appointment)

Assistant Professor of Medicine

Academic Fieldwork Coordinator and Capstone Coordinator

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

Sarah C Cheatham Oberle, O.T.D.

Instructor in Occupational Therapy (primary appointment)

Instructor in Pediatrics

Bachelor of Arts, Wake Forest University, 2008

Doctor of Occupational Therapy, Washington University in St Louis, 2013

Brittany Conners

Course Association

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

Associate Dean for Occupational Therapy

Director of the Research Division

Professor of Neurology

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

Maria Lopez Coxon, M.S., O.T.D.

Course Association

Bachelor of Science, University of Pittsburgh, null

Master of Science, Boston University, null

Doctor of Occupational Therapy, Boston University, null

D

Jessica L Dashner, O.T.D.

Associate Professor of Occupational Therapy (primary appointment)

Associate Professor of Neurology

Bachelor of Science, McKendree University, 2000

Doctor of Occupational Therapy, Washington University in St Louis, 2002

Deborah Dinzebach

Course Association

E

Dorothy F Edwards, Ph.D.

Voluntary Research Professor of Occupational Therapy

Voluntary Research Professor of Neurology

Bachelor of Arts, Loyola University (Duplicate of Loyola University New Orleans), 1972

Doctor of Philosophy, Washington University in St Louis, 1980

F

Anna Fung, M.S., O.T.D.

Course Association

Bachelor of Science, University of Kansas, 2014

Master of Science, University of Kansas Medical Center, 2016

Doctor of Occupational Therapy, University of Kansas Medical Center, 2020

G

Lenin Grajo, M.Ed., Ph.D.

Associate Professor of Occupational Therapy (primary appointment)

Director of Professional Education

Associate Director of Diversity, Equity and Inclusion

Associate Director of Program in Occupational Therapy

Associate Professor of Psychiatry

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

Grace Hoerr

Course Association

Heidi Hoskins

Course Association

Catherine R Hoyt, O.T.D., Ph.D.

Assistant Professor of Occupational Therapy (primary appointment)
Assistant Professor of Neurology
Assistant Professor of Pediatrics
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 (primary appointment)
Assistant Professor of Neurology
Bachelor of Science, University of Wisconsin Milwaukee, 2011
Master of Science, University of Wisconsin Milwaukee, 2012
Doctor of Philosophy, University of Maryland Baltimore, 2019

K

Jessica Kersey, Ph.D.

Instructor in Occupational Therapy (primary appointment)
Instructor in Neurology
Doctor of Philosophy, University of Pittsburgh, 2021

Kathleen Marie Kniepmann, 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
Master of Public Health, Harvard University, 1981
Doctor of Occupational Therapy, Washington University in St. Louis, 2009

L

Chun Lun Lau, Ph.D.

Assistant Professor of Occupational Therapy (primary appointment)
Assistant Professor of Neurology
Bachelor of Science, Hong Kong Polytechnic University, 2016
Doctor of Philosophy, Washington University in St. Louis, 2022

Yejin Lee, M.S.

Course Association
Bachelor of Science, Yonsei University, 2011
Master of Science, Yonsei University, 2016

M

Amanda Mack, M.S., O.T.D.

Assistant Professor of Occupational Therapy (primary appointment)
Director of Post-Professional Education
Assistant Professor of Medicine
Bachelor of Science, Boston University, 2011
Master of Science, Boston University, 2013
Doctor of Occupational Therapy, 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

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.

Associate Professor of Occupational Therapy (primary appointment)
Associate Professor of Neurology
Director of Research Division
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 (primary appointment)
Instructor in Neurology
Bachelor of Science, University of Central Arkansas, 2016
Main Campus, 2019

P

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.

Voluntary Research Assistant Professor of Occupational Therapy
Master of Health Science, University of Florida, 1994

Eliza Prager

Course Association
Course Association

R

Duana C Russell, M.S., O.T.D.

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
Doctor of Occupational Therapy, Washington University in St Louis, 2016

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

Gregory Steven Seymour

Course Association
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 2006

Emily K Somerville, M.A., O.T.D.

Assistant Professor of Occupational Therapy (primary appointment)
Assistant Professor of Neurology
Bachelor of Arts, Covenant College, 2005
Master of Arts, Washington University in St Louis, 2007
Doctor of Occupational Therapy, Washington University in St Louis, 2017

Susan L Stark, M.S., Ph.D.

Professor of Occupational Therapy (primary appointment)
Professor of Social Work
Professor of Neurology
Bachelor of Science, Alma College, 1988
Master of Science, Washington University in St Louis, 1989
Doctor of Philosophy, University of Missouri Columbia, 1998

Macyn Miller Stonner, O.T.D.

Course Association
Bachelor of Science, Furman University, 2013
Doctor of Occupational Therapy, Washington University in St Louis, 2016

T

Steven D Taff, M.S., Ph.D.

Professor of Occupational Therapy (primary appointment)
Professor of Medicine
Assistant Dean for Faculty Promotions and Career Development

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

Kelsey Anne Cook Todd

Course Association

Garth D Tubbs

Assistant Professor Emeritus of Occupational Therapy
Bachelor of Science, School Not Found, 1953

Susan M Tucker, M.S., O.T.D.

Assistant Professor of Occupational Therapy (primary appointment)
Assistant Professor of Neurology
Master of Science, Washington University in St Louis, 2002
Doctor of Occupational Therapy, Washington University in St Louis, 2014

Quinn Peal Tyminski, M.S., O.T.D.

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
Doctor of Occupational Therapy, Washington University in St Louis, 2017

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)
Director of Graduate Studies
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.

Assistant Professor of Occupational Therapy (primary appointment)
Assistant Professor of Medicine
Doctor of Occupational Therapy, Washington University in St Louis, 2014

Marit Watson, O.T.D.

Instructor in Occupational Therapy (primary appointment)
Instructor in Medicine
Bachelor of Science, Colorado State University, 1999
Doctor of Occupational Therapy, Creighton University, 2019

Stacy E West-Bruce, M.S.W., O.T.D.

Assistant Professor of Occupational Therapy (primary appointment)
Assistant Professor of 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

Kristin Will, O.T.D.

Course Association
Bachelor of Science, Colorado State University, 2010
Doctor of Occupational Therapy, Washington University in St. Louis, 2014

Timothy J Wolf, O.T.D.

Voluntary Research Associate Professor of Occupational Therapy
Voluntary Research Associate Professor of Neurology
Doctor of Occupational Therapy, Washington University in St. Louis, 2007

Courses

Visit online course listings to view offerings for M01 OT.

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 advisor required.
Credit variable, maximum 6 units.

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.

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.

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.

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.

M01 OT 615 Fundamentals of Professional Communication

This course provides foundational skills in effective verbal and nonverbal communication for all aspects of occupational therapy practice. Evidenced-based models of professional communication are presented with an emphasis on therapeutic modes of communication. Students develop competency in therapeutic use of self, stages of change, group dynamics, leadership and roles, and the process of conducting an occupational profile using semi-structured assessment.
Credit 3 units.

M01 OT 616 Professional Identity and Practice I

This four-course series emphasizes the personal and professional growth of the student as a representative of the profession and institution. The initial course of the series introduces students to empathy, professional behaviors, ethical practice, professional development, interprofessional collaboration, and field experiences. Students are supported in establishing their role in an inclusive and respectful learning community, and their contribution to group culture. Development of professional behavior, presence, and correspondence is emphasized.
Credit 2 units.

M01 OT 627 Enabling Community Living

Students learn about the role of occupational therapy in population health and community environments. Topics include social determinants of health, universal design and environmental management, social policy, cultural influences, technology for recreation and exercise, and community mobility. Students engage in the assessment of the accessibility of community environments.
Credit 2 units.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

M01 OT 7011 Literature and EBP for the OT Practitioner

In this course, students will critically analyze professional and non-professional literature and evidence to answer occupational therapy practice questions and guide decision-making and professional reasoning. The course covers topics such as literature search strategies, critical appraisal of research articles and gray literature, and application of evidence to practice. Students will learn to use evidence-based practice to improve outcomes, increase efficiency, and enhance their own professional development. As part of the course, students will compile a literature review to guide their doctoral project.

Credit 3 units.

M01 OT 7021 Advanced Theory Implementation

Students learn to critically analyze educational, developmental, and environmental theories and use them to guide decision-making and professional reasoning. By course completion, students will have the skills and knowledge necessary to apply a wide variety of theories and models in their professional and clinical practice. As part of the course, students will write a theoretical basis summary to guide their doctoral project.

Credit 3 units.

M01 OT 7041 Advanced Practice through Experiential Learning

This course provides students the opportunity to implement and evaluate their doctoral projects. In conjunction with the course instructor and the doctoral project mentor, students will implement a plan, document the outcomes, and strategically evaluate the results in preparation for dissemination. Student participation in this course is primarily self-driven with general oversight provided by the course instructor and doctoral mentor. There will be the opportunity for collaboration with peers throughout the course.
Credit 3 units.

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 on-going research projects and can be both laboratory and clinical in nature.
Credit 2 units.

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.

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.

M01 OT 7220 Implementing Best Practices in Teaching

This course is designed for healthcare professionals who want to improve their teaching practice by implementing evidence-based best practices in their instructional strategies. Students will learn how to use best practices to create effective lesson plans, deliver engaging and interactive instruction, create inclusive learning environments, promote diversity, equity, and inclusion in educational settings, and implement innovative teaching techniques. By course completion, students will have the skills and knowledge necessary to apply best practices in teaching to their educational settings, ultimately leading to improved learner outcomes.
Credit 3 units.

M01 OT 7310 Outcomes Focused Leadership

This course focuses on developing leadership skills that prioritize outcomes and results in both healthcare and non-traditional settings. The course covers topics such as setting and measuring goals, outcome evaluation, data-driven decision-making, and accountability. Students will engage in case studies and practical exercises to develop hands-on experience. By course completion, students will be well-equipped to lead their teams towards achieving measurable and impactful outcomes.
Credit 3 units.

M01 OT 7400 Doctoral Project: Ideate

In this 1-credit course, students will learn the fundamentals of project management and collaborate with their doctoral mentor, the course faculty, and peers to begin to develop their doctoral project. This course integrates content from the core courses to facilitate the completion of an evidence-based and theory-driven doctoral project concept. This course also includes required networking and regular meetings with the student's doctoral mentor.
Credit 1 unit.

M01 OT 7420 Doctoral Project: Implement and Evaluate

This course focuses on implementing and evaluating the doctoral project plan designed in the previous semester. It runs concurrently with the "Advanced Practice through Experiential Learning" course where the doctoral project is implemented. This course also includes required networking and regular meetings with the student's doctoral mentor.
Credit 1 unit.

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.

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 12 units.

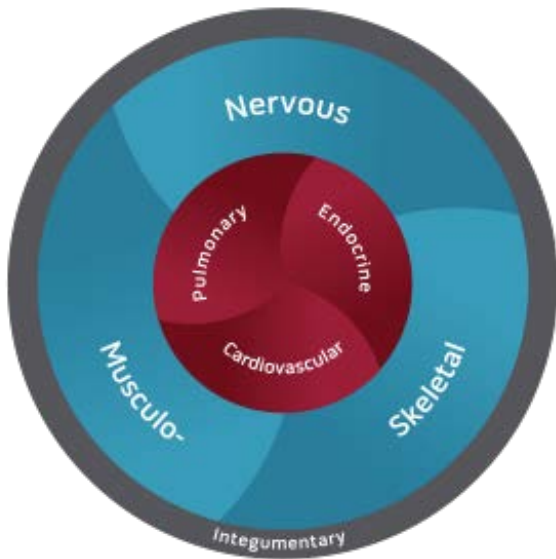
M01 OT 9000 Full-time Graduate Research/Study

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. 155) and the PhD in Movement Science (p. 156).

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 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), 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
 Website: <https://pt.wustl.edu>

Degrees & Offerings

- Doctor of Physical Therapy (p. 155)
- PhD in Movement Science (p. 156)

Research

The mission of the Research Division is to understand how the movement system 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 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.

Our doctoral and postdoctoral 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
Integrative Muscle Physiology	Gretchen A. Meyer, PhD
Movement & Neurodegenerative Disease	Gammon M. Earhart, PT, PhD
Movement & Neurodegenerative Disease	Ryan P. Duncan, PT, DPT
Neural Control of Movement Following Neurological Injury	Laura McPherson, PT, DPT, PhD
Neural Plasticity and Sensorimotor Integration	Jacob McPherson, PhD
Orthopaedic Biomechanics	Michael D. Harris, PhD
Prevention, Rehabilitation & Maintenance in Musculoskeletal Conditions	Linda Van Dillen, PT, PhD, FAPTA
Quantitative Methodology and Rehabilitation Informatics	Keith Lohse, PhD, PStat
Rehabilitation Research for Orthopaedic Conditions	Marcie Harris-Hayes, PT, DPT, MSCI
Shoulder Biomechanics and Rehabilitation	Rebekah Lawrence, PT, PhD
Stroke Recovery & Rehabilitation Accelerometry	Catherine Lang, PT, PhD
Stroke Recovery & Rehabilitation Accelerometry	Marghuretta D. Bland, PT, DPT, NCS
Stroke Recovery, Rehabilitation, and Accelerometry	Carey L. Holleran, PT, MPT, DHS, NCS

Tendon Rehabilitation	Jennifer Zellers, PT, DPT PhD
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
Biplane videoradiography	Muscle physiology testing equipment
Cell culture suite	Oscilloscopes
Dynamometers	Rotating treadmill
Electromyography	Simulated spaces for functional activities
Eye tracking	Split-belt treadmill
Force platforms	Treadmills
Function generators	Wheel mill system
GAITRite instrumented walkway	

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.

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.

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.

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 .

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 .

Faculty

Gammon Earhart, PT, PhD

Executive Director, Program in Physical Therapy

Steve Ambler, PT, DPT, PhD, MPH

Division Director of Education

Tammy L. Burlis, PT, DPT, CCS

Director of Clinical Education

Linda Van Dillen, PT, PhD, FAPTA

Division Director of Research

Gregory Holtzman, PT, DPT, SCS

Division Director of Clinical Practice

Visit our website for more information about our faculty and their appointments.

A

Steven B Ambler, M.P.H., D.P.T., Ph.D.

Professor of Physical Therapy (primary appointment)
Division Director of Professional Curriculum in Physical Therapy
Professor of Orthopedic Surgery
Champaign, 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.

Professor of Physical Therapy (primary appointment)
Professor of Neurology
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.

Emeritus Professor of Physical Therapy
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 Crouner, 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

Mary Maureen Crumley, D.P.T.

Assistant Professor of Physical Therapy (primary appointment)
Assistant Professor of Neurology
Bachelor of Arts, Luther College Iowa, 2011
Bachelor of Science, Luther College Iowa, 2011
Doctor of Physical Therapy, Saint Ambrose University, 2013

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

Ryan Patrick Duncan, M.S., D.P.T.

Associate Professor of Physical Therapy (primary appointment)
Associate Professor of Neurology
Bachelor of Science, Maryville University of Saint Louis, 2007
Master of Science, Maryville University of Saint Louis, 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)
Associate Dean for Physical Therapy
Professor of Neurology
Professor of Neuroscience
Bachelor of Science, Arcadia University, 1994
Master of Science, Arcadia University, 1996
Doctor of Philosophy, Washington University in St Louis, 2000

G

Kristopher Gordon, D.P.T.

Assistant Professor of Physical Therapy (primary appointment)
Assistant Professor of Orthopedic Surgery
Bachelor of Science, Murray State University, 2005
Doctor of Physical Therapy, University of Missouri Columbia, 2014

H

Michael Dennison Harris, Ph.D.

Associate Professor of Physical Therapy (primary appointment)
Associate 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
Champaign, 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)
Assistant Director of Student Assessment and Program Evaluation in Physical Therapy
Associate Professor of Neurology
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)
Division Director of Clinical Practice in Physical Therapy
Professor of Orthopedic Surgery
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

Kiaana Howard, D.P.T.

Assistant Professor of Physical Therapy (primary appointment)
Assistant Professor of Orthopedic Surgery
Bachelor of Science, University of Tennessee at Chattanooga, 2016
Salem State University, 2019

Elizabeth Hughes

Assistant Professor of Physical Therapy (primary appointment)
Assistant Professor of Neurology

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 of Saint Louis, 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

Jeffrey Daniel Konrad, D.P.T., Ph.D.

Assistant Professor of Physical Therapy (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, University of Wisconsin Milwaukee, 2008
Doctor of Physical Therapy, University of Wisconsin Milwaukee, 2011
Doctor of Philosophy, Washington University in St. Louis, 2024

L

Catherine Eckels Lang, M.S., Ph.D.

Professor of Physical Therapy (primary appointment)
Associate Director of Movement Science PhD Program in Physical Therapy
Professor of Neurology
Professor of Occupational Therapy
Barbara J Norton Professor of 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.

Associate Professor of Physical Therapy (primary appointment)
Associate 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 (primary appointment)
Assistant Professor of Orthopedic Surgery
Bachelor of Science, Bradley University, 2006
Doctor of Physical Therapy, Saint Ambrose University, 2008
Doctor of Philosophy, University of Minnesota, 2018

Sylvia Lin, M.S., D.P.T.

Professor of Physical Therapy (primary appointment)
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

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.

Associate Professor of Physical Therapy (primary appointment)
Associate Professor of Orthopedic Surgery
Associate Director of Diversity, Equity, and Inclusion in Physical Therapy
Associate of Science, Hinds Community College, 2001
Bachelor of Science, University of West Alabama, 2004

Doctor of Physical Therapy, Alabama State University, 2007

Ammar Mahmood, Ph.D.

Assistant Professor of Physical Therapy (Pending Executive Faculty Approval) (primary appointment)
Kansas City, 2012

Bachelor of Science, University of Missouri Kansas City, 2015

Doctor of Philosophy, Saint Louis University, 2023

Patricia Navarro McGee, D.P.T.

Associate Professor of Physical Therapy (primary appointment)

Assistant Director of Clinical Education in Physical Therapy

Associate Professor of Orthopedic Surgery

Associate Professor of Pediatrics

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, 2012

Doctor of Philosophy, Northwestern University, 2014

Gretchen Ann Meyer, M.S., Ph.D.

Associate Professor of Physical Therapy (primary appointment)

Associate Professor of Neurology

Associate 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

P

Deborah Athena Rose Rennard Priluck, D.P.T.

Assistant Professor of Physical Therapy (primary appointment)

Assistant Professor of Neurology

Bachelor of Arts, Grinnell College, 2010

Bachelor of Science, Grinnell College, 2010

Doctor of Physical Therapy, Washington University in St Louis, 2019

R

Jessica Randolph, M.S., Ed.D.

Assistant Professor of Physical Therapy (primary appointment)

Assistant Professor of Orthopedic Surgery

Assistant Director of Learning and Continuous Improvement in Physical Therapy

Bachelor of Arts, Carthage College, 2007

Master of Science, Logan College of Chiropractic, 2008

Doctor of Education, Lindenwood University, 2017

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.

Voluntary Research 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

Alyssa Nicole Skala, D.P.T.

Assistant Professor of Physical Therapy (primary appointment)

Assistant Professor of Orthopedic Surgery

Bachelor of Science, University of California Irvine, 2011

Doctor of Physical Therapy, Washington University in St Louis, 2016

Nancy Bloom Smith, M.S., D.P.T.

Emeritus Professor of Physical Therapy

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

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 (primary appointment)
Assistant Professor of Orthopedic Surgery
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 Obstetrics and Gynecology
Associate Professor of Orthopedic Surgery
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

W

Corey B Woldenberg, D.P.T.

Assistant Professor of Physical Therapy (primary appointment)
Assistant Professor of Orthopedic Surgery
Bachelor of Science, University of Kentucky, 2007
Doctor of Physical Therapy, Washington University in St. Louis, 2010

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.

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.

M02 PhysTher 5110 Instrumentation Theory & Application I

Credit 3 units.

M02 PhysTher 5210 Movement Science Teaching Practicum

Focused and supervised classroom and laboratory teaching experiences at the graduate level. Includes delineation of objectives, learning experiences, and presentation of material in both classroom and laboratory settings. Prerequisite: Permission of instructor. The course requires 6 hours of preparation/presentation each week.
Credit 2 units.

M02 PhysTher 5410 Bioenergetics in Movement Science

Application of the principles of muscle metabolism and energy expenditure to human movement.
Credit 3 units.

M02 PhysTher 5510 Biomechanics

Credit 3 units.

M02 PhysTher 5610 Movement Science III - Biocontrol Mechani

The role of neural systems in the production and control of human movement.
Credit 3 units.

M02 PhysTher 5720 Research in Movement Science

Opportunity to pursue non-dissertation research on an individual basis under the supervision and direction of a Movement Science faculty member. PREREQUISITE, PERMISSION OF INSTRUCTOR AND APPROVAL OF MOVEMENT SCIENCE ADVISOR.
Credit variable, maximum 6 units.

M02 PhysTher 5850 Movement Science Program Seminar

Departmental seminar focused on review of current literature, scholarly presentation, and the development of skills in developing and presenting grant proposals. Required for each of the first four semesters of enrollment in the Movement Science program.
Credit 1 unit.

M02 PhysTher 5890 Movement Science Dissertation

Prerequisite, approval of movement science steering committee
Credit variable, maximum 2 units.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 IN THE PHYSICAL THERAPY
Credit 2 units.

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.

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.

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.

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.

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 IN THE PHYSICAL THERAPY PROGRAM.
Credit 4 units.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

M02 PhysTher 711 Prevention, Diagnosis and Management of Complex Movement-Related Problems

Learners will apply the foundations and moderators of movement in the prevention, diagnosis, and management of movement-related conditions across the lifespan with an increasing complexity. An emphasis continues on patient care and the impact of social, environmental, and health systems on patient/client management. Learners will take 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.

M02 PhysTher 720 Practice and Movement

The learner will participate in self-selected activities designed to promote growth of professional skills and attributes gained during situational learning experiences. Learners will hone their clinical reasoning skills across all areas of the movement system. The learner will take action to further develop their professional identity. Learners and faculty will collaborate to optimize the learner's transition from supervised to independent practice with an emphasis on cultivating the master adaptive learner.

Credit 6 units.

M02 PhysTher 721 Practice, Health and Equity

Learners will reflect on experiences across the DPT curriculum in preparation for independent practice and lifelong professional development. Learners will engage in scholarly activities emphasizing practice, health, and equity. Learners will identify and advocate for professional and societal issues affecting physical therapist practice. Learners will enhance strategies to become lifelong master adaptive learners.

Credit 5 units.

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.

M02 PhysTher 731B 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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

M02 PhysTher 741B 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.

M02 PhysTher 741C Patient and Client Care 2

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.

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.

M02 PhysTher 742B 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.

M02 PhysTher 742C 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.

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.

M02 PhysTher 743B 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.

M02 PhysTher 743C 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.

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.

M02 PhysTher 744B 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.

M02 PhysTher 744C 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.

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.

M02 PhysTher 745B 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.

M02 PhysTher 745C 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.

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 746B 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 746C 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.

M02 PhysTher 747B 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.

M02 PhysTher 747C 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.

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.

M02 PhysTher 748B 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.

M02 PhysTher 748C 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.

M02 PhysTher 751A Patient and Client Care 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 751B Patient and Client Care 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 752A Knowledge for Practice 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 752B Knowledge for Practice 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 753A Practice-Based Learning and Improvement 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 753B Practice-Based Learning and Improvement 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 754A Interpersonal & Communication Skills 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 754B Interpersonal & Communication Skills 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 755A Professionalism 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 755B Professionalism 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 756A Systems-Based Practice 3

The learner will demonstrate a minimum of the level 3 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 756B Systems-Based Practice 3

The learner will demonstrate a minimum of the level 3 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 757A Interprofessional Collaboration 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 757B Interprofessional Collaboration 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 758A Personal & Professional Development 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 758B Personal & Professional Development 3

The learner will demonstrate a minimum of the level 3 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.

M02 PhysTher 9000 Full-time Graduate Research/Study

Full-time Graduate Research/Study

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.

Contact: Program Coordinator, Monique Stoves
Email: mphs@wustl.edu
Website: <http://www.mphs.wustl.edu>

Degrees & Offerings

- Master of Population Health Sciences (p. 157)
- Certificate in Clinical Effectiveness (p. 157)
- Certificate in Health Equity and Disparities (p. 158)

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
Director

Yikyung Park, ScD

Co-Deputy Director

Adetunji Toriola, MD, PhD

Co-Deputy Director

Allison King, MD, MPH, PhD

Associate Director for Medical Students

Visit our website for more information about our faculty and their appointments.

Courses

Visit online course listings to view offerings for M19 PHS.

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.

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.

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.

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.

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.

M19 PHS 510 Introduction to SAS for Clinical Research

This 1-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.

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 R program. Prerequisite for the course is knowledge in R.

Credit 3 units.

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 coursework, 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 R 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 R knowledge.

Credit 3 units.

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.

M19 PHS 5254 Using Administrative Data for Health Services Research

The objective of this advanced graduate course is to prepare students to understand and use large administrative healthcare databases to perform epidemiologic / health services research. Lectures will cover the translation of clinical care into healthcare utilization data, review various types of national and state administrative databases, describe methods for administrative database research, and emphasize key issues related to data security and confidentiality. We will consider the strengths and limitations of observational studies using large databases to augment evidence from randomized clinical trials. Students will get hands-on experience with administrative data via programming with R statistical software. Students will develop and present to the class a research proposal in their own area of interest using administrative data. Students will further gain experience with healthcare database research by reviewing journal articles weekly.

Credit 3 units.

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 you are not a student in the MPHS program, please contact the program regarding registration.

Credit 3 units.

M19 PHS 527 Development, Validation and Application of Risk Prediction Models

This course will provide the knowledge and principles of predictive modeling, with applications to clinical and population health settings. Topics covered will include design, conduct, and application of risk predictions; statistical methods and analysis for model development and validation; evaluation of prediction models; emerging new methods; and risk stratification to identify a risk group, to assess eligibility to clinical trials and interventions, and to guide prevention priorities. The student will learn these topics through lecture, class discussions, data analysis lab, and homework.

Credit 3 units.

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 you are not a student in the MPHS program, please contact the program regarding registration.

Credit 3 units.

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.

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 you are not a student in the MPHS program, please contact the program regarding registration.

Credit 3 units.

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 you are not a student in the MPHS program, please contact the program regarding registration.

Credit 3 units.

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.

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 you are not a student in the MPHS program, please contact the program regarding registration.
Credit 3 units.

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.

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.

M19 PHS 590 Introduction to Propensity Score Methods

This introductory course on Propensity Score Methods is designed for medical students, clinicians and health researchers to understand propensity score methods and to foster the skills needed to plan and conduct their own research projects. This course will introduce the students to the techniques of using propensity score methods to control for confounding biases in non-randomized observational studies. Through lectures, labs, and homework assignments, students will learn the concept of propensity score methods and how to apply learnt statistical methods in a medical context.
Credit 1 unit.

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.

M19 PHS 610 Multilevel and Longitudinal Data Analyses for Clinical Research

The course - multilevel and longitudinal data analyses for clinical research is designed for medical students, clinicians and health researchers. The course is an extension of the 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, will be able to interpret the results in the context of clinical research.
Credit 3 units.

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, Associate Dean for Public Health, by phone at 314-935-2760 or by email at hobsona@wustl.edu; information can also be obtained by sending an email to Brown School admissions (brownadmissions@wustl.edu).

Degrees & Offerings

- Doctor of Medicine and Master of Public Health (p. 149)

Research

Please visit the Brown School MPH website for more information about our public health research.

Faculty

Angela Hobson

Associate Dean for Public Health
Teaching Professor
PhD, Saint Louis University

Ragini Maddipati

Assistant Dean for Academic Programs
Lecturer
MPH, Brown School at Washington University in St. Louis

For a complete list of Brown School faculty, 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.

Degrees & Offerings

Applied Health Behavior Research

- Master of Science in Applied Health Behavior Research (p. 105)
- Graduate Certificate in Applied Health Behavior Research (p. 105)

Audiology and Communication Sciences

- Doctor of Audiology (p. 106)
- Master of Science in Deaf Education (p. 106)
- PhD in Speech and Hearing Sciences (p. 107)
- Minor in Speech and Hearing Sciences (p. 107)

Biology & Biomedical Sciences

- PhD Degrees in Biology & Biomedical Sciences (p. 108)

Biomedical Informatics

- Master of Science in Biomedical Informatics (p. 134)
- Certificate in Biomedical Informatics (p. 135)

Biostatistics & Genetic Epidemiology

- Master of Science in Biostatistics (p. 136)
- Master of Science in Biostatistics and Data Science (p. 136)
- Certificate in Biostatistics and Data Science (p. 137)
- Certificate in Genetic Epidemiology (p. 137)

Clinical Investigation

- Master of Science in Clinical Investigation (p. 138)
- Graduate Certificate in Clinical Investigation (p. 139)

Genetic Counseling

- Master of Science in Genetic Counseling (p. 139)

Medical Education

- Doctor of Medicine (p. 140)
- Doctor of Medicine (Five-Year Program) (p. 149)
- Doctor of Medicine and Master of Science in Clinical Investigation (p. 149)
- Doctor of Medicine and Master of Population Health Sciences (p. 149)
- Doctor of Medicine and Master of Public Health (p. 149)
- Doctor of Medicine and Master of Business Administration (p. 150)
- Doctor of Medicine and Doctor of Philosophy (p. 150)
- Graduate Medical Education (p. 150)
- Continuing Medical Education (p. 151)

Medical Physics

- Master of Science in Medical Physics (p. 151)
- PhD in Medical Physics (p. 152)
- Post-PhD Graduate Certificate in Medical Physics (p. 153)

Nursing Science

- PhD in Nursing Science (p. 153)

Occupational Therapy

- Master of Science in Occupational Therapy (p. 154)
- Doctorate of Occupational Therapy (p. 154)
- Post-Professional Doctorate of Occupational Therapy (p. 154)
- PhD in Rehabilitation and Participation Science (p. 155)

Physical Therapy

- Doctor of Physical Therapy (p. 155)
- PhD in Movement Science (p. 156)

Population Health Sciences

- Master of Population Health Sciences (p. 157)
- Certificate in Clinical Effectiveness (p. 157)
- Certificate in Health Equity and Disparities (p. 158)

Applied Health Behavior Research

Master of Science in Applied Health Behavior Research

The Master of Science (MS) in Applied Health Behavior Research (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): 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): 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.

For either concentration, students have an opportunity to participate in the one-year mentored research option. This option 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 curriculum webpage to view concentration-specific required courses and elective options.

Admissions

To be considered for admission, applicants must submit the following:

- AHBR application
- Application fee
- Résumé/curriculum vitae
- Personal statement
- All college transcripts
- Three letters of recommendation

Please visit the application section of the AHBR home page or email the program manager (ahbr@wustl.edu) for additional information.

Graduate Certificate in Applied Health Behavior Research

The Graduate Certificate in Applied Health Behavior Research 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 graduate certificate webpage 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
- Application fee
- Résumé/curriculum vitae
- Personal statement
- All college transcripts
- Three letters of recommendation

Please visit the application section of the Applied Health Behavior Research home page or email the program manager (ahbr@wustl.edu) for additional information.

Audiology and Communication Sciences Doctor of Audiology

The Doctor of Audiology (AuD) 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 emphasizes hands-on experiences and covers the scope of practice for the profession. Specializations in both pediatrics and research are 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 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.

Research Training

The integration of research into the curriculum is a distinctive feature of the AuD program. All students receive research training through course work and the completion of the capstone project during the third year, and a research specialization is also available. Students are encouraged to pursue their individual research interests through a variety of elective interdisciplinary research opportunities, including an elective summer research experience.

Additional Information

Additional information, including Student Outcome Data and information on Accreditation & Certification, can be found on the Program in Audiology & Communication Sciences website.

Master of Science in Deaf Education

The Master of Science in Deaf Education (MSDE) program prepares early interventionists and teachers to work with infants and children who are deaf or hard of hearing (d/hh). The early identification of hearing loss and advanced hearing technologies have increased the national need for professionals with experience in listening and spoken language to work in early intervention and as teachers of the d/hh, creating opportunities for our graduates across the country and in a wide variety of settings. With origins dating back to 1914, the program is recognized internationally as one of the most prestigious of its kind. Our program's intensive curriculum, emphasis on immersion in practice teaching, and experienced faculty attract students nationally from a wide variety of backgrounds.

Curriculum

Two curriculum paths are available:

1. The **Certification Track** is a four-semester curriculum that is rooted in the development of speech, language, and academics. With that as a foundation, students study the factors necessary for high-quality education for children who are d/hh. The MSDE program is recognized as an approved teacher training program, with graduates of the Certification Track eligible for teacher certification recommendation in the State of Missouri (Deaf/

Hearing Impaired, Birth-Grade 12) and national certification by the Council on Education of the Deaf (CED). For complete information, please visit the Accreditation & Certification page of the Program in Audiology & Communication Sciences website.

2. The **Degree-Only Track** provides advanced education and experience in deaf education and is designed for full-time students to complete in two semesters. This track is designed for qualified students with a degree and teacher certification in deaf education and for related professionals seeking to expand their training in deaf education. Course work and experiences are tailored to meet the individual interests and backgrounds of the students who enroll. The Degree-Only Track does not lead to recommendation for teacher certification or licensure.

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, 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.

Additional Information

Additional information, including Student Outcome Data and information on Accreditation & Certification, can be found on the Program in Audiology & Communication Sciences website.

PhD in Speech and Hearing Sciences

The PhD in Speech and Hearing Sciences prepares students for academic and research careers, with students generally focusing on one of three areas: hearing science and audiology, language and education, or auditory neuroscience. 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 for more information.

Minor in Speech and Hearing Sciences

The Minor in Speech and Hearing Sciences (p. 107) 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.

Speech and Hearing Minor

Program Requirements

Total units required: 15

Required Course

Code	Title	Units
Educ 234	Introduction to Speech, Language, and Hearing Sciences	3

Elective Courses

At least four of the following, totaling at least 12 units:

Code	Title	Units
PACS 324	Acoustics and Speech Perception	3
PACS 343	Observation in Audiology	3
PACS 344	Observation and Methods in Speech-Language Pathology	3
PACS 360	Introduction to Audiology	3
PACS 401	Anatomy and Physiology of Speech and Hearing	3
PACS 4301	Sign Language I	2
PACS 4302	Sign Language II	2
PACS 4303	Sign Language III	2
PACS 434	Typical Language Development	3
PACS 443	Speech and Language Disorders	3
Ling 170D	Introduction to Linguistics	3
Ling 312	Phonetics	3

Additional Information

This minor is composed of a minimum of 15 units that focus on the study of speech, language, and hearing. Of the 15 units, 3 units must be Educ 234; at least 9 units must be at the 300 level or higher; and at least 9 units must be offered by the department (M89). To count toward the minor, courses must be selected from the courses listed above or approved in advance by the minor advisor. A grade of C- or higher is required for a course to count toward the minor.

For students who intend to pursue graduate studies in audiology, speech-language pathology, or deaf education, we recommend meeting with the minor advisor to develop a course of study that will fulfill prerequisite requirements for the intended area of study.

Because the minor in speech and hearing sciences is offered by the Program in Audiology and Communication Sciences (PACS) in the School of Medicine, it may not be used as an Integration and does not otherwise fulfill any Arts & Sciences distribution requirements.

Contact: Kate McClannahan
Phone: 314-747-0109
Email: k.mcclannahan@wustl.edu
Website: <http://pacs.wustl.edu>

Biology and Biomedical Sciences

PhD Degrees in Biology & Biomedical Sciences

- Biochemistry, Biophysics, & Structural Biology, PhD (p. 108)
- Biomedical Informatics & Data Science, PhD (p. 110)
- Cancer Biology, PhD (p. 113)
- Computational & Systems Biology, PhD (p. 115)
- Developmental, Regenerative, & Stem Cell Biology, PhD (p. 117)
- Ecology & Evolutionary Biology, PhD (p. 119)
- Immunology, PhD (p. 121)
- Molecular Cell Biology, PhD (p. 123)
- Molecular Genetics & Genomics, PhD (p. 126)
- Molecular Microbiology & Microbial Pathogenesis, PhD (p. 128)
- Neurosciences, PhD (p. 130)
- Plant & Microbial Biosciences, PhD (p. 132)

Biochemistry, Biophysics, & Structural Biology, PhD

Biochemistry, Biophysics, & Structural Biology

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter with regard to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
 - Continued support is guaranteed for the duration of the student's graduate studies, provided that they maintain satisfactory progress toward completion of the degree.

Required Courses

Required courses generally consist of four to nine courses in areas fundamental to the student's program. Students are expected to maintain a B average in graduate courses.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

BBSB Specific Requirements

- Biol 5357 Chemistry and Physics of Biomolecules
- Four Semesters of BBSB Student Seminar

Students complete a peer review seminar series in which they present their current work and receive feedback on both their science and their presentation.

Three Advanced Electives

Courses must be offered through DBBS or through the Chemistry, Physics, or Mathematics departments as 500-level or above graduate courses unless otherwise approved by program directors. MSTP students may use their medical courses to satisfy this requirement.

Three Semesters of Journal Clubs

DBBS and WashU have journal clubs on a variety of topics aligned with student interests. Participating students present at least once per semester for credit and will receive feedback. Students are encouraged to continue participation in journal clubs throughout their graduate experience.

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: After taking the first year of classes and selecting a laboratory, students will develop and defend a novel research project of their own design in the qualifying exam (QE). During this process, which has both a written and oral component, students identify important gaps in knowledge based on primary literature, develop clear hypotheses, and devise quantitative experiments to test said hypotheses.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

- Three of the five 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 must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty. A fourth member may come from inside or outside the student's program. The fifth member must be from outside the student's program; this fifth member may be a Washington University research professor or lecturer, a professor from another university, or a scholar from the private sector or government who holds a doctorate and maintains an active research program.

- Three of the five normally come from the student's degree program; at least one of the five must not.

All committees must be approved by the Office of Graduate Studies, Arts & Sciences, regardless of whether they meet the normal criteria.

The committee is appointed by the Office of Graduate Studies, Arts & Sciences, upon the request of the degree program. 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. Faculty 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 members. 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.

Submission of the Dissertation

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Email: dbbsphdadmissions@wustl.edu
Website: <http://dbbs.wustl.edu>

Biomedical Informatics & Data Science, PhD

Biomedical Informatics & Data Science

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), 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

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.

- **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
- Continued support is guaranteed for the duration of your graduate studies, provided that you maintain satisfactory progress towards completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- BMI 5302 Introduction to Biomedical Informatics I
- BMI 5303 Introduction to Biomedical Informatics II
- BMI 5304 Introduction to Biomedical Data Science I
- BMI 5305 Introduction to Biomedical Data Science II

Additional Requirements

- Three semesters of advanced electives
- Four semesters of BIDS journal club and seminar series

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: In the spring and/or summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

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Email: dbbspadmissions@wustl.edu

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

Cancer Biology, PhD

Cancer Biology

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
 - Continued support is guaranteed for the duration of your graduate studies, provided that you maintain satisfactory progress towards completion of the degree.

Required 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5920 Foundations in Cancer Biology
- Biol 5929 Experimental Cancer Biology

Additional Requirement

- Elective in advanced cancer biology

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.

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 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.

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Program-specific information: In the spring/summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

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The Doctoral Dissertation

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Email: dbbsphdadmissions@wustl.edu

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

Computational & Systems Biology, PhD

Computational & Systems Biology

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.

Doctoral Candidacy

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Program Requirements

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- **Degree Length: 7 Years**
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 - Continued support is guaranteed for the duration of your graduate studies, provided that you maintain satisfactory progress towards completion of the degree.

Required 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5495 Computational Molecular Biology
- Biol 5488 Genomics

Three Advanced Electives

Common options include the following:

- Biol 5014 Biotech Industry Innovators
- Biol 5285 Current Topics in Human and Mammalian Genetics
- Biol 5357 Chemistry and Physics of Biomolecules
- Biol 5483 Human Genetic Analysis
- Biol 5312 Macromolecular Interactions
- Biol 548 Nucleic Acids & Protein Biosynthesis
- Biol 5491 Advanced Genetics
- Math 493C Probability
- CSE 502N Data Structures and Algorithms
- CSE 514A Data Mining

- CSE 517A Machine Learning
- MSB 621 Computational Statistical Genetics
- INFO 558 Applications of Deep Neural Networks

Three Semesters of Journal Clubs

Participation in Biol 5496 Seminar in Computational Molecular Biology is strongly encouraged but not required.

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.

Scientific Scholarship

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Program-specific information: In the spring/summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

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The Doctoral Dissertation

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The Dissertation Defense

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of study; one of these three must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty. A fourth member may come from inside or outside the student's program. The fifth member must be from outside the student's program; this fifth member may be a Washington University research professor or lecturer, a professor from another university, or a scholar from the private sector or government who holds a doctorate and maintains an active research program.

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Email: dbbsphdadmissions@wustl.edu
Website: <http://dbbs.wustl.edu>

Developmental, Regenerative, & Stem Cell Biology, PhD

Developmental, Regenerative, & Stem Cell Biology

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

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- **Degree Length: 7 Years**
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 - Continued support is guaranteed for the duration of your graduate studies, provided that you maintain satisfactory progress towards completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 548 Nucleic Acids & Protein Biosynthesis
- Biol 5068 Fundamentals of Molecular Cell Biology
- Biol 5352 Developmental Biology
- Biol 5491 Advanced Genetics

Advanced Elective

Students may select one or more, subject to approval by the DRSCB Steering Committee:

- Biol 5224 Molecular, Cell and Organ Systems
- Biol 5053 Immunobiology I
- Biol 5054 Immunobiology II
- Biol 5488 Genomics
- Biol 5312 Macromolecular Interactions
- Biol 5392 Molecular Microbiology & Pathogenesis

Journal Clubs

Students may select one or more, based on their interests:

- Biol 5138 Journal Club for the Molecular Mechanism of Aging
- Biol 5128 Cell Biology of Extracellular Matrix Journal Club
- Biol 5152 RAD Journal Club (Regeneration, Aging, and Development)
- Biol 5235 Genetics Journal Club
- Biol 5123 Experimental Hematopoiesis Journal Club
- Biol 5137 Ion Channels Journal Club
- Biol 5192 Cancer Biology Journal Club
- Biol 5255 Experimental Skeletal Biology Journal Club
- Biol 5284 Current Research in Chromatin, Epigenetics and Nuclear Organization
- Biol 5412 Tropical and Molecular Parasitology
- Biol 5445 DNA Metabolism Journal Club
- Biol 5484 Genetics and Development of *C. elegans* Journal Club
- Biol 5496 Seminar in Computational Molecular Biology

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program specific information: In the spring/summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

- Three of the five 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 must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty. A fourth member may come from inside or outside the student's program. The fifth member must be from outside the student's program; this fifth member may be a Washington University research professor or lecturer, a professor from another university, or a scholar from the private sector or government who holds a doctorate and maintains an active research program.
- Three of the five normally come from the student's degree program; at least one of the five must not.

All committees must be approved by the Office of Graduate Studies, Arts & Sciences, regardless of whether they meet the normal criteria.

The committee is appointed by the Office of Graduate Studies, Arts & Sciences, upon the request of the degree program. 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. Faculty 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 members. 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.

Submission of the Dissertation

After the defense, the student must submit an electronic copy of the dissertation online to the Office of Graduate Studies, Arts & Sciences. The submission website requires students to choose among publishing and copyrighting services offered by ProQuest's ETD Administrator. 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 Office of Graduate Studies, Arts &

Sciences. Students who defend their dissertations successfully have not yet completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by the Office of Graduate Studies, Arts & Sciences.

Email: dbbsphdadmissions@wustl.edu

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

Ecology & Evolutionary Biology, PhD

Ecology & Evolutionary Biology

The graduate program in Ecology and Evolutionary 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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.

- **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
- Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

Students must take at least one (1) course from each program course group:

Group 1 courses:

- Biol 5190 Community Ecology
- Biol 5195 Disease Ecology

Group 2 courses:

- Biol 5582 Macroevolution
- Biol 5181 Population Genetics
- Biol 5583 Molecular Evolution
- Biol 5772 Behavioral Ecology

Group 3 courses:

- Group 1 courses
- Group 2 courses
- Biol 5220 Practical Bioinformation
- Biol 5488 Genomics
- Biol 5491 Advanced Genetics
- Other relevant courses – *subject to approval by the EEB Program Director(s)*

Additional Requirements

- Four semesters of Biol 580 Seminar in Population Biology
- Biol 598 Topics in Evolution, Ecology and Population Biology

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: In the spring/summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences

as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

- Three of the five 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 must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty. A fourth member may come from inside or outside the student's program. The fifth member must be from outside the student's program; this fifth member may be a Washington University research professor or lecturer, a professor from another university, or a scholar from the private sector or government who holds a doctorate and maintains an active research program.
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Submission of the Dissertation

After the defense, the student must submit an electronic copy of the dissertation online to the Office of Graduate Studies, Arts & Sciences. The submission website requires students to choose among publishing and copyrighting services offered by ProQuest's ETD Administrator. 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 Office of Graduate Studies, Arts & Sciences. Students who defend their dissertations successfully have not yet completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by the Office of Graduate Studies, Arts & Sciences.

Email: dbbsphdadmissions@wustl.edu
Website: <http://dbbs.wustl.edu>

Immunology, PhD

Immunology

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
 - Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5053 Immunobiology I
- Biol 5054 Immunobiology II

Two to Three Advanced Electives

- Biol 5392 Molecular Microbiology & Pathogenesis
- Biol 5014 Biotech Industry Innovators
- Biol 548 Nucleic Acids & Protein Biosynthesis
- Biol 5312 Macromolecular Interactions
- Biol 5352 Developmental Biology
- Biol 5426 ID Gateway: Translational and Public Health Aspects of Basic Infectious Disease Research
- Biol 5068 Fundamentals of Molecular Cell Biology

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: In the spring/summer semesters of Year 1, students must pass a Qualifying Exam (QE).

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience

Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

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Email: dbbsphdadmissions@wustl.edu
Website: <http://dbbs.wustl.edu>

Molecular Cell Biology, PhD

Molecular Cell Biology

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
 - Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintain satisfactory progress toward completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5068 Fundamentals of Molecular Cell Biology
- Biol 548 Nucleic Acids & Protein Biosynthesis

One Advanced Elective

- Biol 5491 Advanced Genetics
- Biol 5501 The Biology and Pathology of the Visual System
- Biol 5014 Biotech Industry Innovators
- Biol 5495 Computational Molecular Biology
- Biol 5352 Developmental Biology
- Biol 5053 Immunobiology I
- Biol 5054 Immunobiology II

- Biol 5312 Macromolecular Interactions
- Biol 5224 Molecular, Cell and Organ Systems
- Biol 5392 Molecular Microbiology & Pathogenesis

Two Semesters of Journal Clubs

- Biol 5192 Cancer Biology Journal Club
- Biol 5678 Clockclub
- Biol 5284 Current Research in Chromatin, Epigenetics and Nuclear Organization
- Biol 5417 Hematology Division Journal Club: Current Topics in Biochemistry, Cellular, and Molecular Biology
- Biol 5152 RAD Journal Club (Regeneration, Aging, and Development)
- Biol 5445 DNA Metabolism Journal Club
- Biol 5123 Experimental Hematopoiesis Journal Club
- Biol 5255 Experimental Skeletal Biology Journal Club
- Biol 5128 Cell Biology of Extracellular Matrix Journal Club
- Biol 5235 Genetics Journal Club
- Biol 5484 Genetics and Development of *C. elegans* Journal Club
- Biol 5137 Ion Channels Journal Club
- Biol 5148 Metabolism Journal Club
- Biol 5138 Journal Club for the Molecular Mechanism of Aging
- Biol 5565 Oral Presentation of Scientific Data
- Biol 5303 Protein NMR Journal Club
- Biol 5151 RNA Biology Journal Club
- Biol 5577 Synapses Journal Club
- Biol 5328 Structural Biology Journal Club
- Biol 5412 Tropical and Molecular Parasitology

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.

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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 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.

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Program-specific information: In the spring/summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

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Sciences. Students who defend their dissertations successfully have not yet completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by the Office of Graduate Studies, Arts & Sciences.

Email: dbbsphdadmissions@wustl.edu

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

Molecular Genetics & Genomics, PhD

Molecular Genetics & Genomics

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.

- Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5491 Advanced Genetics
- Biol 5488 Genomics
- Biol 5235 Genetics Journal Club

Two Advanced Electives

- Biol 5075 Fundamentals of Biostatistics for Graduate Students (*recommended for students with little or no programming experience*)
- Biol 5483 Human Genetic Analysis
- Biol 5068 Fundamentals of Molecular Cell Biology
- Biol 548 Nucleic Acids & Protein Biosynthesis
- Biol 5224 Molecular, Cell and Organ Systems
- Biol 5495 Computational Molecular Biology

In addition to the listings above, students may also take the following additional courses as appropriate:

- Biol 5352 Developmental Biology
- Biol 5312 Macromolecular Interactions
- Biol 5392 Molecular Microbiology & Pathogenesis
- Biol 5053 Immunobiology I
- Biol 5054 Immunobiology II

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: In Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

- Three of the five 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 must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty. A fourth member may come from inside or outside the student's program. The fifth member must be from outside the student's program; this fifth member may be a Washington University research professor or lecturer, a professor from another university, or a scholar from the private sector or government who holds a doctorate and maintains an active research program.
- Three of the five normally come from the student's degree program; at least one of the five must not.

All committees must be approved by the Office of Graduate Studies, Arts & Sciences, regardless of whether they meet the normal criteria.

The committee is appointed by the Office of Graduate Studies, Arts & Sciences, upon the request of the degree program. 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. Faculty 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 members. 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.

Submission of the Dissertation

After the defense, the student must submit an electronic copy of the dissertation online to the Office of Graduate Studies, Arts & Sciences. The submission website requires students to choose among publishing and copyrighting services offered by ProQuest's ETD Administrator. 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 Office of Graduate Studies, Arts & Sciences. Students who defend their dissertations successfully have not yet completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by the Office of Graduate Studies, Arts & Sciences.

Email: dbbspadmissions@wustl.edu

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

Molecular Microbiology & Microbial Pathogenesis, PhD

Molecular Microbiology & Microbial Pathogenesis

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
 - Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5392 Molecular Microbiology & Pathogenesis
- Biol 5217 Special Topics in Microbial Pathogenesis

Students may select either course below:

- Biol 548 Nucleic Acids & Protein Biosynthesis
- Biol 5068 Fundamentals of Molecular Cell Biology

One Advanced Elective

- Biol 5014 Biotech Industry Innovators
- Biol 5053 Immunobiology I
- Biol 5054 Immunobiology II
- Biol 5146 Principles and Applications of Biological Imaging
- Biol 5224 Molecular, Cell and Organ Systems
- Biol 5312 Macromolecular Interactions
- Biol 5319 Molecular Foundations of Medicine
- Biol 5352 Developmental Biology
- Biol 5357 Chemistry and Physics of Biomolecules
- Biol 5488 Genomics
- Biol 5491 Advanced Genetics
- Biol 5495 Computational Molecular Biology

Journal Clubs

Students may select one or more based on interest:

- Biol 5123 Experimental Hematopoiesis Journal Club
- Biol 5128 Cell Biology of Extracellular Matrix Journal Club
- Biol 5137 Ion Channels Journal Club
- Biol 5138 Journal Club for the Molecular Mechanism of Aging
- Biol 5192 Cancer Biology Journal Club
- Biol 5235 Genetics Journal Club
- Biol 5255 Experimental Skeletal Biology Journal Club
- Biol 5284 Current Research in Chromatin, Epigenetics and Nuclear Organization
- Biol 5393 Molecular Virology Journal Club
- Biol 5397 Current Literature in Microbiology
- Biol 5412 Tropical and Molecular Parasitology
- Biol 5417 Hematology Division Journal Club: Current Topics in Biochemistry, Cellular, and Molecular Biology
- Biol 5484 Genetics and Development of *C. elegans* Journal Club
- Biol 5496 Seminar in Computational Molecular Biology

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: In the spring/summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

- Three of the five 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 must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty. A fourth member may come from inside or outside the student's program. The fifth member must be from outside the student's program; this fifth member may be a Washington University research professor or lecturer, a professor from another university, or a scholar from the private sector or government who holds a doctorate and maintains an active research program.
- Three of the five normally come from the student's degree program; at least one of the five must not.

All committees must be approved by the Office of Graduate Studies, Arts & Sciences, regardless of whether they meet the normal criteria.

The committee is appointed by the Office of Graduate Studies, Arts & Sciences, upon the request of the degree program. 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. Faculty 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 members. 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.

Submission of the Dissertation

After the defense, the student must submit an electronic copy of the dissertation online to the Office of Graduate Studies, Arts & Sciences. The submission website requires students to choose among publishing and copyrighting services offered by ProQuest's ETD Administrator. 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 Office of Graduate Studies, Arts & Sciences. Students who defend their dissertations successfully have not yet completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by the Office of Graduate Studies, Arts & Sciences.

Email: dbbsphdadmissions@wustl.edu

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

Neurosciences, PhD

Neurosciences

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
 - Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5571 Cellular Neurobiology
- Biol 5651 Neural Systems
- Biol 5646 First-Year Fundamentals
- Biol 5648 Coding and Statistical Thinking in the Neurosciences
- Biol 5565 Oral Presentation of Scientific Data

Specialized Advanced Electives

Anytime after their Qualifying Exam (QE), students take two or more "nanocourses" of their choice from rotating topics (often inspired by current student interests).

Journal Clubs

Students can select from a variety of ongoing journal clubs that best align with their interests, with topics ranging from circuits to behavior to glial biology.

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: Students take a qualifying exam approximately 12 months after entering the program. Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences

as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

A Research Advisory Committee (RAC) must be created no later than the end of the student's third year; departments may set shorter timelines (e.g., by the end of the student's second year) for this requirement. 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 that is approved by their RAC.

A Title, Scope & Procedure Form for the dissertation must be signed by the committee members and by the program chair. It must be submitted to the Office of Graduate Studies, Arts & Sciences, at least 6 months before the degree is expected to be conferred or before beginning the fifth year of full-time enrollment, whichever is earlier.

A Doctoral Dissertation Guide & Template that give instructions regarding the format of the dissertation are available on the website of the Office of Graduate Studies, Arts & Sciences. Both should be read carefully at every stage of dissertation preparation.

The Office of Graduate Studies, Arts & Sciences, requires each student to make the full text of the dissertation available to the committee members for their review at least 1 week before the defense. Most degree programs require 2 or more weeks for the review period; students should check with their faculty.

The Dissertation Defense

Approval of the written dissertation by the RAC is necessary before the student can orally defend their dissertation. The Dissertation Defense Committee that observes and examines the student's defense consists of at least five members, who normally meet these criteria:

- Three of the five 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 must be the PhD student's primary thesis advisor, and one may be a member of the emeritus faculty. A fourth member may come from inside or outside the student's program. The fifth member must be from outside the student's program; this fifth member may be a Washington University research professor or lecturer, a professor from another university, or a scholar from the private sector or government who holds a doctorate and maintains an active research program.
- Three of the five normally come from the student's degree program; at least one of the five must not.

All committees must be approved by the Office of Graduate Studies, Arts & Sciences, regardless of whether they meet the normal criteria.

The committee is appointed by the Office of Graduate Studies, Arts & Sciences, upon the request of the degree program. 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. Faculty 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 members. 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.

Submission of the Dissertation

After the defense, the student must submit an electronic copy of the dissertation online to the Office of Graduate Studies, Arts & Sciences. The submission website requires students to choose among publishing and copyrighting services offered by ProQuest's ETD Administrator. 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 Office of Graduate Studies, Arts & Sciences. Students who defend their dissertations successfully have not yet completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by the Office of Graduate Studies, Arts & Sciences.

Email: dbbsphdadmissions@wustl.edu
Website: <http://dbbs.wustl.edu>

Plant & Microbial Biosciences, PhD

Plant & Microbial Biosciences

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.

Doctoral Candidacy

To earn a PhD at Washington University, a student must complete all courses required by their department; 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. For a general layout of doctoral degree general requirements in Arts & Sciences, including an explanation of Satisfactory Academic Progress, students should review the Doctoral Degree Academic Information page of the Arts & Sciences *Bulletin*.

Program Requirements

- **Total Units Required: 36 Credits**
- **Degree Length: 7 Years**
 - Students are expected to maintain satisfactory academic progress in accordance with academic milestones. Students entering their seventh year in the program will receive a warning letter in regards to reaching their stated degree length. Students entering their eighth year in the program will be required to obtain permission from the Associate Dean of Graduate Education.
 - **Note:** Students must be enrolled in 9 graduate credits each semester to retain full-time status. As students complete their course work, if enrolled in fewer than 9 graduate credits, they must enroll in a specific Arts & Sciences graduate course that will show 0 units but does count as full-time status. Students should connect with their department to ensure proper enrollment prior to Add/Drop.
 - Continued support is guaranteed for the duration of the student's graduate studies, provided that the student maintains satisfactory progress toward completion of the degree.

Required Courses

This generally 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.

DBBS Required Courses

- Biol 5098 Graduate Research Fundamentals
- Biol 5011 Ethics & Research Science

Program Required Courses

- Biol 5703 Experimental Design and Analysis in Biological Research
- Biol 5702 Current Approaches in Plant and Microbial Research

Students may select either course below:

- Biol 548 Nucleic Acids & Protein Biosynthesis
- Biol 5068 Fundamentals of Molecular Cell Biology

Two Advanced Electives

- Biol 5491 Advanced Genetics
- Biol 5068 Fundamentals of Molecular Cell Biology
- Biol 5352 Developmental Biology
- Biol 5392 Molecular Microbiology & Pathogenesis
- Biol 5495 Computational Molecular Biology

- Biol 5488 Genomics
- Chem 550 Mass Spectrometry
- Biol 5014 Biotech Industry Innovators
- Biol 5053 How Plants Work: Physiology, Growth, and Metabolism
- Biol 5523 Laboratory in Protein Analysis, Proteomics, and Protein Structure

Two Semesters of Journal Clubs

- Biol 5723 Seminar in Plant and Microbial Bioscience – required
- One additional journal club

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.

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 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.

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 Office of Graduate Studies, Arts & Sciences, of the student's outcome, whether successful or unsuccessful.

Program-specific information: In the spring/summer semesters of Year 2, students must pass a Qualifying Exam (QE). Following a successful QE defense, students will identify and finalize their committee and complete their thesis proposal by December 31 of Year 3.

Mentored Experience Requirements

Doctoral 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 units that a student must earn through Mentored Teaching Experience(s) and/or Mentored Professional Experience(s) 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 Mentored Professional Experiences as an avenue for completing some units of the Mentored Experience Requirement. Doctoral students will enroll in LGS 6XXX Mentored Teaching Experience or LGS 7020 Mentored Professional Experience to signify their progression toward completing the overall Mentored Experience Requirement for the degree.

The Doctoral Dissertation

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The committee is appointed by the Office of Graduate Studies, Arts & Sciences, upon the request of the degree program. 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. Faculty 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 members. 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.

Submission of the Dissertation

After the defense, the student must submit an electronic copy of the dissertation online to the Office of Graduate Studies, Arts & Sciences. The submission website requires students to choose among publishing and copyrighting services offered by ProQuest's ETD Administrator. 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 Office of Graduate Studies, Arts & Sciences. Students who defend their dissertations successfully have not yet completed their PhD requirements; they finish earning their degree only when their dissertation submission has been accepted by the Office of Graduate Studies, Arts & Sciences.

Email: dbbspdmissions@wustl.edu
Website: <http://dbbs.wustl.edu>

Biomedical Informatics Master of Science in Biomedical Informatics

The Institute for Informatics, Data Science and Biostatistics (I²DB) is pleased to offer a Master of Science in Biomedical Informatics. The master's degree program is administered through I²DB, 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.

Master of Science

- 36 units
- Internship/Mentored Research
- Two to five 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
BMI 5200	Biomedical Informatics Journal Club	1
CLNV 510	Ethical and Legal Issues in Clinical Research	2
or MSB 512	Ethics in Biostatistics and Data Science	
MSB 507	R and Python For Biomedical Sciences	2
Up to 6 units of mentored research or internship		3-6

Scientific Writing and Grantsmanship

Students in the MS program will be expected to demonstrate completion of a scientific writing or grantsmanship 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.

Code	Title	Units
CLNV 529	Scientific Writing and Publishing	2
or CLNV 528	Grantsmanship	

Suggested Electives

Students can tailor their course work in areas including translational bioinformatics, applied clinical informatics, and public health informatics. Suggested electives for these areas are below.

Code	Title	Units
Biol 5488	Genomics	max. 4
Biol 5491	Advanced Genetics	3
CLNV 513	Designing Outcomes and Clinical Research	3
CSE 511A	Introduction to Artificial Intelligence	3
CSE 514A	Data Mining	3
CSE 517A	Machine Learning	3
CSE 530S	Database Management Systems	3

CSE 556A	Human-Computer Interaction Methods	3
CSE 584A	Algorithms for Biosequence Comparison	3
CSE 587A	Algorithms for Computational Biology	3
MSB 503	Statistical Computing with SAS	2
MSB 506	Introduction to R For Data Science	2
MSB 550	Introduction to Bioinformatics	3
MSB 560	Biostatistics I	3
MSB 570	Biostatistics II	3
PHS 501	Introduction to Epidemiology	3
PHS 5252	Comparative Effectiveness Research	2
PHS 5254	Using Administrative Data for Health Services Research	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

Prospective Students

Those interested in applying or who would like more information may contact the program recruiter (gsertl@wustl.edu).

Certificate in Biomedical Informatics

The Institute for Informatics, Data Science and Biostatistics (I²DB) 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.

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 to 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
Total Units		12

Prospective Students

Those interested in applying or who would like more information may contact the program recruiter. (gsertl@wustl.edu)

Biostatistics and Genetic Epidemiology Master of Science in Biostatistics

This four-semester, 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 other related fields. It prepares graduates for rewarding employment in academia and industry and for further graduate studies. Students 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
Summer Year 1		
MSB 503	Statistical Computing with SAS	2
MSB 507	R and Python For Biomedical Sciences	2
Fall Year 1		
MSB 507	R and Python For Biomedical Sciences	2
MSB 560	Biostatistics I	3
MSB 570	Biostatistics II	3
MSB 515	Fundamentals of Genetic Epidemiology	3
MSB 5483	Human Genetic Analysis	3
BMI 5302	Introduction to Biomedical Informatics I	3
Pathway course		3
Spring Year 1		
MSB 618	Survival Analysis	3
MSB 621	Computational Statistical Genetics	3
BMI 5303	Introduction to Biomedical Informatics II	3
Pathway course		
Elective from approved list*		
Summer Year 2		
MSB 507	R and Python For Biomedical Sciences	2
MSB 630	Internship	3

or MSB 600	Mentored Research	
Fall Year 2		
MSB 507	R and Python For Biomedical Sciences	2
MSB 617	Study Design and Clinical Trials	3
MSB 630	Internship	3
or MSB 600	Mentored Research	
Elective from approved list*		

* For a list of approved electives, 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).

Prospective Students

Those interested in applying or who would like more information may contact the program recruiter (gsertl@wustl.edu).

Master of Science in Biostatistics and Data Science

This four-semester, 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 other related fields. 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
Summer Year 1		
MSB 503	Statistical Computing with SAS	2
MSB 507	R and Python For Biomedical Sciences	2
Fall Year 1		
MSB 507	R and Python For Biomedical Sciences	2
MSB 560	Biostatistics I	3
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
Spring Year 1		
MSB 512	Ethics in Biostatistics and Data Science	2
MSB 618	Survival Analysis	3
MSB 621	Computational Statistical Genetics	3
BMI 5303	Introduction to Biomedical Informatics II	3
MSB 660	Biomedical Data Mining	3
Summer Year 2		
MSB 507	R and Python For Biomedical Sciences	2
MSB 630	Internship	3
or MSB 600	Mentored Research	
Fall Year 2		
MSB 507	R and Python For Biomedical Sciences	2
MSB 617	Study Design and Clinical Trials	3
MSB 630	Internship	3
or MSB 600	Mentored Research	
Elective from approved list*		
Spring Year 2		
MSB 600	Mentored Research	3
or MSB 630	Internship	
Elective from approved list*		

* For a list of approved electives, please visit our website.

Academic Policies

Academic policies for degree programs can be found in the Student Handbook (PDF).

Prospective Students

Those interested in applying or who would like more information may contact the program recruiter (gsertl@wustl.edu).

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
Total Units		15-19

Academic Policies

Academic policies for degree programs can be found in the Student Handbook (PDF).

Prospective Students

Those interested in applying or who would like more information may contact the program recruiter (gsertl@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
Total Units		19

Academic Policies

Academic policies for degree programs can be found in the Student Handbook (PDF).

Prospective Students

Those interested in applying or who would like more information may contact the program recruiter (gsertl@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 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	Grantmanship	2

or CLNV 529	Scientific Writing and Publishing	
CLNV 589	Advanced Methods for Clinical and Outcomes Research	3
Total Units		16

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 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 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.

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 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) 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.

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). The ACGC is a member of the Association of Specialized and Professional Accreditors (ASPA). 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) 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.

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. 390), which is available in the Policies & Guidelines section (p. 357) of this *Bulletin*.

Application Procedure

General information for prospective medical students and instructions for how to apply can be found on the Medical Student Admissions website.

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, 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 1 of the year prior to that in which they want to matriculate. In addition, applicants must complete a supplemental application, submit letters of recommendation, and pay a nonrefundable application fee of \$100. These materials must be received no later than November 15. 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.

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 established by the Association of American Medical Colleges and encourages students to use the accompanying AMCAS Choose 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.

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. 400) of this *Bulletin* for further details.

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.

Important Dates

- AMCAS application deadline: November 1, 2024
- WUSM supplemental application deadline: November 15, 2024
- “Plan to Enroll” required: April 30, 2025

Visit the Important Dates page of the Admissions website for a complete list of dates and deadlines.

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. 391)

Visit the Medical Student Admissions website for full admissions information and to check the status of an application.

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). 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). 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).

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. Throughout Phase 1, there will be substantial emphasis on professional identity formation and the social, behavioral, and health systems sciences. The EXPLORE Immersion will focus on four key areas: research, medical 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 56 weeks total. Students will engage in 24 weeks of required elements that will include a 4-week Internal Medicine Advanced Clinical Rotation (ACR); two 4-week ACRs (8 weeks total); two 4-week Keystone Integrated Science Courses (KISCs; 8 weeks total); and 4 weeks of Phase 3 Capstone. In addition, students will take 32 weeks of electives (clinical, research, other non-clinical). Up to 8 of the 32 weeks of elective time may be used for USMLE study (4 weeks for Step 1 and 4 weeks for Step 2). Students may use as much elective time for research time as their schedule allows after completing the requirements. During Phase 3, there are 4 weeks of School of Medicine holiday time, and students may also opt to take up to 8 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.

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.

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

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	7
Gateway 505	Defense & Response to Injury	7
Gateway 510	Circulation & Breathing	8
Gateway 530	Ins & Outs	7
Gateway 540	Metabolism & Reproduction	6
Gateway 545	Scaffolding & Movement	4
Gateway 550	Brain & Behavior	7
Gateway 555	Phase 1 Capstone	2

Clinical Immersions

Courses in the Clinical Immersions will include the following:

Code	Title	Units
Gateway 515	Clinical Immersion: Ambulatory/ED	3
Gateway 520	Clinical Immersion: Inpatient	3
Gateway 525	Clinical Immersion: Procedural	3

EXPLORE Immersion

Code	Title	Units
Gateway 535	EXPLORE Immersion	4

Phase 2 Core Courses

Total number of weeks: 48

Code	Title	Units
Gateway 600	Internal Medicine Clerkship - Patient Care	8
Gateway 610	Surgery Clerkship - Patient Care	8
Gateway 620	Pediatrics Clerkship - Patient Care	8
Gateway 630	Psychiatry Clerkship - Patient Care	8
Gateway 640	Neurology Clerkship - Patient Care	8
Gateway 650	Obstetrics & Gynecology Clerkship - Patient Care	8

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.

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 2CK examinations prior to graduation.

Department-Based Courses

- Anesthesiology (p. 169)
- Biochemistry and Molecular Biophysics (p. 175)
- Cell Biology and Physiology (p. 180)
- Developmental Biology (p. 184)
- Genetics (p. 189)
- Medicine (p. 194) (Internal Medicine)
- Molecular Microbiology (p. 203)
- Neurology (p. 217)
- Neuroscience (p. 223)
- Neurosurgery (p. 228)
- Obstetrics and Gynecology (p. 238)
- Ophthalmology and Visual Sciences (p. 246)
- Orthopaedic Surgery (p. 252)
- Otolaryngology (p. 259)
- Pathology and Immunology (p. 268)
- Pediatrics (p. 299)
- Psychiatry (p. 315)
- Radiation Oncology (p. 321)
- Radiology (p. 335)
- Surgery (p. 349)

Interdisciplinary Courses

- List of Interdisciplinary Courses (p. 147)

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).

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.

Faculty

2024-25 Course & Clerkship Directors

Thread Leads

Basic Sciences Thread

Amy Bauernfeind, PhD (Anatomy & Embryology/Development)
Linda Pike, PhD (Biochemistry)
Ian Hagemann, MD, PhD (Genetics & Genomics)
Erika Crouch, MD, PhD (Pathology & Histology)
Simon Haroutounian, PhD, MSc (Pharmacology)
Lai Kuan Dionne, PhD (Physiology)

Basic/Clinical Sciences Thread

Nigar Kirmani, MD (Microbiology & Infectious Diseases)
Ashley Veade, MD (Women's & LGBTQIA+ Health)

Clinical Sciences Thread

Jonathan Mullin, MD (Clinical Skills & Diagnostic Reasoning)
Timothy Yau, MD (Clinical Skills & Diagnostic Reasoning)
Suzanne Thibodeaux, MD, PhD (Laboratory Medicine)
Michelle Miller-Thomas, MD (Radiology)

Social, Behavioral, and Health Systems Sciences Thread

Jay Piccirillo, MD, FACS (Clinical Epidemiology & Evidence-Based Medicine)
Pirooska Kopar, MD (Ethics & Law)
Radhika Jain, MD (Health Equity & Justice)
Kaytlin Reedy-Rogier, MSW (Health Equity & Justice)
TBD (Health Systems Science)
Dennis Chang, MD (Interprofessional Collaboration)
Colleen Wallace, MD (Professional Identity Formation)
Aimee James, PhD, MPH (Public/Population Health)

Coaching

Nichole Zehnder, MD
Amjad Musleh, MD

Phase 1

Module 1: Molecules to Society

Colleen Wallace, MD
Amy Bauernfeind, PhD

Module 2: Defense and Response to Injury

Erika Crouch, MD, PhD
Brian Edelson, MD, PhD

Module 3: Circulation and Breathing

Justin Sadhu, MD, MPHS
Jeffrey Atkinson, MD

Module 4: Ins and Outs

Steven Cheng, MD
Sandeep Tripathy, MD, PhD

Module 5: Metabolism and Reproduction

Linda Pike, PhD
Marina Litvin, MD
Amy Riek, MD

Module 6: Scaffolding and Movement

Kari Allen, PhD
Mariam Malik, MD
Allyson Zazulia, MD

Module 7: Brain and Behavior

Allyson Zazulia, MD

Brendan O'Connor, MD

Phase 1 Capstone

Steven Lawrence, MD, MSc

Immersion Lead

Steven Lawrence, MD, MSc

Ambulatory/ED Immersion

Kaytlin Reedy-Rogier, MSW

Heidi Tastet, MD

Procedures Immersion

Michelle Miller-Thomas, MD

Erica Traxel, MD

Inpatient Immersion

Dennis Chang, MD

TBD

EXPLORE

Terrance Kummer, MD, PhD (Director, Explore Inquiry Lead)

Sara Greer, MD (Education Pathway Lead)

Koong-Nah Chung, PhD (Research Pathway Lead)

Dorina Kallogjeri, MD, MPH (Research Pathway Lead)

Darrell Hudson, PhD, MPH (Advocacy/Global Health Pathway Lead)

Caline Mattar, MD (Advocacy/Global Health Pathway Lead)

Linda Wu, DO (Innovation Pathway Lead)

Phase 2 Clerkships

Integrated Surgical Disciplines Clerkship

Bethany Sacks, MD, Med, FACS (Director)

T.K. Pandian, MD, MPH (Associate Director)

Medicine Clerkship

Lisa Zickuhr, MD, MHPE (Director)

Prashanth Thakker, MD (Associate Director)

Neurology Clerkship

Douglas Larsen, MD, MEd (Director)

Salim Chahin, MD, MSCE (Associate Director)

Obstetrics and Gynecology Clerkship

Tammy Sonn, MD, FACOG (Director)

Katherine Massa, MD (Associate Director)

Pediatrics Clerkship

Laura Hall, MD (Director)

Sarah Bram, MD (Associate Director)

Psychiatry Clerkship

Max Rosen, MD (Director)

Brendan O'Connor, MD (Associate Director)

Phase 3 Keystone-Integrated Science Courses (KISCs)

Advancing End-of-Life Care

Ellen Binder, MD

Brian Carpenter, PhD

Patrick White, MD, HMDC, FACP, FAAHPM

Comprehensive Approach to Disability

Thy Huskey, MD

Kerri Morgan, PhD, ORT/L, ATP

Diabetes Care from A to Z

Linda Pike, PhD

Maamoun Salam, MD

Alexis McKee, MD, CDCES

Holistic and Interdisciplinary Approach to Surgical Critical Care

Justin Knittel, MD

Jessica Nelson, MD

Infectious Diseases and Health Equity

Caline Mattar, MD

Darrell Hudson, PhD, MPH

Integrated Oncology: Basic, Clinical, and Social Science

Perspectives

Jason Frankel, MD

Erica Waters, PhD, MPH

Introduction to Addiction Medicine

Kevin Baumgartner, MD

David Liss, MD

Multidisciplinary Adult Neuro-Oncology

Albert Kim, MD, PhD

Michelle Miller-Thomas, MD

Sonika Dahiya, MD

Pediatric Neurocritical Care: Onset to Outcomes

Jennifer Griffith, MD, PhD

Mary Hartman, MD, MPH

Precision Medicine: Incorporating Genomics into Cutting-Edge

Patient Care

Ian Hagemann, MD, PhD

Felicia Gomez, PhD

Recognizing and Mitigating Maternal and Infant Health

Disparities

Colleen Wallace, MD

Jeannie Kelly, MD, MS

Science, Medicine, and Societal Effects of Pain

Jordan McCall, PhD, MPH

Loc Thang, MD, PhD

Phase 3 Advanced Clinical Rotations (ACRs)

Pediatrics

Sarah Bram, MD

Plastic and Reconstructive Surgery

Joani Christensen, MD

Psychiatry

Marcie Garland, MD

Radiation Oncology

Maria Thomas, MD, PhD

Surgical Critical Care

Justin Knittel, MD
Jessica Nelson, MD

Urologic Surgery

Erica Traxel, MD
Gregory Murphy, MD

Phase 3 Elective Courses and Capstone

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.

Fourth-Year Capstone

Tosin Adeyanju, MD
Michael DeVita, MD, FACP
Suzanne O’Nan, MD
T.K. Pandian, MD, MPH

Interdisciplinary Courses

[Return to Doctor of Medicine Core Courses \(p. 144\)](#)

M80 InterDis 808 Step Preparation

Step Preparation.
Credit variable, maximum 16 units.

M80 InterDis 827 Introduction to Global Health (Non-Clinical Elective)

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.
Credit 2 units.

M80 InterDis 832 Patient Safety and Quality Improvement (Non-Clinical Elective)

This elective provides students practical experience with the application of patient safety and quality improvement principles. Students will bring their own experiences with patient safety or systems-based problems to serve as the foundation of learning and project development. Students will have the opportunity to meet and learn from the interprofessional team that supports patient safety and quality improvement work.
Credit 4 units.

M80 InterDis 835 Interprofessional Hotspotting (Clinical Elective)

We are looking for TWO Washington University Medical Students interested in joining an interprofessional team of students that will learn how to take care of patients with complex medical and social needs. The Center for Interprofessional Practice and Education (CIPE) at the Washington University Medical Campus will create TWO teams and each team will consist of one nursing student from Barnes-Jewish Goldfarb School of Nursing, one occupational therapy student from Wash U OT school, one medical student from Wash U medical school, one pharmacy student from St Louis College of Pharmacy in the University of Health Sciences and Pharmacy and one Public Health Student from the Washington University Institute of Public Health. These teams will learn from and take care of high-risk patients from September 2023 until April 2024 with an estimated time commitment of 3 hours per week.
Credit 2 units.

M80 InterDis 849 Phase 3 Capstone (Non-Clinical Elective)

The Phase 3 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.
Credit 4 units.

M80 InterDis 851 The Business of Medicine (Non-Clinical Elective)

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.
Credit 2 units.

M80 InterDis 858 Humanities in Medicine: Reflecting about Professional Identity (Non-Clinical Elective)

Available blocks: 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16
2 or 4 week rotations

This elective provides a creative space for using many types of activities (narrative writing, poetry, drawing, video, graphic design, etc., as well as activities for which studios are available at the Craft Alliance) to reflect on the professional identity of physicians. The elective offers faculty and/or WUSM alumni as reflective partners, as well as collaborations with student groups or community organizations. If students would like to display their projects, they are welcome to participate in the Art to Heart Annual Art Show. Students will create independent proposals (as individuals or small groups) for a reflection project that involves the arts/humanities and relates to medicine/physicians' roles/professional identity, and make plans to complete a project to share online, at the Art to Heart art show, or in another way. Students can work on projects over time. The course will involve students reading individually the course outline, then drafting proposals for their projects, to include an outline of what they are going to do, the expected timeline, the resources/materials they might need and use, and what they hope to get out of this project (how this will help them grow individually as medical professionals). The course requirements are to produce some reflective product, in each student's choice of medium (visual art, writing, etc.) and to write a brief reflection narrative at the end of the session on their experience and inspiration for their work and how they have grown/changed in participating in this project.

Resources:1) We hope to provide studio time at the Craft Alliance for painting, ceramics, metal work, fiber (weaving, etc.), woodworking, etc., for individuals or small groups.2) The Art to Heart student group will offer students guidance and insight on their projects, hold one-on-one meetings or office hours for students to help brainstorm their projects and find resources for them.3) Students are invited to participate in monthly critique sessions, where students will meet to show each other their progress and give each other advice and thoughts on each other's project. This will encourage students to share ideas, give insight and viewpoints to each other, and provide space for reflective discussion and opportunities to brainstorm future collaborations. Optional project ideas:

- (Group)View a film about health/healthcare experience, engage in group discussion, and use film clip image printouts to create collages by individual students to create their own image reflection about their thoughts and emotions after viewing the film. Students will be provided colored pencils, crayons, colored papers, and pens to draw/color/write about their thoughts and emotions. This can also occur individually. This will kick-start their reflection, using art/humanities as media.
- (Group) Create wristbands/ keychains using colorful threads/fabric yarns using suture tie techniques. Keep the products or sell them for fundraising.
- (Group) Gather waste products from the hospital or the school to create artworks that reflect students' patient experiences or raise awareness of hospital waste.
- (Group or Individual) A student who decides to translate their research into something visual (such as drawing/sculpture/print etc.) can use the media to display their research.
- (Group or Individual) Paint a mural at Mural Mile during Paint Louis event on Labor Day weekend.

Student time distribution: Conferences/Lectures 5%; Independent 95%

Major teaching responsibility: varies, with oversight from Dr. Wallace, Dr. Hanson, and/or other faculty members

Patients seen weekly: 0

On-call/weekend responsibility: None

Credit variable, maximum 4 units.

M80 InterDis 863 Mind Body Stress Reduction (Non-Clinical Elective)

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.
Credit 4 units.

M80 InterDis 864 Care of the Homeless (Non-Clinical Elective)

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.
Credit variable, maximum 4 units.

M80 InterDis 875 Medical Education Scholarship (Non-Clinical Elective)

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.
Credit 2 units.

M80 InterDis 880 Clinical Informatics (Non-Clinical Elective)

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.

Credit 4 units.

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 academic year in a research program. 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 student must conduct research with a Washington University faculty member, and the research project is subject to the approval of the Associate Dean for Medical Student Research. Students enrolled in the five-year program must sign up for insurance coverage through Student Health Services. 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. 66) 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. 100) 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. 103) 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. Linda X. Wu, DO, is the advisor for this program and may be contacted at linda.x.wu@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 is integrated to allow for the timely completion of training. Students typically complete their 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 \$37,000 per year), health coverage, disability and life insurance, reimbursement of qualifying daycare costs, 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 per year for the duration of the award.

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

Graduate Medical Education

Washington University School of Medicine has a number of Graduate Medical Education (GME) opportunities.

GME-Sponsored Programs

In 1997, Washington University School of Medicine, Barnes-Jewish Hospital and St. Louis Children's Hospital 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 100 training programs accredited by the Accreditation Council for Graduate Medical Education (ACGME), the organization that accredits sponsoring institutions and training programs across the United States. There are approximately 80 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 boards-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.

Endowed Scholarships & Fellowships

Please visit the Medical Advancement website for more information about supporting scholarships and fellowships.

Continuing Medical Education

The study of medicine is a lifelong process, with continuing medical education 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. In 2022, the program earned Accreditation with Commendation, which is the highest accreditation awarded by the Accreditation Council for Continuing Medical Education to institutions that demonstrate an engagement with their environment in support of interprofessional learning and team change that is part of a system for quality improvement.

The program's mission is to facilitate lifelong learning for health care practitioners and teams to enhance professional growth, patient care, and community health.

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 faculty development 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 200 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 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.

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
First Year			
Radiation Protection and Safety (MedPhys 521)	2	—	—
Independent Study (MedPhys 503)	1	—	—
Radiological Physics and Dosimetry (MedPhys 502)	3	—	—
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	—	—	—
	6	9	0
Second Year			

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	—	—	—
	6	9	0

Sample Thesis Research Stream Schedule

Course	Fall Units	Spring Units	Summer Units
First Year			
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	—	—	—
	9	9	0
Second Year			
Clinical Imaging Fundamentals (MedPhys 501)	2	—	—
Clinical Rotations (MedPhys 522)	1	—	—
MS 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	—	—	—
	6	3	0

PhD in Medical Physics

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.

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
First Year			
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	—	—	
	8	11	0
Second Year			
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
	12	12	24

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
First Year		
Radiological Physics and Dosimetry (MedPhys 502)	3	—
Radiation Protection and Safety (MedPhys 521)	2	—
Clinical Imaging Fundamentals (MedPhys 501)	2	—
Radiobiology (MedPhys 505)	—	2
Radiation Oncology Physics (MedPhys 506)	—	3
Biological Imaging Technology (ESE 589)	—	3
	7	8

Two-Year Sample Course Schedule

Course	Fall Units	Spring Units
First Year		
Radiological Physics and Dosimetry (MedPhys 502)	3	—
Radiobiology (MedPhys 505)	—	2
Biological Imaging Technology (ESE 589)	—	3
	3	5
Second Year		
Radiation Protection and Safety (MedPhys 521)	2	—
Clinical Imaging Fundamentals (MedPhys 501)	2	—
Radiation Oncology Physics (MedPhys 506)	—	3
	4	3

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. Please visit the Program in Occupational Therapy website to view our NBCOT pass rate.

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. Consult our Program in Occupational Therapy website for more information about our NBCOT Exam Results.

A felony conviction may affect a graduate's ability to sit for the NBCOT exam or to attain state licensure.

Post-Professional Doctorate of Occupational Therapy

The **online post-professional clinical doctorate of occupational therapy (PP-OTD) degree** is for experienced occupational therapists who want to impact the profession through innovative leadership and education. The PP-OTD advances the learner's knowledge and skills to meet their career goals in their current practice, in emerging practice and leadership areas, and in higher education. Students must be licensed to practice occupational therapy in the United States and have completed at least two years of occupational therapy practice.

Our PP-OTD courses are delivered through high-quality synchronous and asynchronous virtual learning. The curriculum focuses on developing skills in leadership, program development and evaluation, teaching, and advocacy. It consists of five semesters of course work (6-7 credits per semester) for a total of 34 credits.

The curriculum includes six core courses (3 credits each) that provide advanced training in communication, evidence-based practice, theory and other areas. Four capstone sequence courses (1 credit each) help guide students through the creation, implementation and evaluation of a student-driven doctoral project and the compilation of a culminating portfolio. For the remaining credits, students select one of two specialty tracks: Educate or Lead. Within each track, four specialty courses (3 credits each) provide additional education to help students meet future goals.

Students can complete the program in five sequential semesters (including the summer semester) on a part-time basis. The curriculum is designed to allow students to continue to work in their current positions, if they choose to do so. There is no full-time study option for this degree. Tuition is charged per credit unit.

Graduates of the PP-OTD program will be prepared for careers as leaders and educators in a wide variety of traditional and nontraditional settings.

PhD in Rehabilitation and Participation Science

The Rehabilitation and Participation Science (RAPS) PhD program aims to develop rehabilitation scientists whose research questions are chosen based explicitly on their potential to generate rehabilitation knowledge that will enhance health, reduce illness and disability and optimize participation and quality of life. In our doctoral training model, students devote the majority of their time to mentored research activities beginning in their first semester, and then they 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 two-year, eight-month 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) 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 or eligibility and prerequisites.

DPT Curriculum

Year One, Fall

Code	Title	Units
PhysTher 700	Learning, Health and Equity	1
PhysTher 701	Professions and Movement	1
PhysTher 702	Movement and Population Health	2
PhysTher 703A	Movement and Precision Health	10
PhysTher 731A	Patient and Client Care 1	0.5
PhysTher 732A	Knowledge for Practice 1	0.5
PhysTher 733A	Practice-Based Learning and Improvement 1	0.5
PhysTher 734A	Interpersonal & Communication Skills 1	0.5
PhysTher 735A	Professionalism 1	0.5
PhysTher 736A	Systems-Based Practice 1	0.5
PhysTher 737A	Interprofessional Collaboration 1	0.5
PhysTher 738A	Personal & Professional Development 1	0.5
Early Clinical Experience		

Year One, Spring

Code	Title	Units
PhysTher 703B	Movement and Precision Health	15
PhysTher 731B	Patient and Client Care 1	0.5
PhysTher 732B	Knowledge for Practice 1	0.5
PhysTher 733B	Practice-Based Learning and Improvement 1	0.5

PhysTher 734B	Interpersonal & Communication Skills 1	0.5
PhysTher 735B	Professionalism 1	0.5
PhysTher 736B	Systems-Based Practice 1	0.5
PhysTher 737B	Interprofessional Collaboration 1	0.5
PhysTher 738B	Personal & Professional Development 1	0.5
Early Clinical Experience		

Year One, Summer

Code	Title	Units
PhysTher 691	Clinical Experience I (8-week, full-time internship)	4

Year Two, Fall

Code	Title	Units
PhysTher 710	Prevention, Diagnosis and Management of Movement-Related Problems	12
PhysTher 741A	Patient and Client Care 2	0.5
PhysTher 742A	Knowledge for Practice 2	0.5
PhysTher 743A	Practice-Based Learning and Improvement 2	0.5
PhysTher 744A	Interpersonal & Communication Skills 2	0.5
PhysTher 745A	Professionalism 2	0.5
PhysTher 746A	Systems-Based Practice 2	0.5
PhysTher 747A	Interprofessional Collaboration 2	0.5
PhysTher 748A	Personal & Professional Development 2	0.5

Year Two, Winter

Code	Title	Units
PhysTher 692	Clinical Experience II (8-week, full-time internship)	4
PhysTher 741B	Patient and Client Care 2	0.5
PhysTher 742B	Knowledge for Practice 2	0.5
PhysTher 743B	Practice-Based Learning and Improvement 2	0.5
PhysTher 744B	Interpersonal & Communication Skills 2	0.5
PhysTher 745B	Professionalism 2	0.5
PhysTher 746B	Systems-Based Practice 2	0.5
PhysTher 747B	Interprofessional Collaboration 2	0.5
PhysTher 748B	Personal & Professional Development 2	0.5

Year Two, Spring

Code	Title	Units
PhysTher 711	Prevention, Diagnosis and Management of Complex Movement-Related Problems	12
PhysTher 741C	Patient and Client Care 2	0.5
PhysTher 742C	Knowledge for Practice 2	0.5

PhysTher 743C	Practice-Based Learning and Improvement 2	0.5
PhysTher 744C	Interpersonal & Communication Skills 2	0.5
PhysTher 745C	Professionalism 2	0.5
PhysTher 746C	Systems-Based Practice 2	0.5
PhysTher 747C	Interprofessional Collaboration 2	0.5
PhysTher 748C	Personal & Professional Development 2	0.5

Year Three, Summer

Code	Title	Units
PhysTher 693	Clinical Experience III (10-week, full-time internship)	5

Year Three, Fall

Code	Title	Units
PhysTher 694	Clinical Experience IV (12-week, full-time internship)	6

Year Three, Spring

Code	Title	Units
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.

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 500	Current Topics in Public Health (medical students only)	1
PHS 501	Introduction to Epidemiology	3
PHS 502	Intermediate Epidemiology	3
PHS 505	Ethics in Population and Clinical Health	1
PHS 511	Introductory Biostatistics for Clinical Research	3
PHS 512	Intermediate Biostatistics for Clinical Research	3
PHS 520	Introduction to R for Clinical Research	1

Information about elective courses is available on the MPHS website.

Certificate in Clinical Effectiveness

Students who complete the Certificate in Clinical Effectiveness will develop the strong methodological skills needed for clinical outcomes research. Students will achieve competency in designing clinical and observational studies, conducting secondary analysis of existing data, and evaluating clinical epidemiology or clinical research projects of clinical or public health significance.

Requirements

The certificate will require a minimum of 15 total credits, including two core courses and three additional elective courses. All electives will be reviewed and approved prior to registration to ensure relevance to the certificate. The certificate can be completed in one year. Exceptions can be made, and all course work must be successfully completed within five years from the start of the first course.

Core Courses

Code	Title	Units
PHS 501	Introduction to Epidemiology (Fall 1)	3
PHS 511	Introductory Biostatistics for Clinical Research (Fall 1)	3

Elective Courses

Code	Title	Units
PHS 502	Intermediate Epidemiology (Fall 2)	3
PHS 5254	Using Administrative Data for Health Services Research (Spring 1 & 2)	3
PHS 527	Development, Validation and Application of Risk Prediction Models (Spring 1 & 2)	3
PHS 540	Decision Analysis for Clinical Investigation and Economic Evaluation (Fall 1 & 2)	3
PHS 550	Randomized Controlled Trials (Fall 1 & 2)	3
PHS 551	Systematic Reviews and Meta-Analysis (Spring 1 & 2)	3
PHS 580	Introduction to Health Disparities and the Structural and Social Determinants of Health (Fall 1 & 2)	2
PHS 590	Introduction to Propensity Score Methods (Spring 1 & 2)	1
PHS 610	Multilevel and Longitudinal Data Analyses for Clinical Research (Spring 1 & 2)	3

Course Credit

All core courses must be taken for a letter grade. Elective courses may be taken pass/fail.

Who Can Apply

- Medical school students and those in medical residency training
- Students in a master's or doctoral degree program at Washington University
- Career-development awardees
- No international applicants
- No remote learning

Certificate in Health Equity and Disparities

Students who complete the Certificate in Health Equity and Disparities will gain knowledge on health disparities and social determinants of health. They will develop the interdisciplinary skills needed to assess health disparities and address the impact of social determinants of health on clinical outcomes and population health.

Requirements

The certificate will require minimum of 15 total credits, including three core courses and three additional elective courses. All electives will be reviewed and approved prior to registration to ensure relevance to the Certificate in Health Disparities and Equity. The certificate can be completed in one year. Exceptions can be made, and all course work must be successfully completed within five years from the start of the first course.

Core Courses

Code	Title	Units
PHS 505	Ethics in Population and Clinical Health (Spring 1 & 2)	1
PHS 580	Introduction to Health Disparities and the Structural and Social Determinants of Health (Fall 1 & 2)	2
One of the following:		
PHS 501	Introduction to Epidemiology (Fall 1)	
PHS 532	Applied Qualitative Methods for Health Research (Fall 1 & 2)	
PHS 550	Randomized Controlled Trials (Fall 1 & 2)	
PHS 559	Dissemination and Implementation Science (Spring 1 & 2)	

Elective Courses

Code	Title	Units
SKILL 5504	Introduction to System Dynamics for Advancing Equity	1
PHS 501	Introduction to Epidemiology (Fall 1)	3
PHS 502	Intermediate Epidemiology (Fall 2)	3
PHS 511	Introductory Biostatistics for Clinical Research (Fall 1)	3
PHS 532	Applied Qualitative Methods for Health Research (Fall 1 & 2)	3
PHS 550	Randomized Controlled Trials (Fall 1 & 2)	3
PHS 559	Dissemination and Implementation Science (Spring 1 & 2)	3
PHS 560	Principles of Shared Decision Making and Health Literacy in the Clinical Setting (Spring 1 & 2)	3

Course Credit

All core courses must be taken for a letter grade. Elective courses may be taken pass/fail.

Who Can Apply

- Medical school students and those in medical residency training
- Students in a master's or doctoral degree program at Washington University
- Career-development awardees
- No international applicants
- No remote learning

Academic Departments

Washington University School of Medicine has 20 academic departments, all of which provide educational opportunities for the Doctor of Medicine (p. 140) and Graduate Medical Education (p. 150) programs.

- Anesthesiology (p. 158)
- Biochemistry and Molecular Biophysics (p. 171)
- Cell Biology and Physiology (p. 175)
- Developmental Biology (p. 180)
- Genetics (p. 184)
- Medicine (p. 189) (Internal Medicine)
- Molecular Microbiology (p. 200)
- Neurology (p. 203)
- Neuroscience (p. 218)
- Neurosurgery (p. 224)
- Obstetrics and Gynecology (p. 228)
- Ophthalmology and Visual Sciences (p. 239)
- Orthopaedic Surgery (p. 247)
- Otolaryngology (p. 253)
- Pathology and Immunology (p. 260)
- Pediatrics (p. 269)
- Psychiatry (p. 304)
- Radiation Oncology (p. 316)
- Radiology (p. 322)
- Surgery (p. 337)

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 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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Faculty

Michael Avidan, MBBCh, FCA SA

Department Chair

Scott Markowitz, MD

Department Vice Chair for Professional Development & Diversity, Equity and Inclusion

Robert Gereau, PhD

Department Vice Chair for Research

Ivan Kangrga, MD, PhD

Department Vice Chair for Health Systems Liaison

Anne Drewry, MD

Department Vice Chair

Chakrapol Lattanand, MD, MBA

Department Vice Chair for Clinical Operations

Dolores Njoku, MD

Department Vice Chair for Pediatric Anesthesiology

G. Richard Benzinger, MD, PhD

Department Interim Vice Chair for Education

Omokhaye Higo, MD, MBA

Department Vice Chair for Innovation

Visit our website for more information about our faculty and their appointments.

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
Main Campus, 2010

Hawa Abubakar, MBBS

Assistant Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, King's College London, 2010

Oluwafunmilayo Beverly Adebayo-Adonis, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Arts, Cornell University, 2007
Doctor of Medicine, Meharry Medical College, 2013

Gustav Akk, Ph.D.

Associate Professor of Anesthesiology (primary appointment)
Bachelor of Science, Moscow State University, 1991
Doctor of Philosophy, State University of New York at Buffalo, 1997

Ream Al-Hasani McCall, Ph.D.

Associate Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Doctor of Philosophy, University of Surrey, 2009

Zekeriyya Alanoglu, M.Ed., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Medicine, Ankara University, 1993
Master of Education, Ankara University, 2000

Mark Joseph Arcario, Ph.D., M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Science, University of Florida, 2009

Champaign, 2014
Champaign, 2017

Umeshkumar Athiraman, M.D.

Associate Professor of Anesthesiology (primary appointment)
Associate Professor of Neurological Surgery
Doctor of Medicine, The Tamil Nadu Dr. M.G.R. Medical University, 2013

Jacob D AuBuchon, M.D.

Associate Professor of Anesthesiology (primary appointment)
Bachelor of Arts, University of Missouri Kansas City, 2005
Doctor of Medicine, University of Missouri Kansas City, 2008

Michael Simon Avidan, MB.BCh.

Professor of Anesthesiology (primary appointment)
Dr. Seymour and Rose T Brown Professor of Anesthesiology
Professor of Surgery (Cardiothoracic Surgery)
Head of the Department of Anesthesiology
Professor of Psychiatry
Foreign MD equivalent, University of the Witwatersrand, 1991

B

Sennaraj Balasubramanian, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, Tirunelveli Medical College, 1992
Doctor of Medicine, All India Institute of Medical Sciences, 1998

Jessica Bauerle, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, Southwest Baptist University, 2004
Doctor of Medicine, University of Colorado Health Science Center, 2010

Arbi Ben Abdallah, Ph.D.

Associate Professor of Anesthesiology (primary appointment)
Doctor of Philosophy, Washington University in St Louis, 2011

Amber Christine Benhardt, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Arts, Texas A&M University, 2009
Doctor of Medicine, Texas A&M University, 2013

George Richard Benzinger, Ph.D., M.D.

Professor of Anesthesiology (primary appointment)
Bachelor of Science, California Institute of Technology, 1993
Doctor of Philosophy, University of Chicago, 1998
Doctor of Medicine, University of Chicago, 2000

Ahmet Onat Bermede, M.D.

Instructor in Anesthesiology (primary appointment)
Doctor of Medicine, Ankara University, 2003

Brad Bernstein, Ph.D., M.D.

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, Yale University, 1992
Doctor of Philosophy, University of Washington, 1999
Doctor of Medicine, University of Washington, 1999

Khairunisa Binte Mohamad Ibrahim, Ph.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Science, National University of Singapore, 2012

Doctor of Philosophy, National University of Singapore, 2018

Matthew Eugene Boland, M.D.

Associate Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Doctor of Medicine, University of Missouri Kansas City, 1996

Anuradha Purushottam Borle, M.D., MBBS

Assistant Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, GMC Miraj, 2007
Doctor of Medicine, All India Institute of Medical Sciences, 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

Jamie Cao Brown-Shpigel, M.D.

Assistant Professor of Anesthesiology (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

Sarah Buday, Ph.D.

Associate Professor of Anesthesiology (primary appointment)
Bachelor of Science, Washington University in St Louis, 2002
Doctor of Philosophy, University of Missouri in St Louis, 2013

Reginald Bulkley, M.D.

Associate Professor of Anesthesiology (primary appointment)
Doctor of Medicine, University of Missouri Kansas City, 1983

C

Yuqing Cao, Ph.D.

Professor of Anesthesiology (primary appointment)
Bachelor of Science, Fudan University (#####), 1989
Doctor of Philosophy, University of California San Francisco, 1999

Baron Chanda, M.S., Ph.D.

Professor of Anesthesiology (primary appointment)
Professor of Biochemistry and Molecular Biophysics
Professor of Neuroscience
Bachelor of Science, University of Delhi, 1991
Master of Science, Savitribai Phule Pune University, 1993
Doctor of Philosophy, National Centre for Biological, 2000

Stephanie Kae Charshafian, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Assistant Professor of Emergency Medicine
Bachelor of Science, University of Florida, 2009
Doctor of Medicine, Washington University in St Louis, 2014

Tao Che, M.S., Ph.D.

Assistant Professor of Anesthesiology (primary appointment)
Master of Science, Wuhan University (#####), 2010
Doctor of Philosophy, Case Western Reserve University, 2015
Bachelor of Science, Wuhan University (#####), 2017

Ziwei Chen, M.S., Ph.D., MBBS

Assistant Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, Dalian Medical University (#####), 1995
Master of Science, Dalian Medical University (#####), 1998
Doctor of Philosophy, Peking University (####), 2001

Wayland W. Cheng, Ph.D., M.D.

Associate Professor of Anesthesiology (primary appointment)
Bachelor of Science, Wheaton College Illinois, 2005
Doctor of Philosophy, Washington University in St. Louis, 2012
Doctor of Medicine, Washington University in St. Louis, 2012

Kelly Lynne Chilson, M.D.

Professor of Anesthesiology (primary appointment)
Doctor of Medicine, University of Missouri Columbia, 1999

Salik Choudhary, M.D.

Voluntary Clinical Instructor in Anesthesiology
Bachelor of Arts, University of Missouri Kansas City, 2013
Doctor of Medicine, University of Missouri Kansas City, 2013

James Close, M.D.

Associate Professor of Anesthesiology (primary appointment)
Associate Professor of Medicine
Bachelor of Arts, Washington University in St. Louis, 1980
Doctor of Medicine, Washington University in St. Louis, 1984

Albert Murray Cohen, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Medicine, Baylor University, 1977

Bryan A Copits, Ph.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Philosophy, Northwestern University, 2012

Thomas E Cox

Professor Emeritus of Anesthesiology

Meaghan Claire Creed, Ph.D.

Associate Professor of Anesthesiology (primary appointment)
Associate Professor of Neuroscience
Associate Professor of Psychiatry
Bachelor of Science, University of Toronto, 2008
Doctor of Philosophy, University of Toronto, 2012

Lara W. Crock, Ph.D., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Arts, Barnard College, 2001
Doctor of Philosophy, Washington University in St. Louis, 2013
Doctor of Medicine, Washington University in St. Louis, 2013

Michael John Cuipa, M.D.

Voluntary Clinical Instructor in Anesthesiology
Bachelor of Science, Tufts University, 1988
Doctor of Medicine, University of Massachusetts Amherst, 1994

Caitlin Curcuru, M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Arts, Kansas City University of Medicine and Biosciences, 2018
Doctor of Medicine, Kansas City University of Medicine and Biosciences, 2018

D

Charl Johan De Wet, MB.ChB.

Professor of Anesthesiology (primary appointment)
Professor of Surgery (Cardiothoracic Surgery)
Foreign MD equivalent, University of Pretoria, 1990

Megan Mary Dewey, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, University of Notre Dame, 2013
Doctor of Medicine, Duke University, 2017

Ding Ding, M.S., M.D.

Instructor in Anesthesiology (Pending Executive Faculty Approval)
(primary appointment)
Bachelor of Science, University of Science and Technology of China (#####), 2001
Master of Science, University of Colorado Boulder, 2004
Doctor of Medicine, University of Colorado Anschutz Medical Campus, 2019

Anne Meredith Drewry, M.D.

Associate Professor of Anesthesiology (primary appointment)
Vice Chair
Division Chief of Critical Care Medicine
Doctor of Medicine, Washington University in St. Louis, 2006

Julie Kosto Drobish, M.D.

Associate Professor of Anesthesiology (primary appointment)
Main Campus, 2006
Doctor of Medicine, Washington University in St. Louis, 2009

Leon du Toit, M.S., MB.ChB.

Assistant Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, Stellenbosch University, 2005
Master of Science, University of Cape Town, 2020

Nicole Marie Durko, D.O.

Associate Professor of Anesthesiology (primary appointment)
Bachelor of Science, Saint Xavier University, 1995
Doctor of Osteopathic Medicine, Midwestern University, 2001

E

Bahaa Eldien Elgendy, M.S., Ph.D.

Associate Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, Benha University, 1999
Master of Science, Benha University, 2003
Doctor of Philosophy, University of Florida, 2010

Daniel Emmert, M.D.

Associate Professor of Anesthesiology (primary appointment)
Associate Professor of Surgery (Cardiothoracic Surgery)
Doctor of Medicine, Saint Louis University, 2005

Alex S Evers, M.D.

Professor of Anesthesiology (primary appointment)
Henry Elliot Mallinckrodt Professor of Anesthesiology
Professor of Developmental Biology

Professor of Medicine
Bachelor of Science, Yale University, 1974
Doctor of Medicine, New York University, 1978

F

Daniel Patrick Fernandez, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, Southern Methodist University, 2012
Doctor of Medicine, Indiana University Indianapolis, 2016

Mitchell Evan Fingerman, M.D.

Associate Professor of Anesthesiology (primary appointment)
Division Chief - Division of Regional and Ambulatory Anesthesia/North
Doctor of Medicine, University of Connecticut, 2004

Catherine Foster, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Arts, University of California Berkeley, 2008
Doctor of Medicine, University of Chicago, 2016

Rosemary Foster, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Medicine, Saint Louis University, 2013

Bradley Alexander Fritz, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, Case Western Reserve University, 2010
Doctor of Medicine, Washington University in St Louis, 2015

Brian M Fuller, M.D.

Professor of Anesthesiology (primary appointment)
Professor of Emergency Medicine
Bachelor of Arts, University of Alabama in Tuscaloosa, 1998
Doctor of Medicine, University of Alabama in Tuscaloosa, 2003

G

Preeta George, MBBS

Associate Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, Bangalore University, 1998

Robert W Gereau, Ph.D.

Professor of Anesthesiology (primary appointment)
Dr Seymour and Rose T Brown Professor of Anesthesiology
Division Chief - WU Pain Center
Vice Chair - Department of Anesthesiology
Professor of Neuroscience
Bachelor of Science, Missouri State University (Formerly Southwest Missouri State), 1991
Doctor of Philosophy, Emory University, 1995

Jason R Gillihan, M.D.

Professor of Anesthesiology (primary appointment)
Division Chief - Division of Anesthesiology, Barnes West County Hospital
Bachelor of Science, University of Southern Indiana, 2002
Doctor of Medicine, Southern Illinois University Carbondale, 2006

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.

Associate Professor of Anesthesiology (primary appointment)
Bachelor of Science, Hofstra University, 1984
Master of Arts, Hofstra University, 1986
Doctor of Philosophy, Saint Louis University, 1994

Cesar Emmanuel Gonzalez, M.A., Ph.D.

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, Jacksonville State University, 2014
Master of Arts, University of Alabama in Huntsville, 2017
Doctor of Philosophy, University of Alabama at Birmingham School of Medicine, 2023

Vivian Maria Gonzalez-Perez, Ph.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, Universidad de la Habana, 1997
Doctor of Philosophy, Universidad de Valparaíso, 2009

Burel Goodin, Ph.D.

Professor of Anesthesiology (primary appointment)
Doctor of Philosophy, University of Maryland Baltimore County, 2010

Thomas J Graetz, M.D.

Associate Professor of Anesthesiology (primary appointment)
Division Chief - Division of Cardiothoracic Anesthesiology
Associate Professor of Surgery (Cardiothoracic Surgery)
Doctor of Medicine, Saint Louis University, 2005

Stephen H Gregory, M.D.

Associate Professor of Anesthesiology (primary appointment)
Division Chief - Division of Perioperative Medicine
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
Doctor of Medicine, Vanderbilt University, 2014

H

Charles B Hantler, M.A., M.D.

Professor of Anesthesiology (primary appointment)
Bachelor of Arts, University of Michigan Ann Arbor, 1971
Master of Arts, Davenport University, 1973
Doctor of Medicine, Davenport University, 1977

Simon Haroutounian, M.A., Ph.D.

Professor of Anesthesiology (primary appointment)
Division Chief - Division of Clinical and Translational Research

Master of Arts, Hebrew University of Jerusalem, 2005
Doctor of Philosophy, Hebrew University of Jerusalem, 2011

Melissa Erica Hector-Greene, Ph.D., M.D.

Instructor in Anesthesiology (Pending Dean Approval) (primary appointment)

Bachelor of Arts, Mount Holyoke College, 2006

Doctor of Philosophy, Duke University, 2018

Doctor of Medicine, Duke University, 2018

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

Erin Leigh Carline Herrera, M.S.N.

Assistant Professor of Anesthesiology (primary appointment)

Master of Science in Nursing, Goldfarb School of Nursing, 2013

Omokhaye M Higo, M.B.A., MBBS

Associate Professor of Anesthesiology (primary appointment)

Vice Chair

Bachelor of Science, University of Ibadan, 1984

Foreign MD equivalent, University of Ilorin, 1990

Master of Business Administration, 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

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.

Assistant Professor of 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 Medicine

Professor of Surgery (General Surgery)

Professor of Developmental Biology

Doctor of Medicine, University of Virginia, 1976

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 of 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 (#####formerly#####), 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.

Assistant Professor of 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)

Foreign MD equivalent, 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
Champaign, 2018

Menelaos Karanikolas, M.D.

Professor of Anesthesiology (primary appointment)
Doctor of Medicine, National and Kapodistrian University of Athens,
1988

Jan Kasal, M.D.

Professor of Anesthesiology (primary appointment)
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)
Champaign, 2006
Master of Science, University of Alabama in Tuscaloosa, 2010
Doctor of Medicine, Southern Illinois University Carbondale, 2015

Christopher Ryan King, Ph.D., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Philosophy, 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.B.A., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Medicine, University of Zagreb, 1996
Master of Business Administration, Washington University in St Louis,
2023

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)
New Brunswick, 1982
Doctor of Medicine, University of Medicine and Dentistry of New Jersey,
1986

Brendan Joseph Kurtz, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Arts, University of Missouri Kansas City, 2016
Doctor of Medicine, University of Missouri Kansas City, 2018

L

Anand Lakshminarasimhachar, MBBS

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)
Vice Chair for Clinical Operations
Doctor of Medicine, Hahnemann University, 2000

Michael Edward Leavell, M.D.

Assistant Professor of Anesthesiology (Pending Executive Faculty
Approval) (primary appointment)
Bachelor of Arts, Harvard University, 1978
Doctor of Medicine, University of Kansas, 1984

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 (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

Stephanie Link, D.O.

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Associate of Science, Southwestern Illinois College, 2011
Bachelor of Science, Southern Illinois University Edwardsville, 2013
Doctor of Osteopathic Medicine, Lincoln Memorial University, 2018

Qianjin Liu, Ph.D., M.D.

Professor of Anesthesiology (primary appointment)
Doctor of Medicine, Nanjing Medical University (#####), 1983
Doctor of Philosophy, Saint Louis University, 1997

Qin Liu, Ph.D.

Professor of Anesthesiology (primary appointment)
Professor of Medicine (Dermatology)
Professor of Ophthalmology and Visual Sciences
Professor of Neuroscience
Bachelor of Science, Wuhan University (####), 1998
Doctor of Philosophy, Chinese Academy of Sciences, 2004

Jenna Lizzo, M.M.Sc., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Champaign, 2012
Master of Medical Science, Loyola University Chicago, 2014
SOM), 2018

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, A T Still University of Health Sciences, 2003

Sunny Shang Lou, Ph.D., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, Massachusetts Institute of Technology, 2009
Doctor of Philosophy, Stanford University, 2017
Doctor of Medicine, Stanford University, 2017

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.

Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
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 (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

John D McAllister, M.D.

Professor of Anesthesiology (primary appointment)
Professor of Pediatrics
Director of Clinical Operations, Pediatric Anesthesiology
Doctor of Medicine, University of Manitoba, 1980
Bachelor of Science, University of Manitoba, 1982

Jordan Gary McCall, Ph.D.

Associate Professor of Anesthesiology (primary appointment)
Doctor of Philosophy, Washington University in St Louis, 2015

Molly Ann McCormick, M.D.

Associate Professor of Anesthesiology (primary appointment)
Division Chief - Division of Anesthesiology, General
Doctor of Medicine, University of Missouri Kansas City, 1987

Brennan Michael McMillan, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Arts, University of Colorado Boulder, 2012
Doctor of Medicine, Albany Medical College, 2017

Carl McMullen

Associate Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)

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

Caitlynn Miller, D.O.

Instructor in Anesthesiology (primary appointment)
Doctor of Osteopathic Medicine, Kansas City University of Medicine and Biosciences, 2018

Gregory Charles Miller, M.D.

Assistant Professor of 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.

Associate 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.

Associate Professor of Anesthesiology (primary appointment)
Doctor of Medicine, University of Birmingham, 2018

John David Moore, M.D.

Instructor in Anesthesiology (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.

Associate 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.

Voluntary Clinical Instructor in Anesthesiology
Doctor of Medicine, Cairo University, 1991

Jose Moron-Concepcion, Ph.D.

Professor of Anesthesiology (primary appointment)
Henry Elliot Mallinckrodt Professor of Anesthesiology
Division Chief - Division of Anesthesiology, Research Unit
Professor of Psychiatry
Professor of Neuroscience
Doctor of Philosophy, University of Barcelona, 1998

Jimmy Lewis Moss, M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Science, Florida State University, 2010
Doctor of Medicine, Florida State University, 2015

Christopher Marlowe Murphy, M.A., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, University of Arkansas Main Campus, 2010
Master of Arts, University of Arkansas Main Campus, 2012
Doctor of Medicine, University of Arkansas Main Campus, 2016

Amjad Issam Musleh, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Assistant Professor of Emergency Medicine
Main Campus, 2008
Main Campus, 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 Ann Arbor, 2012
Bachelor of Science, University of Wisconsin, 2018

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

Kyle Niziolek, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Assistant Professor of Emergency Medicine
Doctor of Medicine, Georgetown University, 2012

Dolores Benedicta Njoku, M.D.

Professor of Anesthesiology (primary appointment)
Rudolph L. and Mary Frances Wise Endowed Chair in Pediatric Anesthesiology

Division Chief of Pediatric Anesthesiology
Vice Chair
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

Victoria Novoselova, MBBS

Assistant Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, Peoples' Friendship University of Russia, 2010

Sydney Marie Nykiel-Bailey, M.D.

Associate 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
Main Campus, 2010

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.

Professor of Anesthesiology (primary appointment)
Division Chief - Division of Obstetrical Anesthesia
Professor of Obstetrics and Gynecology
Doctor of Medicine, Tamilnadu Medical University, 2000
Doctor of Philosophy, All India Institute of Medical Sciences, 2003

Chris M Palmer, M.D.

Associate Professor of Anesthesiology (primary appointment)
Associate Professor of Emergency Medicine
Bachelor of Science, Virginia Polytechnic Institute and State University, 2004
Doctor of Medicine, SUNY 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.

Voluntary Clinical Instructor in Anesthesiology
Bachelor of Science, University of the Philippines, 1997
Doctor of Medicine, University of the Philippines, 2002

Jennifer Pearlstein

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)

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 Philibert

Instructor in Anesthesiology (primary appointment)

Mitchell R Platin, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Medicine, Kent State University, 1987

Amynah Pradhan, Ph.D.

Professor of Anesthesiology (primary appointment)
Bachelor of Science, McGill University, 1997
Doctor of Philosophy, 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

R

Lesley Kathryn Rao, M.D.

Associate Professor of Anesthesiology (primary appointment)
Division Chief - Division of Pain Management
Doctor of Medicine, Saint Louis University, 2006

Satish Reddy, M.D.

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, University of Georgia, 2006
Doctor of Medicine, Medical College of Georgia, 2011

Andrea Bulkley Reidy, M.D.

Associate 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 at 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)
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

Andrea Rodriguez-Restrepo, M.D.

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)
Doctor of Medicine, Pontificia Universidad Javeriana, 2013

Evan Ward Roller, M.D.

Associate Professor of Anesthesiology (primary appointment)
Main Campus, 2010

Brian Christopher Ruyle, Ph.D.

Instructor in Anesthesiology (Pending Dean Approval) (primary appointment)
Bachelor of Arts, University of Missouri in St Louis, 2012
Doctor of Philosophy, University of Missouri in St Louis, 2019

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

Levent Sahin, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Medicine, Eskisehir Osmangazi University, 1999

Emine Aysu Salviz, M.D.

Instructor in Anesthesiology (primary appointment)
Doctor of Medicine, Baskent University, 2004

Vijaya K Samineni, Ph.D.

Assistant Professor of Anesthesiology (primary appointment)
Doctor of Philosophy, Southern Illinois University Carbondale, 2013

Maryam Sammet

Assistant Professor of Anesthesiology (Pending Executive Faculty Approval) (primary appointment)

Jessica Lauren Sanford, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Arts, Emory University, 2009

Doctor of Medicine, University of Missouri Columbia, 2014

Benjamin Sanofsky, M.Ed., M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Arts, Colgate University, 2008
Master of Education, CUNY Hunter College, 2012
Doctor of Medicine, Stony Brook School of Medicine, 2016

Matthew Stringfellow Sanzalone, M.D.

Assistant Professor of Anesthesiology (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.

Assistant Professor of 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

Associate Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, Dayanand Medical College, 2007
Doctor of Medicine, All India Institute of Medical Sciences, 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

Richard Allan Slivicki, Ph.D.

Instructor in Anesthesiology (Pending Dean Approval) (primary appointment)
Bachelor of Science, Winona State University, 2012
Doctor of Philosophy, Indiana University Bloomington, 2018

Sarah Kendall Smith, Ph.D., M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, University of Kansas, 2004
Doctor of Philosophy, University of Kansas Medical Center, 2011
Doctor of Medicine, University of Kansas Medical Center, 2013

Ziyan Song, M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Science, Florida State University, 2014
Doctor of Medicine, Florida State University, 2018

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

Brandon Kyle Tan, M.S., M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Science, Duke University, 2010
Main Campus, 2013
Main Campus, 2018

Rene Tempelhoff

Professor Emeritus of Anesthesiology

Raghu P Terkonda, M.D.

Assistant Professor of Anesthesiology (primary appointment)
Bachelor of Science, Missouri University of Science and Technology
(Formerly University of Missouri at Rolla), 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
Doctor of Philosophy, Michigan State University, 2103

V

Swarup Varaday, MBBS

Professor of Anesthesiology (primary appointment)
Foreign MD equivalent, Andhra University, 1989

Anandhalakshmi Varadharajan, M.D., MBBS

Voluntary Clinical Instructor in Anesthesiology
Foreign MD equivalent, Sri Ramachandra Institute of Higher Education
and Research, 2000
Doctor of Medicine, St. Lukes, 2007

Richard Florentine Villegas, M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Science, University of Nevada Las Vegas, 2003
Doctor of Medicine, University of Santo Tomas, 2008

W

Brian Louis Weber, J.D., M.D.

Assistant Professor of 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 Main Campus, 2011

Brian T Wessman, M.D.

Professor of Anesthesiology (primary appointment)
Associate Director - Critical Care Medicine Fellowship
Professor of Emergency Medicine
Bachelor of Science, College of William and Mary, 2000
Doctor of Medicine, Commonwealth College, 2005

James Douglas Wirthlin, M.D.

Instructor in Anesthesiology (primary appointment)
Bachelor of Science, Brigham Young University, 2006
Doctor of Medicine, Uniformed Services University of the Health Sciences, 2012

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

Y

Branden Edward Yee, M.P.H., M.D.

Associate Professor of Anesthesiology (primary appointment)
Bachelor of Science, Tufts University, 2004
Master of Public Health, Tufts University, 2008
Doctor of Medicine, 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 Main Campus, 1990

Anna Rebecca Young, M.D.

Associate 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.

Professor of Anesthesiology (primary appointment)
Doctor of Philosophy, Saint Louis University, 1990
Doctor of Medicine, Saint Louis University, 1992

Jing Zhong, M.D.

Assistant Professor of 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 at Chicago, 2010
Doctor of Medicine, University of Illinois at Chicago, 2014

Jonathan Kramer Zoller, M.D.

Associate 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; 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. Arrangements for these special electives are made through the specific investigators: Meaghan Creed, PhD; Alex S. Evers, MD; Robert W. Gereau, PhD; Richard S. Hotchkiss, MD; 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; or Ben Palanca, MD, PhD.

Courses

Visit online course listings to view offerings for M10 Anesth.

M10 Anesth 801 General Anesthesiology (Clinical Elective)

Credit 4 units.

M10 Anesth 811 Cardiothoracic Anesthesiology (Clinical Elective)

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.

Credit 4 units.

M10 Anesth 812 Pediatric Anesthesiology (Clinical Elective)

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 where you will have the opportunity to learn about pre-anesthetic assessment, the performance of routine anesthetics (which includes instruction and practice in pediatric airway skills), other technical skills such as intravenous line placement, and the management of patients in the post-anesthesia care unit (PACU). 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. Credit variable, maximum 4 units.

M10 Anesth 819 CTICU: Cardiothoracic Intensive Care Unit (Clinical Elective)

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.

Credit 4 units.

M10 Anesth 821 Pain Management (Clinical Elective)

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.

Credit 4 units.

M10 Anesth 822 Anesthesiology for Neurosurgery (Clinical Elective)

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.

Credit 4 units.

M10 Anesth 823 Obstetrical Anesthesiology (Clinical Elective)

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).

Credit variable, maximum 4 units.

M10 Anesth 910 Anesthesiology Advanced Clinical Rotation (ACR)

This advanced clinical rotation 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 regional anesthesia / acute pain management, labor and delivery, pediatric anesthesia, and the Center for Preoperative Assessment and Planning. The student will interact with patients across all age ranges and demographics. 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 clinical simulator sessions using a simulator mannequin for practical management of airway problems, resuscitation, and trauma emergencies as well as supplemental educational sessions covering relevant topics in anesthesiology. By the end of the rotation, the student should be able to independently (under supervision) provide anesthesia for uncomplicated surgical procedures.

Credit 4 units.

M10 Anesth 915 Surgical Critical Care Advanced Clinical Rotation (ACR)

The 4400 Surgical ICU provides an exciting and challenging opportunity to care for some of the sickest patients in the hospital. From acute trauma to complex organ transplants, the SICU offers incredible teaching and education about a variety of medical topics and conditions. The ACR SICU rotation integrates medical students into one of the two SICU teams, and each medical student, in conjunction with a resident, will care for 3-5 patients on the service. This entails, at minimum, examining the patient, gathering pertinent information (lab results, significant events, etc.), and presenting the patient on rounds. Working with the resident, medical students will develop a problem list, as well as an organized plan for their patients. They will then need to follow up on the execution of all determined labs/interventions/consults, closely communicating with the residents, fellow, and attending throughout the shift, as well as presence for sign-outs each morning/evening at shift change. In addition, medical students will be expected to attend and participate in multiple educational conferences throughout the week/rotation, as well as sessions for skills such as line placement and ultrasound.
Credit 4 units.

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 can be found on our website.

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

Faculty

Ben Garcia, PhD

Department Chair

Visit our website for more information about our faculty and their appointments.

A

Hema Adhikari, M.S., Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Master of Science, State University of New York at Buffalo, 2015

Doctor of Philosophy, State University of New York at Buffalo, 2015

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

Shripad Bhagwat

Professor of Biochemistry and Molecular Biophysics

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

Byoungkyu Cho, M.S., Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, Hankuk University of Foreign Studies, 2010
Master of Science, Seoul National University, 2013
Doctor of Philosophy, Seoul National University, null

John A Cooper, Ph.D., M.D.

Professor of Biochemistry and Molecular Biophysics (primary appointment)
Alan A. and Edith L. Wolff Professorship in Biochemistry and Molecular Biophysics
Professor of Cell Biology and Physiology
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.

Professor of Biochemistry and Molecular Biophysics (primary appointment)
Director of the Center for Drug Discovery
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

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.

Professor of Biochemistry and Molecular Biophysics (primary appointment)
Bachelor of Science, Brown University, 1997
Doctor of Philosophy, University of Washington, 2002

Roberto Galletto, M.S., Ph.D.

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)
Raymond H. Wittcoff Distinguished Professor of Biological Chemistry
Head of the Department of Biochemistry and Molecular Biophysics
Doctor of Philosophy, University of Virginia, 2005

Yehuda Ginosar, M.D.

Voluntary Research Professor of Anesthesiology
Doctor of Medicine, University of London, 1986

Young Ah Goo, M.S., Ph.D.

Professor of Biochemistry and Molecular Biophysics (primary appointment)
Professor of Genetics
Bachelor of Science, Chonnam National University, 1990
Seattle Campus, 1994
Doctor of Philosophy, University of Washington, 2002

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 (primary appointment)
Master of Science, Moscow Institute of Physics and Technology, null
Doctor of Philosophy, 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, M.S., Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)
Master of Science, Jiwaji University, 2004
Doctor of Philosophy, Jawaharlal Nehru University, 2010

L

Weikai Li, M.S., Ph.D.

Professor of Biochemistry and Molecular Biophysics (primary appointment)
Roy and Diana Vagelos Professor of Biochemistry and Molecular Biophysics
Bachelor of Science, East China University of Science and Technology (#####), 1993
Master of Science, University of Tennessee, 1998
Doctor of Philosophy, Yale University, 2004

Zongtao Lin, M.S., Ph.D.

Instructor in Biochemistry and Molecular Biophysics (primary appointment)
Bachelor of Science, Zhengzhou University (#####), 2009
Master of Science, Peking University (#####), 2012
Doctor of Philosophy, University of Tennessee, 2017

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

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

N

Natalie Marie Niemi, Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)
Bachelor of Science, University of Michigan Ann Arbor, 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

Jeramia Ory, Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)
Bachelor of Science, University of Nebraska, null
Doctor of Philosophy, University of Minnesota, null

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 Automoma de Madrid, 2004

S

Andrea Soranno, M.S., Ph.D.

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Master of Science, University of Milan, 2005
Doctor of Philosophy, University of Milan, 2008

Z

Jianwei Zeng, Ph.D.

Instructor in Biochemistry and Molecular Biophysics (primary appointment)
Doctor of Philosophy, Tsinghua University (#####), 2019

Rui Zhang, Ph.D.

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)
Bachelor of Science, Nanjing University, 2005
Doctor of Philosophy, Baylor University, 2010

Mingzhou Zhou, Ph.D.

Instructor in Biochemistry and Molecular Biophysics (primary appointment)
Bachelor of Science, University of Science and Technology Beijing (### ##), 2004
Doctor of Philosophy, University of South Florida, 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

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.

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

John Cooper, MD, PhD

South Building, 2nd Floor
Phone: 314-362-0287

Molecular mechanisms of cell motility and cytoskeleton assembly

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

Eric A. Galburt, PhD

McDonnell Sciences Building, 2nd Floor
Phone: 314-362-5201

Biophysical studies of transcription initiation in eukaryotes and mycobacterial tuberculosis

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.

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.

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.

Visit online course listings to view offerings for M15 Biochem.

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 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

Department Head

Visit our website for more information about our faculty and their appointments.

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

Dhaval Paresh Bhatt

Instructor in Cell Biology and Physiology (Pending Dean Approval)
(primary appointment)

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

Michael J. Bridge, Ph.D.

Instructor in Cell Biology and Physiology (Pending Dean Approval)
(primary appointment)
Main Campus, 1995
Doctor of Philosophy, University of Utah, 2006

C

Chun-Kan Chen, M.S., Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)
Bachelor of Science, National Taiwan University, 2010
Master of Science, University of Southern California, 2013
Doctor of Philosophy, California Institute of Technology, 2017

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 Anschutz Medical Campus, 2010

Sergej Djuranovic, Ph.D.

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.

Voluntary Research Professor of Cell Biology and Physiology
Bachelor of Arts, Yale University, 1985
Doctor of Philosophy, Stanford University, 1993
Doctor of Medicine, Stanford University, 1993

Xueyan He, Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Nanjing University, 2015

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 Bloomington, 1980
Bachelor of Arts, Indiana University Bloomington, 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 Leuven, 2003
Doctor of Philosophy, Katholieke Universiteit Leuven, 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 Neuroscience
Professor of Biomedical Engineering
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
Master of Science, Gwangju Institute of Science & Technology, 2002
Doctor of Philosophy, Washington University in St Louis, 2010

Polina V. Lishko, M.S., Ph.D.

Professor of Cell Biology and Physiology (primary appointment)
Master of Science, National Taras Shevchenko University of Kyiv, 1996
Doctor of Philosophy, Bogomoletz Institute of Physiology of NAS of Ukraine, 2000

M

Michael Benjamin Major, Ph.D.

Professor of Cell Biology and Physiology (primary appointment)
Alan A. and Edith L. Wolff Professorship in Cell Biology and Physiology
Professor of Otolaryngology
Bachelor of Science, Michigan State University, 1997
Doctor of Philosophy, University of Utah, 2004

Grigory Maksaev, 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 Institute of Physics and Technology, 2002

Jackie Lee Martin, M.A., M.B.A., M.D.

Voluntary Clinical 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, Johns Hopkins University (Duplicate of Johns Hopkins University), 2010

Dario Maschi, Ph.D.

Assistant Professor of Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Universidad de Buenos Aires, 2012

Robert Paul Mecham, Ph.D.

Professor Emeritus 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

Jongyun Myeong, Ph.D.

Instructor in Cell Biology and Physiology (primary appointment)
Doctor of Philosophy, Seoul National University, 2016

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)
Hugo F. and Ina C. Urbauer Professorship
Professor of Biochemistry and Molecular Biophysics
Professor of Genetics
Doctor of Philosophy, University of California San Diego, 2005

Giovanni Pauletti, M.S., Ph.D.

Voluntary Research Professor of Anesthesiology
Master of Science, Swiss Fed Inst Tech (EPFL), 1987
Doctor of Philosophy, Swiss Fed Inst Tech (EPFL), 1994

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)
Edward Mallinckrodt, Jr. Professorship in Cell Biology and Physiology
Head of the Department of Cell Biology and Physiology
Co-Director for Center for Quantum Leaps (CQL)
Bachelor of Science, Grinnell College, 1984
Champaign, 1985
Champaign, 1989

Helen Piwnica-Worms, Ph.D.

Voluntary Research Professor of Cell Biology and Physiology
Bachelor of Arts, Saint Olaf College, 1979
Doctor of Philosophy, Duke University, 1984

Jasmina Profirovic, Ph.D.

Voluntary Research 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

R

Eduardo Rosa-Molinar, Ph.D.

Professor of Cell Biology and Physiology (primary appointment)
Professor of Neuroscience

Bachelor of Science, University of Alabama in Tuscaloosa, 1994
Doctor of Philosophy, University of Nebraska Medical Center, 1997

S

Paul Henry Schlesinger, Ph.D., M.D.

Associate Professor of Cell Biology and Physiology (primary appointment)
Champaign, 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)
Gerty Cori Professor of Cell Biology and Physiology
Vice Chair - Cell Biology and Physiology
Professor of Medicine
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)
David English Smith Professorship in Medicine
Associate Director of the Division of Biology and Biomedical Sciences
Bachelor of Science, University of Wisconsin Madison, 1992
Champaign, 1995
Champaign, 1998

W

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

Nathaniel Walter York, Ph.D.

Instructor in Cell Biology and Physiology (primary appointment)
Bachelor of Science, University of Missouri in St Louis, 2013
Doctor of Philosophy, University of Wisconsin Madison, 2018

Zhongsheng You, M.S., Ph.D.

Professor of Cell Biology and Physiology (primary appointment)

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.

Voluntary Research Associate Professor of Cell Biology and Physiology
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 at Chapel Hill, 2013
Doctor of Philosophy, University of Wisconsin, 2017

David W. Piston, PhD

Department Head

Visit our website for more information about our faculty and their appointments.

Research Electives

Cell Biology and Physiology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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.

Kendall J. Blumer, PhD

506 McDonnell Sciences Building
Phone: 314-362-1668

Signaling mechanisms in cardiovascular and neurological disorders.

Chun-Kan Chen, PhD

252D McDonnell Sciences Building
Phone: 314-273-2787

The Chen lab utilizes multi-omic and high-throughput screening approaches to systematically investigate the regulation and function of circRNA in cells and to develop novel circRNA technologies for translational applications. Signaling mechanisms in cardiovascular and neurological disorders are also studied.

Clair Crewe, PhD

1127 Couch Biomedical Research Building
Phone: 314-362-3240

Understanding extracellular vesicle (EV)-mediated signaling during homeostatic and pathologic metabolic regulation.

Sergej Djuranovic, PhD

514 McDonnell Sciences Building
Phone: 314-362-9706

Molecular mechanisms of translational control; cellular processes regulated by changes in RNA metabolism.

Denis Goldfarb, PhD

406 McDonnell Sciences Building
Phone: 314-273-3669

Computational mass spectrometry, proteomics, and their applications in biology.

Xue-Yan He, PhD

5516 Cancer Research Building
Phone: 314-362-5296

The He Lab is dedicated to advancing knowledge of the mechanisms responsible for colorectal tumor progression, with a specific focus on stress and its influence on the tumor microenvironment.

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.

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.

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.

Polina Lishko, PhD

1127 Couch Biomedical Research Building
Phone: 314-362-6672

The role of bioactive lipid signaling and bioelectricity in the physiology of the inverted epithelia of the brain and retina. Physiology and pathophysiology of steroid signaling in reproduction, aging and neurodegeneration.

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.

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.

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.

Slavica Pavlovic Djuranovic, PhD

416 McDonnell Sciences Building
Phone: 314-362-6675

Identifying new targets and possible therapies to treat malaria.

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' α -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' α -cells. High glucose levels inhibit glucagon secretion from α -cells within the islets but not from dispersed α -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.

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.

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.

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.

Visit the online course listings to view offerings for M75 CellBio.

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: <https://developmentalbiology.wustl.edu/>

Faculty

Lilianna Solnica-Krezel, PhD

Department Head

Visit our website for more information about our 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
Main Campus, 1966
Doctor of Philosophy, Washington University in St Louis, 1970

C

Douglas Floyd Covey, M.A., Ph.D.

Professor of Pharmacology in Developmental Biology (primary appointment)
Andrew C and Barbara B Taylor Distinguished Professor of Psychiatry
Professor of Anesthesiology
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, University of Cambridge, 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)
Director of the Center for Theoretical Neuroscience
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
Assistant Dean Academic Pathway Programs
Doctor of Philosophy, University of Maryland Baltimore, 2012

I

Shin-Ichiro Imai, Ph.D., M.D.

Professor of Developmental Biology (primary appointment)
Theodore and Bertha Bryan Distinguished Professor of Environmental Medicine
Professor of Medicine
Doctor of Medicine, Keio University, 1989
Doctor of Philosophy, Keio University, 1995

J

Aaron N Johnson, Ph.D.

Associate 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)
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, Johns 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 of New Jersey, 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.

Associate 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, University of Cambridge, 2007

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 Mumbai, 1985
Doctor of Philosophy, University of Pittsburgh, 1993
Master of Science, University of Mumbai, 2005

Elizabeth Pollina, Ph.D.

Assistant Professor of Developmental Biology (primary appointment)
Bachelor of Arts, Princeton University, 2007
Doctor of Philosophy, Stanford University, 2015

R

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.

Associate 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.

Assistant Professor of 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)
Alan A and Edith L Wolff Professor of Developmental Biology
Head of the Department 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.

Associate Professor of Developmental Biology (primary appointment)
Bachelor of Arts, Harvard University, 2007
Master of Arts, University of Cambridge, 2008

Doctor of Philosophy, University of Cambridge, 2011

Yu-Chen Tony Tsai, Ph.D., M.D.

Assistant Professor of Developmental Biology (primary appointment)
Doctor of Medicine, National Taiwan University, 2005
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 of Jerusalem, 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, the Center for the Investigation of Membrane Excitability Diseases, the Center for Cardiovascular Research, and the Hope Center. 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

7150 Jeffrey T. Fort Neuroscience Research Building
Phone: 314-362-9925

Neurodevelopment, neurodegeneration, and axon regeneration in *Drosophila* and mouse.

Geoff Goodhill, PhD

8322 Jeffrey T. Fort Neuroscience Research Building
Phone: 314-273-7691

The Goodhill Lab's overall goal is to understand the computational principles that underlie brain development using a combination of experimental and theoretical approaches. Previously, the lab has studied how growing nerve fibers detect and respond to molecular gradients to find their targets and how visual experience affects the development of maps in the developing brain. Currently, we are using the larval zebrafish as a model to understand the links between the development of patterns of brain activity and complex behaviors and to study how the development of brain and behavior is altered in autism spectrum disorders.

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.

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.

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.

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.

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.

Liz Pollina, PhD

3830 North Medical Building
Phone: 314-362-7054

The Pollina Lab is broadly interested in identifying the molecular mechanisms that preserve longevity across the diverse cell types of the nervous system.

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.

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.

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.

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.

L41 Biol 5152 RAD Journal Club (Regeneration, Aging, and Development)

Focuses on developing a dialog around current topics in developmental and regenerative biology at the molecular, cellular and systems levels.
Credit 1 unit.

L41 Biol 5352 Developmental Biology

Analysis of a selected set of key processes in development, such as pattern formation, cell-cell signaling, morphogenesis, etc. The focus is on molecular approaches applied to important model systems, but framed in classical concepts. The discussion section provides instruction in presenting a journal club and writing a research proposal. Prerequisites, Molecular Cell Biology (Bio 5068) and Nucleic Acids (548).
Credit 3 units.

L41 Biol 590 Research

Credit to be arranged.
Credit variable, maximum 12 units.

James S. McDonnell Department of Genetics

The Department of Genetics 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.

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

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

Director, Division of Statistical Genomics

Rich Head, MS

Director, Genome Technology Access Center at McDonnell Genome Institute (GTAC@MGI)

Xiaoxia Cui, PhD

Director, Genome Engineering and iPSC Center

Visit our website for more information about our faculty and their appointments.

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
Master of Business Administration, Washington University in St. Louis, 2022

B

Ruteja A. Barve, M.S., Ph.D.

Assistant Professor of Genetics (primary appointment)
Bachelor of Science, Savitribai Phule Pune University, 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, 1979
Doctor of Philosophy, University of Colorado Boulder, 1989

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

William James Buchser, Ph.D.

Associate Professor of Genetics (primary appointment)
Bachelor of Music, University of Miami, 2002

Doctor of Philosophy, University of Miami, 2009

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

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, 1997
Doctor of Philosophy, University of Texas Austin, 2005

D

Joseph D Dougherty, Ph.D.

Professor of Genetics (primary appointment)
Professor of Psychiatry
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 1999
Doctor of Philosophy, University of California, 2005

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

E

Gabor Egervari, Ph.D., M.D.

Assistant Professor of Genetics (primary appointment)
Assistant Professor of Biochemistry and Molecular Biophysics
Doctor of Medicine, Semmelweis University, 2011
Doctor of Philosophy, Icahn School of Medicine at Mo, 2017

F

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 Carbondale, 1992

Paul Hime, Ph.D.

Instructor in Genetics (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

Heather A Lawson, M.A., Ph.D.

Assistant Professor of Genetics (primary appointment)
Bachelor of Arts, University of Wisconsin Milwaukee, 2002
Main Campus, 2004
Main Campus, 2008

Daofeng Li, Ph.D.

Assistant Professor of Genetics (primary appointment)
Bachelor of Science, China Agricultural University, 2005
Doctor of Philosophy, China Agricultural 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 Carbondale, 1996

M

Tassia Mangetti Goncalves, M.S., Ph.D.

Instructor in Genetics (primary appointment)
Bachelor of Science, University of SAO Paulo, 2012
Master of Science, University of SAO Paulo, 2015
Champaign, 2019

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 Main Campus, 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.

Voluntary Research Professor of Genetics
Bachelor of Arts, Princeton University, 1998
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)
Bachelor of Science, Duke University, 2010

Doctor of Philosophy, University of North Carolina at Chapel Hill, null

Benpeng Miao, Ph.D.

Instructor in Genetics (primary appointment)
Bachelor of Science, Ocean University of China (#####), 2013
Doctor of Philosophy, Chinese Academy of Sciences, 2018

Jeffrey D Milbrandt, Ph.D., M.D.

Professor of Genetics (primary appointment)
James S McDonnell Professor of Genetics
Executive Director of the McDonnell Genome Institute
Professor of Medicine
Professor of Pathology and Immunology
Professor of Neurology
Bachelor of Science, University of Nebraska, 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

P

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 and Technology, 1991
Master of Science, Tokyo University of Agriculture and 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

Giwon Shin, Ph.D.

Assistant Professor of Genetics (primary appointment)
Bachelor of Science, Pohang University of Science & Technology, 2007
Doctor of Philosophy, Pohang University of Science & Technology, 2012

James B Skeath, Ph.D.

Professor of Genetics (primary appointment)

Assistant Dean Academic Pathway Programs
Bachelor of Arts, Haverford College, 1988
Doctor of Philosophy, University of Wisconsin Madison, 1993

Gary D Stormo, M.A., Ph.D.

Professor Emeritus of Genetics
Bachelor of Science, California Institute of 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

V

Michael J. Vasek, Ph.D.

Instructor in Genetics (primary appointment)
Bachelor of Science, Duke University, 2006
Doctor of Philosophy, Washington University in St Louis, 2015

W

Ting Wang, M.S., Ph.D.

Professor of Genetics (primary appointment)
Sanford and Karen Loewentheil Distinguished Professor of Medicine
Head of the Department of Genetics
Professor of Computer Science and Engineering
Professor of Biostatistics
Master of Science, Washington University in St Louis, 2001
Doctor of Philosophy, Washington University in St Louis, 2006

Yung-Chun Wang, Ph.D.

Instructor in Genetics (Pending Dean Approval) (primary appointment)
Doctor of Philosophy, University of Georgia, 2018

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, Hubei University of Medicine, 1984
Doctor of Medicine, Hubei University of Medicine, 1984
Master of Science, Tongji Medical College of Huazhong University of Science and Technology, 1995

Doctor of Philosophy, Tongji Medical College of Huazhong University of Science and Technology, 1998

Z

Guoyan Zhao, Ph.D.

Assistant Professor of Genetics (primary appointment)
Assistant Professor of Neurology
Doctor of Philosophy, Washington University in St Louis, 2003

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.

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.

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.

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.

Gabor Egervari, MD, PhD

Couch Biomedical Research Building, Room 6313
Phone: 314-362-6741
gabor@wustl.edu

Our lab combines genomic, proteomic and metabolomic approaches with animal behavioral models to understand how metabolic fluctuations influence gene expression in the brain, particularly in the context of substance use disorders and neurodegeneration.

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.

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.

Michael Meers, PhD

Couch Biomedical Research Building, Room 5308
Phone: 314-747-4061
meers@wustl.edu

The Meers Lab studies how transcription factors interact with and overcome barriers presented by chromatin landscapes to specify developmental and disease outcomes. To do so, we develop cutting-edge epigenomics techniques to map transcription factor binding and chromatin structure in the same context at high resolution.

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/glial 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.

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.

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.

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.

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.

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.

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.

Courses

Visit online course listings to view offerings for M20 Genetics.

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.

Credit variable, maximum 16 units.

John T. Milliken Department of Medicine

Instruction in medicine is provided during all three phases of the new Gateway Curriculum. This begins with immersive experiences and clinical skills that are introduced in Phase 1, bringing immediate clinical context to the foundational sciences. It continues during the Phase 2 Internal Medicine clerkship, where students directly apply knowledge and care to patients in a supervised setting, and it extends into the required Internal Medicine advanced clinical rotation and elective courses in Phase 3.

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

Adolphus Busch Professor of Medicine and Chair

Jeffrey S. Crippin, MD

Marilyn E. Bornefeld Chair in Gastrointestinal Research and Treatment
Professor of Medicine
Vice Chair of Clinical Programs

Nancy K. Sweitzer, MD, PhD

Professor of Medicine
Vice Chair of Clinical Research

Abby L. Spencer, MD

Professor of Medicine
Vice Chair of Education

Angela L. Brown, MD

Professor of Medicine
Vice Chair of Education

Thomas Ciesielski, MD

Associate Professor of Medicine
Vice Chair of Patient Safety

Peggy L. Kendall, MD

Virginia Minnich Distinguished Professor of Medicine
Chief, Division of Allergy and Immunology

Richard W. Gross, MD, PhD

Professor of Medicine
Chief, Division of Bioorganic Chemistry and Pharmacology

Roberto Civitelli, MD

Sydney M. & Stella H. Schoenberg Professor of Medicine
Chief, Division of Bone and Mineral Diseases

Sumanth Prabhu, MD

Lewin Distinguished Professor of Cardiovascular Diseases
Chief, Division of Cardiology/Cardiology Diseases

Lynn A. Cornelius, MD

Winfred A. and Emma R. Showman Professor of Dermatology in Medicine
Chief, Division of Dermatology

Clay F. Semenkovich, MD

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

John E. and Adaline Simon Professor of Medicine
Chief, Division of Gastroenterology

Bradley A. Evanoff, MD, MPH

Richard A. and Elizabeth Henby Sutter Chair in Occupational, Industrial, and Environmental Medicine
Chief, Division of General Medical Sciences

Thomas M. De Fer, MD

Carol & Jerome T. Loeb Professor of Medicine
Associate Dean for Medical Student Education
Chief, Division of General Medicine

Samuel Klein, MD

William H. Danforth Professor of Medicine and Nutritional Science
Chief, Division of Geriatrics and Nutritional Sciences

Elaine M. Majerus, MD, PhD

Professor of Medicine
Co-Chief, Division of Hematology

Stephen Oh, MD, PhD

Associate Professor of Medicine
Co-Chief, Division of Hematology

Mark Williams, MD

Professor of Medicine
Chief, Division of Hospital Medicine

Jennifer A. Philips, MD, PhD

Theodore and Bertha Bryan Professorship in Environmental Medicine #1
Professor of Molecular Microbiology
Co-Chief, Division of Infectious Diseases

William G. Powderly, MD

Dr. J. William Campbell Professor of Medicine
Co-Chief, Division of Infectious Diseases

Benjamin D. Humphreys, MD, PhD

Joseph P. Friedman Professor of Renal Diseases in Medicine
Chief, Division of Nephrology

John F. DiPersio, MD, PhD

Virginia E. and Sam J. Golman Professor of Medicine
Chief, Division of Oncology

Patrick H. White, MD

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

Selma and Herman Seldin Professor of Medicine
Chief, Division of Pulmonary and Critical Care Medicine

Christine Pham, MD

Guy and Ella Mae Magness Professor of Medicine
Chief, Division of Rheumatology

Carlos Bernal-Mizrachi, MD

Philip E. & Carolyn E. Cryer Professor of Medicine
Chief, Veteran's Administration

Visit our website for more information about our faculty and their appointments.

A

Gail G Ahumada, M.A., M.D.

Associate Professor Emerita of Clinical Medicine
Bachelor of Arts, Stanford University, 1961
Master of Arts, Stanford University, 1962
Doctor of Medicine, University of California, 1972

B

Stanley J Birge, M.D.

Emeritus Associate Professor of Medicine
Bachelor of Arts, Amherst College, 1959
Doctor of Medicine, Washington University in St Louis, 1963

C

Lewis Robert Chase

Professor Emeritus of Medicine

D

James Albert Delmez, M.D.

Emeritus Professor of Medicine
Bachelor of Arts, Washington University in St Louis, 1969
Doctor of Medicine, University of Rochester, 1973

F

David Feldman, M.D.

Instructor Emeritus in Clinical Medicine
Doctor of Medicine, Washington University in St Louis, 1943

Victoria J Fraser, M.D.

Professor of Medicine (primary appointment)
Adolphus Busch Professor of Medicine
Head of the Department of Medicine
Bachelor of Science, William Woods University, 1978
Doctor of Medicine, University of Missouri Columbia, 1983

G

Jitendra K Gupta, M.S.

Instructor Emeritus in Clinical Medicine

Master of Science, School Not Found, 1963

H

Jennifer B Hillman, M.S., M.D.

Voluntary Clinical Assistant Professor of Medicine
Bachelor of Science, University of Missouri Columbia, 1996
Doctor of Medicine, University of Missouri Columbia, 2001
Main Campus, 2008

L

Stephen S Lefrak, M.D.

Professor Emeritus of Medicine
Bachelor of Arts, Colgate University, 1960
Doctor of Medicine, State University of New York, 1965

Morton A Levy, M.D.

Associate Professor Emeritus of Clinical Medicine
Bachelor of Arts, University of California, 1957
Doctor of Medicine, Washington University in St Louis, 1961

David M Lieberman, M.D.

Associate Professor Emeritus of Clinical Medicine
Doctor of Medicine, Vanderbilt University, 1949

N

J. Roger Nelson, M.D.

Assistant Professor Emeritus of Clinical Medicine
Bachelor of Arts, Washington University in St Louis, 1949
Doctor of Medicine, Washington University in St Louis, 1953

Charles C Norland, M.D.

Professor Emeritus of Clinical Medicine
Bachelor of Science, Washington State University, 1955
Doctor of Medicine, Washington University in St Louis, 1959

P

Mabel Louise Purkerson, M.D.

Professor Emerita of Medicine
Bachelor of Arts, Erskine College and Seminary, 1951
Doctor of Medicine, University of South Carolina (Duplicate of University of South Carolina Columbia), 1956

R

Kenneth Eugene Remy, M.D.

Associate Professor of Medicine
Doctor of Medicine, Jefferson Medical College, 2004

Willie Ray Ross, M.P.H., M.D.

Professor of Medicine (primary appointment)
Alumni Endowed Professorship In Medicine
Associate Dean for Diversity
Bachelor of Science, Yale University, 1980
Doctor of Medicine, Washington University in St Louis, 1984
Master of Public Health, Saint Louis University, 2007

S

Paul Joseph Scheel, M.A., M.D.

Professor of Medicine (primary appointment)
Chief Executive Officer-Faculty Practice Plan
Vice Chancellor for Clinical Affairs
Bachelor of Science, Lynchburg College, 1983
Doctor of Medicine, Georgetown University, 1987
Master of Arts, Johns Hopkins University, 2001

William D Shannon, M.S., Ph.D.

Professor Emeritus of Biostatistics in Medicine
Bachelor of Science, School Not Found, 1985
Master of Science, University of Massachusetts (Duplicate of University of Massachusetts Amherst), 1989
Doctor of Philosophy, University of Pittsburgh, 1995

T

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

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. 194), please refer to the information at the bottom of this section.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 physiochemical 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.

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. 194)
- M27 Emergency Medicine (p. 199)

M25 Medicine

Visit online course listings to view offerings for M25 Medicine.

M25 Medicine 805 Rheumatology (Clinical Elective)

Students will participate in the diagnostic work-up and management of patients with conditions such as: systemic lupus erythematosus, rheumatoid arthritis, scleroderma, vasculitis, spondyloarthropathies, and gout. There is less exposure to osteoarthritis and regional musculoskeletal problems. By working closely with faculty members, fellows, and medical residents, students actively contribute to the care of rheumatology patients through 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 rheumatology conferences. This elective enrolls students in the inpatient rheumatology consult service. Please

contact the elective Course Director if you prefer a predominantly outpatient rotation, a mixed (inpatient and outpatient) learning experience, or exposure to a specific interest (i.e. adult-pediatric rheumatology, autoimmune eye disease, dermatology-rheumatology, etc).

Credit variable, maximum 4 units.

M25 Medicine 810 Geriatric Medicine (Clinical Elective)

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.

Credit variable, maximum 4 units.

M25 Medicine 821 Inpatient Cardiology (Clinical Elective)

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.

Credit variable, maximum 4 units.

M25 Medicine 823 Clinical Cardiology (Clinical Elective - VA)

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.

Credit variable, maximum 16 units.

M25 Medicine 825 Cardiac Arrhythmias and Electrophysiology (Clinical Elective)

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. Credit 4 units.

M25 Medicine 827 Heart Failure and Transplant Cardiology (Clinical Elective)

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.

Credit variable, maximum 4 units.

M25 Medicine 830 Dermatology (Clinical Elective)

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.

Credit 4 units.

M25 Medicine 831 Pediatric Dermatology (Clinical Elective)

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.

Credit 4 units.

M25 Medicine 836 Clinical Gastroenterology and Hepatology (Clinical Elective)

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.

Credit 4 units.

M25 Medicine 836A Management of Inflammatory Bowel Disease (Clinical Elective)

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

Credit 2 units.

M25 Medicine 838 Medicine Consult Service (Clinical Elective)

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. Credit variable, maximum 4 units.

M25 Medicine 844 Hematology and Hemostasis (Clinical Elective)

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. Credit variable, maximum 4 units.

M25 Medicine 847 Bone and Mineral Diseases (Clinical Elective)

This 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 mineral homeostasis. During the pediatric rotations will have exposure to pediatric metabolic bone diseases (heritable or acquired), heritable disorders of connective tissue, skeletal dysplasias and clinical dysmorphology. The student will rotate through the clinics of the Bone Health Program and see patients at the Center for Advanced Medicine, Barnes-Jewish West County Hospital, Center for Advanced Medicine South, and St. Louis Children's Hospital, under the guidance of Division faculty. The student will also learn the principles and best use of bone densitometry in clinical practice, and participate in the histological assessment of bone biopsies, based on case availability. Medical students will present interesting cases or a pertinent topic related to bone metabolism at the Metabolic Bone Disease Case Conference. Credit variable, maximum 4 units.

M25 Medicine 849 SPOTS: Sun Protection Outreach Teaching by Students (Non-Clinical Elective)

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 pre-written script, interactive games, a video, and hands-on demonstrations. Students are required to attend two evening training sessions (2.5 hours each) to learn the content of the program, as well as teaching strategies. 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. 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. Credit 2 units.

M25 Medicine 853 Orthopedic Infectious Diseases Consult (Clinical Elective)

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. Credit 2 units.

M25 Medicine 854 Transplant Infectious Disease (Clinical Elective)

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. Credit variable, maximum 4 units.

M25 Medicine 858 Ambulatory Infectious Disease (Clinical Elective)

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. Credit 4 units.

M25 Medicine 859 General Inpatient Infectious Disease (Clinical Elective)

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 infectious 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, and the principles of antimicrobial stewardship.

Credit variable, maximum 4 units.

M25 Medicine 861 Inpatient Oncology Consult Service (Clinical Elective)

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 bedside teaching and attend tumor boards and lectures focused on the care of patients with solid tumors. 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 an Oncology attending and an Oncology fellow. 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.

Credit variable, maximum 4 units.

M25 Medicine 869 Hospice and Palliative Medicine (Clinical Elective)

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.

Credit variable, maximum 4 units.

M25 Medicine 870 Endocrinology, Diabetes, and Metabolism (Clinical Elective)

In general, the rotation will be divided across general endocrinology and diabetes consultative services, as well as outpatient clinics. Students taking this elective will perform consultations with fellows and faculty on the inpatient services at Barnes-Jewish Hospital and will see patients with endocrine and metabolic diseases in outpatient faculty clinics. They will present cases daily on teaching rounds, and participate in case conferences and seminars on a weekly basis. Caring for patients with diabetes and gaining experience with the latest glycemic control technologies (continuous glucose monitoring, pump therapy, etc.) are important parts of the rotation, as is interacting with patients presenting for transgender care as well as patients with thyroid, pituitary, adrenal, gonadal, bone, and lipid disorders. A variety of outpatient clinics are offered in the division and students should speak with the fellows and faculty members to customize the learning experience to match their 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.

Credit variable, maximum 4 units.

M25 Medicine 871 Outpatient Oncology (Clinical Elective)

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.

Credit 2 units.

M25 Medicine 879 Pulmonary Clinic for the Underserved (Clinical Elective)

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. - to understand some of the psychosocial barriers to care for this population. 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.

Credit variable, maximum 16 units.

M25 Medicine 880 Pulmonary Medicine (Clinical Elective)

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.

Credit variable, maximum 4 units.

M25 Medicine 884 Bone Marrow Transplantation and Stem Cell Biology (Clinical Elective)

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.

Credit 4 units.

M25 Medicine 888 Outpatient Hematology (Clinical Elective)

Students will gain experience in the diagnostic workup of hematological conditions like low or high blood counts, thrombosis, bleeding, and paraproteinemia. They will get familiar with treatment strategies for a wide variety of benign hematological conditions (e.g. thrombotic microangiopathies, sickle cell disease, thrombosis, and hemophilias) and malignant hematological disorders (e.g. myeloproliferative neoplasms and myelodysplastic syndromes). Students will also learn about the role of procedures like blood/blood fraction exchange (apheresis) and bone marrow biopsy. Participation in hematology case conference will provide insight into approaching a case with evidence-based management strategies and hematology grand rounds will offer formal learning experience in hematology from experts in the area. Students will observe hematologists going through a typical workday and managing difficult conversations (e.g. breaking bad news). They will learn about gaps in the field of hematology, which generate rationale for future research.

Credit 4 units.

M25 Medicine 890 Clinical Nephrology (Clinical Elective)

Students rotate through inpatient and outpatient experiences to gain exposure to all facets of nephrology. They will spend 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.

Credit variable, maximum 4 units.

M25 Medicine 890A Kidney Transplantation (Clinical Elective)

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 adeno virus that are commonly seen in inpatients that have had a kidney transplant (and not often seen otherwise).

Credit variable, maximum 4 units.

M25 Medicine 893 Adult Allergy and Clinical Immunology (Clinical Elective)

Students will participate in the outpatient Allergy Clinics located in Barnes-Jewish Hospital Center for Advanced Medicine, Barnes-Jewish West County, and the 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.

Credit variable, maximum 4 units.

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.

Credit variable, maximum 4 units.

M25 Medicine 910 Internal Medicine Advanced Clinical Rotation (ACR)

This rotation is designed to imitate intern year as much as possible while working with adult hospitalized patients. It is a four-week rotation; three of those weeks will be on a daytime rotation and one of those weeks will be a night float rotation. You will be expected to put in discharge and admission orders, write notes on your patients, communicate with ancillary staff and consultants about patient care, and communicate updates to patients' families. During the day you will be expected to take care of 4-6 patients. At night, you will be expected to provide cross-cover for existing patients and admit new patients. This rotation will take place at the John Cochran VA Hospital and at Barnes-Jewish Hospital on the medicine firm service, cardiology firm service or hospitalist service. Hospitalist and medicine firm see patients admitted for a medical reason. Cardiology firm takes care of patients admitted primarily for a cardiac reason, but these patients often have many medical comorbidities reflective of a general medicine population. The team structure of cardiology and medicine firm services include one attending, one residents and two interns. The team structure of hospitalist will include working more one-on-one with a hospitalist attending. The John Cochran VA Hospital sees more common medical illnesses but is still a referral center. The VA teams consist of one attending, one resident, and one intern.
Credit 4 units.

M25 Medicine 915 Medicine Intensive Care Advanced Clinical Rotation (ACR)

The Medical Intensive Care Unit ACR is designed to introduce medical students to critical care medicine. The rotation will provide the opportunity to care for critically ill medicine patients presenting with a wide variety of diagnoses including shock, respiratory failure, metabolic derangements, and acute gastrointestinal hemorrhage, amongst others. Students will be expected to learn the basic pathophysiology and treatment approaches of these common MICU disease processes. The MICU ACR will take place in the 8300 and 8400 Medical Intensive Care Units, and the medical students will work on a team comprised of internal medicine residents, pulmonary and critical care fellows, and attending physicians. The rotation will consist of three weeks of days and one week of nights. While on days, the students on the MICU ACR will be expected to follow 3-4 ICU patients, present these patients on rounds, and develop management plans. While on nights, the students will join the residents and fellows in cross covering established patients and admitting new patients to present on rounds the next morning. The management of critically ill patients is an essential skill for an intern in a variety of medical specialties, and the pathology seen in the Medical ICU will allow for students to gain experience in this environment prior to starting their residency.
Credit 4 units.

M27 Emergency Medicine

Visit online course listings to view offerings for M27 Emergency Medicine.

M27 EMED 800 Reading Elective - Emergency Medicine

Credit variable, maximum 16 units.

M27 EMED 802 Emergency Medicine (Clinical Elective)

This four week elective will encompass all aspects of Emergency Medicine, with clinical time spent in the main urban trauma center as well as in a community setting. In addition, to seeing a wide range of pathology at the two sites, students will be given the opportunity for a 1:1 teaching shift, toxicology shift, and nursing shift, as well as a shift

with ancillary departments such as social work and respiratory therapy. Students will be expected to attend grand rounds and teaching lectures as well as team-based learning and simulation sessions. Students will work in the trauma/critical care area and general medicine areas of the ED, and are expected to see patients independently, present to the team, perform basic procedures with guidance, call consults, and sign out patients to the oncoming team.
Credit 4 units.

M27 EMED 810 Medical Toxicology (Clinical Elective)

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.
Credit 4 units.

M27 EMED 820 Emergency Ultrasound (Clinical Elective)

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.
Credit variable, maximum 4 units.

M27 EMED 830 EMS: Emergency Medical Services (Clinical Elective)

TBD
Credit 2 units.

M27 EMED 910 Emergency Medicine Advanced Clinical Rotation (ACR)

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 St. Louis Children's Hospital, Barnes-Jewish West County Hospital and Missouri Baptist hospital, community teaching hospitals 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, 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 rotation as well as having a teaching shift with the education resident and fellow. Students desiring a Standard Letter of Evaluation (SLOE) should take the Emergency Medicine ACR. 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.
Credit 4 units.

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) program in Molecular Microbiology and Microbial Pathogenesis, 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

Visit our website for more information about our faculty and their appointments.

B

Wandy L. Beatty, Ph.D.

Associate Professor of Molecular Microbiology (primary appointment)
Bachelor of Science, Montana State University Bozeman, 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 of 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, 1991
Doctor of Medicine, Johns Hopkins University, 1991

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 de 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.

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Bachelor of Arts, Occidental College, 1972
Doctor of Philosophy, California Institute of Technology, 1977

Scott James Hultgren, Ph.D.

Professor of Molecular Microbiology (primary appointment)
Helen L Stoeber Professor of Molecular Microbiology
Bachelor of Science, Indiana University Bloomington, 1981
Doctor of Philosophy, Northwestern University, 1987

K

Sebla Bulent Kutluay, Ph.D.

Associate 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)
Bachelor of Arts, Colgate University, 2007
Doctor of Philosophy, 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)
Theodore and Bertha Bryan Professorship In Environmental Medicine
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.

Voluntary Research 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.

Voluntary Research 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)
Associate of Arts, Tyler Junior College, 2004
Bachelor of Science, Tulane University, 2008
Master of Science, University of Texas Tyler, 2011
Doctor of Philosophy, 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 of Jerusalem, 2005

Christina Leigh Stallings, M.A., M.S., Ph.D.

Professor of Molecular Microbiology (primary appointment)
Bachelor of Science, University of Mary Washington, 1999
Master of Arts, Columbia University, 2001
Master of Science, Columbia University, 2002
Doctor of Philosophy, Columbia University, 2005

T

Niraj Harish Tolia, Ph.D.

Voluntary Research 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)
Mankato, 1986
Doctor of Philosophy, Princeton University, 1993

W

David Wang, Ph.D.

Professor of Molecular Microbiology (primary appointment)
Robert C. Packman Professorship
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)
Marvin A Brennecke Distinguished Professor of Molecular Microbiology
Head of the Department of Molecular Microbiology
Doctor of Philosophy, University of Reading, 1993

Meng Wu, Ph.D.

Assistant Professor of Molecular Microbiology (primary appointment)
Doctor of Philosophy, Washington University in St Louis, 2014

Research Electives

Molecular Microbiology Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

Stephen M. Beverley, PhD

McDonnell Pediatric Research Building, 10th Floor
Phone: 314-747-2630

Molecular genetics of protozoan parasites and their viruses, including neglected tropical diseases; biosynthesis of the parasite surface, molecular genetics and genomics, glycobiology, virulence and drug action or resistance.

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.

Siyuan Ding, PhD

McDonnell Pediatric Research Building, 9th Floor
Phone: 314-273-3963

Our lab studies the molecular mechanisms of rotavirus replication, immunity, and pathogenesis; enteric virus-host interactions; and antiviral signaling in the gastrointestinal tract using viral reverse genetics, high-throughput screens, mouse models, and human intestinal organoids.

Tamara L. Doering, MD, PhD

McDonnell Pediatric Research Building, 10th Floor
Phone: 314-747-5597

We study the opportunistic fungal pathogen *Cryptococcus neoformans*, with the dual motivations of elucidating basic biology and identifying potential drug targets. Topic areas include the synthesis of the polysaccharide capsule that is the main cryptococcal virulence factor, host-fungal interactions, transcriptional regulation, fungal cell biology, and genomic determinants of cryptococcal virulence. Current approaches include those of biochemistry, cell and molecular biology, and genetics; studies also include image-based analysis of host-pathogen interactions and computational analyses.

Daniel Goldberg, MD, PhD

McDonnell Pediatric Research Building, 9th Floor
Phone: 314-362-1514

Biochemistry of malaria.

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.

Christina L. Stallings, PhD

BJC Institute of Health, 10th 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.

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.

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.

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.

Courses

Visit online course listings to view offerings for M30 MoMB.

Department of Neurology

Neurology covers the diseases of the brain, spinal cord, nerves, and muscles. The Department of Neurology has an extensive presence in each phase of the medical school curriculum. In Phase 1, students are introduced to the basic anatomy and function of the nervous system as well as the major diseases encountered by neurologists in Modules 6 and 7. Students can also rotate on neurology services during their clinical immersions in Phase 1. During Phase 2, students rotate through neurology as one the required core clinical clerkships. During this course, students have extensive exposure to both the inpatient and outpatient practice of neurology. In Phase 3 of the curriculum, students can select a month-long advanced clinical rotation (ACR) in either adult or pediatric neurology. They can also select shorter or more flexible electives in neurology or certain subspecialties of neurology. Various neurology-related keystone integrated science courses (KISCs) are also offered.

For more information about the Department of Neurology, please visit the department website.

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

Faculty

Jin-Moo Lee, MD, PhD

Department Chair

Visit our website for more information about our faculty and their appointments.

A

Aninda Bhat Acharya, M.D.

Voluntary Clinical Instructor in Neurology
Bachelor of Science, University of Kansas, 1992
Doctor of Medicine, University of Kansas, 1996

Dusit Adstamongkonkul

Voluntary Clinical Assistant Professor of 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
New Brunswick, 2011
New Brunswick, 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 Fluminense (UFF), 2008

Lizette Alvarez-Montero, M.D.

Voluntary Clinical Instructor in Neurology
Bachelor of Arts, Washington University in St Louis, 1987
Doctor of Medicine, School Not Found, 1991

Korina Anastasaki, M.S., Ph.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Science, University of York, 2006
Master of Science, University of Edinburgh, 2007
Doctor of Philosophy, University of Edinburgh, 2011

Beau Mark Ances, M.S., Ph.D., M.D.

Professor of Neurology (primary appointment)
Daniel J Brennan MD Professor of Neurology
Vice Chair-Faculty Affairs
Professor of Radiology
Professor of Biomedical Engineering
Bachelor of Science, University of Pennsylvania, 1993
Master of Science, London School of Economics and Political Science, 1994
Doctor of Philosophy, University of Pennsylvania, 2000
Doctor of Medicine, University of Pennsylvania, 2001

Gabriel C Araujo, M.S., Ph.D.

Voluntary Clinical Instructor in 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
Bachelor of Science, Michigan State University, 2005
Doctor of Philosophy, University of Oxford, 2008
Doctor of Medicine, Washington University in St Louis, 2012

Baback Arshi, M.A., M.D.

Associate 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

Sylvia Awadalla, M.D.

Professor Emeritus of Neurology
Main Campus), 1985

B

Ganesh M Babulal, M.S., Ph.D.

Associate Professor of Neurology (primary appointment)
Bachelor of Arts, 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 of 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.

Voluntary Research 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

Michael Eddy F Belloy, M.S., D.Sc.

Assistant Professor of Neurology (primary appointment)
Assistant Professor of Psychiatry
Master of Science, University of Antwerp, 2013
Doctor of Science, University of Antwerp, 2016

Max Prely Benzaquen

Voluntary Clinical Instructor in 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 Carbondale, 1993

Alan J Birtwistle

Voluntary Clinical Assistant Professor of Neurology

Lynn Bennett Blackburn, M.A., Ph.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in Neurology
Bachelor of Arts, Drury University, 1976
Doctor of Medicine, University of Missouri Columbia, 1980

Christopher C. Bosworth, Ph.D.

Voluntary Clinical Assistant Professor of 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.

Assistant Professor of Neurology (primary appointment)
Assistant Professor of 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.

Voluntary Research Associate Professor of Neurology
Doctor of Medicine, University of Virginia, 1987

Robert Charles Bucelli, Ph.D., M.D.

Professor of Neurology (primary appointment)
Assistant Director of Neuromuscular Clinical Lab
Professor of Pathology and Immunology
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

Virginia D Buckles, M.S., Ph.D.

Instructor in Neurology (Pending Dean Approval) (primary appointment)
Pomona, 1974
Pomona, 1977
Doctor of Philosophy, University of Wisconsin Madison, 1981

Michelle A. Burack, Ph.D., M.D.

Voluntary Research 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.

Voluntary Clinical Associate Professor of Neurology
Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Science, School Not Found, 1964
Doctor of Medicine, Saint Louis University, 1968

C

David J Callahan, M.D.

Professor of Neurology (primary appointment)
Section Chief- Section of Pediatrics-General
Professor of Pediatrics
Bachelor of Science, University of Notre Dame, 1982
Doctor of Medicine, Washington University in St. Louis, 1986

Meghan Clark Campbell, Ph.D.

Professor of Neurology (primary appointment)

Professor of Radiology

Champaign, 1999
Doctor of Philosophy, Indiana University Bloomington, 2004

Russell C. Cantrell, M.D.

Voluntary Clinical Instructor in Neurology
Bachelor of Science, School Not Found, 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.

Associate Professor of Neurology (primary appointment)
Doctor of Medicine, Damascus University, 2004
Master of Science, University of Pennsylvania, 2014

Xiaoying Chen, Ph.D.

Instructor in Neurology (primary appointment)
Doctor of Philosophy, Fisher More College, 2016

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.

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)
Melba and Forest Seay Professor of Clinical Neuropharmacology in Neurology
Section Chief - Section of Neuroinfectious Diseases
Professor of Medicine
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

Sarah Ann Cooley, Ph.D.

Instructor in Neurology (primary appointment)
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 2010
Doctor of Philosophy, University of Missouri in St. Louis, 2016

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)
Manny and Rosalyn Rosenthal and Dr. John L. Trotter MS Center Chair
in Neuroimmunology at Barnes-Jewish Hospital
Section Chief - Section of Neuroimmunology
Bachelor of Science, University of South Alabama, 1976
Doctor of Medicine, University of Alabama in Birmingham, 1980

Nicole Cruz

Voluntary Clinical Instructor in Neurology

Ana Curta, M.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Science, University of Florida, 2014
Doctor of Medicine, University of Florida, 2018

D

Xing Dai, M.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Arts, University of California Berkeley, 2013
Doctor of Medicine, Saint Louis University, null

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.

Assistant Professor of Neurology (primary appointment)
Bachelor of Science, Cardinal Stritch University, 2007
Master of Health Administration, 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 and Headache Medicine
Bachelor of Arts, University of Texas Austin, 1996
Doctor of Philosophy, Cornell University, 2003
Doctor of Medicine, Cornell University, 2004

Saurav Das, M.D.

Associate Professor of Neurology (primary appointment)
Doctor of Medicine, Stanley Medical College, 2013

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)
Baccalaureatus, 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)

Executive Vice Chair- Department of Neurology
Doctor of Medicine, Federal University of Ceara, 2005

Andrea Denny, M.S.S.W., J.D.

Assistant Professor of 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.

Voluntary Research 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.

Voluntary Research Professor of Neurology
Bachelor of Science, Princeton University, 1987
Doctor of Medicine, University of San Francisco, 1993

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

Voluntary Clinical Instructor in 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.

Voluntary Clinical Associate Professor of Neurology
Bachelor of Science, Saint Louis University, 1954
Doctor of Medicine, Saint Louis University, 1958

Nico U. Dosenbach, Ph.D., M.D.

Professor of Neurology (primary appointment)
Professor of Psychological & Brain Sciences (Courtesy Affiliation)
Professor of Radiology
Professor of Biomedical Engineering
Professor of Pediatrics
Professor of Occupational Therapy
Bachelor of Arts, Columbia University, 2000
Doctor of Philosophy, Washington University in St Louis, 2008
Doctor of Medicine, Washington University in St Louis, 2008

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, Saint 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, 2014

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

Juan Escandon, M.D.

Voluntary Clinical Assistant Professor of Neurology
Bachelor of Science, School Not Found, 1985
Doctor of Medicine, School Not Found, 1989

Eugene Evra, M.D.

Voluntary Clinical Instructor in Neurology
Doctor of Medicine, Smolensk State Medical Academy, 1996

F

Slim Fellah, M.S., Ph.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Science, Higher Institute of Biotechnol, 2005
Master of Science, Higher Institute of Biotechnol, 2007
MARSEILLE UNIVERSITY, 2012

Albert James Fessler, M.D.

Professor of Neurology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Arts, Johns Hopkins University, 1991
Doctor of Medicine, Vanderbilt University, 1995

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.

Assistant Professor of Neurology (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.

Voluntary Clinical Instructor in 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

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 (primary appointment)
Doctor of Medicine, Universidad de Buenos Aires, 2014

Rafael Galindo, Ph.D., M.D.

Associate Professor of Neurology (primary appointment)
Main Campus, 1996
Main Campus, 2005
Main Campus, 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

Daniel Garbin Di Luca, M.S., M.D.

Assistant Professor of Neurology (primary appointment)
Doctor of Medicine, Universidade Federal Fluminense (UFF), 2015
Master of Science, University of Toronto, 2023

Stefanie Geisler, M.D.

Assistant Professor of Neurology (primary appointment)
Doctor of Medicine, Humboldt University, 2001

Nupur Ghoshal, Ph.D., M.D.

Professor of Neurology (primary appointment)
Adjunct Lecturer - Biology
Professor of Psychiatry
Bachelor of Arts, Iowa State University, 1995
Doctor of Philosophy, Northwestern University, 2001
Doctor of Medicine, Northwestern University, 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.

Voluntary Clinical Instructor in 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.

Associate Professor of Neurology (primary appointment)
Associate 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.

Voluntary Clinical Assistant Professor of Neurology
Bachelor of Arts, School Not Found, 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
Section Chief of Pediatric Epilepsy
Bachelor of Science, Bates College, 2001
Doctor of Osteopathic Medicine, University of New England, 2009

Kristin Guilliams, M.S., M.D.

Associate Professor of Neurology (primary appointment)
Section Chief - Section of Pediatric Critical Care
Associate Professor of Pediatrics
Associate Professor of Radiology
Bachelor of Science, Furman University, 2002
Doctor of Medicine, University of Virginia, 2006
Master of Science, Washington University in St Louis, 2016

Christina A. Gurnett, Ph.D., M.D.

Professor of Neurology (primary appointment)
A. Ernest and Jane G. Stein Professor of Developmental Neurology
Division Chief - Division of Pediatric and Developmental Neurology
Professor of Orthopedic Surgery
Professor of Pediatrics
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)
Donald O. Schnuck Family Professor of Neurology
Director - Neurofibromatosis Center
Professor of Pediatrics
Professor of Genetics
Professor of Neurological Surgery
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.

Voluntary Clinical Assistant Professor of 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

Voluntary Clinical Instructor in 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.

Voluntary Clinical Associate Professor of Neurology
Bachelor of Arts, Saint Johns University, 1970
Doctor of Medicine, Washington University in St Louis, 1977

Robert John Heuermann, Ph.D., M.D.

Instructor in Neurology (primary appointment)
Bachelor of Arts, Washington University in St Louis, 2008
Doctor of Philosophy, Northwestern University, 2015
Doctor of Medicine, Northwestern University, 2017

Kristin Hannah Hinrichs, Ph.D.

Assistant Professor of Neurology (primary appointment)
Doctor of Philosophy, 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 South Dakota, 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 of Medicine and Science (Formerly Finch University of Health Sciences), 2008
Doctor of Medicine, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 2012

David Michael Holtzman, M.D.

Professor of Neurology (primary appointment)
Barbara Burton and Reuben M Morriss III Distinguished Professorship
Director - Hope Center for Neurological Disorders
Director- Knight Alzheimer's Disease Research Center
Professor of Developmental Biology
Bachelor of Science, Northwestern University, 1983
Doctor of Medicine, Northwestern University, 1985

Destiny Lee Hooper, M.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Science, University of California San Diego, 2009

Doctor of Medicine, Semmelweis University, 2016

Terri L Hosto, M.S.W.

Assistant Professor of Neurology (primary appointment)
Master of Social Work, University of Michigan Ann Arbor, 1986

Chung Hsu, Ph.D., M.D.

Voluntary Research 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)
Bachelor of Science, University of California San Diego, 2005
Champaign, 2013
Doctor of Medicine, 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.

Voluntary Clinical Instructor in 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-El S Ju, M.D.

Professor of Neurology (primary appointment)
Barbara Burton and Reuben M Morriss III Professorship
Bachelor of Science, Harvard University, 2001
Doctor of Medicine, Columbia University, 2005

K

Peter Kang, M.D.

Associate Professor of Neurology (primary appointment)
Bachelor of Science, SUNY Geneseo, 2008
Doctor of Medicine, University of Pittsburgh, 2012

Richard T. Katz, M.A., M.D.

Voluntary Clinical Professor of 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

Main Campus, 2013

Main Campus, 2015

Salah G. Keyrouz, M.D.

Professor of Neurology (primary appointment)
Section Chief - Section of Neurological Critical Care
Professor of Neurological Surgery
Doctor of Medicine, Université Libanaise (Lebanese University), 2000

Syed Ahmed Khader, M.D.

Voluntary Clinical Instructor in Neurology
Bachelor of Science, School Not Found, 1989
Doctor of Medicine, University of Madras, 1993

Eva Sari Klinman, Ph.D., M.D.

Instructor in Neurology (Pending Dean Approval) (primary appointment)
Bachelor of Science, Massachusetts Institute of Technology, null
Doctor of Philosophy, University of Pennsylvania, null
Doctor of Medicine, University of Pennsylvania, null

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.

Voluntary Clinical Assistant Professor of 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)
Doctor of Philosophy, University of Wisconsin Madison, 2011
Doctor of Medicine, University of Wisconsin Madison, 2013

Erin Lee Langton, M.D.

Assistant Professor of Neurology (primary appointment)
Doctor of Medicine, Eastern Virginia Medical School, 2017

Douglas P. Larsen, M.D.

Professor of Neurology (primary appointment)
Vice Chair- Educational Affairs
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 of Puerto Rico Rio Piedras, 2010
Doctor of Medicine, Washington University in St Louis, 2014

Jin-Moo Lee, Ph.D., M.D.

Professor of Neurology (primary appointment)
Andrew B. and Gretchen P. Jones Professor of Neurology
Head of the Department of Neurology
Professor of Radiology
Bachelor of Arts, Yale University, 1985
Doctor of Philosophy, Cornell University, 1992
Doctor of Medicine, Weill Cornell Medical College, 1993

Walter Lemann, M.D.

Voluntary Clinical Associate Professor of Neurology
Bachelor of Science, Yale University, 1975
Doctor of Medicine, Tulane University, 1979

Alison M Leston, Ph.D., M.D.

Voluntary Clinical Assistant Professor of 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, M.S., Ph.D., M.D.

Associate Professor of Neurology (primary appointment)
Doctor of Medicine, Jiamusi University (#####), 1983
Master of Science, Harbin Medical University, 1987
Doctor of Philosophy, Kochi Medical School, 1989

Yan Li, Ph.D.

Associate Professor of Neurology (primary appointment)
Doctor of Philosophy, University of Alabama in Birmingham, 2017
Bachelor of Science, Central China Agricultural University (#####),
Huazhong Agricultural University), 2007

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
Master of Science, 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

Jane Loitman, M.S., M.D.

Voluntary Clinical Assistant Professor of Neurology
Bachelor of Arts, Tufts University, 1982
Master of Science, Georgetown University, 1988
Doctor of Medicine, University of Minnesota, 1992

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.

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
Master of Science, 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

Baijyanta Maiti, Ph.D., M.D.

Associate Professor of Neurology (primary appointment)
Associate Professor of Radiology
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

John F Mantovani, M.D.

Voluntary Clinical Associate Professor of Neurology
Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, University of Evansville, 1971
Doctor of Medicine, University of Missouri Columbia, 1974

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.

Voluntary Clinical Assistant Professor of Neurology
Bachelor of Arts, Kent State University, 1971
Doctor of Medicine, Saint Louis University, 1975

Eric Martin McDade, D.O.

Professor of Neurology (primary appointment)
Bachelor of Arts, Canisius College, 1998
Doctor of Osteopathic Medicine, Midwestern University Illinois, 2004

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)
Clayson Professor of Neurology
Vice Chair-Research
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)
Harvey A and Dorismae Hacker Friedman Distinguished Professor of Neurology
Section Chief - Section of Aging and Dementia
Associate Director- Knight Alzheimer's Disease Research Center
Professor of Occupational Therapy
Professor of Pathology and Immunology
Professor of Physical Therapy
Bachelor of Arts, Ohio Wesleyan University, 1970
Doctor of Medicine, University of Rochester, 1974

Michael Justin Morrissey, Ph.D.

Voluntary Clinical Instructor in 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.

Assistant Professor of 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)
Doctor of Medicine, Universidade Federal do Paraná (UFPR), 2014

Jeffrey J Neil, Ph.D., M.D.

Professor of Neurology (primary appointment)
Section Chief - Section of Pediatric Movement/CP
Professor of Pediatrics
Doctor of Philosophy, Washington University in St Louis, 1984
Doctor of Medicine, Washington University in St Louis, 1984

Joshua David Newman, M.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Science, University of Virginia, 2014
Doctor of Medicine, Georgetown University, 2018

Susan Searles Nielsen, M.S., Ph.D.

Associate Professor of Neurology (primary appointment)
Bachelor of Arts, The 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)
Section Chief- Section of Movement Disorders
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, Johns Hopkins University, 2009
Master of Science, University of Rochester, 2013
Doctor of Philosophy, University of Rochester, 2017

P

Sheel Jitendra Pathak, M.D.

Associate Professor of Neurology (primary appointment)
Associate 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.

Voluntary Research 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.

Voluntary Clinical Instructor in Neurology
Bachelor of Arts, Vanderbilt University, 1982
Doctor of Medicine, University of Chicago, 1986

Lindsay M Peglar Marsala, 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.

Voluntary Clinical Assistant Professor of Neurology
Main Campus), 1975
Main Campus), 1979

Emmanuel Perez Martinez, Ph.D., M.D.

Instructor in Neurology (Pending Dean 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)
Elliot H. Stein Family Chair in Neurology at Barnes-Jewish Hospital
Professor of Neuroscience
Professor of Occupational Therapy
Professor of Radiology
Professor of Physical Therapy
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, 1970

Kellen Kay Petersen, M.S., Ph.D.

Instructor in Neurology (primary appointment)
Bachelor of Science, University of Utah, 2007
Master of Science, New York University, 2009
Doctor of Philosophy, New York University, 2020

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.

Voluntary Clinical Assistant Professor of Neurology
Bachelor of Science, Northwestern University, 1976
Doctor of Medicine, Washington University in St Louis, 1980

Cyril P Pottier, M.S., Ph.D.

Assistant Professor of Neurology (primary appointment)
Assistant Professor of Psychiatry

Bachelor of Science, Université Rene Descartes Paris 5, 2007
Master of Science, Université Rene Descartes Paris 5, 2009
Doctor of Philosophy, Université de Rouen, 2013

Stephanie K Powell, M.S., Ph.D.

Voluntary Clinical Instructor in 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.

Voluntary Research Professor of Neurology
Bachelor of Arts, Dartmouth College, 1971
Doctor of Medicine, Cornell University, 1975

Arthur L Prenskey, M.D.

Professor Emeritus of Neurology
Bachelor of Arts, Cornell University, 1951
Doctor of Medicine, New York University, 1955

Joseph Varghese Puthussery, Ph.D.

Instructor in Neurology (primary appointment)
Research Assistant Professor
Champaign, 2021

R

Brad Alan Racette, M.D.

Professor Emeritus of Neurology
Bachelor of Arts, Princeton University, 1988
Doctor of Medicine, Northwestern University, 1992

Christopher Austin Ray, M.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Arts, Vanderbilt University, 2011
Doctor of Medicine, University of Alabama at Birmingham School of Medicine, 2018

David Martin Reisler, M.P.H., M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in Neurology
Bachelor of Arts, Northwestern University, 1996
Doctor of Medicine, Northwestern University, 2000

Charles Andrew Roach, M.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Science, Kansas State University, 2013
Doctor of Medicine, University of Kansas, 2018

James R Rohrbaugh, M.D.

Voluntary Clinical Associate Professor of Neurology
Bachelor of Arts, Yale University, 1971
Main Campus), 1974

Monica Rosado Bruno, M.S., Ph.D.

Assistant Professor of Neurology (primary appointment)

Bachelor of Arts, University of Puerto Rico, 2015
Master of Science, Albizu University, 2018
Doctor of Philosophy, Albizu University, 2021

Robert John Rudock, M.B.A., M.D.

Assistant Professor of Neurology (primary appointment)
Assistant Professor of Pediatrics
Bachelor of Science, Johns 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 Veterinary 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.

Voluntary Research 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.

Voluntary Clinical Professor of 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 Arts, Korea University, 2006
Doctor of Philosophy, University of Texas Austin, 2015

Christian T Sheline, Ph.D.

Voluntary Research Associate Professor of Neurology
Bachelor of Arts, Dartmouth College, 1983
Doctor of Philosophy, University of California, 1989

Renee Shellhaas, M.S., M.D.

Professor of Neurology (primary appointment)
David T. Blasingame Professor
Senior Associate Dean for Faculty Promotions and Career Development

Doctor of Medicine, University of Michigan Ann Arbor, 2001
Master of Science, University of Michigan Ann Arbor, 2008

Todd B Silverman

Voluntary Clinical Instructor in Neurology

Barry A. Singer

Voluntary Clinical Associate Professor of 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.

Assistant Professor of 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.S., M.D.

Professor of Neurology (primary appointment)
Section Chief - Section of Pediatric Neonatal
Professor of Pediatrics
Professor of Radiology
Professor of Psychiatry
Bachelor of Science, University of Iowa, 1998
Doctor of Medicine, University of Iowa, 2004
Master of Science, Washington University in St Louis, 2016

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.

Voluntary Clinical Assistant Professor of 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

Tara V. Spevack, M.S., Ph.D.

Voluntary Clinical Instructor in Neurology

Bachelor of Science, McGill University, 1987

Master of Science, University of Florida, 1994

Doctor of Philosophy, University of Florida, 1997

Jeremy Fuller Strain, Ph.D.

Assistant Professor of Neurology (primary appointment)

Bachelor of Science, University of Texas Dallas, 2009

Doctor of Philosophy, University of Texas Dallas, 2015

In Sook Sunwoo, M.D.

Instructor Emerita in Neurology

Doctor of Medicine, School Not Found, 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

Yunshuo Tang, Ph.D., M.D.

Instructor in Neurology (primary appointment)

Bachelor of Science, University of California Berkeley, 2007

Doctor of Philosophy, University of California San Francisco, 2015

Doctor of Medicine, University of California San Francisco, 2017

Sandra L Tate, M.D.

Voluntary Clinical Instructor in Neurology

Bachelor of Arts, School Not Found, 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 Neuroscience

Professor of Pediatrics

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.

Voluntary Clinical Assistant Professor of 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.

Associate 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.

Voluntary Research 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

Regina Lindsay Triplett, M.S., M.D.

Instructor in Neurology (primary appointment)

Bachelor of Science, William Smith College, 2010

Master of Science, University of Pittsburgh, 2014

Doctor of Medicine, University of Pittsburgh, 2015

Angela M Tripp

Voluntary Clinical Assistant Professor of Neurology

U

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.

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

Manouela Vesselinova Valtcheva, Ph.D., M.D.

Instructor in Neurology (primary appointment)

Bachelor of Science, University of Georgia, 2010

Doctor of Philosophy, Washington University in St Louis, 2018

Doctor of Medicine, Washington University in St Louis, 2018

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 in 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.

Professor of Neurology

Doctor of Medicine, Minsk State Medical Institute, 1976

W

Guoqiao Wang, M.A., M.S., Ph.D.

Associate Professor of Neurology (primary appointment)
Associate Professor of Biostatistics
Master of Science, Yunnan University (#####), 2007
Master of Arts, University of Alabama in Tuscaloosa, 2010
Doctor of Philosophy, University of Alabama in Birmingham, 2014

Yan Wang, M.D.

Assistant Professor of Neurology (primary appointment)
Doctor of Medicine, University of Chicago, 2016

Andrew M. Wayne, M.D.

Voluntary Clinical Instructor in Neurology
Bachelor of Science, University of California Riverside, 1989
Doctor of Medicine, University of Missouri Columbia, 1993

Ling Wei, M.D.

Voluntary Research Assistant Professor of Neurology
Doctor of Medicine, Beijing Medical University (Duplicate of Capital University of Medical Sciences (#####)), 1977

Conrad Christian Wehl, Ph.D., M.D.

Professor of Neurology (primary appointment)
Section Chief - Section of Neuromuscular Diseases
Champaign, 1993
Doctor of Philosophy, University of Chicago, 1998
Doctor of Medicine, University of Chicago, 2001

Judith L. Weisenberg, M.D.

Professor of Neurology (primary appointment)
Bachelor of Science, Barnard College, 1998
Doctor of Medicine, University of Minnesota, 2002

Howard I Weiss, M.D.

Voluntary Clinical Assistant Professor of Neurology
Doctor of Medicine, Tulane University, 1972

Emily Katherine White, M.A., Ph.D.

Assistant Professor of Neurology (primary appointment)
Assistant Professor in Psychological & Brain Sciences
Bachelor of Arts, Washington University in St Louis, 2008
Master of Arts, 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)
Assistant Professor of Radiology
Bachelor of Science, Washington University in St Louis, 1999
Doctor of Philosophy, Washington University in St Louis, 2007
Doctor of Medicine, Washington University in St Louis, 2007

Jonathan Paul Williams, M.D.

Assistant Professor of Neurology (primary appointment)
Bachelor of Arts, University of Florida, 2011
Doctor of Medicine, Howard University, 2017

Kyle Byron Womack, M.S., M.D.

Professor of Neurology (primary appointment)
Bachelor of Arts, 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)
Allen P and Josephine B Green Professor of Pediatric Neurology
Professor of Neuroscience
Professor of Pediatrics
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.

Professor of Neurology (primary appointment)
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)
Associate Dean for Continuing Medical Education
Professor of Radiology
College Park, 1990
Doctor of Medicine, Georgetown University, 1994

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.

Voluntary Clinical Assistant Professor of 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.

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.

Randall Bateman, MD

BJCIH 9603
Phone: 314-273-9057

Diagnostic tests, biomarkers, and pathophysiology of Alzheimer's disease and other neurologic diseases. 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 the performance of clinical research studies to discover and develop diagnostic tests and biomarkers and to understand the pathophysiology of Alzheimer's disease. 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, proteomic analyses, clinical analyses including determining sensitivity and specificity of tests, and application to real-world populations including diverse clinical cohorts led by the PI (SEABIRD) and the SILQ Center. Quantitation, analysis and modeling of the data will be taught in the context of data interpretation and clinical study design. The student will learn about how clinical tests and treatments are developed in medicine, advancing the leading edge of advanced medical diagnosis and treatment.

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.

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 are testing new drugs that might rescue injured nigrostriatal neurons (a model of PD) with the potential to slow the progression of PD. For these, we use PET to measure dopamine and related pathways and 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. In addition, we have an active program that combines a variety of approaches to develop biomarkers and investigate the pathophysiology of dementia associated with PD. We use PET to measure radioligand binding in PD and dystonia. We use PET to investigate drug-mediated pathways and inflammatory responses in the brain and to parse out the effects of potential therapeutic interventions. We also develop and implement MR-based methods including diffusion tensor imaging and resting-state functional connectivity to investigate the brain mechanisms underlying PD and dystonia.

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.

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.

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.

Courses

Visit online course listings to view offerings for M35 Neurol.

M35 Neurol 820 Neurology (Clinical Elective)

This four-week elective will be customized to include inpatient and outpatient experiences desired by WU students who have completed the WU 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 2-week rotations which may include: 1. Adult Inpatient General Service (with 1 clinic/week) 2. Adult Inpatient Stroke Service (with 1 clinic/week) 3. Adult Inpatient Consult Service (with 1 clinic/week) 4. Pediatric Neurology Consult Service (with 1 clinic/week) 5. Adult Neurology ICU (with 1 clinic/week) 6. Outpatient Clinics (with 8-10 clinics/week)

Credit variable, maximum 4 units.

M35 Neurol 827A Inpatient Adult Clinical Neurology (Clinical Elective)

Special Elective in Adult Inpatient Clinical Neurology
Credit variable, maximum 4 units.

M35 Neurol 830 Neuro-Oncology (Clinical Elective)

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.

Credit 4 units.

M35 Neurol 851 Clinical Aspects of Aging and Dementia (Clinical Elective)

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.

Credit variable, maximum 4 units.

M35 Neurol 859 Neonatal Neurology (Clinical Elective)

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.

Credit variable, maximum 4 units.

M35 Neurol 860 Pediatric Neurology (Clinical Elective)

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

Credit variable, maximum 4 units.

M35 Neurol 861 Neurointensive Care Unit (Clinical Elective)

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.

Credit 4 units.

M35 Neurol 865 Adult Epilepsy (Clinical Elective)

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.
Credit variable, maximum 4 units.

M35 Neurol 910 Neurology Advanced Clinical Rotation (ACR)

The Neurology Advanced Clinical Rotation (ACR) is a 4-week education experience for Phase III Gateway Medical Students offering graduated supervised responsibility for patient care in adult or pediatric Neurology. ACR Students can select a rotation on one of the following services: Inpatient General Adult Neurology (at Barnes-Jewish Hospital) Adult Stroke Neurology (at Barnes-Jewish Hospital) Inpatient General Pediatric Neurology (at St. Louis Children's Hospital) The ACR student will gain exposure to a wide variety of adult or pediatric neurologically affected patients. They will evaluate and treat patients with acute neurological disorders as well as those with acute/subacute presentations of chronic neurological disorders. The Neurology ACR rotation will give students increased exposure and autonomy in the care of Neurology patients and further increase their knowledge and experience in Neurological disorders. Under the supervision of a senior resident, chief resident and attending physician, the student will have supervised responsibility for their patients. The ACR student will perform a complete history and neurological examination on their new and follow-up patients and will independently establish a differential diagnosis and plan for their patients. When possible, they will have the opportunity to write orders and write admission notes, daily progress notes and discharge summaries. The ACR student will carry a sufficient number of patients to ensure adequate learning and experience. The number of patients assigned to the ACR student is determined by the complexity of the case, the clinical skills of the student and the total number of patients on the service. The ACR student will also attend departmental rounds and clinical conferences.
Credit 4 units.

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, 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. 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

Department Chair

Visit our website for more information about our 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)
Vice Chair Education Department of Neuroscience
Associate Professor of Anthropology (Courtesy)
Bachelor of Science, Vanderbilt University, 2004
Master of Philosophy, George Washington University, 2011
Doctor of Philosophy, George Washington University, 2014

Peter O Bayguinov, Ph.D.

Assistant Professor of Neuroscience (primary appointment)
Assistant Professor of Cell Biology and Physiology
Bachelor of Science, University of Washington, 2003
Doctor of Philosophy, University of Nevada Reno, 2010

Azad Bonni

Voluntary Research Professor of Neuroscience

Paul C Bridgman, M.S., Ph.D.

Professor Emeritus of Neuroscience
Bachelor of Arts, University of San Diego, 1974
Master of Science, University of California San Diego, 1976
Main Campus, 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 Emeritus of Neuroscience
Bachelor of Arts, University of Michigan Ann Arbor, 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

Fujun Chen, Ph.D.

Instructor in Neuroscience (primary appointment)
Doctor of Philosophy, East China Normal University (#####), 2007

Yao Chen, M.S., Ph.D.

Assistant Professor of Neuroscience (primary appointment)
Assistant Professor of Cell Biology and Physiology
Bachelor of Science, University of Cambridge, 2002
Master of Science, University of Cambridge, 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
Doctor of Medicine, Medical University of Varna, 1978
Doctor of Philosophy, Medical University of Sofia, 1992

F

Susan M Fitzpatrick, Ph.D.

Voluntary Research Associate Professor of Neuroscience
Voluntary Research Associate Professor of Occupational Therapy
Bachelor of Science, Saint Johns University, 1978
Doctor of Philosophy, Cornell University, 1984

Tom P Franken, M.S., Ph.D., M.D.

Assistant Professor of Neuroscience (primary appointment)
Doctor of Medicine, Katholieke Universiteit Leuven, 2009
Doctor of Philosophy, Katholieke Universiteit Leuven, 2015
Master of Science, 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

Matthew Gaidica, Ph.D.

Assistant Professor of Neuroscience (primary appointment)
Bachelor of Science, Kettering University, 2010

Doctor of Philosophy, University of Michigan Ann Arbor, 2019

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.

Associate Professor of Neuroscience (primary appointment)
Bachelor of Science, Yale University, 2000
Doctor of Philosophy, University of California San Diego, 2008

Naoki Hiratani, Ph.D.

Assistant Professor of Neuroscience (primary appointment)
Bachelor of Science, The University of Tokyo, 2011
Doctor of Philosophy, The University of Tokyo, 2016

Timothy E. Holy, M.A., Ph.D.

Professor of Neuroscience (primary appointment)
Alan A and Edith L Wolff Professor of Neuroscience
Vice Chair Research of Neuroscience
Bachelor of Arts, Rice University, 1991
Master of Arts, Princeton University, 1992
Doctor of Philosophy, Princeton University, 1997

Cheng Huang, M.S., Ph.D.

Assistant Professor of Neuroscience (primary appointment)
Bachelor of Science, Beijing Institute of Technology (#####), 2005
Master of Science, Beijing Institute of Technology (#####), 2007
Doctor of Philosophy, Tsinghua University (####), 2013

K

Adam Kepecs, Ph.D.

Professor of Neuroscience (primary appointment)
Robert J Terry Professor of Neuroscience
Professor of Psychiatry
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

Alessandro Livi, Ph.D.

Instructor in Neuroscience (primary appointment)

Doctor of Philosophy, University of Parma, 2019

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.

Professor of Neuroscience (primary appointment)
Professor of Biomedical Engineering
Professor of Neurological Surgery
Professor of Electrical and Systems Engineering
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)
Bachelor of Science, Illinois College, 2006
Master of Science, Western Illinois University, 2009
Main Campus, 2016

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

Hysell Oviedo, Ph.D.

Assistant Professor of Neuroscience (primary appointment)
Roger M Perlmutter Career Development Assistant Professorship
Doctor of Philosophy, New York University, 2004

P

Camillo Padoa-Schioppa, M.S., Ph.D.

Professor of Neuroscience (primary appointment)
Professor of Biomedical Engineering
Professor of Economics (Courtesy)
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)
Edison Professor of Neuroscience
Director of McDonnell Center for Cellular and Molecular Neurobiology
Head of the Department 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
Assistant Professor of Physics
Bachelor of Science, Politecnico di Torino, 2010
Master of Science, Politecnico di Torino, 2012
Doctor of Philosophy, École Normale Supérieure Paris, 2015

Alex Michael Taylor, Ph.D.

Instructor in Anatomy (primary appointment)
Doctor of Philosophy, Saint Louis University, 2021

V

David C Van Essen, Ph.D.

Professor of Neuroscience (primary appointment)
Alumni Endowed Professor of Neurobiology
Professor of Biomedical Engineering
Bachelor of Science, California Institute of 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

Research Electives

Neuroscience Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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

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

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

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.

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

James Fitzpatrick, PhD

McKinley Research Building, Basement
Phone: 314-747-0838

Optical and charged particle multiscale microscopy application method development

Tom Franken, MD, PhD

East McDonnell Building, 3rd Floor
Phone: 314-362-3590

Neuronal mechanisms of perception

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

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

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.

Ilya Monosov, MS, PhD

East McDonnell Building, 2nd Floor
Phone: 314-362-3740

Neuronal mechanisms of voluntary behavior

Ashley Morhardt, PhD

North Building, 3rd Floor
Phone: 314-273-1859

Evolution of neural diversity within and across non-mammalian vertebrate clades, especially dinosaurs

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

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

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.

Lawrence B. Salkoff, PhD

McDonnell Medical Sciences Building, 9th Floor
Phone: 314-362-3644

Roles of ion channels in neuronal long-term excitability changes

Paul J. Shaw, PhD

McDonnell Medical Sciences Building, 9th Floor
Phone: 314-362-2703

Molecular genetics of sleep and circadian rhythms

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

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

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

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.

Courses

M05 Neurosci 810 Advanced Dissection (Non-Clinical Elective)

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 30 hours of self-paced individual dissection is required and may include practice of surgical approaches, and/or study of cross-sectional anatomy and medical imaging. Available to medical students only.
Credit 4 units.

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.

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.

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 3 units.

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.

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.

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, with the participation of the neurosurgery faculty. During the second year, the Department of Neurosurgery 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 physiatry.

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

Department Head

Visit our website for more information about our faculty and their appointments.

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

David Thomas Bundy, M.S., Ph.D.

Assistant Professor of Neurological Surgery (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, Texas A&M University, 2008
Master of Science, Washington University in St Louis, 2015
Doctor of Philosophy, Washington University in St Louis, 2015

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 Neurological Surgery (primary appointment)
Bachelor of Science, Chaudhary Charan Singh Haryana Agricultural University, 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

G

Jacob K. Greenberg, M.S., M.D.

Assistant Professor of Neurological Surgery (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, Washington University in St Louis, 2009
Master of Science, Washington University in St Louis, 2015
Doctor of Medicine, Washington University in St Louis, 2015

H

Daniel Michael Hafez, Ph.D., M.D.

Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Orthopedic Surgery
Champaign, 2007
Doctor of Philosophy, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 2012
Doctor of Medicine, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 2014

Gabriel E. Haller, Ph.D.

Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Genetics
Assistant Professor of Neurology
Bachelor of Arts, University of Chicago, 2008
Doctor of Philosophy, Washington University in St Louis, 2013

K

Albert H Kim, M.A., Ph.D., M.D.

Professor of Neurological Surgery (primary appointment)
August A. Busch, Jr. Professor of Neurological Surgery
Professor of Neurology
Professor of Developmental Biology
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

Caroline Ko, M.A., Ph.D.

Associate Professor of Neurological Surgery (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, University of Toronto, 1999
Master of Arts, University of Toronto, 2001
Doctor of Philosophy, University of Toronto, 2009

L

Eric Claude Leuthardt, M.D.

Professor of Neurological Surgery (primary appointment)
Shi Hui Huang Professor of Neurological Surgery
Professor of Neuroscience
Professor of Mechanical Engineering and Applied Science.
Bachelor of Science, Saint Louis University, 1995
Doctor of Medicine, University of Pennsylvania, 1999

Yang Li, Ph.D.

Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Genetics
Bachelor of Science, Sichuan University (#####), 2013
Doctor of Philosophy, Tsinghua University (#####), 2018

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

Dimitrios Mathios, M.D.

Assistant Professor of Neurological Surgery (Pending Executive Faculty Approval) (primary appointment)
Doctor of Medicine, Athens University, Medical School, 2011

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.

Assistant Professor of Neurological Surgery (primary appointment)
Master of Science, All India Institute of Medical Sciences, 2007
Doctor of Philosophy, All India Institute of Medical Sciences, 2013

Camilo Alejandro Molina, M.D.

Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Orthopedic Surgery
Oxford, 2008
Doctor of Medicine, Johns Hopkins University, 2013

O

John Ogunlade, D.O.

Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Orthopedic Surgery
Doctor of Osteopathic Medicine, Nova Southeastern University, 2014

Joshua William Osbun, 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

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)
Henry G and Edith R Schwartz Professor of Neurological Surgery
Professor of Orthopedic Surgery
Professor of Biomedical Engineering
Doctor of Medicine, University of Iowa, 2004

Jarod Roland, M.D.

Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Pediatrics
Doctor of Medicine, Texas Tech University Health Sciences Center, 2009

S

Alexander Stegh, M.A., Ph.D.

Professor of Neurological Surgery (primary appointment)
Professor of Chemistry
Professor of Biomedical Engineering
Master of Arts, Medizinische Hochschule Hannover, 1998
Doctor of Philosophy, Medizinische Hochschule Hannover, 2000

Jennifer Mae Strahle, M.D.

Professor of Neurological Surgery (primary appointment)
Professor of Orthopedic Surgery
Professor of Pediatrics
Bachelor of Science, Bates College, 2002
Doctor of Medicine, University of Minnesota, 2008

T

Rui Tang, Ph.D.

Assistant Professor of Neurological Surgery (Pending Executive Faculty Approval) (primary appointment)
Assistant Professor of Genetics (Pending Executive Faculty Approval)
Bachelor of Science, Nanjing University (#####), 2008
Doctor of Philosophy, University of Georgia, 2016

V

Kumar Vasudevan, M.D.

Assistant Professor of Neurological Surgery (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Arts, Brown University, 2008
Bachelor of Science, Brown University, 2008
Doctor of Medicine, Brown University, 2012

Ananth Kesav Vellimana, MBBS

Assistant Professor of Neurological Surgery (primary appointment)
Assistant Professor of Radiology
Assistant Professor of Neurology
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 Neurology
Associate Professor of Neuroscience
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
Champaign, 1991
Doctor of Medicine, Northwestern University, 1995

Research Electives

Neurosurgery Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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.

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.

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.

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.

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.

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.

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.

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 craniostomy 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.

Courses

Visit online course listings to view offerings for M40 NeuroSurg.

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.

M40 NeuroSurg 810 Neurosurgery (Clinical Elective)

Credit 4 units.

M40 NeuroSurg 910 Neurosurgery Advanced Clinical Rotation (ACR)

Credit 4 units.

Department of Obstetrics and Gynecology

The Department of Obstetrics and Gynecology is actively engaged in undergraduate medical education. A summary of our course involvement include the following:

- **Phase 1 Immersions:** Labor & Delivery (L&D) and Gynecologic Oncology (GynOnc) are two different Procedural Immersion sites that allow two students on rotation at a time. The L&D site involves the ability to experience clinical encounters with patients in the Women's Assessment Center, antepartum unit, L&D, and postpartum floor. Services will include time with the Ob/Gyn resident teams, laborists, and nurse practitioners; the OB Anesthesia team; lactation consultants; and other practitioners. The GynOnc immersion will include the inpatient floor, the outpatient offices at two different sites, the Gyn operating rooms, and the chemo center. Services will include time with the Gyn resident team and nurse practitioners; the chemo nurses; and pharmacists, social workers, case managers, and others.
- **Phase 2 Ob/Gyn Clerkship:** This core clerkship includes a full week of dedicated didactic time, three clinical rotations of two weeks in length, and a final week of assessments. Students will have the opportunity to experience the labor and delivery unit, inpatient Gyn specialties, and Ob/Gyn ambulatory settings. Based on the lottery outcome, these experiences will dive into any combination of the inpatient, office, or operating room setting.
- **Phase 3 Ob/Gyn ACR, Electives, & Capstone:** In this segment of training, students will have greater autonomy in patient care under the supervision of resident, fellows, or attendings. The OB Inpatient ACR includes two weeks of L&D and two weeks of the antepartum unit. The GynOnc ACR includes four weeks of inpatient care, outpatient care, and operating room experiences. In addition,

there are a variety of elective options including Outpatient MFM, Outpatient Generalist, REI, and Ob/Gyn Ultrasound. Finally, the Capstone course provides a very active hands-on curriculum for those who are Ob/Gyn-bound.

No matter what stage our students find themselves in, our department is dedicated to the educational training of our medical students. We want our students to respect and understand the scope of female health care to ensure they will bring this knowledge base to their future clinical practice, regardless of the specialty area.

Website: <http://www.obgyn.wustl.edu>

Faculty

Dineo Khabele, MD, FACOG, FACS

Department Head

Tammy Sonn, MD

Ob/Gyn Student Clerkship Director

Visit our website for the most updated information about our faculty and their appointments.

A

Ali Ahmady, M.S., Ph.D.

Associate Professor of Obstetrics and Gynecology (primary appointment)

Bachelor of Science, Tehran University, 1988

Master of Science, National University of Singapore, 1995

Doctor of Philosophy, National University of Singapore, 1998

Vinita M Alexander

Voluntary Clinical Instructor in Obstetrics and Gynecology

Farners Amargant i Riera, M.S., Ph.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)

Bachelor of Science, Universitat Autònoma de Barcelona, 2012

Master of Science, Universidad Complutense de Madrid, 2013

Doctor of Philosophy, Universitat Pompeu Fabra, 2018

John K Appelbaum, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology

Bachelor of Arts, Saint Louis University, 1980

Doctor of Medicine, Washington University in St Louis, 1984

Tomas Ismael Aquino

Voluntary Research Assistant Professor of Obstetrics and Gynecology

Jillian Mary Ashley-Martin, M.S., M.S.N., Ph.D.

Voluntary Research Assistant Professor of Obstetrics and Gynecology

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.

Voluntary Clinical Instructor in 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

Emily Sara Barker

Voluntary Clinical Instructor in Obstetrics and Gynecology

James Allen Bartelsmeyer

Voluntary Clinical Instructor in Obstetrics and Gynecology

Margaret Elizabeth Baum, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology

Voluntary Clinical Instructor in Obstetrics and Gynecology

Bachelor of Arts, Saint Louis University, 1997

Doctor of Medicine, Johns Hopkins University (Duplicate of Johns Hopkins University), 2001

Adriana Beatty

Voluntary Clinical Instructor in Obstetrics and Gynecology

Robert L Becker, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology

Bachelor of Arts, Cornell University, 1965

Doctor of Medicine, Washington University in St Louis, 1969

James E Belcher, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Associate Professor of Obstetrics and Gynecology

Bachelor of Arts, Central Methodist College (Duplicate of Central Methodist University), 1953

Doctor of Medicine, Saint Louis University, 1957

Katherine H Bligard, M.A., M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)

Bachelor of Science, Louisiana State University, 2010

Master of Arts, Washington University in St Louis, 2015

Doctor of Medicine, Washington University in St Louis, 2015

Richard Gerald Bolanos

Voluntary Clinical Instructor in Obstetrics and Gynecology

Voluntary Clinical Instructor in Obstetrics and Gynecology

Lawrence V Boveri, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Bachelor of Science, Saint Peters College, 1977
Doctor of Medicine, Washington University in St Louis, 1983

Madeline Louise Bruck

Voluntary Clinical Instructor in Obstetrics & Gynecology

Bruce L Bryan, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Doctor of Medicine, School Not Found, 1900

Robert Burstein, M.D.

Professor Emeritus of Clinical Obstetrics and Gynecology
Doctor of Medicine, Washington University in St Louis, 1948

C

Heather Campbell

Associate Professor of Obstetrics and Gynecology (Pending Executive Faculty Approval) (primary appointment)

Emma Elizabeth Cermak, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, University of Pennsylvania, 2005
Doctor of Medicine, Case Western Reserve University, 2010

Aneesh Surya Chawla, M.S., M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)
urban, 2013
Master of Science, Midwestern University, 2015
Doctor of Medicine, Wake Forest University, 2019

Michael B Chen

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology

Octavio Robert Chirino

Voluntary Clinical Instructor in Obstetrics and Gynecology

Ronald J Chod, M.D.

Voluntary Clinical 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.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Bachelor of Arts, University of Puerto Rico (Duplicate of University of Puerto Rico), 1978
Doctor of Medicine, School Not Found, 1982

Sarah Elizabeth Cusworth

Voluntary Clinical Instructor of Obstetrics and Gynecology

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

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in Obstetrics and Gynecology

Michelle R Devera, M.D.

Voluntary Clinical Instructor in 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
Main Campus, 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, Case Western Reserve University, 2004
Doctor of Medicine, Case Western Reserve University, 2008

Russell B Dieterich, M.D.

Voluntary Clinical Instructor in 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 Ann Arbor, 2006
Doctor of Medicine, Wayne State University, 2011

Maggie Dwiggin, Sc.M., M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)
Bachelor of Science, Augustana College Illinois, 2007
Champaign, 2009
Doctor of Medicine, University of Illinois College, 2013

E

David Louis Eisenberg, M.P.H., M.D.

Professor of Obstetrics and Gynecology (primary appointment)
Division Chief of Complex Family Planning
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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Science, School Not Found, 1965
Doctor of Medicine, School Not Found, 1974

Mechelle Elosiebo

Voluntary Clinical Instructor in Obstetrics and Gynecology

Sarah K England, Ph.D.

Professor of Obstetrics and Gynecology (primary appointment)
Alan A and Edith L Wolff Professor of Medicine
Vice Chair - Basic Research
Professor of Cell Biology and Physiology
Bachelor of Arts, Carleton College, 1988
Doctor of Philosophy, Medical College of Wisconsin, 1993

Renee D Ewing, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Assistant Professor of 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

Voluntary Clinical Instructor in Obstetrics and Gynecology

Andrew R Fisher, M.S., M.D.

Voluntary Clinical Instructor in 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 Found, 1951
Doctor of Medicine, Heidelberg University, 1954

Antonina I Frolova, Ph.D., M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)
Champaign, 2005
Doctor of Philosophy, Washington University in St Louis, 2013
Doctor of Medicine, Washington University in St Louis, 2013

Katherine C Fuh, Ph.D., M.D.

Voluntary Research Associate Professor of Obstetrics and Gynecology
Bachelor of Arts, Johns Hopkins University, 1999
Doctor of Medicine, Georgetown University, 2005
Doctor of Philosophy, Stanford University, 2013

G

Andrew E Galakatos, M.D.

Professor Emeritus of Obstetrics and Gynecology
Bachelor of Science, Saint Louis College of Pharmacy, 1960
Doctor of Medicine, University of Missouri Columbia, 1965

Valene Garr Barry, M.S., Ph.D.

Instructor in Obstetrics and Gynecology (Pending Dean Approval)
(primary appointment)
Bachelor of Science, University of Texas Arlington, 2014
Master of Science, University of Alabama in Birmingham, 2018
Doctor of Philosophy, University of Alabama in Birmingham, 2021

Chiara G.I. Ghetti, M.D.

Professor of Obstetrics and Gynecology (primary appointment)
Bachelor of Arts, Cornell University, 1992
Doctor of Medicine, Indiana University Indianapolis, 1997

Nardhy Gomez-Lopez, M.S., Ph.D.

Professor of Obstetrics and Gynecology (primary appointment)
Professor of Pathology and Immunology
Bachelor of Science, Instituto Politécnico Nacional (IPN), 2004
Master of Science, Instituto Politécnico Nacional (IPN), 2006
Doctor of Philosophy, Instituto Politécnico Nacional (IPN), 2009

Diana Lee Gray, M.D.

Professor of Obstetrics and Gynecology (primary appointment)
Professor of Radiology
Champaign, 1977
Champaign, 1981

Margaret Rosanna Gray-Swain, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in 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.

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.

Voluntary Clinical Associate Professor of Obstetrics and Gynecology
Bachelor of Science, Massachusetts Institute of Technology, 1974
Doctor of Medicine, University of Missouri Columbia, 1978

Kenneth Edmond Hemba, M.D.

Voluntary Clinical Instructor in 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

James Howard Hobby

Voluntary Clinical Instructor in Obstetrics and Gynecology

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 Carbondale, 2008

Julia Hoffman

Voluntary Clinical Instructor in Obstetrics and Gynecology

Kathleen M Hogan, M.D.

Voluntary Clinical Instructor in 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)
Doctor of Medicine, University of Missouri Kansas City, 2004
Master of Public Health, University of California Los Angeles, 2010

Saji Jacob, M.S., M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Master of Science, Kerala University, 1989
Doctor of Medicine, School Not Found, 1993

Kathleen E Jaeger, Ph.D., M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology (Oxford), 2007
Doctor of Philosophy, Loyola University Chicago, 2014
Doctor of Medicine, Loyola University Chicago, 2014

Patricia T. Jimenez, M.D.

Associate 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology (Main Campus), 1970
Doctor of Medicine, Saint Louis University, 1975

Mark J Jostes, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in 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 Carbondale, 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

Sarah I Kennedy

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in Obstetrics and Gynecology

Dineo Khabele, M.D.

Professor of Obstetrics and Gynecology (primary appointment)
Mitchell and Elaine Yanow Professor of Obstetrics and Gynecology
Head of the Department of Obstetrics and Gynecology
Professor of Biochemistry and Molecular Biophysics
Bachelor of Science, Columbia University, 1989
Doctor of Medicine, Columbia University, 1994

Phillip Lee Kintner, M.D.

Voluntary Clinical Instructor in 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 Found, 1954
Doctor of Medicine, School Not Found, 1958
Doctor of Science, School Not Found, 1967

Laurie Klabi, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, University of Missouri Columbia, 1987
Doctor of Medicine, University of Missouri Columbia, 1991

Jacob Klein, M.D.

Voluntary Clinical Professor of Obstetrics and Gynecology
Bachelor of Science, Muhlenberg College, 1964
Doctor of Medicine, School Not Found, 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Science, University of Missouri Kansas City, 2001
Doctor of Medicine, University of Missouri Kansas City, 2001

Yosuke Komatsu

Voluntary Clinical Instructor in Obstetrics and Gynecology

Claudia Krasnoff, M.A., M.D.

Voluntary Clinical Instructor in 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
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 Arts, Brown University, 2004
Doctor of Medicine, Brown University, 2009

L

Christine Marie Ladd, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, Saint Louis University, 1986
Doctor of Medicine, University of Missouri Columbia, 1990

Bobbi Omori Lakin, M.D.

Voluntary Clinical Instructor in 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

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.

Voluntary Clinical Instructor in 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 at Chapel Hill, 1995
Doctor of Medicine, East Carolina University, 1999
Master of Science, University of Pittsburgh, 2006

Kerith Lucia Lucco

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in Obstetrics and Gynecology

M

Madhavi Manyam

Voluntary Clinical Instructor in Obstetrics and Gynecology

Carolyn Marie Martin, M.D.

Voluntary Clinical Assistant Professor of 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

Janet Matuszek

Voluntary Clinical Instructor in Obstetrics and Gynecology

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

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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Science, Yale University, 1984
Doctor of Medicine, University of Missouri Columbia, 1989

Colleen Patricia McNicholas, D.O.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, Duke University, 1988
Main Campus), 1992

Christina Kay Meddows-Jackson

Voluntary Clinical Instructor in Obstetrics and Gynecology

Manuela Mejia

Voluntary Clinical Instructor in Obstetrics and Gynecology

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

Jennifer Ann Meyer, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Science, Saint Louis University, 2001
Doctor of Medicine, Saint Louis University, 2005

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

Sumegha Mitra, M.S., Ph.D.

Associate Professor of Obstetrics and Gynecology (Pending Executive Faculty Approval) (primary appointment)
Master of Science, Devi Ahilya University, 1998
Doctor of Philosophy, University of Mumbai, 2008

Megan Mohrman

Voluntary Clinical Instructor in Obstetrics and Gynecology

Kelle Harbert Moley, M.D.

Voluntary Research 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 Mormol

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in 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.

Voluntary Clinical Associate Professor of Obstetrics and Gynecology
Bachelor of Science, Howard University, 1958
Doctor of Medicine, Meharry Medical College, 1963

Helen I-Yun Mussemann, M.D.

Voluntary Clinical Instructor in 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
Bachelor of Arts, Carleton College, 1976
Doctor of Medicine, Washington University in St. Louis, 1980

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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in 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)
Bachelor of Science, Western Kentucky University, 2014
Doctor of Medicine, University of Louisville, 2018

Micaela O'Neil-Callahan, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Science, University of Missouri Columbia, 1983

P

Jay Lawrence Padratzlik

Voluntary Clinical Instructor in Obstetrics and Gynecology

Meera Raman Patel, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, University of Missouri Kansas City, 1995
Doctor of Medicine, University of Missouri Kansas City, 1996

Timothy Charles Philpott, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Bachelor of Arts, Carleton College, 1987
Doctor of Medicine, Washington University in St Louis, 1994

Jorge Pineda, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Doctor of Medicine, School Not Found, 1972

Shannon J Potter

Voluntary Clinical Instructor in Obstetrics and Gynecology
Voluntary Clinical Instructor in Obstetrics and Gynecology

Matthew A Powell, M.D.

Professor of Obstetrics and Gynecology (primary appointment)
Ira C and Judith Gall Professor of Obstetrics and Gynecology
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.

Voluntary Clinical Professor of Obstetrics and Gynecology
Bachelor of Arts, Drake University, 1978
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 in Tuscaloosa, 2011

Jodie Rai, M.D.

Voluntary Clinical Associate Professor of 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
Champaign, 1983
Doctor of Medicine, Johns Hopkins University, 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 DuBose

Voluntary Clinical Instructor in Obstetrics and Gynecology

Erin Lynn Reinl, Ph.D.

Instructor in Obstetrics and Gynecology (primary appointment)
Bachelor of Science, Saint Norbert College, 2009
Doctor of Philosophy, 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.

Voluntary Clinical Associate Professor of 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, Saint Louis University, 1987
Doctor of Medicine, Saint Louis University, 1991

Chinda Vanasin Rojanasathit, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Doctor of Medicine, School Not Found, 1967

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.

Associate Professor of Obstetrics and Gynecology (primary appointment)

Associate Residency Director of Obstetrics and Gynecology

Doctor of Medicine, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 2010

Bridget Scheve Rutledge

Voluntary Clinical Instructor in Obstetrics and Gynecology

Voluntary Clinical Instructor in Obstetrics and Gynecology

S

Jerome D Sachar, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology

Doctor of Medicine, University of Missouri Columbia, 1979

Bachelor of Arts, Amherst College, 2000

Brooke Sanders, M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)

Bachelor of Science, University of Southern California, 2012

Doctor of Medicine, University of California Irvine, 2016

Celia Maria Santi Grau Perez, Ph.D., M.D.

Professor of Obstetrics and Gynecology (primary appointment)

James P Crane Professor of Obstetrics and Gynecology

Professor of Neuroscience

Bachelor of Science, Instituto de Montevideo, 1979

Doctor of Medicine, Instituto de Montevideo, 1992

Doctor of Philosophy, National Autonomous University of Mexico (UNAM), 1998

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

Voluntary Clinical Instructor in Obstetrics and Gynecology

Donna Nicole Senciboy, M.H.A., D.O.

Voluntary Clinical Instructor in Obstetrics and Gynecology

Bachelor of Science, University of Missouri Columbia, 2002

Master of Health Administration, University of Missouri Columbia, 2004

Doctor of Osteopathic Medicine, A T Still University of Health Sciences, 2008

Anne R Seyer, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology

Bachelor of Science, Missouri State University (Formerly Southwest Missouri State), 1984

Doctor of Chiropractic, Logan College of Chiropractic, 1987

Jennifer H. Smith, M.D.

Voluntary Clinical Instructor in 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

Associate Dean for Student Affairs

Bachelor of Science, University of Chicago, 1999

Doctor of Medicine, Rush University, 2004

Chotchai Srisuro, M.D.

Voluntary Clinical Associate Professor of Obstetrics and Gynecology

Doctor of Medicine, School Not Found, 1967

Andrea L Stephens, M.S., M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Instructor in Obstetrics and Gynecology

Bachelor of Arts, Grinnell College, 1962

Doctor of Medicine, University of Wisconsin Madison, 1969

Abbe L Sudvarg

Voluntary Clinical Instructor in Obstetrics and Gynecology

T

Melissa Dawn Tepe, M.S., M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology

Voluntary Clinical Instructor in 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)

David and Lynn Mutch Distinguished Professorship

Interim Division Chief - Division of Gynecologic Oncology

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.

Voluntary Clinical Instructor in Obstetrics and Gynecology

Doctor of Medicine, School Not Found, 1972

Jeffrey Bryant Thompson, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology

Bachelor of Science, Vanderbilt University, 1989

Doctor of Medicine, University of Missouri Columbia, 1994

M. Bryant Thompson, M.D.

Voluntary Clinical Associate Professor of Obstetrics and Gynecology

Main Campus), 1957
Doctor of Medicine, University of California, 1961

Albro C Tobey, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Bachelor of Science, Butler University, 1965
Doctor of Medicine, School Not Found, 1972

Randall W Tobler, M.D.

Voluntary Clinical Assistant Professor of Obstetrics and Gynecology
Bachelor of Arts, University of Missouri Columbia, 1980
Doctor of Medicine, Washington University in St Louis, 1984

Jayme Trevino, M.P.H., M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Science, University of Texas Austin, null
Master of Public Health, University of Texas Medical School Houston, null
Doctor of Medicine, University of Texas Health Sciences at San Antonio, null

Stephanie Marie Tsai, M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)
Bachelor of Arts, Drury University, 2008
Doctor of Medicine, Saint Louis University, 2012

Jacqueline Sue Turner, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Arts, Massachusetts Institute of Technology, 1979
Doctor of Medicine, Tulane University, 1983

Kanika A Turner

Voluntary Clinical Instructor in Obstetrics and Gynecology

V

Ashley Veade, M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)
Bachelor of Science, Louisiana State University, 2010
Doctor of Medicine, Louisiana State University Health Sciences Center at New Orleans, 2014

Dionysios K Veronikis

Voluntary Clinical Instructor in Obstetrics and Gynecology

Juliana Carmi Verticchio, M.D.

Voluntary Clinical Instructor in Obstetrics and Gynecology
Bachelor of Science, Saint Louis University, 2007
Doctor of Medicine, Loyola University Chicago, 2011

Zevidah Vickery, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Instructor in 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 Gynecology
Bachelor of Arts, Vanderbilt University, 1957
Doctor of Medicine, University of Tennessee, 1960

Yong Wang, Ph.D.

Professor of Obstetrics and Gynecology (primary appointment)
Associate Professor
Professor of Radiology
Doctor of Philosophy, Washington University in St Louis, 2009

Gary Michael Wasserman, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Associate Professor of Obstetrics and Gynecology
Bachelor of Science, University of Michigan, 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

Victoria Whelan, M.D.

Assistant Professor of Obstetrics and Gynecology (primary appointment)
Doctor of Medicine, Saint Louis University, 2019

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 Carbondale, 2000

Makeba Williams, M.D.

Professor of Obstetrics and Gynecology (primary appointment)
Vice Chair for Professional Development and Wellness

Bachelor of Science, Vanderbilt University, 1998
Doctor of Medicine, Meharry Medical College, 2004

Sara Wood, M.S., M.D.

Associate Professor of Obstetrics and Gynecology (primary appointment)
Division Chief of Female Pelvic Medicine and Reconstructive Surgery
Bachelor of Arts, University of Northern Iowa, 2002
Doctor of Medicine, Carver College of Medicine at University of Iowa, 2006
Master of Science, University of Illinois at Chicago, 2016

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

Heather E. Wuebker, M.D.

Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in 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.

Basic Research

During this four-week elective, students will have the opportunity to immerse themselves in bench research in one of our labs. 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.

Eligible students interested in a basic research experience should call our office at 314-286-1775 (prior to signing up for a course) to discuss the schedule and expectations of this rotation.

Clinical Research

Eligible students interested in a clinical research experience are encouraged to apply for the TI2, Meharry, or Institute for Public Health programs through Washington University.

Courses

Visit online course listings to view offerings for M45 ObGyn.

M45 ObGyn 805 Outpatient OBGYN Generalist Care (Clinical Elective)

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 student will spend the majority of time attending half day clinics and private offices. In addition, the student will spend one week of the rotation on night shift in labor & delivery which will help acquaint the student with the residents and hospital. 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.
Credit 4 units.

M45 ObGyn 810 OBGYN Reproductive Endocrinology & Infertility (Clinical Elective)

The student 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.
Credit 4 units.

M45 ObGyn 845 Outpatient Maternal-Fetal Medicine (Clinical Elective)

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. In addition, the student will spend one week of the rotation on night shift in labor & delivery which will help acquaint the student with the residents and hospital. 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 in power point and on a topic of their choice, inspired by a patient-related clinical condition that piqued their interest during the block.
Credit 4 units.

M45 ObGyn 856 OBGYN Ultrasound - Genetics (Clinical Elective)

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.
Credit 2 units.

M45 ObGyn 910 Inpatient Maternal-Fetal Medicine Advanced Clinical Rotation (ACR)

This experience is designed to prepare you for a career in obstetrics and gynecology. The rotation is divided into 2-week blocks alternating with Labor & Delivery and Antepartum. Depending on the number of 4th year students during the rotation you may start on Labor & Delivery or Antepartum. You will be treated as an acting intern and will be expected to become a functioning member of the team. The purpose of the Labor & Delivery segment is to allow you to participate in monitoring and delivery of patients in labor including spontaneous vaginal deliveries and cesarean sections. The team will be comprised of PGY1,2, 4, fellow, and attendings. You will participate in team rounds and board signout, perform histories & physical exams, and write admit orders/ progress notes for co-signature. You will be taught how to perform cervical exams and to interpret fetal monitoring during labor. During your antepartum block your primary team includes a PGY2, 4, fellow, and attending. You will learn how to diagnose, evaluate, and manage obstetric conditions including preterm labor, preterm pre-labor rupture of membrane, hypertensive disorders of pregnancy, diabetes, and fetal growth restriction. You will also be exposed to uncommon conditions and expected to generate appropriate differential diagnoses. You will round with the team, perform detailed histories & physical exams, write admit orders/ progress notes for cosignature, and assist with the interpretations of antepartum fetal testing. You will be introduced to basic ultrasonography skills. The student will be responsible for one topical presentation to be given to the OB teams at the end of the rotation.
Credit 4 units.

M45 ObGyn 915 Gynecologic Oncology Advanced Clinical Rotation (ACR)

This course is designed to prepare students for a career in Obstetrics and Gynecology. By the end of the ACR, students are expected to be functioning near the level of a matriculating intern and should be fully integrated with the team, which includes an attending and a fellow (who rotate weekly), a resident team (R4, 2 R3's, R2, R1, rotating every 6w), and often Phase 2 and Phase 1 students. The student will take part in the work-up of patients on the gynecology service prior to surgery and/or radiotherapy, assist in surgery, participate in rounds with residents/fellows/faculty, assist in managing the inpatient unit including writing notes and entering orders for MD co-signature, accompany chief residents/fellows/faculty on consultations, and

attend gynecologic oncology clinics and conferences. Opportunities for clinical or basic research projects in gynecologic malignancy are also available. A 30-minute presentation to the division reviewing a topic in gynecologic oncology is required.
Credit 4 units.

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."¹

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.

¹ 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

Allan A. and Edith Wolff Distinguished Professor and Chairman

Kevin Ko, MBA

Executive Director of Business Affairs

P. Kumar Rao, MD, MBA

Professor and Vice Chair for Clinical Affairs

Daniel Kerschensteiner, MD

Bernard Becker Professor of Ophthalmology and Visual Sciences

Vice Chair for Research

Co-Director of the Neuroscience PhD Program

Rajendra S. Apte, MD, PhD

Paul A. Cibis Distinguished Professor of Ophthalmology and Visual Sciences

Vice Chair for Innovation and Translation

Carla 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

Pediatric Ophthalmology Director

Visit our website for more information about our faculty and their appointments.

A

Rajendra Apte, Ph.D., M.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)

Paul A. Cibis Distinguished Professor of Ophthalmology and Visual Sciences

Vice Chair - Translation and Innovation

Professor of Developmental Biology

Professor of Medicine

Doctor of Medicine, University of Mumbai, 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 Found, 1949

Doctor of Medicine, School Not Found, 1954

B

Steven Bassnett, Ph.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)

Grace Nelson Lacy Distinguished Professorship in Ophthalmology

Professor of Cell Biology and Physiology

Bachelor of Science, University of Wales, 1982

Doctor of Philosophy, University of East Anglia, 1987

William L Becker, M.A., M.D.

Voluntary Clinical Assistant Professor of Ophthalmology and Visual Sciences

Voluntary Teaching Assistant Professor of 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

Voluntary Teaching Associate Professor of Ophthalmology and Visual Sciences

Bachelor of Arts, Duke University, 1979

Doctor of Medicine, Saint Louis University, 1983

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

Kevin Jay Blinder, M.D.

Voluntary Clinical Professor of Ophthalmology and Visual Sciences

Voluntary Teaching Professor of Ophthalmology and Visual Sciences

Doctor of Medicine, University of Missouri Kansas City, 1985

James C Bobrow, M.D.

Voluntary Clinical Professor of Ophthalmology and Visual Sciences
Bachelor of Arts, Yale University, 1966
Doctor of Medicine, Johns Hopkins University Medical (Duplicate of Johns Hopkins University), 1970

Sean Michael Breit, M.D.

Voluntary Clinical Instructor of Ophthalmology & Visual Sciences
Voluntary Teaching Instructor in Ophthalmology and Visual Sciences (Main Campus), 2002

Nancy M Buchser, M.D.

Voluntary Clinical Instructor of Ophthalmology & 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

Shiming Chen, M.S., Ph.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)
Bernard Becker and Janet R Becker Distinguished Professorship in Ophthalmology
Professor of Developmental Biology
Bachelor of Science, Capital Normal University (#####), 1981
Master of Science, Capital University of Medical Sciences (#####), 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
Bachelor of Science, University of Wisconsin Madison, 2004
Doctor of Philosophy, Medical College of Wisconsin, 2013

Bruce H Cohen, M.D.

Voluntary Clinical Assistant Professor of Ophthalmology and Visual Sciences
Bachelor of Arts, Harvard University, 1976
Doctor of Medicine, Johns Hopkins University, 1980

Steven Michael Couch, M.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)
Patient Safety Officer (Adult) - Clinical Adult Division
Doctor of Medicine, University of Missouri Kansas City, 2006

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

Kyle Dohrman, O.D.

Instructor in Ophthalmology and Visual Sciences (primary appointment)
Champaign, 2007
Doctor of Optometry, Southern College of Optometry, 2011

E

Matthew S Elitt

Instructor in Ophthalmology and Visual Sciences (Pending Dean Approval) (primary appointment)

Jennifer M. Enright, Ph.D., M.D.

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Bachelor of Science, University of Notre Dame, 2008
Doctor of Philosophy, Washington University in St Louis, 2017
Doctor of Medicine, Washington University in St Louis, 2017

F

Adam Ross Fedyk

Voluntary Teaching Instructor in Ophthalmology and Visual Sciences

Robert M Feibel, M.D.

Voluntary Clinical Professor of 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
Main Campus, 1982

G

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

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 of Medicine and Science (Formerly Finch University of Health Sciences), 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 Ann Arbor, 1999

H

George J Harocopos, M.D.

Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
Assistant Professor of Pathology and Immunology
Bachelor of Arts, Harvard University, 1995
Doctor of Medicine, Medical College of Virginia, 2000

James R Hoekel, O.D.

Assistant Professor of 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.

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Champaign, 2004
Doctor of Medicine, University of Illinois at Chicago, 2009

Jing-Wei Huang, M.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)
Doctor of Medicine, National Taiwan University, 1981

J

Sharon Leslie Jick

Voluntary Teaching Instructor in Ophthalmology and Visual Sciences

William Steven Joffe, M.D.

Assistant Professor Emeritus of Clinical Ophthalmology and Visual Sciences
Bachelor of Arts, Washington University in St Louis, 1959
Doctor of Medicine, Washington University in St Louis, 1963

Jordan Kelley Jones, O.D.

Instructor in Ophthalmology and Visual Sciences (primary appointment)
Doctor of Optometry, University of Missouri in St Louis, 2011

K

Michael A Kass, M.S., M.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)
Bernard Becker Professor of Ophthalmology and Visual Sciences
Senior Associate Dean for Human Research Protection
Bachelor of Science, Northwestern University, 1963
Master of Science, Northwestern University, 1966
Doctor of Medicine, Northwestern University, 1966

Daniel Kerschensteiner, M.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)

Janet and Bernard Becker Professor of Ophthalmology
Vice Chair - Research Division
Professor of Biomedical Engineering (Courtesy)
Professor of Neuroscience
Doctor of Medicine, Georg August University, 2004

L

Andrew R. Lee, M.D.

Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
Director - Medical Student Education
Director - Clinical Pediatric Division
Bachelor of Science, Duke University, 2009
Doctor of Medicine, Washington University in St Louis, 2013

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 Emeritus of Ophthalmology and Visual Sciences
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

Peter David Lukasiewicz, Ph.D.

Professor Emeritus of Ophthalmology and Visual Sciences
Bachelor of Science, Brown University, 1977
Doctor of Philosophy, University of Michigan Ann Arbor, 1984

M

Robi N Maamari, M.D.

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Doctor of Medicine, University of California Irvine, 2014
Bachelor of Science, University of California Berkeley, null

Todd P Margolis, Ph.D., M.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)
Alan A and Edith L Wolff Distinguished Professor
Head of the Department of Ophthalmology and Visual Sciences
Bachelor of Science, Stanford University, 1977
Doctor of Philosophy, University of California San Francisco, 1983
Doctor of Medicine, University of California San Francisco, 1984

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

O

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

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

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

Julia Pulliam, O.D.

Instructor in Ophthalmology and Visual Sciences (primary appointment)

Bachelor of Science, Illinois College, 2007

Doctor of Optometry, Indiana University Bloomington, 2011

R

Rithwick Rajagopal, Ph.D., M.D.

Associate Professor of Ophthalmology and Visual Sciences (primary appointment)

Doctor of Philosophy, 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)

Assistant Professor of Psychiatry

Bachelor of Science, Creighton University, 2010

Doctor of Medicine, Cornell University, 2014

Juan Gomez Rodriguez

Voluntary Research Assistant Professor of Ophthalmology and Visual Sciences

Mark A Rothstein, M.D.

Voluntary Clinical Assistant Professor of 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

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

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.

Voluntary Teaching Instructor in 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.

Voluntary Teaching Assistant Professor of Ophthalmology and Visual Sciences

Bachelor of Science, Washington University in St. Louis, 1981

Doctor of Medicine, Washington University in St. Louis, 1986

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 and Visual Sciences (primary appointment)
Jacquelyn E and Allan E Kolker M.D. Distinguished Professor of Ophthalmology
Vice Chair - Diversity, Equity and Professionalism
Bachelor of Arts, University of Missouri Kansas City, 1989
Doctor of Medicine, University of Missouri Kansas City, 1989

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

Florentina Soto Lucas, Ph.D.

Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
Doctor of Philosophy, University of Alicante, 1992

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

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

Chi Sun, Ph.D.

Instructor in Ophthalmology and Visual Sciences (primary appointment)
Bachelor of Science, Nanyang Technological University, 2010
Doctor of Philosophy, University of Idaho, 2017

T

Paul M Tesser, Ph.D., M.D.

Voluntary Teaching Associate Professor of 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

Praneetha Thulasi, M.D.

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Bachelor of Arts, Saint Louis University, 2008
Doctor of Medicine, Emory University, 2016

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

Nathan Tuttle, O.D.

Instructor in Ophthalmology and Visual Sciences (primary appointment)
Doctor of Optometry, Southern College of Optometry, 2009

Robert Lawrence Tychsen, M.D.

Professor of Ophthalmology and Visual Sciences (primary appointment)
John F Hardesty MD Distinguished Professor of Ophthalmology and Visual Sciences
Professor of Ophthalmology and Visual Sciences in Pediatrics
Professor of Neuroscience
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)
Robert C. Drews Professor in Ophthalmology
Professor of Neurology
Bachelor of Science, La Salle University, 1989
Main Campus, 1993

W

Jessica Yang Walia, M.D.

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Bachelor of Arts, Northwestern University, 2013
Doctor of Medicine, University of Illinois at Chicago, 2018

James Walsh, Ph.D., M.D.

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Bachelor of Science, University of North Carolina at Chapel Hill, 2005
Doctor of Philosophy, University of Virginia, 2014
Doctor of Medicine, University of Virginia, 2016

Daniel Joseph Watson, M.D.

Instructor in Ophthalmology and Visual Sciences (primary appointment)
Bachelor of Science, Saint Louis University, 2010
Doctor of Medicine, 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)
Champaign, 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

Y

Takeshi Yoshimatsu, M.S., Ph.D.

Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Bachelor of Science, University of Tokyo, 2001
Master of Science, University of Tokyo, 2003
Doctor of Philosophy, 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 of the Department of Ophthalmology & Visual Sciences website.

Basic Science Research

- Dr. Steven Bassnett: Pseudoexfoliation syndrome and glaucoma; refractive development; mouse models of ectopia lentis
- Dr. Shiming Chen: Bedside to bench: phenotype-genotype correlations of CRX retinopathies
- Dr. Mae Gordon and Dr. Philip Ruzycski: Microbiome assays of normal eyes and eyes presenting with conjunctivitis
- Dr. Lynn Hassman: Single-cell transcriptomics of ocular inflammatory cells in uveitis
- Dr. Todd Margolis: Regulation of latent infection with herpes simplex virus
- Dr. Joshua Morgan: Downstream circuit degeneration in a mouse glaucoma model
- Dr. Philip Williams: Retinal ganglion cell degeneration and axon regeneration in mouse glaucoma
- Dr. Alan Shiels: Molecular genetics of pediatric cataracts and associated eye disorders
- Dr. Carla Siegfried: Differential gene expression and mitochondrial function studies of trabecular meshwork cells; racial disparities of open-angle glaucoma
- Dr. Margaret Reynolds: Occupational therapy interventions for patients with low vision; inherited eye diseases; retinopathy of prematurity; refractive surgery; autism spectrum disorder

Clinical Research

- Dr. Steven Couch: Genetic correlates of extrascleral extension in intraocular melanomas
- Dr. Andrew Lee: Strabismus outcomes; retinopathy of prematurity; health care disparities in pediatric ophthalmology
- Dr. Todd Margolis: 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: Vitreous proteomics
- Dr. Lawrence Tychsen: Amblyopia; eye movements; pediatric refractive surgery
- Dr. Gregory P. Van Stavern: Opportunities in neuro-ophthalmology
- Dr. Carla Siegfried: Ethical issues in patient care; outcomes in glaucoma care
- Dr. Leanne Stunkel: Opportunities in neuro-ophthalmology; diagnostic errors in medicine

Quality Improvement Research

- Dr. Phil Custer: Resident-initiated patient safety and quality improvement projects

Translational Research

- Dr. Robi Maamari: Translational research opportunities for those interested in the development of ophthalmic diagnostic devices (i.e., image-based diagnostics)

Courses

Curriculum courses (p. 246) for Ophthalmology and Visual Sciences are listed below.

Visit online course listings to view offerings for M50 Ophth.

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.

Curriculum Courses

M50 Ophth 805 Ophthalmology (Clinical Elective)

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.

Credit variable, maximum 4 units.

M50 Ophth 910 Ophthalmology Advanced Clinical Rotation (ACR)

On the Ophthalmology Advanced Clinical Rotation, medical students will rotate on the ophthalmology adult consult service, the University Eye Service clinic, and the subspecialty clinics of the full time faculty of the Department of Ophthalmology and Visual Sciences (cornea, glaucoma, retina, oculoplastics, neuro-ophthalmology, pediatric ophthalmology, ophthalmic pathology, uveitis, and ocular oncology). Students will care for patients of all ages and backgrounds, and ophthalmic diseases seen will range from common eye conditions to complex diseases requiring subspecialty care. In clinic and on consults, students will perform the ophthalmic history and physical examination and also develop their ability to diagnose, manage, and treat common ophthalmic conditions. In the operating room, students will participate in all phases of perioperative patient care and learn basic ophthalmic surgical principles and techniques. Academic curriculum for the rotation will include weekly case presentations with ophthalmology faculty, resident lectures and conferences, and weekly departmental grand rounds. Each student will also present a case at grand rounds during the final week of the rotation with the assistance of a resident mentor. Students will participate in ophthalmology call approximately once per week from 5pm-12am. During that time, the medical student is expected to be present to work with the primary call ophthalmology resident.

Credit 4 units.

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

Department Chair

Visit our website for more information about our faculty and their appointments.

A

Yousef Abu-Amer, M.S., Ph.D.

Professor of Orthopedic Surgery (primary appointment)
Dr J Albert Key Professor of Orthopedic Surgery
Professor of Cell Biology and Physiology
Bachelor of Science, Hebrew University of Jerusalem, 1985
Master of Science, Hebrew University of Jerusalem, 1987
Doctor of Philosophy, Hebrew University of Jerusalem, 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
Master of Science, Washington University in St Louis, 2019

B

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 (primary appointment)
Doctor of Medicine, Loyola University Chicago, 2015

Ilya Bendich, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Doctor of Medicine, Dartmouth College, 2015

Marschall Brantling Berkes, M.D.

Associate 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 Boevig, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Doctor of Medicine, 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)
J Albert Key Distinguished Professor of Orthopedic Surgery
Professor of Neurological 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)
Lawrence G and Elizabeth A Lenke Distinguished Professor of Orthopedic Surgery
Division Chief - Division of Spine
Vice Chair - Department of Orthopedic Surgery
Professor of Neurological 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

Alexandre Carter, Ph.D., M.D.

Associate Professor of Orthopedic Surgery (primary appointment)
Associate Professor of Occupational Therapy
Associate Professor of Neurology
Associate Professor of Radiology
Bachelor of Science, Brandeis University, 1991
Doctor of Philosophy, Harvard University, 2003

Doctor of Medicine, Harvard University, 2003

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)
Daniel C. and Betty B. Viehmann Distinguished Professor of Orthopedic Surgery
Vice Chair - Department of Orthopedic Surgery
Bachelor of Arts, Northwestern University, 1985
Doctor of Medicine, Northwestern University, 1989

John Clayton Fournier Clohisy, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Assistant Professor of Neurological Surgery
Bachelor of Science, University of Notre Dame, 2013
Doctor of Medicine, University of Missouri Columbia, 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 University, 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

Naomi Dirckx, M.S., Ph.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Bachelor of Science, Katholieke Universiteit Leuven, 2011
Master of Science, Katholieke Universiteit Leuven, 2013
Doctor of Philosophy, Katholieke Universiteit Leuven, 2018

Ryan Everett Doyel, M.D.

Assistant Professor of Orthopedic Surgery (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, Marquette University, 2011
Doctor of Medicine, Creighton University, 2015

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

Voluntary Clinical Instructor in Orthopedic Surgery

F

Roberta Faccio, Ph.D.

Professor of Orthopedic Surgery (primary appointment)
Professor of Cell Biology and Physiology
Jerome J. Gilden, M.D. Endowed Distinguished Professorship in Orthopedic Surgery
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 at Chapel Hill, 1965
Doctor of Medicine, University of Tennessee, 1969

Charles A Goldfarb, M.D.

Professor of Orthopedic Surgery (primary appointment)
Richard H. Gelberman, MD Distinguished Professorship in Orthopaedic Surgery
Executive Vice Chair - Department of Orthopedic Surgery
Bachelor of Arts, Williams College, 1992
Doctor of Medicine, University of Alabama in Tuscaloosa, 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

Farshid Guilak, M.P.H., M.S., Ph.D.

Professor of Orthopedic Surgery (primary appointment)
Mildred B. Simon Research Professorship in Orthopaedic Surgery
Professor of Biomedical Engineering
Professor of Mechanical Engineering and Materials Science
Professor of Developmental Biology
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, 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

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.

Voluntary Clinical Instructor in 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 University of Medical Sciences, 2004

Devyani M. Hunt, M.D.

Professor of Orthopedic Surgery (primary appointment)
Division Chief - Division of Physical Medicine & Rehabilitation
Professor of Neurology
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, 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.

Assistant Professor of 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, Lithuanian University of Health Sciences, 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 (primary appointment)
Main Campus, 2014

Christine Krull, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Assistant Professor of Neurology
Doctor of Medicine, University of Missouri Columbia, 2013

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

Mark J. Lambrechts, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Assistant Professor of Neurological Surgery
Oxford, 2010
Doctor of Medicine, Tulane University, 2016

Xiaofei Li, Ph.D.

Instructor in Orthopedic Surgery (primary appointment)
Doctor of Philosophy, Stony Brook University, 2019

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

M

Matthew J Matava, M.D.

Professor of Orthopedic Surgery (primary appointment)
Division Chief - Division of Sports Medicine
Professor of Physical Therapy
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

Jeremy James McCormick, M.D.

Professor of Orthopedic Surgery (primary appointment)
Division Chief - Division of Foot and Ankle
Baccalaureatus, 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, D.V.M., Ph.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Doctor of Veterinary Medicine, University of Leon, 2002
Main Campus, 2015

John P Metzler, M.D.

Professor of Orthopedic Surgery (primary appointment)
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 (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)
Jerome J. Gilden, MD Endowed Distinguished Professor of Orthopaedic Surgery
Vice Chair - Department of Orthopedic Surgery
Division Chief - Division of Orthopedic Trauma
Bachelor of Arts, Rice University, 2001
Doctor of Medicine, Baylor College of Medicine, 2005

Mark L. Miller, M.D.

Associate Professor of Orthopedic Surgery (primary appointment)
Bachelor of Science, Stanford University, 2004
Doctor of Medicine, Harvard University, 2008

Blake Karlton Montgomery, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Assistant Professor of Neurological Surgery
Doctor of Medicine, University of Missouri Kansas City, 2016

Marie Theresa Morris, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Bachelor of Science, University of Arkansas Main Campus, 2012
Doctor of Medicine, 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 (Formerly Northeast Missouri State University), 2003
Doctor of Medicine, Washington University in St Louis, 2007

Brian J. Neuman, M.D.

Professor of Orthopedic Surgery (primary appointment)
Professor of Neurological Surgery
Doctor of Medicine, Thomas Jefferson University, 2007

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 at Chapel Hill, 2002

O

Regis James O'Keefe, Ph.D., M.D.

Professor of Orthopedic Surgery (primary appointment)
Fred C Reynolds Professor of Orthopedic Surgery
Head of the Department of Orthopedic Surgery
Bachelor of Arts, Yale University, 1981
Doctor of Medicine, Harvard University, 1985
Doctor of Philosophy, University of Rochester, 2000

Mitchel Robert Obey, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Bachelor of Arts, Luther College Iowa, 2012
Doctor of Medicine, Mayo Medical School, 2017

Arin D Oestreich, Ph.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Doctor of Philosophy, University of Missouri Columbia, 2015

Nathan P Olafsen, M.D.

Associate Professor of Orthopedic Surgery (primary appointment)
Associate Professor of Neurology
Doctor of Medicine, University of Missouri Columbia, 2012

P

Nicholas Pallotta, M.S., M.D.

Assistant Professor of Orthopedic Surgery (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

Joseph Pangelinan, M.A., Ph.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Master of Arts, Southeast Missouri State University, 1995
Doctor of Philosophy, University of Missouri in St Louis, 2015

Cecilia Pascual Garrido, M.D.

Associate Professor of Orthopedic Surgery (primary appointment)
Doctor of Medicine, Universidad de Buenos Aires, 2000

R

Elizabeth Yanik Rowlands, Sc.M., Ph.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
College Park, 2007
Master of Science, Johns Hopkins University, 2009
Doctor of Philosophy, University of North Carolina at Chapel Hill, 2013

Rimma Ruvinskaya, M.D.

Associate Professor of Orthopedic Surgery (primary appointment)
Doctor of Medicine, Saint Petersburg State Pediatric Medical Academy, 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

Andrew M. Schneider, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Bachelor of Arts, University of California Berkeley, 2011
Stritch School of Medicine, 2017

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

Jason Shellhaas

Voluntary Clinical Assistant Professor of Orthopedic Surgery

Hua Shen, M.S., Ph.D., M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Doctor of Medicine, Capital University of Medical Sciences (#####),
1991
Master of Science, Peking Union Medical College (#####formerly ##
#####), 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)
Julia and Walter R Peterson Professor of Orthopedic Research
Vice Chair - Research, Department of Orthopedic Surgery
Professor of Mechanical Engineering and Materials Science
Assistant Professor of Biomedical Engineering
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.

Associate Professor of Orthopedic Surgery (primary appointment)
Associate Professor of Neurology
Bachelor of Arts, Columbia University, 2005
Doctor of Medicine, University of Rochester, 2010

Matthew Vernon Smith, M.D.

Professor of Orthopedic Surgery (primary appointment)
Doctor of Medicine, Virginia Commonwealth University, 2002

Michael F Sookochoff, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Doctor of Medicine, University of Wisconsin Madison, 2016

Katherine Caroline White Stenson, M.D.

Associate Professor of Orthopedic Surgery (primary appointment)
Associate Professor of Neurology
Bachelor of Arts, Washington University in St Louis, 1994
Doctor of Medicine, Northwestern University Medical, 2018

Gaurav Swarnkar, Ph.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Doctor of Philosophy, Jawaharlal Nehru University, 2012

T

Katharine Tam, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)
Assistant Professor of Neurology
Bachelor of Science, Cornell University, 2010
Doctor of Medicine, Albert Einstein College of Medicine, 2014

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

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 (primary appointment)
Bachelor of Arts, University of Missouri Kansas City, 2013
Doctor of Medicine, University of Missouri Kansas City, 2015

W

Lindley Bevelle Wall, M.D.

Professor of Orthopedic Surgery (primary appointment)
Jacqueline N Baker and W. Randolph Baker Professor
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)
Bachelor of Science, Soochow University (#####), 2005
Master of Science, Nanjing University, 2008
Doctor of Philosophy, University of Rochester, 2014
Bachelor of Science in Nursing, Goldfarb School of Nursing, 2020

Melissa A. Wright, M.D.

Assistant Professor of Orthopedic Surgery (primary appointment)

Bachelor of Science, Duke University, 2010
Doctor of Medicine, Washington University in St Louis, 2014

Rick Wayne Wright, M.D.

Voluntary Clinical Professor of Orthopedic Surgery
Bachelor of Science, University of Missouri Columbia, 1984
Doctor of Medicine, University of Missouri Columbia, 1988

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.

M96 Ortho 807 Physical Medicine and Rehabilitation (Clinical Elective)

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 physiatry 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.

Credit variable, maximum 4 units.

M96 Ortho 815 Orthopedic Surgery (Clinical Elective)

Available blocks: All
2 or 4 weeks

This 2 or 4 week elective will allow for a rich immersion within one of many possible orthopaedic surgery subspecialties. The student will be assigned to a mentor/preceptor and work primarily with a single attending within the possible available subspecialties including orthopaedic oncology, hand surgery, orthopaedic trauma, sports medicine, arthroplasty and adult reconstruction, pediatric orthopaedics, spine, foot and ankle or shoulder and elbow. The student will have the opportunity to care for patients in the inpatient and outpatient setting, and working within a team to include residents, attendings and possibly fellows. Emphasis will be on the evaluation and treatment of a variety of orthopaedic conditions in the outpatient clinic and hospital. Surgical education with an emphasis on anatomy, surgical approaches and operative rationale will be central to the rotation. Participation in department and service specific lectures and conferences will be expected. Overnight call responsibilities will be available to allow for further exposure to the management of acute orthopaedic problems in the emergency room.

Student time distribution: Variable by service. Inpatient 0-80%; Outpatient 20-100%; Conferences/Lectures 10%; Subspecialty Care 80%

Patients seen weekly: Variable, approximately 80

On-call/weekend responsibility: Call will be expected. Frequency will be no more than every 4th day, variable based on number of students in the call pool.
Credit variable, maximum 4 units.

M96 Ortho 816 PM&R Musculoskeletal and Sports Medicine (Clinical Elective)

Available blocks: 1, 2, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 16
Rotation options: 2 or 4 weeks

In this outpatient Physical Medicine and Rehabilitation rotation, students will assess patients with musculoskeletal and sport medicine concerns, develop a diagnostic approach, and design treatment plans. Common presenting concerns include acute or chronic pains, strains, and sprains. Students will be exposed to a variety of outpatient procedures including diagnostic ultrasound, electrodiagnostic testing, as well as anatomic, ultrasound, and fluoroscopic-guided injections. This rotation is useful for any student, especially those interested in PM&R, primary care, emergency medicine, radiology, and orthopedic surgery.

Duties: Evaluating new and return patients in clinic, participating in and helping with outpatient procedures, attending PM&R Conference / Journal club. All of this will be under the guidance of attendings, residents, and possibly fellows.

Patient population: pediatric and adult, including geriatric

Student time distribution: 95% Outpatient; 5% Conferences/Lectures; 100% Subspecialty care
Patients seen weekly: 15-25 per day, 60-125 per week, 30-50 of which will be outpatient procedures
On-call/weekend responsibility: none
Credit variable, maximum 4 units.

M96 Ortho 817 PM&R and Orthopedic Injury Clinic (Clinical Elective)

Available blocks: 1, 2, 4, 5, 6, 7, 11, 13, 14, 15, 16
Rotation options: 2 weeks

In this outpatient Physical Medicine and Rehabilitation rotation, students will assess patients presenting to the Orthopedic Injury Clinic, our orthopedic urgent care clinic. Common presenting concerns include acute or chronic pains, fractures, strains, and sprains. Students will help develop a diagnostic approach and design treatment plans. Students will be exposed to a variety of outpatient procedures including diagnostic ultrasound, anatomic, ultrasound, and fluoroscopic-guided injections. This rotation is useful for any student, especially those interested in PM&R, primary care, emergency medicine, pediatrics, radiology, and orthopedic surgery.

Duties: Evaluating new and return patients in clinic, participating in and helping with outpatient procedures, attending PM&R Conference / Journal club. All of this will be under the guidance of attendings, residents, and possibly fellows.

Patient population: pediatric and adult, including geriatric

Student time distribution: 95% Outpatient; 5% Conferences/Lectures; 100% Subspecialty care
Patients seen weekly: 15-25 per day, 60-125 per week, 30-50 of which will be outpatient procedures

On-call/weekend responsibility: none
Credit variable, maximum 4 units.

M96 Ortho 899 Special Study Elective: Orthopedic Surgery

Credit variable, maximum 16 units.

M96 Ortho 899C Clinical Special Study Elective: Ortho

Credit variable, maximum 16 units.

M96 Ortho 910 Orthopedic Surgery Advanced Clinical Rotation (ACR)

This will be a 4 week clinical experience involving the evaluation, diagnosis and treatment of orthopedic conditions. This will be an inpatient and outpatient clinical experience with exposure to a variety of degenerative and acute orthopedic disease states. Students will be expected to function at the level of a PGY1 with regard to clinical duties and responsibilities. Participation will involve floor management, ER evaluation, operating theatre participation and outpatient clinic experience. Emphasis will be on correlating anatomy to function in normal and pathologic states. Patient populations: adult and pediatric Services: orthopedic trauma, adult reconstruction (joint replacement), or pediatric orthopedics Duties: rounding on inpatients, participating in service and department wide education conference, participating/assisting in operations, seeing and evaluating new, return and postoperative patients in clinic, taking call in the emergency room. This will be done under the guidance of attendings, fellows and residents.
Credit 4 units.

Department of Otolaryngology

The Department of Otolaryngology–Head & Neck Surgery 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*, 2022-23), 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 (R25 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 (Department of Otolaryngology–Head & Neck Surgery) is a consortium of graduate education, research, and clinical programs 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

Department Head

Visit our website for more information about our faculty and their appointments.

A

Azadeh Afshari, M.S., D.Dent.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Instructor in Otolaryngology
Bachelor of Science, Tulane University, 1981
Doctor of Medicine, Tulane University, 1987
Master of Science, Tulane University, 1988

Eric Barbarite, M.D.

Assistant Professor of Otolaryngology (primary appointment)
Bachelor of Science, University of Miami, 2013
Doctor of Medicine, University of Miami, 2017

Lynda Cheryl Berkowitz, M.S.

Instructor in Otolaryngology (primary appointment)
Champaign, 1981
Master of Science, Washington University in St Louis, 1983

Paul Bigg, D.M.D.

Voluntary Clinical Instructor in Otolaryngology
Baccalaureatus, Washington University in St Louis, 2014
Doctor of Medical Dentistry, Case Western Reserve University, 2019

Gregory Harris Branham, M.D.

Professor of Otolaryngology (primary appointment)
Bachelor of Science, University of South Carolina Columbia, 1979
Doctor of Medicine, University of South Carolina Columbia, 1983

Nicholas Branham

Voluntary Clinical Instructor in Otolaryngology

Jennifer Brinkmeier, M.D.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Arts, Williams College, 2002
Doctor of Medicine, Ohio State University College of Medicine, 2007

Craig Alan Buchman, M.D.

Professor of Otolaryngology (primary appointment)
Lindburg Professor of Otolaryngology
Head of the Department of Otolaryngology
Bachelor of Arts, University of Georgia, 1986
Doctor of Medicine, University of Florida, 1990

C

John Jeonhwan Chi, M.A., M.D.

Professor of Otolaryngology (primary appointment)
Division Chief - Facial Plastic & Reconstructive Surgery
Bachelor of Science, Columbia University, 2001
Master of Arts, City College, 2003
Doctor of Medicine, SUNY Downstate Medical Center University Hospital in Brooklyn, 2007

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 Ann Arbor, 1969

Master of Science, University of Michigan Ann Arbor, 1973
Doctor of Philosophy, University of Michigan Ann Arbor, 1975

Sheldon C Cohen, D.Dent.

Voluntary Clinical Instructor in Otolaryngology
Bachelor of Science, Washington University in St Louis, 1973
Doctor of Dentistry, Southern Illinois University (Duplicate of Southern Illinois University Carbondale), 1976

Zachariah W Cole

Voluntary Clinical Instructor in Otolaryngology

D

Lisa S. Davidson, M.S., Ph.D.

Associate Professor of Otolaryngology (primary appointment)
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

Voluntary Clinical Assistant Professor of Otolaryngology

Andrew J. Drescher, M.D.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Science, Yale University, 1998
Doctor of Medicine, University of Michigan Ann Arbor, 2002

Norman Steven Druck, M.D.

Voluntary Clinical Assistant Professor of Otolaryngology
Bachelor of Arts, Washington University in St Louis, 1967
Champaign, 1970

Katherine Dunsky, M.D.

Associate Professor of Otolaryngology (primary appointment)
Doctor of Medicine, Saint Louis University, 2010

Nedim Duraković, M.D.

Assistant Professor of Otolaryngology (primary appointment)
Bachelor of Arts, Brown University, 2007
Doctor of Medicine, Brown University, 2012

E

Julia Edgar

Voluntary Research Instructor in Otolaryngology

F

Nyssa F Farrell, M.D.

Assistant Professor of Otolaryngology (primary appointment)
Bachelor of Science, University of South Carolina Columbia, 2010
Doctor of Medicine, University of South Carolina Columbia, 2014

Jill B Firszt, M.S., Ph.D.

Professor of Otolaryngology (primary appointment)
Champaign, 1978
Champaign, 1982
Champaign, 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

Rebecca Lindsay Grammer

Voluntary Clinical Instructor in Otolaryngology

Heather Jean Grantham, M.Ed., Ph.D.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Arts, Emory University, 1995
Master of Education, Smith College, 2005
Doctor of Philosophy, Washington University in St Louis, 2009

Christine Hilleary Gustus, M.S.

Instructor in Otolaryngology (primary appointment)
Main Campus, 1973
Master of Science, Washington University in St Louis, 1975

H

Richard Alexander Harbison, M.S., M.D.

Assistant Professor of Otolaryngology (primary appointment)
Bachelor of Science, University of Denver, 2009
Doctor of Medicine, University of Colorado Anschutz Medical Campus, 2013
Seattle Campus, 2017

Eugenio Guidote Herbosa

Voluntary Clinical Instructor in 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 Pediatrics
Doctor of Medicine, Harvard University, 1993

Lawrence M Hoffman, D.Dent.

Voluntary Clinical Instructor in Otolaryngology
Bachelor of Arts, Indiana University Bloomington, 1972
Doctor of Dentistry, Washington University in St Louis, 1976

Timothy Hullar

Voluntary Research Professor of Otolaryngology

Margaret Naunheim Huston, M.D.

Associate 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.

Voluntary Clinical Instructor in Otolaryngology
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.

Associate Professor of Otolaryngology (primary appointment)
Doctor of Medicine, University of Tirana, 1997
Master of Public Health, Saint Louis University, 2007

Eugenia Kardaris

Voluntary Clinical Instructor in Otolaryngology

Andrew M Kim, M.S., D.Dent.

Voluntary Clinical Instructor in Otolaryngology
Voluntary Clinical Assistant Professor of Surgery
Bachelor of Arts, California State University, 1978
Doctor of Dentistry, Washington University in St Louis, 1984
Main Campus), 1987

Jinkyung Kim, Ph.D.

Assistant Professor of Otolaryngology (primary appointment)
Assistant Professor of Neuroscience
Ang University, 2006
Doctor of Philosophy, Pohang University of Science & Technology, 2012

Prashanth Konatham Haribabu

Voluntary Clinical Instructor in Otolaryngology

L

Carl Wesley Lee, M.D.

Voluntary Clinical Instructor in 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
Vice Chair Education Department of Otolaryngology
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)
Bachelor of Science, Washington University in St Louis, 2010
Doctor of Medicine, Washington University in St Louis, 2017

Xia Liu, MBBS

Assistant Professor of Otolaryngology (primary appointment)
Bachelor of Science, Jiangsu University (#####), 2008
Foreign MD equivalent, Jiangsu University (#####), 2013

M

Richard W Maack, M.D.

Voluntary Clinical Instructor in Otolaryngology
Voluntary Teaching Instructor in Otolaryngology
Bachelor of Science, Muhlenberg College, 1981
College Park), 1985

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.

Voluntary Clinical Instructor in Otolaryngology
Champaign, 1982
Champaign, 1986

Dwight McLeod

Voluntary Clinical Instructor in 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

John Richard Monterubio

Voluntary Clinical Instructor in Otolaryngology

Nancy Tye Murray, M.S., Ph.D.

Professor Emeritus of Otolaryngology
Bachelor of Science, Texas Christian University, 1977
Master of Science, University of Iowa, 1979
Doctor of Philosophy, University of Iowa, 1984

O

Margaret A Ogden, M.D.

Professor of Otolaryngology (primary appointment)
Vice Chair for Clinical Operations Dept of Otolaryngology
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)
Bachelor of Science, Indiana University Bloomington, 1983

Doctor of Philosophy, Northwestern University, 1990

Amanda J Ortmann, M.S., Ph.D.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Science, Missouri Baptist University, 2001
Master of Science, Washington University in St Louis, 2003
Doctor of Philosophy, University of Pittsburgh, 2012

P

Randal C Paniello, M.A., M.B.A., M.S., Ph.D., M.D.

Professor of Otolaryngology (primary appointment)
Christy J. and Richard S. Hawes III Professorship
Champaign, 1979
Champaign, 1980
Champaign, 1984
Master of Business Administration, Washington University in St Louis, 1999
Master of Arts, Washington University in St Louis, 2010
Doctor of Philosophy, Washington University in St Louis, 2013

Guangyong Peng, M.S., Ph.D., M.D.

Professor of Otolaryngology (primary appointment)
Professor of Pathology and Immunology
Doctor of Medicine, JIANGSU UNIVERSITY ZHENJIANG, 1993
Master of Science, Nanjing Medical University (#####), 1999
Doctor of Philosophy, Chinese Academy of Preventive Medicine, 2002

Jay Francis Piccirillo, M.D.

Professor of Otolaryngology (primary appointment)
Vice Chair - Research
Professor of Occupational Therapy
Professor of Biostatistics
Professor of Medicine
Bachelor of Arts, University of Vermont, 1979
Doctor of Medicine, University of Vermont, 1985

Patrik Pipkorn, M.D.

Associate Professor of Otolaryngology (primary appointment)
Doctor of Medicine, University of Gothenburg, 2007

Sidharth Venkata Puram, Ph.D., M.D.

Associate Professor of Otolaryngology (primary appointment)
Division Chief - Head and Neck Surgery
Associate Professor of Genetics
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.

Professor of Otolaryngology (primary appointment)
Bachelor of Science, Brigham Young University, 2000
Main Campus, 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)
Bachelor of Science, Massachusetts Institute of Technology, 2007
College of Medicine, 2011
Master of Science, Washington University in St Louis, 2015

Mark A Rutherford, Ph.D.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Science, University of Missouri Columbia, 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

John Stone Schneider, M.P.P., M.D.

Associate Professor of Otolaryngology (primary appointment)
Division Chief - Rhinology
Assistant Dean for Faculty Promotions and Career Development
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

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 University Fort Wayne (IPFW), 2014

Emily A. Spataro, M.D.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Science, Duke University, 2007
Doctor of Medicine, Washington University in St Louis, 2012

Richard Benjamin Speaker, MB.BCh.

Assistant Professor of Otolaryngology (primary appointment)
Bachelor of Science, University of California Davis, 2004
Foreign MD equivalent, University College Dublin National University of Ireland, 2010

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

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.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Science, University of Illinois at 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 Neuroscience
Bachelor of Science, University of Washington, 1981
Doctor of Philosophy, Northwestern University, 1989

Cameron Connelly Wick, M.D.

Associate Professor of Otolaryngology (primary appointment)
Bachelor of Science, Washington and Lee University, 2006
Main Campus, 2010

June Kleinfeld Wolff, D.Dent.

Voluntary Clinical Instructor in 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, Peoples' Friendship University of Russia, 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.

Tatyana Yakusheva, PhD

Neuroscience Research Building
4370 Duncan 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.

Judith E.C. Lieu, MD, MSPH

8600 MCC, 8th 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 methods to screen for hearing loss in an outpatient setting. 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.

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.

Jay F. Piccirillo, MD

8430 MCC, 8th 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.

Courses

Visit online course listings to view offerings for M55 Oto.

M55 Oto 803 Pediatric Otolaryngology (Clinical Elective)

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.
Credit variable, maximum 4 units.

M55 Oto 804 Otolaryngology (Clinical Elective)

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.
Credit 4 units.

M55 Oto 833 Ambulatory Otolaryngology for the Primary Care Physician (Clinical Elective)

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.
Credit 2 units.

M55 Oto 910 Otolaryngology Advanced Clinical Rotation (ACR)

The Otolaryngology Advanced Clinical Rotation (ENT-ACR) is a four-week rotation designed to provide a comprehensive sub-internship otolaryngology experience during the Phase III Gateway WUSM Curriculum. The rotation can accommodate 1 student per month. Student assessments will be competency-based evaluating performance in patient care, communication, technical skills, professionalism, and medical knowledge. Students will primarily rotate through the adult Head and Neck Service at Barnes-Jewish Hospital, Pediatric Otolaryngology Service at St. Louis Children's Hospital, and may include time at the John Cochran VA hospital. The services at Barnes and Children's have the highest inpatient census amongst the Otolaryngology sub-specialties. A typical day will begin with morning rounds alongside the Otolaryngology residents. The ENT-ACR student will be responsible for all care associated with assigned patients. This includes getting sign-out from the overnight call team, obtaining vitals, communicating plans with nursing and auxiliary care providers, and helping residents with progress notes and orders. Throughout the day the student will be expected to maintain communication with nursing and other medical teams assisting in the care of those patients and communicating those updates with the otolaryngology residents and attendings. During the day, the student will be expected to spend time in the operating room, clinic, and shadowing the on-call consult resident. There will be an expectation to take at least one overnight or 24 hour call during the rotation. Additional weekend assistance with rounds and cases will mirror internship expectations. The ENT-ACR is a sub-internship experience. As such, the student will get hands on practice with patient care, common bedside procedures (e.g. flexible nasolaryngoscopy; control of epistaxis; laceration repair), assisting in the operating room, and continuity of care via the clinic and inpatient rounding. The Head and Neck and Pediatric Services will provide much of the ENT-ACR student's exposure due to the relative complexity and multidisciplinary care of their patients. The students will stay at

Barnes-Jewish Hospital, St. Louis Children's, or the VA and will not be rotating at our satellite offices. When appropriate there may be opportunity to spend time on other Otolaryngology sub-specialties (Otology/Neurotology; Rhinology; Laryngology; Facial Plastics; General Otolaryngology), however greater exposure to those fields should be sought via other ENT electives that have been designed as a complimentary experience to the ENT-ACR. To assist the rotating ENT-ACR student, there will be one meeting with a course director at the beginning of the rotation. This meeting is to serve as an introduction, set clear expectations, confirm the schedule, and provide relevant educational resources. There will be a second meeting with a course director at the end of the rotation to provide two-way feedback on the student's performance and the rotation experience.
Credit 4 units.

Department of Pathology & Immunology

The Department of Pathology & Immunology 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, Immunobiology, Laboratory and Genomic Medicine, Genomic and Molecular Pathology, and Neuropathology have faculty involved in teaching, clinical service, and research. Many clinical faculty have appointments with Siteman Cancer Center.

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 clinical electives, including an Advanced Clinical Rotation in Anatomic Pathology and Laboratory Medicine. The department plays a variety of leadership and instruction roles in the undergraduate Gateway Curriculum. Students can take elective rotations in Autopsy Pathology, Surgical Pathology, or Laboratory Medicine, or they may participate in the research activities of the faculty.

The Division of Immunobiology integrates immunobiology activities at the school. It is 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. The department has strong participation in the Immunology graduate program, with many opportunities in basic and translational research.

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

Faculty

Joseph Gaut, MD, PhD

Anatomic and Molecular Pathology Division Chief

Kodi Ravichandran, PhD

Immunobiology Division Chief

Guantam Dantas, PhD

Laboratory and Genomic Medicine Division Co-Chief

Ann M. Grownowski, PhD

Laboratory and Genomic Medicine Division Co-Chief

Eric J. Duncavage, MD

Genomic and Molecular Pathology Division Chief

Molly Schroeder, PhD, FACMG

Genomic and Molecular Pathology Associate Division Chief

Robert E. Schmidt, MD, PhD

Neuropathology Division Chief

Visit our website for more information about our faculty and their appointments.

A

Sarah DeGenova Ackerman, Ph.D.

Assistant Professor of Pathology and Immunology (primary appointment)

Assistant Professor of Developmental Biology

Bachelor of Science, The College of New Jersey, 2011

Doctor of Philosophy, 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 Ann Arbor, 1974

Master of Science, University of Michigan Ann Arbor, 1977

Doctor of Philosophy, University of Michigan Ann Arbor, 1981

Gaya K Amarasinghe, Ph.D.

Professor of Pathology and Immunology (primary appointment)

Alumni Professorship - Pathology and Immunology

Professor of Biochemistry and Molecular Biophysics

Professor of Molecular Microbiology

Bachelor of Science, City College, 1997

Doctor of Philosophy, University of Maryland Baltimore County, 2001

Timothy Amukele

Voluntary Research Professor of Pathology and Immunology

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

Vahid Azimi, M.S., M.D.

Instructor in Pathology and Immunology (primary appointment)

Bachelor of Arts, Johns Hopkins University, 2013

Master of Science, University of Arizona, 2014
Doctor of Medicine, Vollum Institute of Oregon Health and Science University, 2020

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.

Professor of Pathology and Immunology (primary appointment)
Doctor of Philosophy, King's 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

Adam Lee Booth, M.D.

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, University of Texas at Tyler, 2010
Doctor of Medicine, Ross University School of Medicine, 2016

Nicholas Craig Borcherding, M.S., Ph.D., M.D.

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Science, Iowa State University, 2012
Master of Science, University of Iowa, 2014
Doctor of Philosophy, Carver College of Medicine at University of Iowa, 2020
Doctor of Medicine, Carver College of Medicine at University of Iowa, 2020

Fouad Ismat Boulos, M.D.

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 (primary appointment)
Doctor of Philosophy, University of Alabama in Tuscaloosa, 2008

Simone Brioschi, M.S., Ph.D.

Instructor in Pathology and Immunology (primary appointment)
Master of Science, University of Milan, 2010
Doctor of Philosophy, University of Freiburg, 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)
Vice Chair - Faculty Development
Professor of Molecular Microbiology
Professor of Medicine
Professor of Pediatrics
Bachelor of Science, University of Alberta, 2002
Doctor of Philosophy, University of Alberta, 2007

Kathleen Byrnes, M.D.

Associate Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, Washington University in St Louis, 2008
Doctor of Medicine, Tulane University, 2013

C

Laura Campisi, M.S., Ph.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Master of Science, Université de Nice Sophia Antipolis, 2005
Doctor of Philosophy, Université de Nice Sophia Antipolis, 2009

Yang Cao, Ph.D.

Associate 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

Anne L Chen, M.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, University of Miami, 2012
Doctor of Medicine, University of Miami, 2015

Jiye Cheng, M.S., Ph.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Main Campus, 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
Champaign, 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

Emily Coberly

Voluntary Clinical Professor of Pathology and Immunology

Marco Colonna, M.D.

Professor of Pathology and Immunology (primary appointment)
Robert Rock Belliveau MD Professor of Pathology
Professor of Medicine
Doctor of Medicine, Parma University, 1983

Leigh Anne Compton, Ph.D., M.D.

Associate Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, Centenary College of 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)
Edward Mallinckrodt Professorship in Pathology
Head of the Department of Pathology and Immunology
Doctor of Medicine, University of Chicago, 1980

Bridgit Crews, Ph.D.

Associate Professor of Pathology and Immunology (primary appointment)
Doctor of Philosophy, University of California Santa Barbara, 2006

Erika C Crouch, Ph.D., M.D.

Professor of Pathology and Immunology (primary appointment)
Carol B. and Jerome T. Loeb Professorship in Medical Education
Vice Chair - Education
Doctor of Philosophy, University of Washington, 1978
Doctor of Medicine, University of Washington, 1979

Suzanne Crumley

Associate Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)

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)
Conan Professorship in Laboratory and Genomic Medicine
Co-Division Chief - Division of Laboratory and Genomic Medicine
Professor of Molecular Microbiology
Professor of Pediatrics
Professor of Biomedical Engineering

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 and Immunology (primary appointment)
Bachelor of Science, University of Delaware, 2015
Doctor of Philosophy, Duke University, 2020

Eric James Duncavage, M.D.

Professor of Pathology and Immunology (primary appointment)
Division Chief - Division of Genomic and Molecular Pathology
Bachelor of Arts, Vanderbilt University, 1998
Doctor of Medicine, University of Tennessee, 2004

William Michael Dunne, Ph.D.

Voluntary Clinical 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

Ali Hassan Ellebedy, Ph.D.

Professor of Pathology and Immunology (primary appointment)
Professor of Molecular Microbiology
Professor of Medicine
Leo Loeb Endowed Professor
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

Skye Fishbein, M.S., Ph.D.

Instructor in Pathology and Immunology (Pending Dean Approval) (primary appointment)
Bachelor of Science, Brandeis University, 2012
Master of Science, Brandeis University, 2012
Doctor of Philosophy, Harvard University, 2019

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

Christine Karen Fuja, D.O.

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Arts, Columbia College Chicago, 2007
Doctor of Osteopathic Medicine, Midwestern University Illinois, 2020

G

Joseph P. Gaut, Ph.D., M.D.

Professor of Pathology and Immunology (primary appointment)
Ladenson Professorship in Pathology
Division Chief - Division of Anatomic and Molecular Pathology
Professor of Medicine
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 and Immunology (primary appointment)
Doctor of Medicine, Shanghai Jiao Tong University (#####), 2000

Doctor of Philosophy, Karolinska Institute, 2007

Daniel A Gibson, Ph.D.

Instructor in Pathology and Immunology (Pending Dean Approval) (primary appointment)
Bachelor of Arts, University of Southern California, 2006
Doctor of Philosophy, University of Southern California, 2013

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

Jeffrey I Gordon, M.D.

Professor of Pathology and Immunology (primary appointment)
Dr Robert J Glaser Distinguished University Professor
Director - Center for Genome Sciences
Professor of Developmental Biology
Professor of Molecular Microbiology
Professor of Medicine
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 (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)
Oree M Carroll and Lillian B Ladenson Professor of Clinical Chemistry in Pathology and Immunology
Co-Division Chief - Division of Laboratory and Genomic Medicine
Professor of Obstetrics and Gynecology
Champaign, 1985
Master of Science, Iowa State University, 1988
Doctor of Philosophy, University of Wisconsin Madison, 1992

Brenda Jean Grossman, M.S., M.D.

Voluntary Clinical Professor of Pathology and Immunology
Main Campus, 1976
Doctor of Medicine, Medical College of Georgia, 1980
Master of Science, Saint Louis University, 2003

H

Ian Sean Hagemann, Ph.D., M.D.

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

Claudia Han

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)

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., Ph.D.

Instructor in Pathology and Immunology (primary appointment)
Bachelor of Arts, Georgetown University, 1989
Doctor of Veterinary Medicine, Tufts University, 1995
Doctor of Philosophy, Washington University in St. Louis, 2008

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.

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
New Brunswick, 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

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, M.D.

Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, Northwestern University, 1990
Doctor of Medicine, Washington University in St. Louis, 1994

Andrew E. Hughes, M.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Doctor of Medicine, Washington University in St. Louis, 2019
Bachelor of Science, College of William and Mary, null

J

Ronald R Jackups, Ph.D., M.D.

Professor of Pathology and Immunology (primary appointment)
Professor of Pediatrics
Bachelor of Science, Washington University in St. Louis, 2000
Doctor of Philosophy, University of Illinois at Chicago, 2008
Doctor of Medicine, University of Illinois at Chicago, 2008

Umang Jain, M.S., Ph.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, Manipal University, 2007
Master of Science, Manipal University, 2009
Doctor of Philosophy, Dalhousie University, 2015

K

Liang-I Kang, Ph.D., M.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, University of Delaware, 2006
Doctor of Philosophy, University of Pittsburgh, 2013
Doctor of Medicine, University of Pittsburgh, 2014

Sunkyung Kim, Ph.D.

Instructor in Pathology and Immunology (primary appointment)
Bachelor of Science, Handong Global University, 2006
Doctor of Philosophy, Seoul National University, 2015

Jonathan Kipnis, M.S., Ph.D.

Professor of Pathology and Immunology (primary appointment)
Alan A and Edith L Wolff Distinguished Professor
Professor of Neurology
Professor of Neuroscience
Professor of Neurological Surgery
Bachelor of Science, Tel Aviv University, 1998
Master of Science, Weizmann Institute of Science, 1999
Doctor of Philosophy, Weizmann Institute of Science, 2004

Eynav Yafit Klechevsky, Ph.D.

Associate 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 at Chapel Hill, 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 Emeritus of Pathology and Immunology
Main Campus, 1964
College Park, 1971

Yi-Shan Lee, Ph.D., M.D.

Associate 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.

Associate Professor of Pathology and Immunology (primary appointment)
Bachelor of Arts, Hendrix College, 1988
Doctor of Philosophy, 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 (#####formerly ######), 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

Tiantian Liu, Ph.D.

Instructor in Pathology and Immunology (primary appointment)
Bachelor of Science, Wuhan University (#####), 2010
Doctor of Philosophy, Wuhan University (#####), 2016

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 and Immunology (primary appointment)
Doctor of Philosophy, 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.

Associate Professor of Pathology and Immunology (primary appointment)
Doctor of Medicine, Alexandria University, 2005

Nathan McLamb, M.D.

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)
Associate of Applied Science, Wake Technical Community College, 2009
Bachelor of Science, North Carolina State University, 2012
Doctor of Medicine, East Carolina University, 2016

Nidia Messias, M.D.

Associate Professor of Pathology and Immunology (primary appointment)
Doctor of Medicine, Faculdade Medicina Estadual (ISEP), 1998

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

Pooja P Navale, M.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Doctor of Medicine, Tata Institute of Fundamental Research (TIFR), 2013

Julie Ann Neidich, M.D.

Professor of Pathology and Immunology (primary appointment)
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, 1994

O

Eugene Merle Oltz, Ph.D.

Voluntary Research Professor of Pathology and Immunology
Bachelor of Science, Cornell University, 1982
Doctor of Philosophy, Columbia University, 1987

P

Bijal A. Parikh, Ph.D., M.D.

Associate Professor of Pathology and Immunology (primary appointment)
New Brunswick, 2004
Doctor of Medicine, University of Medicine and Dentistry 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 National University of Ireland, 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

Champaign, 2002

Champaign, 2004

Richard J. Perrin, Ph.D., M.D.

Associate Professor of Pathology and Immunology (primary appointment)

Bachelor of Science, Yale University, 1992

Champaign, 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

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

Doctor of Philosophy, University of Massachusetts Amherst, 1992

Alejandro Reyes

Voluntary Research 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.

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, All India Institute of Medical Sciences, 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.

Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, Cornell University, 2004

Doctor of Medicine, Cornell University, 2005

S

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)

Andrew M Bursky and Jane M Bursky Distinguished Professor

Professor of Molecular Microbiology

Bachelor of Arts, State University of New York, 1968

Doctor of Philosophy, State University of New York, 1973

Molly Schroeder, Ph.D.

Associate Professor of Pathology and Immunology (primary appointment)

Associate Professor of Pediatrics

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 (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

Mitchell G Scott, M.S., Ph.D.

Voluntary Clinical Professor of Pathology and Immunology

Bachelor of Science, Washington University in St. Louis, 1974

Master of Science, University of Missouri Columbia, 1977

Doctor of Philosophy, Washington University in St. Louis, 1982

Alexey Sergushichev, Ph.D.

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)

Doctor of Philosophy, ITMO University, null

Andrey S Shaw, M.D.

Voluntary Research 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.

Assistant Professor of Pathology and Immunology (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

Jean Simpson

Voluntary Clinical Professor of Pathology and Immunology

Igor Smirnov, D.V.M.

Associate Professor of Pathology and Immunology (primary appointment)
Doctor of Veterinary Medicine, Moscow Veterinary Academy, 1993

Hussein MH Sultan, D.Sc.

Instructor in Pathology and Immunology (primary appointment)
Doctor of Science, Augusta University, 2017

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

Chanchal Sur Chowdhury, Ph.D.

Instructor in Pathology and Immunology (primary appointment)
Doctor of Philosophy, University of Basel, 2014

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 Irvine, 2000
Master of Arts, University of California, 2006
Doctor of Philosophy, University of California, 2007
Doctor of Medicine, University of California, 2009

T

Steven L Teitelbaum, M.D.

Professor of Pathology and Immunology (primary appointment)
Messing Professor of Pathology and Immunology
Professor of Medicine
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

Katarzyna Thompson, Ph.D.

Assistant Professor of Pathology and Immunology (primary appointment)

Doctor of Philosophy, Medical University of Gdansk, 2014

Ning Tsao, Ph.D.

Instructor in Pathology and Immunology (primary appointment)
Doctor of Philosophy, National Taiwan University, 2015

Jackson S Turner, Ph.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, University of Tulsa, 2011
Doctor of Philosophy, University of Michigan Ann Arbor, 2017

Jane Willman Turner

Voluntary Clinical Professor of Pathology and Immunology

U

Aayushi Uberoi

Assistant Professor of Pathology and Immunology (Pending Executive Faculty Approval) (primary appointment)

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

Herbert W Virgin, Ph.D., M.D.

Professor Emeritus of Pathology and Immunology
Bachelor of Arts, Harvard University, 1977
Doctor of Philosophy, Harvard University, 1985
Doctor of Medicine, Harvard University, 1985

W

Miranda J Wallace, Ph.D.

Instructor in Pathology and Immunology (Pending Dean Approval) (primary appointment)
Main Campus, 2011
Doctor of Philosophy, University of Tennessee Health Science Center, 2019

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
Margaret Gladys Smith Professorship in Pathology and Immunology
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 (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.

Associate Professor of Pathology and Immunology (primary appointment)
Bachelor of Science, University of Missouri Columbia, 2005
Doctor of Osteopathic Medicine, A T Still University of Health Sciences, 2013

Anthony Williams, Ph.D.

Assistant Professor of Pathology and Immunology (primary appointment)
Bachelor of Arts, Occidental College, 2002
Doctor of Philosophy, University of Miami, 2014

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 (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
Doctor of Philosophy, Washington University in St Louis, null

Bernd Heinrich Zinselmeyer, Ph.D.

Associate 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 of Jerusalem, 2003

Research Electives

Pathology and Immunology Research Electives

For information about research opportunities available for students in Gateway EXPLORE or Gateway Phase 3, please visit the Research Lab Pages listings on the Department of Pathology & Immunology website.

Courses

Visit online course listings to view offerings for M60 Path.

M60 Path 805 Autopsy Pathology (Clinical Elective)

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.
Credit variable, maximum 4 units.

M60 Path 807 Dermatopathology (Clinical Elective)

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.
Credit 4 units.

M60 Path 812 Cytopathology (Clinical Elective)

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.
Credit variable, maximum 4 units.

M60 Path 813 Molecular Pathology (Clinical Elective)

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.
Credit 4 units.

M60 Path 817 OBGYN Pathology (Clinical Elective)

The expectation for this elective is that the student participates 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 student 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.
Credit variable, maximum 4 units.

M60 Path 820 Surgical Pathology (Clinical Elective)

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.
Credit variable, maximum 4 units.

M60 Path 825 Introduction to Neuropathology (Clinical Elective)

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.

Credit variable, maximum 4 units.

M60 Path 860 Clinical Laboratory Medicine (Clinical Elective)

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.
Credit variable, maximum 4 units.

M60 Path 910 Anatomic Pathology and Laboratory Medicine Advanced Clinical Rotation (ACR)

The purpose of the Anatomic Pathology and Laboratory Medicine Advanced Clinical Rotation involves the development of expertise related to diagnostic pathology and laboratory testing in a well-supervised teaching environment. ACR students are under the supervision of anatomic pathology and laboratory medicine residents, fellows and attending pathologists. ACR students have the same daily schedules as first year anatomic pathology/clinical pathology residents. They are assigned the primary workup of patient specimens or patients on each sign-out day. An approach to the specimen or patient and required follow up or ancillary testing is planned in consultation with the resident, fellow or attending physician. The trainees assume the primary responsibility for generating any required reports and communication with other healthcare providers. As for most entering residents, there is no formal after-hours call schedule. Students attend the same conferences as the house staff.
Credit variable, maximum 16 units.

Edward Mallinckrodt Department of Pediatrics

The primary aim of the teaching program of the Department of Pediatrics 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, and the newborn services are at the Women & Infants Center. 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 per year. Nearly 4,000 infants are born annually at the Washington University Medical Center.

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

Faculty Department Chair

Gary A. Silverman, MD, PhD

Department Vice Chairs

Vice Chair of Clinical Informatics: Kevin O'Bryan, MD

Vice Chair of Quality & Safety: Beverly Brozanski, MD

Vice Chair of Outpatient Health: Cassandra M. Pruitt, MD, FAAP

Vice Chair of Outpatient Health & Strategic Planning: Jason Newland, MD, MEd

Vice Chair of Investigation: Vikas Dharnidharka, MD, MPH

Vice Chair of Physician Scientist Training: Anthony French, MD, PhD

Division Chiefs

Ana Maria Arbeláez, MD, MSCI

Vikas Dharnidharka, MD, MPH

Patricia Dickson, MD

Jorge Di Paola, MD

Andrew Glatz, MD, MSCE

David Hunstad, MD

Lisa Moscoso, MD, PhD

Katie Plax, MD

Cassandra M. Pruitt, MD, FAAP

Kimberly S. Quayle, MD

Ronald Rubenstein, MD, PhD

Phillip I. Tarr, MD

Juliane Bubeck Wardenburg, MD, PhD

Barbara B. Warner, MD, MSc

Visit our website for more information about our faculty 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 (Koln), 2011

Philip Mulayara Abraham, M.D.

Associate 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.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Associate Professor of 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 (primary appointment)
Doctor of Medicine, 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

Jacob Charles Adney

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)

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

Etihad S. Al-Falahi

Voluntary Clinical Instructor in Pediatrics

Duha Naser Al-Zubeidi, MBBS

Associate 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

Jennifer Marie Allen

Voluntary Clinical Assistant Professor of Pediatrics

Ardis Kay Allison, D.O.

Voluntary Clinical Instructor in Pediatrics
Main Campus), 1980

Patricia J Amato, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Science, Notre Dame College, 1979
Doctor of Medicine, School Not Found, 1982

Sabat Sardar Ameen

Voluntary Clinical Assistant Professor of Pediatrics

Karine Amirikian, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Arts, University of Pennsylvania, 2009
Doctor of Medicine, Thomas Jefferson University, 2015

Jagruhi Shah Anadkat, M.D.

Associate Professor of Pediatrics (primary appointment)
Main Campus, 2000
Doctor of Medicine, Northeastern University, 2005

Kristen Minette Andersen

Voluntary Clinical Instructor in Pediatrics

Anne Marie Anderson

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)

George Christopher Anderson, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, Saint Louis University, 1993

Dana E Ankney, M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Arts, Washington University in St Louis, 2001
Doctor of Medicine, Wake Forest University, 2005

Amal F. Antoun

Voluntary Clinical Instructor in Pediatrics

Ana Maria Arbelaez, M.D.

Professor of Pediatrics (primary appointment)
David English Smith Professorship In Medicine
Division Chief - Division of Endocrinology & Diabetes
Doctor of Medicine, Universidad del Valle Med Sch, 1996

Amy Elizabeth Armstrong, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Virginia Commonwealth University, 2012

Meredith Denise Arra, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Baccalaureatus, Harvard University, 2015
Doctor of Medicine, Augusta University, 2020

Jennifer L. Arter, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in Pediatrics
Doctor of Medicine, Hahnemann University, 1994

Robert K Atteberry, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, University of Missouri Columbia, 1998

Fariba Azarpour, M.D.

Voluntary Clinical Instructor in Pediatrics
Doctor of Medicine, School Not Found, 1971

B

Saba Bajwa

Voluntary Clinical Assistant Professor of Pediatrics

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 (primary appointment)
Doctor of Medicine, University of Central Florida, 2019

Angela L Bard, M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Science, Indiana University Bloomington, 1976
Doctor of Medicine, Indiana University Bloomington, 1981

David Lawrence Bark, Ph.D.

Associate Professor of Pediatrics (primary appointment)
Main Campus, 2010

Alan Roy Barnette

Voluntary Clinical Instructor in Pediatrics

Laura Barton, M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, Northwestern University, 1998
Doctor of Medicine, University of Illinois at 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

Voluntary Clinical Instructor in Pediatrics

Marie Lynn Batty, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Saint Louis University, 2013
Doctor of Medicine, Saint Louis University, 2017

Susan L Baumer, M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Arts, University of Oregon, 1969
Doctor of Medicine, University of Pennsylvania, 1975

Christie A. Bayer, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Saint Louis University, 1986
Doctor of Medicine, University of Missouri Columbia, 1990

Julia M. Becker, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, University of Missouri Columbia, 1993
Doctor of Medicine, University of Missouri Columbia, 1997

Jeffrey John Bednarski, Ph.D., M.D.

Associate 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

Halima Bello-Manga

Voluntary Research Associate Professor of Pediatrics

Walter F Benoist, M.D.

Voluntary Clinical Professor of 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 (primary appointment)
Bachelor of Science, Saint Louis University, 2009
Doctor of Medicine, Loyola University Chicago, 2013

Peter M Bess

Voluntary Clinical Assistant Professor of Pediatrics

Michelle Louise Beumer, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Ohio Wesleyan University, 1984
Doctor of Medicine, University of Missouri Columbia, 1988

Huldah C Blamoville, M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Science, Queens College, 1959
Doctor of Medicine, Meharry Medical College, 1965

Kevin J Blanton

Voluntary Clinical Instructor in 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Harvard University, 1992
Doctor of Medicine, Albany Medical College, 1996

Kelly Minnette Boland

Voluntary Clinical Assistant Professor of Pediatrics

Joshua P Boldt

Voluntary Clinical Instructor in Pediatrics

Nastassia Collen Bommel

Professor

Rachael Jane Bradshaw, M.S.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Earlham College, 2000
Main Campus, 2004

Robert J Bradshaw, M.D.

Voluntary Clinical Instructor in 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.

Assistant Professor of Pediatrics (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, M.D.

Instructor in Pediatrics (primary appointment)
Doctor of Medicine, Saint Louis University, 2015

Amelia G Bray-Aschenbrenner, M.D.

Assistant Professor of Pediatrics (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 Kansas City, 2011

Steven Kyle Brennan, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Arts, University Victoria, 2007
Doctor of Medicine, University of Queensland, 2013

Matthew A Broom

Voluntary Clinical Associate Professor of Pediatrics

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

Rebekah L Browning, Ph.D., M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Arts, Davidson College, 2002
Main Campus, 2017
Main Campus, 2017

Earline A Brownridge, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Washington University in St Louis, 1978
Doctor of Medicine, University of Missouri Columbia, 1982

Seth J Brownridge, M.D.

Voluntary Clinical Assistant Professor of 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)
Susan and James C. Gould Professor of Pediatric Quality and Safety
Vice Chair - Quality Improvement & Safety
Doctor of Medicine, University of Pittsburgh, 2019

Juliane Bubeck-Wardenburg, Ph.D., M.D.

Professor of Pediatrics (primary appointment)
Donald B Strominger Professor of Pediatrics
Division Chief - Division of Critical Care Medicine
Professor of Molecular Microbiology
Executive Vice Chair of Pediatrics
Doctor of Philosophy, Washington University in St Louis, 2017

Doctor of Medicine, Washington University in St Louis, 2017

Ayse Bahar Budan Caliskan, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Doctor of Medicine, Istanbul University, 2001

Tara M. Budetti

Voluntary Clinical Assistant Professor of Pediatrics

Lorena Buffa, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, University of Missouri Columbia, 1998

Rebecca Kay Bullivant, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Eastern Illinois University, 1988
Champaign, 1992

Max H Burgdorf, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Washington University in St Louis, 1970
Doctor of Medicine, Washington University in St Louis, 1974

Katherine Anne Burgener, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Doctor of Medicine, Saint Louis University, 2017

Kylie Michelle Bushroe, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Bachelor of Science, University of Dayton, 2014
Doctor of Medicine, Ohio State University College of Medicine, 2018

David Franklin Butler, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Creighton University, 2013

Lauren Elizabeth Buxbaum, M.D.

Assistant Professor of Pediatrics (primary appointment)
Champaign, 2011
Doctor of Medicine, Rush University, 2015

C

Kelley S. Caddel, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Indiana University Bloomington, 1998
Doctor of Medicine, George Washington University, 2008

Archna Calfee, M.D.

Voluntary Clinical Assistant Professor of 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 Ann Arbor, 2006
Doctor of Medicine, Wayne State University, 2011

Joseph Edward Cangas

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, University of Rochester, 2008
Doctor of Medicine, University of Rochester, 2012

Rubilinda Q Casino, M.D.

Voluntary Clinical Instructor in 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)
Adjunct Lecturer in Biology
Doctor of Pharmacy, University of Navarra, 2015

Allison Leigh Chalupa, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, University of Dayton, 2011
Main Campus, 2015

Tattamangalam P Chandrika, M.S.

Voluntary Clinical Associate Professor of Pediatrics
Master of Science, University of Calcutta, 2000

William T Chao, M.D.

Voluntary Clinical Instructor in Pediatrics
Champaign, 1975
Champaign, 1979

Christine Leigh Chen, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Saint Louis University, 2001
Doctor of Medicine, Saint Louis University, 2005

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

Luana Chiquetto Paracatu, Ph.D.

Instructor in Pediatrics (primary appointment)
Doctor of Philosophy, Universidade Estadual Paulista (Unesp), 2016

Eileen Anna Ciccia, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Saint Louis University, 2019

Julia Ann Ciurria, M.D., B.Eng

Assistant Professor of Pediatrics (Pending Executive Faculty approval)
(primary appointment)
Bachelor of Engineering, Queen's University, 2009
Doctor of Medicine, Royal College of Surgeons of Ireland, 2017

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.

Associate 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)
College Park, 2006
Doctor of Medicine, University of Texas Southwest, 2010

Darryl S Cohen, D.O.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, University of North Texas, 1976
Doctor of Osteopathic Medicine, School Not Found, 1981

Barbara A Cohlan, M.D.

Professor of Pediatrics (primary appointment)
Bachelor of Arts, University of Michigan Ann Arbor, 1974
Doctor of Medicine, New York University, 1978

Elisabeth Cole

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Bachelor of Science, Mount Holyoke College, 2006

F. Sessions Cole, M.D.

Professor Emeritus of Pediatrics
Bachelor of Arts, Amherst College, 1969
Doctor of Medicine, Yale University, 1973

John C. Cole, Ph.D., M.D.

Voluntary Clinical Instructor in 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 (primary appointment)
Doctor of Medicine, Tulane University, 2008

Lora Pearlman Collier

Voluntary Clinical Instructor in Pediatrics

Elizabeth Montgomery Collins

Associate Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)

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 at 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

Voluntary Clinical Instructor in Pediatrics

Jonathan David Cooper, Ph.D.

Professor of Pediatrics (primary appointment)

Professor of Neurology

Professor of Genetics

Doctor of Philosophy, University of Bristol, 1990

Megan A Cooper, Ph.D., M.D.

Professor of Pediatrics (primary appointment)

Professor of Pathology and Immunology

Division Chief - Pediatric Rheumatology

Anthony R French, MD, PhD Professor of Pediatrics

Bachelor of Arts, College of Wooster, 1995

Main Campus, 2002

Main Campus, 2004

Tara Conway Copper, M.D.

Associate Professor of Pediatrics (primary appointment)

Associate Medical Director SLCH ED

Doctor of Medicine, University of Miami, 2017

Samuel Reynaldo Cortez, M.D.

Instructor in Pediatrics (primary appointment)

Doctor of Medicine, Universidad Evangelica de El Salvador, 2014

Andrea Michele Coverstone, M.D.

Associate Professor of Pediatrics (primary appointment)

Bachelor of Science, Gonzaga University, 2004

Doctor of Medicine, Saint Louis University, 2009

Mary Michaeleen Craddock

Voluntary Clinical Assistant Professor of Pediatrics

Bachelor of Arts, Rice University, 1987

Andrew Cronyn, M.D.

Voluntary Clinical Instructor in Pediatrics

Bachelor of Arts, Princeton University, 1987

Doctor of Medicine, Albert Einstein College of Medicine, 1996

Betty Cross, M.D.

Voluntary Clinical Instructor in Pediatrics

Bachelor of Science, University of Kansas, 1979

Doctor of Medicine, University of Kansas, 1983

Clayton Cummings, M.D.

Associate 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 (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.

Voluntary Clinical Assistant Professor of Pediatrics

Bachelor of Science, University of Missouri Columbia, 1983

Champaign, 1987

Yasmeen Daud, M.D.

Professor of Pediatrics (primary appointment)

Doctor of Medicine, University of Missouri Kansas City, 2000

Jesse Alan Davis, M.D.

Instructor in Pediatrics (primary appointment)

Doctor of Medicine, American University of Integrative Sciences, School of Medicine, 2019

John C Davis, M.D.

Voluntary Clinical Associate Professor of Pediatrics

Doctor of Medicine, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1980

Ray S Davis, M.D.

Voluntary Clinical Professor of Pediatrics

Doctor of Medicine, University of Louisville, 1978

Dana Marie DeCuffa, M.D.

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, Saint Louis University, 2019

Jane E. Defalco, M.S., M.D.

Voluntary Clinical Assistant Professor of Pediatrics

New Brunswick), 1977

New Brunswick), 1978

Doctor of Medicine, Case Western Reserve University, 1984

Leanne Michelle DePalma, M.D.

Instructor in Pediatrics (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.

Voluntary Clinical Instructor in 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)

Alexis Hartmann MD Professor of Pediatrics

Division Chief - Division of Nephrology

Vice Chair - Clinical Investigation

Foreign MD equivalent, Topiwala National Med College, 1988

Doctor of Medicine, Topiwala National Med College, 1991

Orsola Di Martino, M.S., Ph.D.

Assistant Professor of 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)

Elizabeth Finney McDonnell Chair in Pediatric Hematology/Oncology

Division Chief - Division of Hematology & Oncology

Doctor of Medicine, Universidad de Buenos Aires, 1990

Patricia Irene Dickson, M.D.

Professor of Pediatrics (primary appointment)

Centennial Professor of Genetics

Centennial Professor of Pediatrics

Division Chief - Division of Genetics and Genomic Medicine

Baccalaureatus, University of Chicago, 1995

Doctor of Medicine, Columbia College of Physicians and Surgeons, 1999

Lizbeth H Didriksen

Voluntary Clinical Assistant Professor of Pediatrics

Stephanie Diggs

Instructor in Pediatrics (Pending Dean Approval) (primary appointment)

Mary C Dinauer, Ph.D., M.D.

Professor Emerita of Pediatrics

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.

Voluntary Clinical Assistant Professor of Pediatrics

Doctor of Medicine, School Not Found, 1977

Alla Dorfman, M.D.

Voluntary Clinical Assistant Professor of Pediatrics

Doctor of Medicine, Cheruovtsy State School of Med, 1986

Julie R Dorfman, M.D.

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, Saint Louis University, 2015

Alexa Michelle Altman Doss, M.D.

Assistant Professor of Pediatrics (primary appointment)

Bachelor of Arts, University of Missouri Kansas City, 2015

Doctor of Medicine, University of Missouri Kansas City, 2016

Catherine J Doty

Voluntary Clinical Instructor in Pediatrics

Charles H Dougherty, M.D.

Voluntary Clinical Professor of Pediatrics

Bachelor of Arts, Holy Cross College, 1969

Doctor of Medicine, University of Rochester, 1973

Matthew P Dougherty

Voluntary Clinical Instructor in Pediatrics

Laura Albert Duckworth, M.D.

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, Saint Louis University, 2017

Bachelor of Science, Vanderbilt University, null

Jennifer Gries Duncan, M.D.

Professor of Pediatrics (primary appointment)

Bachelor of Science, Vanderbilt University, 1993

Doctor of Medicine, University of Chicago, 1997

Jennifer M Dunn, M.D.

Voluntary Clinical Associate Professor of 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 (primary appointment)

Assistant Professor of Pathology and Immunology

Doctor of Medicine, Universidad Catolica de Santia, 2013

E

Adam C. Eaton, M.D.

Voluntary Clinical Associate Professor of Pediatrics

Champaign, 1992

Doctor of Medicine, Washington University in St Louis, 1997

Lori L Eberhart

Voluntary Clinical Assistant Professor of Pediatrics

Irem Eldem, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)

Doctor of Medicine, Hacettepe University, 2011

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 in Maryland, 1988

College Park, 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, University of Missouri Columbia, 2002

Laura Ann Esswein, M.D.

Voluntary Clinical Instructor in Pediatrics

Bachelor of Arts, Washington University in St Louis, 1987

Doctor of Medicine, University of Missouri Columbia, 1991

Timothy Robert Evans, M.D.

Instructor in Pediatrics (primary appointment)

Instructor in Medicine

Doctor of Medicine, Creighton University, 2016

F

Evan Facer, D.O.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Osteopathic Medicine, Lake Erie College of Osteopathic
Medicine, 2011

Christina Fahey, M.D.

Instructor in Pediatrics (primary appointment)
Doctor of Medicine, University of Kentucky, 2019

Korre Leigh Fairman, D.O.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Osteopathic Medicine, Lake Erie College of Osteopathic
Medicine, 2015

Alexandra Gybbon Fallon, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Bachelor of Science, San Diego State University, 2008
Doctor of Medicine, American University of the Caribbean School of
Medicine, 2013

Elliott H Farberman, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, University of Rochester, 1969
Doctor of Medicine, Saint Louis University, 1973

Marjorie Ann Farrington, M.D.

Instructor in Pediatrics (primary appointment)
Doctor of Medicine, University of Missouri Kansas City, 2019

Yuri Fedorovich, M.D.

Instructor in Pediatrics (primary appointment)
SOM), 2018

Richard A. Felkel, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, Saint Louis University, 1993
Doctor of Medicine, Saint Louis University, 1997

Kora Felsch

Voluntary Clinical Assistant Professor of Pediatrics

Isabel Fernandez-Holtzman, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, Michigan State University, 2019

Margaret Ashley Ferris, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, Carnegie Mellon University, 2005
Doctor of Medicine, Washington University in St Louis, 2013

Melanie Erin Fields, M.D.

Associate Professor of Pediatrics (primary appointment)
Associate Professor of Neurology
Bachelor of Science, Tulane University, 2003
Doctor of Medicine, University of Texas Medical School Houston, 2008

Mayte Ideliz Figueroa, M.D.

Professor of Pediatrics (primary appointment)
Doctor of Medicine, Mount Sinai School of Medicine, 1992

Gregory K Finn, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Hendrix College, 1985
Doctor of Medicine, Washington University in St Louis, 1992

Joseph D Finney

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Arts, Washington University in St Louis, 2007

Emily Faith Rood Fishman, M.D.

Associate 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 (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 (primary appointment)
Bachelor of Science, Rockhurst University, 1998
Doctor of Medicine, Saint Louis University, 2002
Master of Public Health, Harvard University, 2008

Eli S Fredman, M.D.

Instructor in Pediatrics (Pending Dean Approval) (primary
appointment)
Doctor of Medicine, George Washington University, null

Anthony Raymond French, M.S., Ph.D., M.D.

Professor of Pediatrics (primary appointment)
Alan L. Schwartz Chair in Pediatrics STLCH
Professor of Pathology and Immunology
Professor of Biomedical Engineering
Vice Chair of Physician Scientist Training
Bachelor of Science, University of Minnesota, 1989
Champaign, 1993
Champaign, 1995
Champaign, 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

Nishanth Noel Gabriel, M.S., Ph.D.

Instructor In Pediatrics (primary appointment)
Bachelor of Science, Kannur University, 2003
Master of Science, Cochin University of Science and Technology, 2005
Doctor of Philosophy, The Tamil Nadu Dr. M.G.R. Medical University, 2016

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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Massachusetts Institute of Technology, 1968
Doctor of Medicine, Harvard University, 1972

Caryn Garriga

Voluntary Clinical Assistant Professor of Pediatrics

Sarah Kathryn Garwood, M.D.

Professor of Pediatrics (primary appointment)
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 1998
Doctor of Medicine, University of Missouri Columbia, 2002

Karen J Garzia

Voluntary Clinical Instructor in Pediatrics

Karuna Gausper, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Arts, University of Missouri Kansas City, 2020
Doctor of Medicine, University of Missouri Kansas City, 2021

Elliot Field Gellman, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Arts, Iowa State University, 1957
Doctor of Medicine, University of Missouri Columbia, 1961

Kolby Jean Gerling

Voluntary Clinical Assistant Professor of Pediatrics

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.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Philosophy, Tennessee State University, 2018

Andrew Charles Glatz, M.D.

Professor of Pediatrics (primary appointment)
Louis Larrick Ward Professor of Pediatrics
Division Chief of Pediatric Cardiology
Bachelor of Science, Princeton University, 1996
Doctor of Medicine, Washington University in St. Louis, 2002

John F Gleeson, M.D.

Instructor in Pediatrics (primary appointment)
Doctor of Medicine, Saint Louis University, 2007

Brian Glen, D.O.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Osteopathic Medicine, Campbell University, 2019

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

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

Carol Gonzales

Voluntary Clinical Assistant Professor of Pediatrics

Catherine Frances Gooch, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of Tennessee, 2016

Gary M Goodman, M.D.

Voluntary Clinical Assistant Professor of 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

Laquita A Graham, M.D.

Voluntary Clinical Assistant Professor of 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.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Washington University in St Louis, 2015

Lauren Anne Grant, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Bachelor of Science, Saint Louis University, 2016
SOM), 2020

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.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, Eastern Illinois University, 1990
Champaign), 1994

Sarah E. Greene, M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, Barnard College, 2005
Doctor of Medicine, Washington University in St Louis, 2016

Eric Lieberman Greer, Ph.D.

Associate Professor of Pediatrics (primary appointment)
Associate Professor of Genetics
Bachelor of Arts, Case Western Reserve University, 2004
Doctor of Philosophy, Stanford University, 2010

Sara Kathleen Greer, M.D.

Assistant Professor of Pediatrics (primary appointment)
Champaign, 2010
Doctor of Medicine, Johns 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.

Associate Professor of Pediatrics (primary appointment)

Bachelor of Arts, Rice University, 2001
Doctor of Medicine, Baylor College of Medicine, 2006

Jesse Brookshire Groh, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Rice University, 2002
Doctor of Medicine, Baylor University, 2006

Kamal Gursahani, M.B.A., M.D.

Associate Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Bachelor of Arts, Columbia University, 1997
Doctor of Medicine, University of Missouri Columbia, 2002
Master of Business Administration, Saint Louis University, 2012

H

Kimberly Noelle Hackney, D.O.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Osteopathic Medicine, Des Moines University, 2009

Justin T Hagen

Voluntary Clinical Assistant Professor of Pediatrics

Michelle Lynn Hagene, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, Southern Illinois University Carbondale, 2010
Doctor of Medicine, Southern Illinois University Carbondale, 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.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Science, Allegheny College, 2005
Doctor of Medicine, University of Toledo, 2010

Melanie G Hampton, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Georgetown College, 1976
Doctor of Medicine, University of Louisville, 1981

Elinor F Hancock, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Fisk University, 1975
Doctor of Medicine, Meharry Medical College, 1982

Robin D Hanson, Ph.D., M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Vanderbilt University, 2002
Doctor of Medicine, Washington University in St Louis, 2006

Thomas J. Harrison, M.D.

Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in 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.

Assistant Professor of Pediatrics (primary appointment)
Assistant Professor of Medicine
Bachelor of Arts, Columbia University, 2007
Doctor of Medicine, University of Pittsburgh, 2014
Health System, null

John Edward Hartweger

Voluntary Clinical Instructor in 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.

Associate 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

Voluntary Clinical Assistant Professor of Pediatrics

Sarah Ann Faasse Henkel, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Arts, Colby College, 2007
Doctor of Medicine, Michigan State University, 2013

Kara E Hennelly, M.D.

Associate Professor of Pediatrics (primary appointment)

Doctor of Medicine, University of Missouri Kansas City, 2015

Robyn Shea Herbert

Voluntary Clinical Assistant Professor of Pediatrics

Milarys Hernandez Martinez, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of Puerto Rico, 2017

Mary Jo Hernandez-Zipfel, M.D.

Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in Pediatrics

Hieu Dinh Hoang, Ph.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, San Jose State University, 2009
Doctor of Philosophy, University of Alabama in Tuscaloosa, 2015

Sandra Jean Hodel

Voluntary Clinical Instructor in Pediatrics

Dee Hodge, M.D.

Professor Emeritus of Pediatrics
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 Carbondale, 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.

Voluntary Clinical Instructor in Pediatrics
Doctor of Philosophy, University of Florida, 1995

George Michael Hoganson, M.D.

Assistant Professor of Pediatrics (primary appointment)
Medical Director for Convenient Care/After Hours Clinics
Assistant Professor of Biology (Courtesy Affiliation)
Bachelor of Arts, Loyola University Chicago, 2001
Doctor of Medicine, Loyola University Chicago, 2014

Nicholas Alan Holekamp, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Dartmouth College, 1982
Doctor of Medicine, Saint Louis University, 1987

Nancy E Holmes, M.D.

Voluntary Clinical Professor of 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
Main Campus, 2003
Master of Science, Saint Louis University, 2014

Amjad Horani, M.D.

Associate Professor of Pediatrics (primary appointment)
Associate Professor of Cell Biology and Physiology
Doctor of Medicine, Hebrew University of Jerusalem, 2004
Bachelor of Science, Hebrew University of Jerusalem, 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, University of Missouri Columbia, 2003
Doctor of Medicine, University of Missouri Columbia, 2007

Matthew Hosler

Voluntary Clinical Assistant Professor of Pediatrics

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
Doctor of Philosophy, 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.

Voluntary Clinical Instructor in Pediatrics
Doctor of Medicine, University of Missouri Columbia, 2019

Laura Kathleen Hulteen, M.D.

Assistant Professor of Pediatrics (primary appointment)
Champaign, 2015

David A Hunstad, M.D.

Professor of Pediatrics (primary appointment)
Arnold W Strauss, MD Endowed Professorship For Mentoring
Division Chief - Division of Infectious Diseases
Professor of Molecular Microbiology
Vice Chair of Basic and Translational Research
Bachelor of Arts, Carleton College, 1991
Doctor of Medicine, Washington University in St Louis, 1995

Jane Alyce Hunt, M.D.

Associate 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

Voluntary Clinical Assistant Professor of Pediatrics

Catherine Carissa Hutter

Voluntary Clinical Associate Professor of Pediatrics

I

Richard J Iken, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, University of Wisconsin Madison, 1972
Doctor of Medicine, University of Missouri Columbia, 1978

Carl S Ingber, M.D.

Voluntary Clinical Instructor in 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
Doctor of Medicine, University of Missouri 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.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Arts, Oakwood University, 1979
Doctor of Medicine, Loma Linda University, 1984

Joyce D Johnson, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Science, University of Missouri Columbia, 1977
Doctor of Medicine, University of Missouri Columbia, 1981

Angela Marie Jones, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, Universidad Nacional de Colombia, 1989

Katherine McMullin Jones, M.D.

Associate 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.

Voluntary Clinical Assistant Professor of 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

Lauren Jones, D.O.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, University of Missouri Columbia, 2012
Doctor of Osteopathic Medicine, A T Still University of Health Sciences, 2017

Heather Robin Joyce, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, School Not Found, 1987

K

Courtney Kaar, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, University of Massachusetts Amherst, 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

Alicia McDonnell Kamsheh, M.D.

Assistant Professor of Pediatrics (primary appointment)
College Park, 2012
Doctor of Medicine, University of Pennsylvania, 2016

Carol M Kao, M.D.

Associate Professor of Pediatrics (primary appointment)
Main Campus, 2008
Main Campus, 2012

Thomas J Kasper

Voluntary Clinical Instructor in Pediatrics

Bhushan Katira, Ph.D., MBBS

Assistant Professor of Pediatrics (primary appointment)
Foreign MD equivalent, University of Mumbai, 2003
Doctor of Philosophy, University of Toronto, 2020

Jenny E Kaufman, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, University of Michigan (Duplicate of University of Michigan Ann Arbor), 1999
Doctor of Medicine, Washington University in St Louis, 2004

Supender Kaur, M.S., Ph.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, Guru Nanak Dev University, 2006
Master of Science, Sardar Vallabhbhai National Institute of Technology, 2008
Doctor of Philosophy, CDRI, 2016

Robert S Kebler, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Muhlenberg College, 1980
Doctor of Medicine, Saint Louis University, 1984

Robert V Kellow

Voluntary Clinical Assistant Professor of Pediatrics

Michele E Kemp, M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Arts, Washington University in St Louis, 1977
Doctor of Medicine, Washington University in St Louis, 1981

Robert M Kennedy, M.D.

Voluntary Clinical Professor of Pediatrics
Main Campus, 1975

Doctor of Medicine, Medical College of Georgia, 1980

Kaitlin Gabrielle Kenney, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of Louisville, 2019

Aayush Khanal, M.D.

Assistant Professor of Pediatrics (primary appointment)
SOM), 2019

Kent Leon Killian, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Saint Louis University, 1986
Doctor of Medicine, Saint Louis University, 1990

Allison A King, M.D.

Professor of Pediatrics (primary appointment)
Professor of Medicine
Professor of Surgery (General Surgery)
Professor of Occupational Therapy
Professor of Education (Courtesy)
Fred M. Saigh Distinguished Chair in Pediatric Research
Bachelor of Science, Washington University in St Louis, 1992
Doctor of Medicine, University of Missouri Columbia, 1996

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 (primary appointment)
Bachelor of Science, Northwestern University, 2006
Doctor of Medicine, Baylor College of Medicine, 2010

Maleewan Kitcharoensakkul, M.D.

Associate Professor of Pediatrics (primary appointment)
Doctor of Medicine, Mahidol University, 2002

Darci Elizabeth Klein, M.S., Ph.D.

Voluntary Clinical Assistant Professor of 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

Voluntary Clinical Instructor in Pediatrics

Shirley M Knight, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Arts, Dillard University, 1976
Doctor of Medicine, Washington University in St Louis, 1980

Daisuke Kobayashi, M.P.H., M.D.

Associate Professor of Pediatrics (primary appointment)
Master of Public Health, Wayne State University, 2019
Doctor of Medicine, National Defense Medical College, 2021

Joel S Koenig, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Science, Yale University, 1978
Doctor of Medicine, Vanderbilt University, 1982

Michael Gilbert Koenig

Voluntary Clinical Assistant Professor of Pediatrics

Amanda Kolmar, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of California San Francisco, 2019

Julia Helen Kolodziej

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)

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.

Voluntary Clinical Instructor in Pediatrics
Doctor of Medicine, Drexel University, 2006

James M Krafcik

Voluntary Clinical Instructor in Pediatrics

Michael Alan Kramer, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Creighton University, 2016

Theodore Raymond Kremer, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Saint Louis University, 2011
Doctor of Medicine, Saint Louis University, 2015

Katherine L Kreusser, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Science, University of Pennsylvania, 1973
Doctor of Medicine, Indiana University Bloomington, 1978

Kendra Noelle Daiss Krietsch, M.S., Ph.D.

Voluntary Clinical Assistant Professor of 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.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Science, Maryville University of Saint Louis, 2001
Doctor of Osteopathic Medicine, Des Moines University, 2012

Sakil Subhash Kulkarni, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, PGIMER, 2010

Denise Kung, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, University of Missouri Columbia, 1986
Doctor of Medicine, Yale University, 1991

Teresa Kurtz

Voluntary Clinical Assistant Professor of Pediatrics

Voluntary Teaching Assistant Professor of Pediatrics

Abby Kushnir, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Northwestern University, 2002
Main Campus), 2006

L

Jennifer S Ladage, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, Valparaiso University (Duplicate of Valparaiso University), 1987
Doctor of Medicine, Saint Louis University, 1991

Stacie Sharon Laff, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Lawrence University, 1989
Bachelor of Music, Lawrence University, 1989
Doctor of Medicine, School Not Found, 1993

Alexandra Lahart, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, Lake Forest College, 2009
College Park, 2013

Li-Ling Lai

Voluntary Clinical Instructor in 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

Merideth Theresa Lathrop

Voluntary Clinical Assistant Professor of Pediatrics

Leland M Laycob, M.D.

Voluntary Clinical Instructor of Pediatrics
Bachelor of Arts, Washington University in St Louis, 1964
Doctor of Medicine, University of Missouri Columbia, 1968

Richard Lee Lazaroff, M.D.

Voluntary Clinical Professor of 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 Arts, Knox College, 2003
Doctor of Philosophy, University of North Carolina at Chapel Hill, 2009
Doctor of Medicine, University of North Carolina at Chapel Hill, 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

Kenneth C Levy, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Emory University, 1983
Doctor of Medicine, University of Chicago, 1988

Jessica Michelle Lewis, M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Arts, Washington University in St Louis, 2010
Doctor of Medicine, New York University School of Medicine, 2017

Fuhai Li, Ph.D.

Associate 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.

Professor of Pediatrics (primary appointment)
Doctor of Medicine, Jagiellonian University, 1988

John Chao-Chun Lin, M.D.

Professor of Pediatrics (primary appointment)
Bachelor of Arts, 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)
Medical Director CHNW ED
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.

Associate 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.

Voluntary Clinical Assistant Professor of 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)
Harvey R Colten Professor of Pediatric Science
Senior Associate Dean for Research
Vice Chancellor for Research
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.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Yale University, 1994
Doctor of Medicine, Washington University in St Louis, 2002

Jeffrey A Magee, Ph.D., M.D.

Professor of Pediatrics (primary appointment)
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

Kathleen Elizabeth Mahoney, M.D.

Associate Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Arts, Kenyon College, 2004
Doctor of Medicine, University of Missouri Columbia, 2010

Louise Cantisano Malburg, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)
Doctor of Medicine, University of Missouri Kansas City, 2015

Jay Randolph Malone, M.S., Ph.D., M.D.

Associate 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

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 and Marshall College, 2007
Doctor of Medicine, McGill University, 2011

Mohannad Manna, MBBS

Professor of Pediatrics (primary appointment)

Foreign MD equivalent, Jordan University of Science & Technology, 1993

Shelby Ann Markel

Voluntary Clinical Assistant Professor of Pediatrics

Megan Elizabeth Marolt, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 2015
Doctor of Medicine, Creighton University, 2019

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

Kimberly Lashun Massey, M.P.H., M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, Piedmont College, 2004
Doctor of Medicine, Ross University School of Medicine Florida, 2010
Master of Public Health, George Washington University, null

Shakila Mathew, D.O.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Science, Missouri University of Science and Technology (Formerly University of Missouri at Rolla), 2004
Doctor of Osteopathic Medicine, A T Still University of Health Sciences, 2009

Patrice Mathews, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Assistant Professor of 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)
Bachelor of Science, University of Miami, 2003
Doctor of Philosophy, Saint Louis University, 2009
Doctor of Medicine, Saint Louis University, 2011
null, Stanford University, null

Ariane E May, M.P.H., M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Arts, Tufts University, 1983
Master of Public Health, Boston University, 1992

Doctor of Medicine, School Not Found, 1993

Jina L McAtee

Voluntary Clinical Assistant Professor of Pediatrics

Megan McBride

Voluntary Clinical Instructor in Pediatrics

Maggie Steffen McCormick, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, Loyola University Chicago, 2004

Mark E. McGranahan, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Marquette University, 1993
Doctor of Medicine, Saint Louis University, 1997

Thomas Casey McKinney, M.D.

Voluntary Clinical Professor of 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 Mc Nerney, 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

Voluntary Clinical Associate Professor of Pediatrics

Shilpa Menolascino, M.D.

Voluntary Clinical Instructor in 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 at Chicago, 2013

Mary Shaughnessy Meyer, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Saint Louis University, 1999
Doctor of Medicine, Saint Louis University, 2003

Jenny Lynn Miele, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Valparaiso University, 2001
Doctor of Medicine, University of Illinois at Chicago, 2005

Donna C Miller, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, Boston College, 1978
Doctor of Medicine, University of Miami, 1982

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

Voluntary Clinical Instructor in Pediatrics

Jerome Michael Molleston

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)

Gail Lynn Moolsintong, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, University of Missouri Columbia, 1997
Doctor of Medicine, University of Missouri Columbia, 2001

Darlene A. Moore, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Saint Louis University, 1989
Doctor of Medicine, University of Missouri Columbia, 1993

Sharon Celeste Morley, Ph.D., M.D.

Professor of Pediatrics (primary appointment)
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)
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

Lamya Suhail Mubayed, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Doctor of Medicine, Weill Cornell Medical College in Qatar, 2013

Janet Gwen Mueller, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Arts, Kansas State University, 1985
Doctor of Medicine, Washington University in St Louis, 1992

Margaret M Mueller

Voluntary Clinical Assistant Professor of Pediatrics

Steven Mueth, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Champaign, 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.

Associate 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 (primary appointment)
Doctor of Philosophy, Washington University in St Louis, 2015

Maria Ganninger Mura, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, University of Missouri Kansas City, 2000

Mark C. Murawski, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Villanova University, 1995
Doctor of Medicine, Saint Louis University, 1999

Kevin J Murphy, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Science, Birmingham Southern College, 1974
Doctor of Medicine, Saint Louis University, 1978

Gian Marco Musarra, M.D.

Associate 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Washington University in St Louis, 1993
SOM), 1997

N

Venkata S. Nagireddi

Voluntary Clinical Instructor in Pediatrics

Tasnim A Najaf, M.D.

Professor of Pediatrics (primary appointment)
Doctor of Medicine, Dow Medical College Karachi, 1991

Alison C Nash, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Science, Howard University, 1977
Doctor of Medicine, Baylor University, 1981

Ameera Farhat Nauman

Voluntary Clinical Assistant Professor of Pediatrics

Lynn G Nelms

Voluntary Clinical Instructor in Pediatrics

Tara Marie Neumayr, M.D.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Arts, Duke University, 1999
Doctor of Medicine, University South Dakota Vermillion, 2003

Hoanh Thi Nguyen, M.D.

Assistant Professor of Pediatrics (primary appointment)

Doctor of Medicine, Tulane University, 2003

Ellen Margaret Nicastro, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Saint Louis University, 2000
Doctor of Medicine, Saint Louis University, 2004

Ramzi T Nicolas

Voluntary Clinical Associate Professor of Pediatrics

Lila Sarah Wahidi Nolan, M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, Saint Louis University, 2012
Doctor of Medicine, University of Missouri Columbia, 2016

David Craig Norman, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Champaign), 1988
Doctor of Medicine, School Not Found, 1992

Karen K Norton, M.D.

Voluntary Clinical Associate Professor of 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.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, University of California San Diego, 1991
Doctor of Medicine, Saint Louis University, 1996

Caroline Grace Nugent, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, University of Kansas, 2015
Doctor of Medicine, University of Kansas, 2020

O

Kevin Sullivan O'Bryan, M.D.

Associate Professor of Pediatrics (primary appointment)
Vice Chair of Clinical Informatics
Doctor of Medicine, University of Michigan Ann Arbor, 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

Voluntary Clinical Instructor in Pediatrics

Jerome H O'Neil, M.B.A., M.D.

Voluntary Clinical Assistant Professor of 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

Dean Thomas Odegard, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, Washington University in St Louis, 2019

Justin O Ogbevoen, MBBS

Instructor in Pediatrics (primary appointment)
Foreign MD equivalent, University of Lagos, 1982

Erin Engelhardt Orf, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, Georgetown University, 2010
Doctor of Medicine, University of Missouri Columbia, 2015

Bradley William Ornstein, M.D.

Associate Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Bachelor of Science, University of Washington, 2001
Doctor of Medicine, Washington University in St Louis, 2005

Andrea Cohron Orr, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, University of Georgia, 2007
Doctor of Medicine, Medical College of Georgia, 2013

William B Orr, M.D.

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.

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.

Voluntary Clinical Assistant Professor of 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.

Assistant Professor of 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

Voluntary Clinical Instructor in Pediatrics

P

Pamela B Padda, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, University of Michigan Ann Arbor, 1986

Champaign, 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

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

Voluntary Clinical Assistant Professor of 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

David H Perlmutter, M.D.

Professor of Pediatrics (primary appointment)
Spencer T and Ann W Olin Distinguished Professor in the School of Medicine
George and Carol Bauer Dean of the School of Medicine
Dean of the School of Medicine
Executive Vice Chancellor for Medical Affairs
Bachelor of Science, University of Rochester, 1974
Doctor of Medicine, Saint Louis University, 1978

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

Lance W Peterson

Instructor in Pediatrics (primary appointment)

Thomas M Pfeiffer, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Medizinische Universität Wien, 2014

Megan Elizabeth Philibert, M.D.

Instructor in Pediatrics (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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Brown University, 1988
Doctor of Medicine, Washington University in St Louis, 1993

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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Washington University in St Louis, 1982
Doctor of Medicine, School Not Found, 1987

Deepika Polineni, M.P.H., M.D.

Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)
Bachelor of Arts, University of Missouri Kansas City, 2001
Master of Public Health, Boston University, 2003
Doctor of Medicine, University of Missouri Kansas City, 2004

Juanita C Polito-Colvin, M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Arts, University of Dallas, 1975
Doctor of Medicine, Southwest Texas State University, 1979

Brooke Ivan Polk, M.D.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Science, Colorado State University, 2008
Doctor of Medicine, University of Colorado Boulder, 2012

Anthony Gerard Pompa, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, United States Air Force Academy, 2012
Doctor of Medicine, University of Pittsburgh, 2016

Claudia Preuschoff, M.D.

Voluntary Clinical Instructor in Pediatrics
Doctor of Medicine, Wake Forest University, 1983

Sara Susan Procknow

Instructor in Pediatrics (Pending Dean Approval) (primary appointment)

Cassandra Michelle Pruitt, M.D.

Professor of Pediatrics (primary appointment)
Vice Chair of Outpatient Health
Division Chief for Academic Pediatrics
Bachelor of Arts, Emory University, 1994
Doctor of Medicine, Texas Tech University, 1999

Peter J Putnam, M.D.

Voluntary Clinical Associate Professor of 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 (primary appointment)
Doctor of Medicine, Saint Louis University, 2004
Baccalaureatus, Washington University in St Louis, null
Master of Public Health, Saint Louis University, null

Q

Robert Louis Quaas, M.D.

Voluntary Clinical Instructor in 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)
Dana Brown Chair for Emergency Medicine at St. Louis Children's Hospital
Division Chief - Division of Emergency Medicine
Bachelor of Arts, University of Missouri Columbia, 1984
Doctor of Medicine, Washington University in St Louis, 1988

R

Edon Rabinowitz, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Saint George's University, 2012

Mohammad H Rahman

Voluntary Clinical Instructor in Pediatrics

Pathmawathy T Ramesvara, M.S.

Voluntary Clinical Instructor in Pediatrics
Master of Science, School Not Found, 1972

Rakesh Rao, M.D., MBBS

Associate Professor of Pediatrics (primary appointment)
Foreign MD equivalent, University College of Medical Sciences (UCMS), 1992
Doctor of Medicine, Maulana Azad Medical College, 1996

Emanuel Rashed, M.D.

Voluntary Clinical Instructor in Pediatrics
Champaign, 1958
Doctor of Medicine, Saint Louis University, 1962

Sheryl S Ream, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Saint Louis University, 1982
Doctor of Medicine, Saint Louis University, 1986

Shawn Robert Reathaford, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, University of Evansville, 1993
Champaign, 1999

Timothy Reed

Voluntary Clinical Instructor in Pediatrics

Patrick Joseph Reich, M.D.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Science, Saint Louis University, 2007

Doctor of Medicine, Saint Louis University, 2011

Phillip D Reichert, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Saint Louis University, 1992
Doctor of Medicine, Saint Louis University, 1996

Brian Davis Reinholz, M.D.

Instructor in Pediatrics (primary appointment
SOM), 2019

Catherine R Remus, M.S.N., M.D.

Voluntary Clinical Assistant Professor of 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 Found, 1983

Elizabeth A Remus

Voluntary Clinical Assistant Professor of Pediatrics

George H Rezabek, D.O.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, Saint Louis College of Pharmacy, 1982
Doctor of Osteopathic Medicine, School Not Found, 1988

Noor Riaz, M.D.

Associate Professor of Pediatrics (primary appointment)
Doctor of Medicine, Washington University in St Louis, 2008

Brian E Richter

Voluntary Clinical Assistant Professor of Pediatrics

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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Midland Lutheran College, 1991
Doctor of Medicine, A T Still University of Health Sciences, 1995

Janis B Robinson, M.A., M.D.

Voluntary Clinical Associate Professor of 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 (primary appointment)
Doctor of Osteopathic Medicine, Nova Southeastern University, 2013

Rebecca Ann Rockamann

Voluntary Clinical Assistant Professor of Pediatrics

Melissa A Roewe, D.O.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Osteopathic Medicine, Lake Erie College of Osteopathic
Medicine in Bradenton, 2009

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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Saint Louis University, 1989
Doctor of Medicine, University of Medicine and Dentistry of New Jersey,
1993

Rachael Elissa Rose, M.D.

Assistant Professor of Pediatrics (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.

Voluntary Clinical Associate Professor of 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.

Voluntary Clinical Associate Professor of Pediatrics
Oxford), 1968
Doctor of Medicine, Washington University in St Louis, 1972

Jeffrey Harold Rothweiler, Ph.D.

Voluntary Clinical Associate Professor of Pediatrics
Doctor of Philosophy, Saint Louis University, 1989

Rene Martin Roy, Ph.D., M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Arts, Harvard University, 2002
Doctor of Philosophy, University of Wisconsin Madison, 2012
Doctor of Medicine, University of Wisconsin Madison, 2014

Ella Rozin

Voluntary Clinical Assistant Professor of Pediatrics

Ronald Craig Rubenstein, Ph.D., M.D.

Professor of Pediatrics (primary appointment)
Robert C. Strunk Endowed Chair for Lung and Respiratory Research
Division Chief - Division of Allergy, Immunology, & Pulmonary Medicine
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 Professor of Pediatrics
Bachelor of Science, Loyola University New Orleans, 1990
Doctor of Medicine, Northwestern University, 1994

Emily Puetz Rudloff

Voluntary Clinical Assistant Professor of Pediatrics

Martin D Rudloff, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Saint Louis University, 1988
Doctor of Medicine, Saint Louis University, 1992

Diane Mary Rup, M.A., M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, University of Nebraska, 2019

S

Brooke E. Sadler, M.S., Ph.D.

Assistant Professor of Pediatrics (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 (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.

Professor of Pediatrics (primary appointment)
Bachelor of Science, University of North Carolina at Chapel Hill, 1998
Doctor of Medicine, University of Washington, 2003

Gretchen A Sander, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Vanderbilt University, 2000
Doctor of Medicine, Loyola University Chicago, 2004

Heidi L Sandige, M.A., M.D.

Associate 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 Philosophy, 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

Krishnasamy Savadamuthu

Voluntary Clinical Assistant Professor of Pediatrics

Blaine M Sayre, M.P.H., M.D.

Voluntary Clinical Professor of Pediatrics
Doctor of Medicine, Washington University in St Louis, 1968
Master of Public Health, University of California Berkeley, 1972

Joseph Schachter, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Indiana University Bloomington, 1974
Doctor of Medicine, Indiana University Bloomington, 1979

Kim E Schamel, M.D.

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.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, University of Missouri Columbia, 2011
Doctor of Medicine, University of Missouri Columbia, 2015

Ellen Merrick Schill

Instructor in Pediatrics (Pending Dean Approval) (primary appointment)

Howard J Schlansky, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, University of Missouri Kansas City, 1976
Doctor of Medicine, University of Missouri Kansas City, 1978

Margaret Ann Schmandt, M.D.

Voluntary Clinical Associate Professor of 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.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, University of Missouri Columbia, 1975
Doctor of Medicine, Saint Louis University, 1979

Laura Graves Schuettelpelz, Ph.D., M.D.

Professor of Pediatrics (primary appointment)
Professor of Developmental Biology
Doctor of Philosophy, Northwestern University, 2000
Doctor of Medicine, Northwestern University, 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.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of Minnesota, 2016

Ginny Lynn Schulz, M.S.N., Ph.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, University of Missouri Columbia, 2006
Master of Science in Nursing, University of Missouri Columbia, 2011
Doctor of Philosophy, University of Missouri Columbia, 2018

Alan L Schwartz, Ph.D., M.D.

Professor of Pediatrics (primary appointment)
Alumni Endowed Professor of Pediatrics
Professor of Developmental Biology
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 Seematter, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval) (primary appointment)
Doctor of Medicine, Saint Louis University, 1998

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, Saint George's University, 2019

Snehal Paresh Shah, M.D.

Associate 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.

Voluntary Clinical Instructor in 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
Doctor of Science, 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 (primary appointment)
Doctor of Medicine, University of Illinois at Chicago, 2011
Master of Science, University of Texas Houston, 2018

Eleanor Maria Shaw, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, University of Missouri Columbia, 1978
Doctor of Medicine, University of Missouri Columbia, 1983

Megan Elizabeth Shelton

Voluntary Clinical Assistant Professor of Pediatrics

Melissa Anne Shenep, M.S., M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, Emory University, 2013
Doctor of Medicine, University of Tennessee Health Science Center, 2017
Master of Science, Saint Jude Children's Research Hospital, 2023

Shalini Shenoy, M.D., MBBS

Professor of Pediatrics (primary appointment)
Foreign MD equivalent, Kasturba Medical College, 1981
Doctor of Medicine, Kasturba Medical College, 1985

Marwan Shinawi, M.D.

Professor of Pediatrics (primary appointment)
Bachelor of Science, Hebrew University of Jerusalem, 1989
Doctor of Medicine, Technion Israel Institute of Technology, 1996

Min-Yi Katherin Shiue, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Washington University in St Louis, 1992
Doctor of Medicine, Washington University in St Louis, 1996

Darla Roye Shores, Ph.D., M.D.

Associate Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Main Campus, 1996
Main Campus, 2002
Doctor of Philosophy, Johns Hopkins University, 2017

Jennifer N Silva, M.D.

Professor of Pediatrics (primary appointment)
Bachelor of Arts, Union College New York, 1997
Doctor of Medicine, Saint 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

Voluntary Clinical Instructor in Pediatrics

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

Kyleigh Kay Skedgell

Voluntary Clinical Assistant Professor of Pediatrics

Alan Joseph Skouttchi, M.S., M.D.

Voluntary Clinical Assistant Professor of 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)
Champaign, 2005
Champaign, 2006

Champaign, 2013

Carl Hugh Smith

Professor Emeritus of Pediatrics

Carolyn Anne Delaney Smith, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Rice University, 1996
Doctor of Medicine, Washington University in St Louis, 2000

Joshua C Smith

Voluntary Clinical Instructor in Pediatrics

Mallory Brooke Smith, M.S., M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of Texas Medical Branch at Galveston, 2014
Master of Science, 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

Nareshkumar J Solanki, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, University of Nairobi, 1975

David Stuart Sonderman, M.D.

Voluntary Clinical Instructor in 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
Main Campus, 2014

Robert D Spewak, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Drake University, 1975
Doctor of Medicine, Saint Louis University, 1979

Jennifer E. Sprague, Ph.D., M.D.

Associate 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

Evangelos Spyridakis, M.D.

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)
Doctor of Medicine, University of Athens Medical School, 2014

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

Voluntary Clinical Instructor in Pediatrics

Kristin Voellinger Stahl, M.D.

Voluntary Clinical Instructor in Neurology
Bachelor of Arts, Johns Hopkins University, 1992
Doctor of Medicine, University of Missouri Columbia, 1996

Sarah A Stange, M.D.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Arts, Washington University in St Louis, 2001
Doctor of Medicine, University of Louisville, 2008

Edward Stapleton, M.D.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Indiana University Bloomington, 1968
Doctor of Medicine, Indiana University Bloomington, 1972

Miriam Bathia Steinham, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Arts, Washington University in St Louis, 2011
Doctor of Medicine, Washington University in St Louis, 2015

Randall S Sterkel, M.D.

Voluntary Clinical Professor of Pediatrics
Bachelor of Arts, Duke University, 1989
Doctor of Medicine, Washington University in St Louis, 1993

Anita R Stiffelman, M.D.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Arts, Washington University in St Louis, 1983
Doctor of Medicine, New York Medical College, 1987

Sierra Stippich

Voluntary Teaching Assistant Professor of Pediatrics
Voluntary Clinical Assistant Professor of Pediatrics

Jeffrey R Stokes, M.D.

Professor of Pediatrics (primary appointment)
Bachelor of Science, Kansas State University, 1987
Doctor of Medicine, University of Kansas Medical Center, 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)
Ruth L. Siteman Professor of Pediatrics

Professor of Molecular Microbiology
Professor of Medicine
Bachelor of Arts, Harvard University, 1969
Doctor of Medicine, New York University, 1973

Brian Ross Stotter, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Tufts University, 2013

Robert H Strashun, M.A., M.D.

Voluntary Clinical Associate Professor of 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.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Defiance College, 1968
Master of Arts, University of Connecticut, 1970
Champaign), 1976

Rosa M Suarez-Solar, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, University of Puerto Rico (Duplicate of University of Puerto Rico), 1990
Doctor of Medicine, School Not Found, 1991

Curie Marie Subramanian

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)

Lisa Suffian, M.D.

Voluntary Clinical Assistant Professor of 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 (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 Ann Arbor, 1981
Doctor of Philosophy, University of Michigan Ann Arbor, 1989
Doctor of Medicine, University of Michigan Ann Arbor, 1990

Amanda Sweetland

Voluntary Clinical Instructor in Pediatrics

Stephen Matthew Sykes, Ph.D.

Associate Professor of Pediatrics (primary appointment)
Bachelor of Science, Mount Allison University, 2000
Doctor of Philosophy, University of Pennsylvania, 2007

Susan C. Sylvia

Voluntary Clinical Instructor in Pediatrics

T

Linda Ann Tackes, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, University of Missouri Kansas City, 1993

Phillip Irwin Tarr, M.D.

Professor of Pediatrics (primary appointment)
Melvin E Carnahan Professor of Pediatrics
Division Chief - Division of Gastroenterology, Hepatology, & Nutrition
Professor of Molecular Microbiology
Bachelor of Arts, Brown University, 1975
Doctor of Medicine, Yale University, 1980

Kristen A Terrill

Voluntary Clinical Assistant Professor of Pediatrics

Donna T Thackrey, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, John Carroll University, 1990
Main Campus), 1994

Stephen Thierauf

Voluntary Clinical Instructor in 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

Suzanne Thompson

Voluntary Clinical Assistant Professor of Pediatrics

Mary A Tillman, M.D.

Voluntary Clinical Professor of Pediatrics
Doctor of Medicine, Howard University, 1960

Robert W Tolan, M.A., M.D.

Voluntary Clinical Instructor in 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
Doctor of Public Health, Tulane University, null

Inna Treskov, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of Missouri Columbia, 2006

Garland R Tschudin, M.D.

Voluntary Clinical Instructor in 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)
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 (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

April L Tyus

Voluntary Clinical Instructor in 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 (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 Emeritus of Pediatrics
Bachelor of Science, Bates College, 1980
Doctor of Medicine, University of Connecticut, 1980

Yasasvi Vasili, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, East Tennessee State University, 2015

Laird Henry Vermont, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Champaign, 1989
Doctor of Medicine, Saint Louis University, 1993

Zachary Andrew Vesoulis, M.S., M.D.

Assistant Professor of Pediatrics (primary appointment)
Oxford, 2005
Main Campus, 2009
Master of Science, Washington University in St Louis, 2019

Luke Timothy Viehl, M.D.

Instructor in Pediatrics (primary appointment)
Bachelor of Science, Saint Louis University, 2012
Doctor of Medicine, Saint Louis University, 2016

Arpita Vyas, MB.ChB.

Associate Professor of Pediatrics (primary appointment)

Foreign MD equivalent, University of Sheffield, 2001

W

Kathryn K. Wade

Voluntary Clinical Instructor in Pediatrics

Jean V Wagner

Voluntary Clinical Assistant Professor of Pediatrics

Colleen M Wallace, M.D.

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)
F. Sessions Cole, MD, Chair in Newborn Medicine
Division Chief - Division of Newborn Medicine
Bachelor of Science, University of Dayton, 1976
Master of Science, University of Massachusetts Amherst, 1981
Main Campus, 1985

Courtney E Watza

Voluntary Clinical Assistant Professor of Pediatrics

Kristin Kay Wenger, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Arts, Ohio Wesleyan University, 1997
Doctor of Medicine, Washington University in St Louis, 2008

Jennifer Corinne Wessman, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, College of William and Mary, 2001
Doctor of Medicine, Commonwealth College, 2005

Neil Harris White, M.D.

Professor Emeritus of Pediatrics
Bachelor of Science, State University of New York at Albany, 1971
Doctor of Medicine, Albert Einstein College of Medicine, 1975

Keisha White Makinde, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, University of Connecticut, 2017

Halana Victoria Whitehead, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Arts, University of Pennsylvania, 2009
Doctor of Medicine, Case Western Reserve University, 2013

Karen Whiteside, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Assistant Professor of 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 Center, 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.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Arts, Saint Louis University, 1993
Doctor of Medicine, Saint Louis University, 1997

Katie Knoedelseder Wolfe, M.Ed., M.D.

Assistant Professor of Pediatrics (primary appointment)
Director of the Pediatric Residency Program
Bachelor of Science, Vanderbilt University, 2007
Doctor of Medicine, Saint Louis University, 2011
Main Campus, 2022

Kel Vin Woo, Ph.D., M.D.

Instructor in Pediatrics (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 University, 2009
Doctor of Medicine, Saint Louis University, 2013

Ronald Edward Worthington

Voluntary Clinical Professor of Pediatrics

Jeffrey M Wright, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Vanderbilt University, 1975
Doctor of Medicine, Washington University in St Louis, 1979

Linda Xiao-Chen Wu, D.O.

Assistant Professor of Pediatrics (primary appointment)
Adjunct Instructor
Bachelor of Science, University of Waterloo, 2007
Doctor of Osteopathic Medicine, Midwestern University, 2015

Kathie R Wuellner, M.D.

Voluntary Clinical Professor of Clinical Pediatrics
Champaign, 1973

Doctor of Medicine, Saint Louis University, 1978

Hayley Wurzel, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Bachelor of Science, Brown University, 1995
Doctor of Medicine, Washington University in St. Louis, 1999

Kristine M Wylie, Ph.D.

Associate Professor of Pediatrics (primary appointment)
Associate Professor of Molecular Microbiology
Associate Professor of Obstetrics and Gynecology
Bachelor of Arts, Southern Illinois University Edwardsville, 1996
Doctor of Philosophy, Saint Louis University, 2009

Todd N Wylie

Associate Professor of Pediatrics (primary appointment)
Bachelor of Science, Southern Illinois University Edwardsville, 1995

Emily Jean Wynia

Assistant Professor of Pediatrics (Pending Executive Faculty Approval)
(primary appointment)

X

Xunjun Xiao, M.S., Ph.D.

Associate 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.

Voluntary Clinical Instructor in Pediatrics
Doctor of Medicine, School Not Found, 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, Saint George's University, 2012

Julia Catherine Young, M.D.

Voluntary Clinical Assistant Professor of Pediatrics
Doctor of Medicine, Saint Louis University, 1999

Staci R. Young, M.D.

Voluntary Clinical Instructor in 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.

Voluntary Clinical Associate Professor of Pediatrics
Bachelor of Science, Brown University, 1987
Doctor of Medicine, University of Texas Southwest, 1992

Z

Kristina Zalud, M.D.

Instructor in Pediatrics (primary appointment)
Doctor of Medicine, Creighton University, 2020

Christina Elizabeth Zanaboni, M.D.

Assistant Professor of Pediatrics (primary appointment)
Doctor of Medicine, Saint Louis University, 2016

Dominic Battista Zanaboni, M.D.

Assistant Professor of Pediatrics (primary appointment)
Bachelor of Science, Rockhurst University, 2011
Doctor of Medicine, University of Missouri Columbia, 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)
Bachelor of Science, Wuhan University (#####), 2005
Doctor of Philosophy, Chinese Academy of Sciences, 2013

Amy Christine Zimmermann, M.D.

Voluntary Clinical Instructor in Pediatrics
Bachelor of Science, University of Missouri Columbia, 1998
Doctor of Medicine, University of Missouri Columbia, 2003

Andrew C. Zuckerman

Voluntary Clinical Instructor in Pediatrics

Research Electives

Pediatrics Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

Ana María Arbeláez, 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

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

F. Sessions Cole, MD, and Jennifer Wambach, MD, MS

Northwest Tower, 8th Floor, and McDonnell Pediatric Research Building, 5th Floor
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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.

Vikas Dharnidharka, MD, MPH

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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.

Stephanie A. Fritz, MD, MSCI

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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.

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.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

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.

Courses

Visit online course listings to view offerings for M65 Peds.

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.

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.

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.

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.

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.

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.

M65 Peds 507 Genetic Counseling Research Methods and Ethics

This course will provide the foundation for the development and execution of the research project required for the 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.

M65 Peds 508 Research Project I

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.
Credit 1 unit.

M65 Peds 509 Clinical Fieldwork Rotations I

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. 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 4 units.

M65 Peds 510 Clinical Genetics & Genomics I

This course is a seminar focusing on the fundamentals of clinical genetics and genomics. Attendance and active participation are expected and required. Course activities will include interactive lectures, class discussion, and class member presentations. This course is open to students in the Master's Program in Genetic Counseling. Admittance may be offered to other students by request.

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.

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.

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.

M65 Peds 604 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. 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 Program in Genetic Counseling. Admittance may be offered to other students by request. Prerequisites for this course are Human Embryology (taken online via University of Cincinnati during the first year of study).
Credit 2 units.

M65 Peds 605 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 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. 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. Prerequisite for this course is Advanced Genetic Counseling I (M65.601).
Credit 4 units.

M65 Peds 606 Clinical Fieldwork Rotations III

This course covers clinical fieldwork rotations. Participation as requested by supervisors is required. This includes two 14-day clinical rotations during the spring semester of the second year. This course is open to students in the Master's Program in Genetic Counseling. Prerequisites for this course are successful completion of Clinical Fieldwork Rotations I and II (M65.509 and M65.603).
Credit 3 units.

M65 Peds 607 Research Project III

The primary objective of the 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 III is taken during the spring semester of the second year. This course is open to students in the Master's Program in Genetic Counseling.
Credit 2 units.

M65 Peds 808 Pediatric Asthma and Allergy (Clinical Elective)

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.
Credit variable, maximum 4 units.

M65 Peds 811 Pediatric Critical Care (Clinical Elective)

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.
Credit variable, maximum 4 units.

M65 Peds 813 Pediatric Cardiac Catheterization (Clinical Elective)

This elective will focus on the interpretation of hemodynamic and angiographic data acquired in the cardiac catheterization laboratory.
Credit variable, maximum 4 units.

M65 Peds 819 Outpatient Pediatric Cardiology (Clinical Elective)

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.
Credit variable, maximum 4 units.

M65 Peds 826 Genetics and Genomic Medicine (Clinical Elective)

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.
Credit variable, maximum 4 units.

M65 Peds 828 Pediatric Hematology and Oncology (Clinical Elective)

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.
Credit 4 units.

M65 Peds 836 Pediatric Rheumatology (Clinical Elective)

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.

Credit 2 units.

M65 Peds 838 Pediatric Gastroenterology, Hepatology, and Nutrition (Clinical Elective)

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.

Credit variable, maximum 4 units.

M65 Peds 839 Antimicrobial Use, Resistance, and Stewardship (Clinical Elective)

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.

Credit 2 units.

M65 Peds 840 Pediatric Infectious Diseases (Clinical Elective)

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.

Credit 4 units.

M65 Peds 845 Pediatric Emergency Medicine (Clinical Elective)

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.

Credit 4 units.

M65 Peds 846 Child Abuse Pediatrics (Clinical Elective)

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.

Credit variable, maximum 4 units.

M65 Peds 849 Pediatric Endocrinology and Diabetes (Clinical Elective)

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.

Credit variable, maximum 4 units.

M65 Peds 852 Clinical Pediatric Pulmonary Medicine (Clinical Elective)

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 inpatient and outpatient settings. 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 flexible bronchoscopy. 4. Learn about various treatment modalities available for common lung diseases. Unique aspects of this rotation include: - A broad exposure to children with asthma, cystic fibrosis, sleep disorders, 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.

Credit variable, maximum 4 units.

M65 Peds 861 Newborn Medicine (Clinical Elective)

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) Credit variable, maximum 4 units.

M65 Peds 870 Pediatric Clinical Immunology (Clinical Elective)

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.

Credit variable, maximum 4 units.

M65 Peds 875 Pediatric Nephrology (Clinical Elective)

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.

Credit variable, maximum 4 units.

M65 Peds 876 Pediatric Lung Transplantation (Clinical Elective)

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.

Credit variable, maximum 4 units.

M65 Peds 890 Primary Care Pediatrics (Clinical Elective)

This elective is a unique opportunity for medical students to take a deeper dive into the knowledge, skillsets, and relationships that comprise primary care pediatrics.

Credit variable, maximum 4 units.

M65 Peds 910 Pediatrics Advanced Clinical Rotation (ACR)

This is the general pediatric ACR. The student will be assigned to one of two inpatient pediatric floor teams at St. Louis Children's Hospital (10-100/green or 11-100/yellow teams). They will follow patients from initial evaluation through 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. With supervision, students will be expected to preround on their patients, present on rounds, perform daily tasks including calling consults, PMDs, writing orders (to be cosigned), and other various tasks, write notes (to be cosigned), and participate in handoffs. Students will spend 3 weeks on day shifts and 1 week on night shifts. 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 but not limited to pulmonary, infectious diseases, gastrointestinal, renal, endocrine, neurological, and rheumatologic issues. Other common conditions include failure to thrive, ingestions, and fever of unknown origin.

Credit 4 units.

M65 Peds 915 Newborn and Pediatric Critical Care Advanced Clinical Rotation (ACR)

Credit 4 units.

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 offers a varied teaching program for medical students, residents in psychiatry, and fellows at St. Louis Children's Hospital and the 4444 Forest Park Child Psychiatry Clinic, which provides outpatient services to children with an array of psychiatric concerns. Trainees are assigned to various services, including the Child and Adolescent Psychiatry (CAP) Clinic, the Pediatric Behavioral Health Unit at St. Louis Children's Hospital, and the CAP Consult 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

Department Chair

Visit our website for more information about our 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

Voluntary Clinical Instructor in Psychiatry

Kirsten Gilbert Alberts, Ph.D.

Assistant Professor of Psychiatry (primary appointment)

Bachelor of Arts, Stanford University, 2005

Doctor of Philosophy, Yale University, 2014

Muhammad Ali, Ph.D.

Instructor in Psychiatry (primary appointment)

Doctor of Philosophy, University of Luxembourg, 2019

Dale J Anderson, M.D.

Voluntary Clinical Instructor in Psychiatry

Doctor of Medicine, Washington University in St Louis, 1978

Richard H Anderson, M.S., Ph.D., M.D.

Voluntary Clinical Instructor in 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 Found, 1938

Master of Science, School Not Found, 1941

Doctor of Philosophy, School Not Found, 1948

Doctor of Medicine, School Not Found, 1949

Scott J Arbaugh, M.D.

Voluntary Clinical Instructor in Psychiatry

Bachelor of Arts, Saint Louis University, 1980

Doctor of Medicine, Saint Louis University, 1985

Ahmad Beheshti Ardekani, M.D.

Voluntary Clinical Assistant Professor of Psychiatry

Doctor of Medicine, School Not Found, 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

Devin E Banks, M.S., Ph.D.

Assistant Professor of Psychiatry (primary appointment)

Bachelor of Arts, University of California Berkeley, 2011

Master of Science, Indiana University Purdue University Indianapolis, 2016

Doctor of Philosophy, Indiana University Purdue University Indianapolis, 2020

Michael Roman Banton, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Arts, Johns Hopkins University Medical (Duplicate of Johns Hopkins University), 1981
Doctor of Medicine, Saint Louis University, 1985

Vadim Baram

Voluntary Clinical Instructor in Psychiatry

Desiree Cherie Baumgartner, M.D.

Instructor in Psychiatry (primary appointment)
Doctor of Medicine, Washington University in St Louis, 2015

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

John Bilbily, M.D.

Instructor in Psychiatry (Pending Dean Approval) (primary appointment)
Doctor of Medicine, University of Kentucky, 2017

Callie Lynn Bishop

Voluntary Clinical Instructor in Psychiatry

Kevin J. Black, M.D.

Professor of Psychiatry (primary appointment)
Professor of Neurology
Professor of Radiology
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

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 Center, 1988

Susan Kathleen Boyer, M.D.

Voluntary Clinical Instructor in 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)
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 in Maryland, 2002
Master of Science, Loyola College in Maryland, 2006
Doctor of Psychology, Loyola College in Maryland, 2010

James Byrd, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Science, Southeast Missouri State University, 1987
Doctor of Medicine, School Not Found, 1991

C

Joshua W. Calhoun, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Science, Yale University, 1978
Doctor of Medicine, University of Connecticut, 1982

Robert Michael Carney, Ph.D.

Professor Emeritus of Psychiatry
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.

Assistant Professor of 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.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Science, Saint Louis University, 2013
Doctor of Medicine, Creighton University, 2018

Natchanan Charatcharungkiat, M.D.

Assistant Professor of Psychiatry (primary appointment)
Doctor of Medicine, Chulalongkorn University, 2008

Mina Charepoo, M.D.

Associate 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.

Professor of Psychiatry (primary appointment)
Doctor of Medicine, National Taiwan University, 1993
Master of Public Health, Johns Hopkins University, 1995
Doctor of Science, Johns Hopkins University, 1998

Andrew Chirchirillo, Ph.D.

Voluntary Clinical Instructor in Psychiatry
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.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Arts, University of Oklahoma, 1979
Doctor of Medicine, University of Oklahoma, 1983

John Nicholas Constantino

Voluntary Research Professor of Psychiatry

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 Found, 1957
Doctor of Medicine, School Not Found, 1965

Linda B Cottler, M.P.H., Ph.D.

Voluntary Research 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.

Professor of Psychiatry (primary appointment)
Doctor of Medicine, Univ Industrial de Santander, 2000

Carlos Cruchaga, M.S., Ph.D.

Professor of Psychiatry (primary appointment)
Barbara Burton & Reuben Morriss III Professor
Professor of Neurology
Professor of Genetics
Bachelor of Science, University of Navarra, 2000

Master of Science, 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

Victoria Carmen De Leon, M.D.

Instructor in Psychiatry (Pending Dean Approval) (primary
appointment)
Doctor of Medicine, University of Kentucky, 2017

Nathaniel Adam Dell, M.A., M.S.W., Ph.D.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Arts, Southern Illinois University Edwardsville, 2011
Master of Arts, University of Chicago, 2012
Master of Social Work, Saint Louis University, 2016
Doctor of Philosophy, Saint Louis University, 2022

Carie Kollmeyer Dinehart, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Arts, Saint Louis University, 1999
Doctor of Medicine, Saint Louis University, 2003

Fanghong Dong, M.A., M.M.Sc., Ph.D.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Arts, Shandong University (#####), 2008
Master of Medical Science, Shandong University (#####), 2012
Master of Arts, University of Pennsylvania, 2020
Doctor of Philosophy, University of Pennsylvania, 2020
Bachelor of Science in Nursing, Shandong University (#####), null

Meghan Rose Donohue, Ph.D.

Assistant Professor of Psychiatry (primary appointment)
Doctor of Philosophy, Georgia State University, 2018

E

Matthew S Ellis, M.P.H., Ph.D.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Arts, Rockhurst University, 2004
Master of Public Health, Washington University in St Louis, 2011
Doctor of Philosophy, Saint Louis University, 2021

Baris C Ercal, Ph.D., M.D.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Arts, 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.

Assistant Professor of 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

Robert T. Fitzgerald, M.P.H., Ph.D.

Associate Professor of Psychiatry (primary appointment)
Adjunct Instructor
Bachelor of Science, Abilene Christian University, 1998
Master of Public Health, 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 Arts, University of Notre Dame, 2008
Master of Science, University North Carolina, 2010
Doctor of Philosophy, University of North Carolina at Chapel Hill, 2014

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 at Manoa, 1982

Darrin Friesen, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Arts, School Not Found, 1990
Doctor of Medicine, Washington University in St Louis, 1996

Lara A Fuchs

Voluntary Clinical Instructor in Psychiatry

G

Bridget Mary Galati, D.O.

Assistant Professor of 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

Torie Gettinger, M.S.W., Ph.D.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Science, Saint Louis University, 2008
Master of Social Work, Saint Louis University, 2009
Doctor of Philosophy, Saint Louis University, 2022

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.

Voluntary Clinical Professor of Psychiatry

Bachelor of Science, School Not Found, 1983
Master of Science, School Not Found, 1985
Doctor of Medicine, School Not Found, 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 Glowinski

Voluntary Clinical Professor of Psychiatry

Mark Gold, M.D.

Voluntary Research Professor of Psychiatry
Bachelor of Arts, Washington University in St Louis, 1971
Doctor of Medicine, University of Florida, 1975

David Goldmeier, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Arts, Dartmouth College, 1978
Doctor of Medicine, Washington University in St Louis, 1982

Julia D. Grant, M.A., Ph.D.

Voluntary Research 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

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.

Professor of Psychiatry (primary appointment)
Doctor of Philosophy, Massachusetts Institute of Technology, 2002

Sarah McConnell Hartz, Ph.D., M.D.

Professor of Psychiatry (primary appointment)
Bachelor of Arts, Knox College, 1996
Champaign, 2002
Doctor of Medicine, University of Iowa, 2005

Steven Arthur Harvey, M.D.

Voluntary Clinical Instructor in 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)
Spencer T. Olin Professor of Psychology in Psychiatry
Associate Professor of Psychological & Brain Sciences

Professor of Genetics

Bachelor of Arts, University of Oxford, 1979

Doctor of Philosophy, University of Oxford, 1983

Laura P Hennefeld, M.S., Ph.D.

Assistant Professor of Psychiatry (primary appointment)

Bachelor of Science, State University of New York at Purchase, 2005

Master of Science, CUNY Hunter College, 2008

Doctor of Philosophy, Washington University in St Louis, 2015

Tamara G Hershey, Ph.D.

Professor of Psychiatry (primary appointment)

James S McDonnell Professor of Cognitive Neuroscience

Professor of Radiology

Director of the McDonnell Center for Systems Neuroscience

Division Director - Translational Neuroscience

Professor of Neurology

Adjunct Professor

Bachelor of Arts, Earlham College, 1988

Doctor of Philosophy, Washington University in St Louis, 1996

Jarrold Holiday, M.D.

Assistant Professor of 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)

Bachelor of Arts, Rhodes College, 2000

Doctor of Medicine, Saint Louis University, 2005

Caroline P Hoyniak, D.Sc.

Assistant Professor of Psychiatry (primary appointment)

Doctor of Science, Indiana State University, 2019

James J Hudziak

Voluntary Research 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 Science, University of Barcelona, 2007

Master of Science, University of Barcelona, 2008

Doctor of Philosophy, University of Barcelona, 2015

Sayaka Inoue, Ph.D.

Assistant Professor of Psychiatry (primary appointment)

Doctor of Philosophy, University of Tokyo, 2013

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)

Doctor of Medicine, Yamagata University, 1985

Doctor of Philosophy, Yamagata University, 1989

J

Celina Rose Jacobi, M.D.

Assistant Professor of Psychiatry (primary appointment)

Doctor of Medicine, Washington University in St Louis, 2012

Aleksandar Janca, M.D.

Voluntary Research Professor of Psychiatry

Doctor of Medicine, School Not Found, 1900

Michael R Jarvis, M.S., Ph.D., M.D.

Professor of Psychiatry (primary appointment)

Bachelor of Science, University of Minnesota, 1977

Champaign, 1980

Champaign, 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 Arts, University of Colorado Boulder, 2016

Doctor of Philosophy, University of Colorado Boulder, 2017

Mark C. Johnson, M.D.

Voluntary Clinical Associate Professor of Psychiatry

Bachelor of Arts, Eckerd College, 1972

Doctor of Medicine, University of Kentucky, 1980

Christine Juang, Ph.D.

Assistant Professor of Psychiatry (primary appointment)

Assistant Professor of Psychological & Brain Sciences

Assistant Professor of Neurology

Doctor of Philosophy, University of Southern California, 2018

K

Celeste Marie Karch, Ph.D.

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)

Lecturer in Psychology

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

Saaïd Khojasteh, M.D.

Professor of Psychiatry (primary appointment)

Doctor of Medicine, Shiraz University of Medical Sciences, 1981

Mary Claire Kimmel, Ph.D., M.D.

Associate Professor of Psychiatry (Pending Executive Faculty Approval)
(primary appointment)

Doctor of Medicine, Drexel University, 2007

Doctor of Philosophy, Uppsala University, 2023

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.

Voluntary Clinical Instructor in Psychiatry

Bachelor of Arts, Wesleyan College, 1994

Master of Arts, University of Colorado Boulder, 1998

Doctor of Philosophy, University of Colorado Boulder, 2000

Alexxai V Kravitz, Ph.D.

Associate Professor of Psychiatry (primary appointment)

Associate Professor of Neuroscience

Associate Professor of Anesthesiology

Interim Division Director for Basic Neuroscience

Bachelor of Arts, Wesleyan University, 2019

Doctor of Philosophy, University of Pennsylvania, 2019

Erin Doty Kurtz

Voluntary Clinical Instructor in Psychiatry

Anatoliy Kuznetsov, M.D.

Instructor in Psychiatry (primary appointment)

Bachelor of Arts, Washington University in St Louis, 2011

Doctor of Medicine, University of Missouri Kansas City, 2017

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.

Assistant Professor of 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.

Assistant Professor of Psychiatry (primary appointment)

Doctor of Philosophy, Washington University in St Louis, 2015

Eric J Lenze, M.D.

Professor of Psychiatry (primary appointment)

Wallace and Lucille K Renard Professor of Psychiatry

Head of the Department of Psychiatry

Professor of Anesthesiology

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 Science, University of Pittsburgh, 2003

Doctor of Philosophy, University of Pittsburgh, 2007

Christina Lessov-Schlaggar, Ph.D.

Voluntary Research Assistant Professor of Psychiatry

Doctor of Philosophy, Oregon Health Science University (Duplicate of Oregon Health & Science University), 2000

Angela Lin, M.D.

Assistant Professor of Psychiatry (primary appointment)

Doctor of Medicine, Washington University in St Louis, 2018

Penelope Alatheia Lind

Voluntary Research Associate Professor of Psychiatry

Kelechi Loynd, M.D.

Voluntary Clinical Assistant Professor of Psychiatry

Doctor of Medicine, Saint Louis University School of Medicine, null

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.

Assistant Professor of Psychiatry (primary appointment)
College Park, 2013

Philip A Ludbrook, MBBS

Professor Emeritus of Psychiatry

Professor Emeritus of Medicine

Foreign MD equivalent, University of Adelaide, 1963

Patrick Joseph Lustman, M.S.W., Ph.D.

Professor of Psychiatry (primary appointment)

Professor of Psychological & Brain Sciences

Bachelor of Arts, University of Illinois at Chicago, 1972

Master of Social Work, University of Wisconsin Madison, 1974

Doctor of Philosophy, Michigan State University, 1980

Michael T. Lynskey, M.S., Ph.D.

Voluntary Research Instructor of Psychiatry

Bachelor of Science, School Not Found, 1987

Master of Science, University of Canterbury, 1989

Doctor of Philosophy, School Not Found, 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.

Associate 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, 1998

Lauren Ashley Marks, M.D.

Assistant Professor of Psychiatry (primary appointment)
Doctor of Medicine, 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

Voluntary Research Professor of Psychiatry

Gregory Warren Mattingly, M.D.

Voluntary Research Instructor of Psychiatry
Bachelor of Science, University of Missouri Columbia, 1985
Doctor of Medicine, Washington University in St Louis, 1989

Kimberli McCallum, M.D.

Voluntary Clinical Assistant Professor of 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)
Main Campus, 1985
Master of Science in Social Work, Washington University in St Louis,
2001
Doctor of Philosophy, Washington University in St Louis, 2005

Shannon Rose McGuire

Voluntary Clinical Assistant Professor of Psychiatry

Steven James Mennerick, Ph.D.

Professor of Psychiatry (primary appointment)
John P Feighner Professor of Neuropsychopharmacology
Associate Dean for Biology and Biomedical Sciences
Professor of Neuroscience
Bachelor of Arts, Earlham College, 1988
Doctor of Philosophy, Washington University in St Louis, 1995

Jay L Meyer, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Arts, Washington University in St Louis, 1956
Doctor of Medicine, Saint Louis University, 1960

Ruth Huang Miller, M.S., Ph.D.

Voluntary Clinical Associate Professor of 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.

Assistant Professor of Psychiatry (primary appointment)
Doctor of Science, Universidad Autonomoma de Madrid, 2015

Carrie M Mintz, M.D.

Voluntary Clinical Assistant Professor of Psychiatry
Bachelor of Arts, Harvard University, 2005

Doctor of Medicine, Washington University in St Louis, 2013

David M Montani, M.D.

Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in Psychiatry

Randi H Mozenter, M.A., Ph.D.

Voluntary Clinical Instructor 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

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
Champaign, 1986

Ginger E. Nicol, M.D.

Associate Professor of Psychiatry (primary appointment)
Bachelor of Arts, University of Iowa, 1998
Doctor of Medicine, University of Iowa, 2002

Kevin K. Noguchi, M.A., Ph.D.

Associate 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.

Voluntary Clinical Assistant Professor of 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 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

Voluntary Clinical Instructor in Psychiatry

Akinkunle Owoso, M.D.

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, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 1997
Doctor of Philosophy, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 2001

Michael T Perino, M.A., Ph.D.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Arts, New York University, 2008
Master of Arts, CUNY John Jay College Criminal Justice, 2010
Champaign, 2018

Susan B Perlman, Ph.D.

Professor of Psychiatry (primary appointment)
Doctor of Philosophy, Duke University, 2019

Marco Pignatelli, M.D.

Assistant Professor of Psychiatry (primary appointment)
Doctor of Medicine, University of Rome, 2008

Elizabeth F Pribor, M.D.

Voluntary Clinical Associate Professor of 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 University, 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

Q

Darin F Quach, D.O., Ph.D.

Instructor in Psychiatry (primary appointment)
Bachelor of Science, University of California San Diego, 2006
Doctor of Philosophy, Michigan State University, 2016
Doctor of Osteopathic Medicine, Michigan State University, 2018

R

John S Rabun, M.D.

Voluntary Clinical Instructor in 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 Center, 1995

Alex Taylor Ramsey, M.A., Ph.D.

Associate 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.

Voluntary Clinical Assistant Professor of Psychiatry
Bachelor of Arts, University of Colorado Boulder, 1962
Doctor of Medicine, University of Colorado Boulder, 1968

Radhika Rao, M.D.

Voluntary Clinical Instructor in Psychiatry
Doctor of Medicine, University of South Dakota, 2001

Mary Katherine O Ray, Ph.D.

Assistant Professor of Psychiatry (primary appointment)
Doctor of Philosophy, University of Alabama in Tuscaloosa, 2018

Syed A Raza, M.D.

Voluntary Clinical Assistant Professor of Psychiatry
Bachelor of Science, Osmania Medical College, 1953
Doctor of Medicine, School Not Found, 1959

Chandrashekar Reddy

Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in 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

Syed T Rizvi

Voluntary Clinical Assistant Professor of Psychiatry

John Deno Rogakos, M.D.

Voluntary Clinical Instructor in 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)
Blanche F Ittleson Professor of Psychiatry (Child Psychiatry)
Division Director of Child and Adolescent 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

Voluntary Clinical Instructor in 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

Voluntary Clinical Instructor in Psychiatry

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.

Voluntary Clinical Associate Professor of 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.

Voluntary Clinical Assistant Professor of Psychiatry
Bachelor of Arts, Middlebury College, 1973
Main Campus, 1982

Kruthika Sampathgiri

Assistant Professor of Psychiatry (Pending Executive Faculty Approval)
(primary appointment)

Carolyn E. Sartor, M.S., Ph.D.

Voluntary Research 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

Voluntary Research Professor of Psychiatry

Jeffrey Frank Scherrer, Ph.D.

Voluntary Research Associate Professor of Psychiatry
Doctor of Philosophy, Saint Louis University, 2004

Jeffrey I Schulman, M.B.A., M.D.

Voluntary Clinical Instructor in 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 (primary appointment)
Bachelor of Arts, Northwestern University, 2002
Doctor of Philosophy, Massachusetts Institute of Technology, 2008

Adelita Segovia Langley

Voluntary Clinical Associate Professor of Psychiatry

Lawrence Evan Shapiro, Psy.D.

Voluntary Clinical Instructor in Psychiatry
Doctor of Psychology, University of California, 1990

Paul W Sheffner, M.D.

Voluntary Clinical Assistant Professor of Psychiatry
Doctor of Medicine, Washington University in St. Louis, 1974

Hongjin Shu, Ph.D., M.D.

Instructor in Psychiatry (primary appointment)
Doctor of Medicine, Shanghai Second Medical University (#####), 1991
Doctor of Philosophy, Yamagata University, 2002

Joshua S Siegel, Ph.D., M.D.

Instructor in Psychiatry (primary appointment)
Bachelor of Arts, Washington University in St. Louis, 2010
Doctor of Philosophy, Washington University in St. Louis, 2018
Doctor of Medicine, Washington University in St. Louis, 2018

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.

Voluntary Clinical Assistant Professor of 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.

Voluntary Clinical Assistant Professor of Psychiatry
Bachelor of Arts, Northwestern University, 1986
Doctor of Medicine, Northwestern University, 1991

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.

Professor of Psychiatry (primary appointment)
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)
Associate Professor of Radiology
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.

Assistant Professor of 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.

Professor of Psychiatry (Child) (primary appointment)
Bachelor of Science, Truman State University (Formerly Northeast Missouri 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

Jeffrey A. Vander Kooi, M.D.

Voluntary Clinical Instructor in Psychiatry
Bachelor of Science, University of Iowa, 1997
Doctor of Medicine, University of Iowa, 2002

Jessica Vanderlan, M.A., Ph.D.

Voluntary Clinical Instructor in 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.

Voluntary Research Assistant Professor of Psychiatry
Doctor of Philosophy, University of Virginia, 2004

Marysia Weber

Voluntary Clinical Instructor in 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 University, 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)
Scott Rudolph University Professor
Professor of Psychological & Brain Sciences
Professor of Medicine
Professor of Pediatrics
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

Voluntary Clinical Instructor in Psychiatry

Eric Nicholas Wittrock, D.O.

instructor in Psychiatry (primary appointment)
Doctor of Osteopathic Medicine, Kansas State University, 2011

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

X

Kevin Y Xu, M.P.H., M.D.

Assistant Professor of Psychiatry (primary appointment)
Bachelor of Arts, Columbia University, 2014
Master of Public Health, Mount Sinai School of Medicine, 2018
Doctor of Medicine, Mount Sinai School of Medicine, 2018

Y

Carla Marie Yuede, Ph.D.

Professor of Psychiatry (primary appointment)
Professor of Neuroscience
Professor of Neurology
Doctor of Philosophy, University of Missouri in St Louis, 2006

Sean H Yutzey

Voluntary Clinical Professor of Psychiatry

Z

Charles F Zorumski, M.D.

Professor of Psychiatry (primary appointment)
Samuel B. Guze Professor of Psychiatry
Director of the Taylor Family Institute for Innovative Psychiatric Research
Professor of Neuroscience
Bachelor of Arts, Saint Louis University, 1974
Doctor of Medicine, Saint Louis University, 1978

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.

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.

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.

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.

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 for examples of past research.

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.

Courses

Visit online course listings to view offerings for M85 Psych.

M81 Gateway 630 Psychiatry Clerkship - Patient Care

Psychiatry is the specialty of medicine that focuses on the prevention, evaluation, and treatment of mental disorders. Mental disorders are disorders of the "mind", by which we mean what results from the operation of specific brain networks that underlie the "mental trilogy" of cognition, emotion, and motivation (From Synaptic Self by Joseph Le Doux, 2002). Regardless of the specialty you end up choosing, it is very likely that you will take care of patients with severe mental illness (SMI). SMI is common, and ranks as one of the top causes of disability worldwide and in the United States alike. Washington University School of Medicine is committed to the education of tomorrow's leaders in biomedicine and our mission requires a solid foundation in the knowledge, skills, and attitudes required to care for people with mental disorders.

Credit 8 units.

M85 Psych 805 Psychiatry Consult (Clinical Elective)

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

Credit 4 units.

M85 Psych 810 Outpatient Community Psychiatry (Clinical Elective)

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.

Credit 4 units.

M85 Psych 836 Inpatient Psychiatry (Clinical Elective)

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 psychiatric 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.

Credit 4 units.

M85 Psych 840 Child Psychiatry (Clinical Elective)

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.

Credit variable, maximum 2 units.

M85 Psych 844 Forensic Psychiatry (Non-Clinical Elective)

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.

Credit 4 units.

M85 Psych 880 Schizophrenia Precursors & Prodromal States (Clinical Elective)

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.

Credit variable, maximum 4 units.

M85 Psych 910 Psychiatry Advanced Clinical Rotation (ACR)

This is an advanced rotation that provides the students with an opportunity to expand their knowledge of inpatient clinical psychiatry by functioning as interns. While rotating through the inpatient psychiatry units on the main campus, students will encounter patients with a variety of severe psychiatric illnesses that are oftentimes complicated by various medical comorbidities requiring consultation services. Students will work on patient care teams with a PGY-1, and

an attending psychiatrist. 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. This includes writing notes, entering orders, and updating the handoff list. The students will also complete one week of night-float with a PGY-1, and shadow a PGY-2 in the Emergency Department's behavioral health unit. Immediate supervision is provided by the inpatient attending, senior resident, and intern on the service. Teaching emphasis is directed toward psychiatric diagnosis, appropriate use of psychopharmacologic agents, psychotherapeutic intervention, the use of community resources and pursuit of the psychiatric scientific literature.

Credit 4 units.

M85 Psych WU Psychiatry Warm-up

Credit 2 units.

Department of Radiation Oncology

The Department of Radiation Oncology 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 (1-2 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 (2-5 years); established 2022

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

Faculty

Dennis Hallahan, MD

Department Head

Maria Thomas, MD

Clerkship Director

Joanna Yang, MD

Clinical Residency Program Director

Michael Altman, PhD

Medical Physics Residency Program Director
Director of Education in Medical Physics

Visit our website for more information about our faculty and their appointments.

A

Christopher Abraham, M.D.

Associate Professor of Radiation Oncology (primary appointment)
Associate Professor of Medicine
Bachelor of Science, Medical College of 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.

Associate 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

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, University of Cambridge, 1999
Doctor of Philosophy, Medical College of Wisconsin, 2006
Doctor of Medicine, Medical College of Wisconsin, 2008

Amit Bhatt, Ph.D., M.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, University of Michigan Dearborn, 1997
Doctor of Philosophy, University of Wisconsin, 2002
Doctor of Medicine, Rush University, 2006

Walter R Bosch, M.S., D.Sc., B.E.E.

Professor of Radiation Oncology (primary appointment)
Bachelor of Electrical Engineering, Washington University in St. Louis, 1980
Master of Science, Washington University in St. Louis, 1983
Doctor of Science, 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

Jessika Contreras, M.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Arts, Johns Hopkins University, 2009
Bachelor of Science, Johns Hopkins University, 2009
Doctor of Medicine, University of South Florida, 2014

David T Curiel, Ph.D., M.D.

Professor of Radiation Oncology (primary appointment)
Distinguished Professor of Radiation Oncology
Professor of Medicine
Professor of Obstetrics and Gynecology
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

Jennifer De Los Santos

Professor of Radiation Oncology (primary appointment)

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.

Voluntary Clinical Associate Professor of 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

F

Farnoush Forghani-Arani, M.S., Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Shiraz University of Medical Sciences, 2000
Master of Science, University of Tehran, 2002
Doctor of Philosophy, Colorado School of Mines, 2013

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, Rosalind Franklin University of Medicine and Science
(Formerly 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 Columbia, 2000

H

Lannis Hall, M.P.H., M.D.

Voluntary Clinical Associate Professor of 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)
Head of the Department of Radiation Oncology
Professor of Cell Biology and Physiology
Professor of Pathology and Immunology
Professor of Molecular Microbiology
Professor of Biomedical Engineering
Elizabeth H and James S McDonnell III Distinguished Professor of
Medicine
Champaign, 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

Ibrahim Hatipoglu, M.S., Ph.D.

Instructor in Radiation Oncology (Pending Dean approval) (primary
appointment)
Bachelor of Science, Istanbul University, null
Master of Science, University of Anatolia, null

Doctor of Philosophy, University of Anatolia, null

Dean Hobbis, M.S., Ph.D.

Instructor in Radiation Oncology (primary appointment)
Bachelor of Science, Eckerd College, 2015
Master of Science, University of South Florida, 2018
Doctor of Philosophy, University of South Florida, 2020

Donghua Hu, Ph.D.

Instructor in Radiation Oncology (Pending Dean Approval) (primary
appointment)
Bachelor of Science, Anhui University of Traditional Chinese Medicine
(#####), 2011
Doctor of Philosophy, University of Tasmania, 2018

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)
Master of Science, Louisiana State University Health Sciences Center at
New Orleans, 2016

Geoffrey Douglas Hugo, Ph.D.

Professor of Radiation Oncology (primary appointment)
Director - Physics Division, Medical Physics
Professor of Computer Science and Engineering
Endowed Professor of Radiation Oncology
Doctor of Philosophy, University of California Los Angeles, 2003

K

Vaishali Kapoor, M.S., Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Arts, Delhi University, 2006
Master of Science, All India Institute of Medical Sciences, 2008
Doctor of Philosophy, All India Institute of Medical Sciences, 2013

Hyun Kim, M.D.

Associate Professor of Radiation Oncology (primary appointment)
Bachelor of Science, University of California, 2006
Doctor of Medicine, University of Pittsburgh, 2012

Taeho Kim, Ph.D.

Professor of Radiation Oncology (primary appointment)
Doctor of Philosophy, Washington University in St Louis, 2007

Nels C Knutson, M.S., Ph.D.

Associate 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)
Champaign, 1983

Heui Chang Lee, M.S., Ph.D.

Assistant Professor of Radiation Oncology (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

Calvin Darnell Lewis, Ph.D., M.D.

Instructor in Radiation Oncology (primary appointment)
Bachelor of Science, University of Missouri Columbia, 2011
Doctor of Philosophy, University of Missouri Columbia, 2017
Doctor of Medicine, University of Missouri Columbia, 2017

Hua Li, Ph.D.

Professor of Radiation Oncology (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)
Doctor of Medicine, University of Wisconsin 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)
Carlos Perez Distinguished Professor of Radiation Oncology
Director - Clinical Division, Clinical Programs
Vice Chair - Department of Radiation Oncology
Professor of Radiology
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.

Associate Professor of Radiation Oncology (primary appointment)
Associate Professor of Radiology
Champaign, 2002

Doctor of Philosophy, 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

Allen Mo, Ph.D., M.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Arts, Colgate University, 2011
Doctor of Philosophy, University of Connecticut, 2018
Doctor of Medicine, University of Connecticut, 2018

Michael Moravan, M.S., Ph.D., M.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Clarkson University, 2001
Master of Science, Clarkson University, 2003
Doctor of Philosophy, University of Rochester, 2011
Doctor of Medicine, University of Rochester, 2011

Eric Daniel Morris, Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Michigan Technological University, 2015
Doctor of Philosophy, Wayne State University, 2020

Naoshad Muhammad, M.S., Ph.D.

Instructor in Radiation Oncology (primary appointment)
Bachelor of Science, Bundelkhand University, 2005
Master of Science, Jamia Hamdard University, 2009
Doctor of Philosophy, Savitribai Phule Pune University, 2016

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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

O

Seung Jong Oh, M.S., Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Korea Advanced Institute of Science & Technology, 2001
Master of Science, Catholic University of Korea, 2003
Doctor of Philosophy, Catholic University of Korea, 2011

P

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S. Lee Kling Endowed Chair of Radiation Oncology
Bachelor of Science, Union University, 2001

Doctor of Medicine, University of Tennessee at Memphis, 2005

James Vernon Piephoff, M.D.

Voluntary Clinical Instructor in 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

Michael Thomas Prusator, M.S., Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, University of Ozarks, 2012
Master of Science, University of Oklahoma Health Sciences Center, 2014
Doctor of Philosophy, University of Oklahoma Health Sciences Center, 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

Nikhil Rammohan, M.S., M.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Johns Hopkins University, 2008
Master of Science, Johns Hopkins University, 2009
Doctor of Medicine, Northwestern University, 2018

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

Tapan Roy, M.S.

Voluntary Clinical Instructor in Radiation Oncology
Master of Science, Baroda Medical College, 1974

S

Ziad Saleh, M.S., Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Master of Science, University of Florida, 2003
Doctor of Philosophy, Florida Institute of Technology, 2010

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
Main Campus, 2007
Main Campus, 2011

Master of Public Health, Washington University in St Louis, 2020

Matthew Schmidt, M.S., Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Valdosta State University, 2011
Master of Science, Duke University, 2013
Doctor of Philosophy, University of Massachusetts Lowell, 2022

Julie K Schwarz, Ph.D., M.D.

Professor of Radiation Oncology (primary appointment)
Director - Cancer Biology Division
Vice Chair - Research
Professor of Cell Biology and Physiology
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.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Brabu, 2002
Master of Science, Jamia Hamdard University, 2005
Doctor of Philosophy, All India Institute of Medical Sciences, 2012

Christopher Spencer, M.A., M.D.

Voluntary Clinical 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)
Champaign, 1983
Master of Electrical Engineering, Washington University in St Louis, 1992

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

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 (primary appointment)
Bachelor of Science, Davidson College, 2014
Master of Science, Louisiana State University, 2017
Doctor of Philosophy, Louisiana State University, 2020

Bruce J Walz, M.D.

Voluntary Clinical Associate Professor of Radiation Oncology
Bachelor of Arts, Washington University in St Louis, 1962
Doctor of Medicine, Washington University in St Louis, 1966

Michael Richard Waters

Assistant Professor of Radiation Oncology (Pending Executive Faculty Approval) (primary appointment)

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.

Associate Professor of Radiation Oncology (primary appointment)
Bachelor of Arts, Stanford University, 2008
Doctor of Medicine, Mount Sinai School of Medicine, 2013
Master of Public Health, Harvard University, 2018

Z

Hailei Zhang

Assistant Professor of Radiation Oncology (primary appointment)

Jin Zhang, M.Eng., Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Bachelor of Science, Tianjin University (#####), 2005
Master of Engineering, Tianjin Polytechnic University (#####), 2008
Doctor of Philosophy, University of Connecticut, 2012

Tiezhi Zhang, M.S., Ph.D.

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

Xiandong Zhao, Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Doctor of Philosophy, Southern Methodist University, 2017

Xiaodong Zhao, Ph.D.

Assistant Professor of Radiation Oncology (primary appointment)
Doctor of Philosophy, Louisiana State University, 2020

Tong Zhu, Ph.D.

Associate Professor of Radiation Oncology (primary appointment)
Doctor of Philosophy, University of Rochester, 2009

Imran Zoberi, 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 Zoberi, 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 (DBBS) and the Medical Scientist Training Program (MSTP) to train with faculty in the cancer biology research laboratories.

Please visit the Department of Radiation Oncology website for more information about current research in the department.

Courses

Graduate Programs in Medical Physics

For course information related to the Master of Science in Medical Physics, the PhD in Medical Physics, and the Post-PhD Graduate Certificate in Medical Physics, please visit the Medical Physics page (p. 73) of this *Bulletin*.

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.

M92 RadOnc 801 Clinical Radiation Oncology (Clinical Elective)

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. Credit 2 units.

M92 RadOnc 910 Radiation Oncology Advanced Clinical Rotation (ACR)

The Department of Radiation Oncology invites students planning to apply for radiation oncology residency to enroll in the Radiation Oncology Advanced Clinical Rotation (ACR). The field of radiation oncology involves the delivery of therapeutic radiation for patients with malignant and some benign conditions. Radiation oncology is a field which has a great team dynamic among physicians, physicists, nurses, therapists, social workers, and many others. We also collaborate in a multi-disciplinary fashion with medical oncology and surgical oncology. Clinical care will be provided at Barnes-Jewish Hospital, South County, and West County.

This course will fully immerse the student in the field of radiation oncology and prepare them for a successful transition to radiation oncology residency. Students will be directly involved in patient care, including seeing new outpatient and inpatient consults, follow ups, and on-treatment patients. Students will review the patient charts as well as relevant literature, obtain the patient's history, perform a physical exam, and counsel the patient regarding their proposed treatment recommendations. The student will then present their findings and proposed treatment plan to the resident and attending. Students will also be involved in radiation simulations, contouring, and treatment planning. Students will attend lectures on clinical management, radiation biology, and radiation physics. Students will present at the department case management conference as well as give a talk at the completion of the rotation to department faculty and residents. During this course, students will expand their knowledge of radiation oncology and will be well prepared to start radiation oncology residency.

Student time distribution: Inpatient 10%; Outpatient 75%; Conferences/Lectures 15%; Subspecialty Care 100%

Patients seen weekly: 20-35

On-call/weekend responsibility: ACR students will participate in on-call duties during the rotation.

Credit 4 units.

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 for Washington University School of Medicine in St. Louis, 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; for more information, contact the department's director Maxwell Amurao, PhD, MBA, at 314-362-2988 or maxwell.amurao@wustl.edu.

Website: <https://www.mir.wustl.edu>

Faculty

Richard L. Wahl, MD

Department Chair

Visit our website for more information about our faculty and their appointments.

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

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

Mercy Iyabode Akerele

Assistant Professor of Radiology (Pending Executive Faculty Approval)
(primary appointment)

Hongyu An, M.S., Ph.D.

Professor of Radiology (primary appointment)
Professor of Neurology
Bachelor of Science, Tianjin University (#####), 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

Jonathan C Baker, M.D.

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 at 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 Center at New Orleans, 2015

Krystle G. Barhaghi, M.D.

Assistant Professor of Radiology (primary appointment)
Doctor of Medicine, Tulane University, 2014

Remco Bastiaannet, M.S., Ph.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, University of Twente, 2011
Master of Science, University of Twente, 2013
Doctor of Philosophy, University of Utrecht, 2020

Adam Quentin Bauer, M.S., Ph.D.

Associate Professor of Radiology (primary appointment)
Bachelor of Science, Truman State University (Formerly Northeast Missouri 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 Engineering, 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
Hugh Monroe Wilson Professor of Radiology

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 Medicine
Professor of Pediatrics
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

Tyler M Blazey, Ph.D.

Instructor in Radiology (Pending Dean Approval) (primary appointment)
Bachelor of Science, University of Minnesota Twin Cities, 2010
Doctor of Philosophy, Washington University in St. Louis, 2019

Mitra Bill Boodram, M.D.

Voluntary Clinical Instructor in Radiology
Bachelor of Science, McMaster University, 1983
Doctor of Medicine, Rosalind Franklin University of Medicine and Science (Formerly Finch University of Health Sciences), 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 Carbondale, 2015

Scott Michael Bugenhagen, Ph.D., M.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, Milwaukee School of Engineering, 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)
Masters in Bioimaging, Imperial College, 2012
Doctor of Philosophy, University of Manchester, 2016

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.

Voluntary Clinical Instructor in Radiology
Bachelor of Science, Boston University, 2003
Doctor of Medicine, Boston University, 2007

Sherwin Chiu, M.D.

Assistant Professor of Radiology (primary appointment)
Doctor of Medicine, University of Alabama at Birmingham School of Medicine, 2018

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.

Voluntary Clinical Instructor in Radiology
Bachelor of Science, University of California Davis, 1993
Doctor of Medicine, Saint Louis University, 1997

Paul Kevin Commean, B.E.E.

Assistant Professor of Radiology (primary appointment)

Assistant Professor of Physical Therapy
Main Campus, 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)
Sherwood Moore Professor of Radiology
Professor of Physics (Courtesy)
Professor of Electrical and Systems Engineering
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.

Voluntary Clinical Instructor in Radiology
Doctor of Medicine, University of Texas Southwest, 1997

D

Michael D Darcy, M.D.

Professor of Radiology (primary appointment)
Associate Professor of Surgery (General Surgery)
Main Campus, 1976
Main Campus, 1979

Farrokh Dehdashti, M.D.

Professor of Radiology (primary appointment)
Barry A and Marilyn J Siegel Professor of Radiology
Senior Vice Chair - Division of Nuclear Medicine
Doctor of Medicine, Pahlavi University, 1977

Christina Doherty, M.D.

Associate Professor of Radiology (primary appointment)
Bachelor of Science, Truman State University (Formerly Northeast Missouri State University), 1997
Doctor of Medicine, Southern Illinois University Carbondale, 2001

Steven Don, M.D.

Professor of Radiology (primary appointment)
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)
Bachelor of Science, University of Michigan Ann Arbor, 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 at Chapel Hill, 2014

Allen Devaney Elster, M.A., M.B.A., M.D., B.Eng

Professor of Radiology (primary appointment)
Bachelor of Engineering, Vanderbilt University, 1976
Master of Arts, University of Oxford, 1978
Doctor of Medicine, Baylor College of Medicine, 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

Katharina Franziska Feister

Assistant Professor of Radiology (primary appointment)

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

Shaney Flores, M.S.

Instructor in Radiology (primary appointment)
Bachelor of Science, University of Texas Pan American, 2011
Master of Science, University of Missouri in St Louis, 2023

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.

Assistant Professor of Radiology (primary appointment)
Martinique, 2002
Master of Science, Université Paris 6 Pierre and Marie Curie, 2008
Doctor of Philosophy, University of Paris, 2012

G

Joel Richard Garbow, Ph.D.

Professor of Radiology (primary appointment)
Champaign, 1978
Doctor of Philosophy, University of California Berkeley, 1983

Heather Vallhonrat Garrett, M.D.

Associate Professor of Radiology (primary appointment)
Bachelor of Arts, University of Virginia, 1996
Doctor of Medicine, Washington University in St Louis, 2002

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.

Assistant Professor of Radiology (primary appointment)
Assistant Professor of Neuroscience
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)
Adjunct Lecturer
Assistant Professor of Psychological & Brain Sciences
Champaign, 2003
Champaign, 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 Neuroscience
Associate Professor of Neurology
Bachelor of Science, University of Illinois at Chicago, 2000
Master of Science, University of Oxford, 2001
Doctor of Medicine, University of Chicago, 2005

Perry W Grigsby, M.B.A., M.S., M.D.

Instructor in Radiology (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)

Senior Vice Chair - Division of Radiological Sciences, Research Laboratories

Associate Professor of Medicine
Associate Professor of Biomedical Engineering
Bachelor of Science, Allegheny College, 1977
Main Campus, 1981

Carlos J Guevara, M.D.

Associate Professor of Radiology (primary appointment)
Associate Professor of Surgery (General Surgery)
Bachelor of Science, University South Carolina, 2002
Doctor of Medicine, Duke University, 2006

Caroline Guglielmetti, M.S., Ph.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, Universite Paul Sabatier, 2008
Master of Science, Universite Paul Sabatier, 2010
Doctor of Philosophy, University of Antwerp, 2016

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
Champaign, 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.

Voluntary Clinical Instructor in Radiology
Doctor of Medicine, Drexel University, 2013

Gloria J. Guzman Perez-Carrillo, M.B.A., 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
Master of Business Administration, University of Arizona, 2023

H

Paul Wayne Hargan, M.D.

Voluntary Clinical Instructor in Radiology
Doctor of Medicine, Southern Illinois University Carbondale, 1977

Daniel Paul Harwood, M.D.

Assistant Professor of Radiology (primary appointment)
Doctor of Medicine, Creighton University, 2015

Bruce L Hedgepeth, M.D.

Voluntary Clinical Instructor in 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, 1975

Mark Jeffrey Hoegger, Ph.D., M.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, University of Wisconsin Madison, 2007
Doctor of Philosophy, University of Iowa, 2015
Doctor of Medicine, University of Iowa, 2015

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

I

Resten Imaoka, M.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, University of California Davis, 2008
Doctor of Medicine, Saint George's University, 2013

Masatoshi Inoue, M.M.Sc., D.M.Sc.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, University of Tokyo, 2007
Master of Medical Science, University of Tokyo, 2009
Doctor of Medical Science, University of Tokyo, 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.

Associate Professor of Radiology (primary appointment)
Bachelor of Science, American University of Beirut, 2003
Doctor of Medicine, American University of Beirut, 2007

J

Amin Haghighat 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 Medicine
Associate Professor of Pediatrics
Doctor of Medicine, Iran University of Medical Sciences, 1994

Jack W Jennings, M.S., Ph.D., M.D.

Professor of Radiology (primary appointment)
Section Chief - Musculoskeletal
Professor of Orthopedic Surgery
Bachelor of Science, Wheaton College Illinois, 1992
Main Campus, 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 Polytechnic Institute and State University, 2014

R. Gilbert Jost, M.D.

Professor Emeritus of Radiology
Bachelor of Arts, Harvard University, 1964
Doctor of Medicine, Yale University, 1969

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.

Associate Professor of Radiology (primary appointment)
Associate Professor of Surgery (General Surgery)
Main Campus, 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

Stacy Juyeh Kim, M.D.

Assistant Professor of Radiology (primary appointment)
Assistant Professor of Medicine
Bachelor of Arts, University of Illinois at Chicago, 2009
Doctor of Medicine, University of Illinois at Chicago, 2013

Stephanie Hewon Kim

Assistant Professor of Radiology (primary appointment)

Thomas Kim, M.B.A., M.D.

Assistant Professor of Radiology (primary appointment)
Doctor of Medicine, Washington University in St Louis, 1988
Master of Business Administration, Northwestern University, 2013

Katerina Sunn Konstantinoff, M.D.

Assistant Professor of Radiology (primary appointment)

Doctor of Medicine, Washington University in St Louis, 2018

Veera Venkata Satyanarayana Kothapalli, M.S., Ph.D.

Instructor in Radiology (primary appointment)

Bachelor of Science, Andhra University, 2005

Master of Science, Royal Institute of Technology, 2010

Doctor of Philosophy, Royal Institute of Technology, 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

Kacie Kuykendall, M.D.

Assistant Professor of Radiology (primary appointment)

Bachelor of Arts, Vanderbilt University, 2013

Doctor of Medicine, Rush University, 2017

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

Michael H Lanier, Ph.D., M.D.

Assistant Professor of Radiology (primary appointment)

Baccalaureatus, Washington University in St Louis, 2006

Doctor of Philosophy, Washington University in St Louis, 2017

Doctor of Medicine, Washington University in St Louis, 2017

John Joowon Lee, Ph.D., M.D.

Assistant Professor of Radiology (primary appointment)

Bachelor of Science, Brown University, 1990

Champaign, 1998

Champaign, 2002

Michelle Lee, M.D.

Professor of Radiology (primary appointment)

Bachelor of Science, University of Wisconsin Madison, 1993

Doctor of Medicine, Northwestern University, 2001

David Alan Leitman, M.D.

Voluntary Clinical Instructor in 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

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.

Assistant Professor of 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)

Doctor of Medicine, 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.

Associate Professor of Radiology (primary appointment)

Associate 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)

Assistant Professor of Psychiatry

Bachelor of Science, John Carroll University, 2012

Doctor of Philosophy, University of Pittsburgh, 2017

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 Arts, University of Auckland, 2008
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)
William R. Orthwein, Jr. and Laura Rand Orthwein Chair in Radiology and Pediatrics
Senior Vice Chair - Division of Diagnostic Imaging at MIR
Professor of 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 Arts, University of Notre Dame, 2002
Doctor of Medicine, University of Texas Houston, 2006

Christine Onsy Menias, M.D.

Voluntary Research Professor of Radiology
Bachelor of Science, Marquette University, 1990
Doctor of Medicine, George Washington University, 1995

Joyce Chipso 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
null, Yale University, null

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 Tech University, 2005

Michelle M Miller-Thomas, M.D.

Professor of Radiology (primary appointment)
Vice Chair of Faculty Development
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

Lisa B Mogil, M.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, Columbia University, 2012
Doctor of Medicine, State University of New York at Buffalo, 2017

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.

Voluntary Clinical Instructor in Radiology
Bachelor of Science, University of Missouri Columbia, 1982
Doctor of Medicine, University of Iowa, 1991

N

Ayman Nada, M.M.Sc., M.D., DEGREE-3-160

Assistant Professor of Radiology (primary appointment)
Bachelor of Medicine and Bachelor of Surgery, Cairo University, 2010
Master of Medical Science, Cairo University, 2014
Doctor of Medicine, Cairo University, 2017

Ying Hwey Nai, Ph.D., B.Eng

Assistant Professor of Radiology (primary appointment)
Bachelor of Engineering, Nanyang Technological University, 2008
Doctor of Philosophy, Tohoku University, 2017

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.B.A., 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
Master of Business Administration, Washington University in St Louis, 2015

Adam David Naylor, M.D., B.Eng

Assistant Professor of Radiology (primary appointment)
Bachelor of Engineering, University of Michigan Ann Arbor, 2013

Doctor of Medicine, Washington University in St Louis, 2018

Arash Nazeri, M.D.

Assistant Professor of Radiology (primary appointment)
Doctor of Medicine, Tehran University of Medical Sciences, 2013

Michael Lee Nickels, Ph.D.

Associate Professor of Radiology (primary appointment)
Bachelor of Science, Northern Kentucky University, 2001
Champaign, 2007

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

P

Smita Parikh, M.D.

Voluntary Clinical Instructor in Radiology
Doctor of Medicine, BJ Medical College, 1970

Matthew S Parsons, M.D.

Professor of Radiology (primary appointment)
Oxford, 1995
Main Campus, 2000

Daniel D Picus, M.D.

Professor of Radiology (primary appointment)
Senior Vice Chair - Special Projects
Professor of Surgery (General Surgery)
Champaign, 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)
Foreign MD equivalent, Gandhi Memorial Science College (G.G.M. Science College), 2001

Hilton I Price, M.D.

Voluntary Clinical Instructor in 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

Amir Ata Rahnemai Azar

Assistant Professor of Radiology (primary appointment)

Marcus E Raichle, M.D.

Professor of Radiology (primary appointment)
Alan A and Edith L Wolff Distinguished Professor of Medicine
Professor of Neuroscience
Professor of Neurology
Professor of Psychological & Brain Sciences
Professor of Biomedical Engineering
Bachelor of Science, University of Washington, 1960
Doctor of Medicine, University of Washington, 1964

Cyrus A Raji, Ph.D., M.D.

Associate Professor of Radiology (primary appointment)
Associate 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 Illinois, 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 Medicine
Associate Professor of Pediatrics
Bachelor of Science, University of Chicago, 2005
Doctor of Medicine, Case Western Reserve University, 2011

Nanette Rahee Reed, M.D.

Assistant Professor of Radiology
Bachelor of Science, University of Notre Dame, 2000
Doctor of Medicine, Baylor College of Medicine, 2004

David E Reichert, Ph.D.

Voluntary Research Associate Professor of Radiology
Voluntary Teaching Associate Professor
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.

Associate Professor of Radiology (primary appointment)
Associate Professor of Surgery (General Surgery)
Doctor of Medicine, Tehran University, 2005
Master of Science, Monash University, 2008

Toni Roth, M.D.

Voluntary Clinical Instructor in 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.

Associate Professor of Radiology (primary appointment)
Section Chief - Interventional
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.

Voluntary Clinical Instructor in Radiology
Bachelor of Science, University of Texas Austin, 1974
Doctor of Medicine, University of Texas Southwest, 1979

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 Emerita of Radiology
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)
Bachelor of Science, Fatih University, 2007
Master of Science, University of California Los Angeles, 2010

Doctor of Philosophy, University of California Los Angeles, 2013

Noah McKimsey Seymore, M.D.

Voluntary Clinical Assistant Professor of Radiology
Bachelor of Science, University of North Carolina at Chapel Hill, 2011
Doctor of Medicine, East Carolina University, 2015

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

Elizabeth Sheybani

Instructor in Radiology (Pending Dean Approval) (primary appointment)

Joshua S Shimony, Ph.D., M.D.

Professor of Radiology (primary appointment)
Bachelor of Science, Technion Israel Institute of Technology, 1982
Doctor of Philosophy, University of Tennessee, 1988
Champaign, 1995

Koresh 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)
Vice Chair of Diversity, Equity, and Justice
Associate Professor of Medicine
Doctor of Philosophy, Washington University in St Louis, 2006

Ryan Gregory Short, M.D.

Assistant Professor of Radiology (primary appointment)
Assistant Professor of Medicine
Bachelor of Science, Cedarville University, 2008
Main Campus, 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

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

Sheng-Kwei Song, M.S., Ph.D.

Professor of Radiology (primary appointment)
Bachelor of Science, Tamkang University, 1981
Master of Science, University of Alabama in Tuscaloosa, 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
Master of Electrical Engineering, National Technical University of Athens, 2006
Master of Science, Ecole Polytechnique, 2007
Doctor of Philosophy, Ecole Centrale Paris, 2011

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.

Voluntary Clinical Instructor in Radiology
Bachelor of Science, University of Wisconsin, 1980
Doctor of Medicine, Mayo Clinic College of Medicine and Science, 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

Christopher A. Swingle, M.B.A., D.O.

Assistant Professor of Radiology (primary appointment)
Bachelor of Arts, University of Kansas, 1996
Doctor of Osteopathic Medicine, Kansas City University of Medicine and Biosciences, 2000
Master of Business Administration, Washington University in St Louis, null

T

Yuan-Chuan Tai, M.E.E., Ph.D.

Associate Professor of Radiology (primary appointment)
Associate Professor of Electrical and Systems Engineering
Senior Vice Chair of Radiology
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

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 at Manoa, 1980

Matthew Allan Thomas, Ph.D.

Assistant Professor of Radiology (primary appointment)
Doctor of Philosophy, University of Arkansas at Little Rock, 2012

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.

Voluntary Clinical Instructor in 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

Richard Tsai, M.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, University of California San Diego, 2008

Doctor of Medicine, 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.

Voluntary Clinical Instructor in 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)
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.

Associate Professor of Radiology (primary appointment)
Associate Professor of Neurological Surgery
Doctor of Philosophy, California Institute of Technology, 2014

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

Muriah Dawn Wheelock, Ph.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Arts, University of Alabama in Tuscaloosa, 2010
Doctor of Philosophy, University of Alabama in Tuscaloosa, 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 Psychiatry
Professor of Neuroscience
Professor of Neurology
Bachelor of Science, University of Western Ontario, 1972
Doctor of Medicine, University of Toronto, 1977
Doctor of Philosophy, Johns 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)
Elizabeth E Mallinckrodt Professor of Radiology
Head of the Department of Radiology
Director of The Edward Mallinckrodt Institute of Radiology

Professor of Medicine
Professor of Pediatrics
Professor of Biomedical Engineering
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

Jie Zheng, M.S., Ph.D.

Associate Professor of Radiology (primary appointment)
Bachelor of Science, Beijing University, 1986
Main Campus, 1992
Main Campus, 1994

Dong Zhou, M.S., Ph.D.

Assistant Professor of Radiology (primary appointment)
Bachelor of Science, Shandong University (#####), 1990
Master of Science, Shandong University (#####), 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.

David Ballard, MD

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.

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.

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)dioxy]-19-norpregn-4-ene-3,20 dione (FFNP); (2) assessment of cell proliferation with a new tracer, N-(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.

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 α system in defining this metabolic-functional relation.

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.

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.

Courses

For more information, contact Michelle Miller-Thomas, MD, Coordinator of Radiology Medical Student Education, at miller-thomasm@wustl.edu or 314-362-5949.

Visit online course listings to view offerings for M90 Radiol.

M90 Radiol 801 General Radiology (Clinical Elective)

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. Credit 4 units.

M90 Radiol 802 Advanced Radiology (Clinical Elective)

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; 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. Credit 4 units.

M90 Radiol 820 Clinical Nuclear Medicine (Clinical Elective)

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. Credit variable, maximum 4 units.

M90 Radiol 830 Interventional Radiology (Clinical Elective)

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. Credit 4 units.

M90 Radiol 842 Cardiothoracic Radiology (Clinical Elective)

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.
Credit 4 units.

M90 Radiol 910 Diagnostic Radiology Advanced Clinical Rotation (ACR)

Credit 4 units.

M90 Radiol 915 Interventional Radiology Advanced Clinical Rotation (ACR)

As part of this 4 week Advanced Clinical Rotation in Interventional Radiology (IR-ACR), trainees will participate in image-guided procedures as well as the care of patients before and after those procedures. The increasing use of ultrasound, fluoroscopy and computer tomography to guide an ever increasing array of minimally invasive procedures means that trainees preparing for a broad array of specialties may benefit from this course. While the experiences with central venous catheter placement, image-guided drainages, and angiography will be most applicable to students interested in Interventional and Diagnostic Radiology, the resulting knowledge, skills and abilities will also likely prove useful for students interested in Critical Care, Emergency Medicine, Anesthesiology and multiple surgical specialties. The IR-ACR will include caring for adult and pediatric patients at Barnes-Jewish Hospital, Barnes-Jewish West County Hospital and St Louis Children's Hospital. The course will include inpatient as well as outpatient experiences.
Credit 4 units.

Mary Culver Department of Surgery

Formal instruction in surgery begins during Phase 2 of the MD program's Gateway Curriculum, with a required eight-week clinical clerkship. During this curricular phase, students are assigned to two general surgery clinical rotations lasting three weeks each within the Department of Surgery. These clinical experiences provide students with 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 Phase 3, students may elect to participate in a variety of sub-internship rotations offered within the Department of Surgery. The sub-internships cover general surgical specialties and subspecialties, including trauma surgery, 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 and their appointments.

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.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, University of Michigan Dearborn, 2012
Doctor of Medicine, Wayne State University, 2016

Brent Allen, M.D.

Associate Professor of Surgery (General Surgery) (primary appointment)
Bachelor of Science, Utah State University, 1975
Doctor of Medicine, Washington University in St Louis, 1979

David Michael Alvarado, Ph.D.

Assistant Professor of Surgery (Pediatric Surgery) (primary appointment)
Bachelor of Science, University of South Florida, 2007
Doctor of Philosophy, Johns Hopkins University, 2014

Rachel Alexandria Anolik, M.D.

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)
Main Campus, 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 Mumbai, 1970

Christopher Thomas Arett, M.D.

Associate 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

Michael Magdi Awad, M.Ed., 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
Master of Education, University of Illinois at Chicago, 2022

B

Saifeddin Moh'D Ahmad Badran, Ph.D., M.D.

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)
Doctor of Medicine, University of Jordan, 2015
Doctor of Philosophy, Qatar University, 2023

Jeffrey Allen Bailey, M.P.A., M.D.

Professor of Surgery (General Surgery) (primary appointment)
Master of Public Administration, Golden Gate University California, 1986
Doctor of Medicine, Saint Louis University, 1996

Ana Amelia L Baumann Walker, M.A., Ph.D.

Associate Professor of Surgery (Public Health Sciences) (primary appointment)
Associate Professor of Anesthesiology
Bachelor of Arts, Brasilia University, 2000
Master of Arts, Brasilia University, 2003
Doctor of Philosophy, Utah State University, 2008

Kimberly Crawford Berni, M.D.

Instructor in Surgery (Urologic Surgery) (primary appointment)
Bachelor of Science, University of Missouri Columbia, 1988
Doctor of Medicine, 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

Jeffrey Alan Blatnik, M.D.

Associate Professor of Surgery (General Surgery) (primary appointment)
Oxford, 2003
Doctor of Medicine, Case Western Reserve University, 2007

Grant Bochicchio, M.P.H., M.D.

Professor of Surgery (General Surgery) (primary appointment)
Harry Edison Professor of Surgery
Section Chief - Division of Acute & Critical Care Surgery
Master of Public Health, University of Pittsburgh, 1989
Main Campus, 1993

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

Whitney Brandt, M.D.

Assistant Professor of Surgery (Cardiothoracic Surgery) (primary appointment)
Champaign, 2010
Stritch School of Medicine, 2014

Alexander Angelo Brescia

Assistant Professor of Surgery (Cardiothoracic Surgery) (primary appointment)

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)
Pruett Professor of Surgery
Section Chief - Section of Minimally Invasive
Bachelor of Arts, University of Mississippi, 1976
Doctor of Medicine, Johns Hopkins University, 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

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 of 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
Doctor of Science, Harvard University, 2013

David Anthony Caplin, M.D.

Voluntary Clinical Instructor in 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)
Eugene M. Bricker Professor of Surgery (General Surgery)
Section Chief - Section of Transplantation

Division Chief - Division of General Surgery
Bachelor of Arts, University of North Carolina at Chapel Hill, 1980
Doctor of Medicine, University of South Carolina Columbia, 1984

William Cavanaugh Chapman, M.P.H., M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Arts, University North Carolina, 2009
Doctor of Medicine, Georgetown University, 2015
Master of Public Health, Washington University in St Louis, 2018

Graham A Colditz, M.P.H., M.D., MBBS

Professor of Surgery (General Surgery) (primary appointment)
Deputy Director for the Institute of Public Health
Division Chief - Division of Public Health
Professor of Medicine
Niess-Gain Professor of Medicine
Bachelor of Science, University of Queensland, 1977
Foreign MD equivalent, University of Queensland, 1979
Master of Public Health, Harvard University, 1982
Doctor of Medicine, University of Queensland, 1998

H. Groves Cooke, M.S., D.Dent.

Voluntary Clinical Instructor in 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 Copen, M.D.

Professor of Surgery (Urologic Surgery) (primary appointment)
Bachelor of Arts, Wabash College, 1981
Doctor of Medicine, Indiana University Bloomington, 1985

Michelle Cowan

Associate Professor of Surgery (General Surgery) (Pending Executive Faculty Approval) (primary appointment)

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.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, University of Kentucky, 2008
Master of Medical Science, Marshall University, 2010
Doctor of Osteopathic Medicine, West Virginia School of Osteopathic Medicine, 2015

Darren Robert Cullinan, Sc.M., M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science in Nursing, University of Iowa, 2008
Doctor of Medicine, University of Tennessee Health Science Center, 2013
Master of Science, Washington University in St Louis, 2019

Kelly Bettina Currie, M.D.

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)
Adjunct Lecturer
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)
Evarts Ambrose Graham Professor of Surgery (Cardiothoracic Surgery)
Division Chief - Division of Cardiothoracic Surgery
Bachelor of Arts, Dartmouth College, 1976
Doctor of Medicine, Duke University, 1980

Neha Datta, M.D.

Assistant Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)
Assistant Professor of Otolaryngology
Bachelor of Science, Rice University, 2006
Doctor of Medicine, Harvard University, 2012

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
Doctor of Science, Harvard University, 2015

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

Maria Bernadette Majella Doyle, M.D.

Professor of Surgery (General Surgery) (primary appointment)
Mid-America Transplant/Department of Surgery Endowed
Distinguished Professor of Abdominal Transplantation
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)
Assistant Vice Provost of Community-Engaged Research
Director of the Confluence Collaborative for Community-Engaged Research, Teaching and Practice
Bachelor of Science, Baylor University, 2001
Master of Public Health, University of Texas Health Science Center, 2003

Doctor of Philosophy, University of South Carolina Columbia, 2006

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.

Voluntary Clinical Assistant Professor of 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.

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)
Spencer T. and Ann W. Olin Distinguished Professor
Senior Associate Dean for Cancer Programs
Director, Siteman Cancer Center
Professor of Pathology and Immunology
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 and Reconstructive Surgery) (primary appointment)
Bachelor of Arts, University of Missouri Kansas City, 2009
Doctor of Medicine, University of Missouri Kansas City, 2015

James R Edgerton

Voluntary Clinical Professor of Surgery (General Surgery)

Pirooz Eghtesady, M.S., D.Sc., M.D.

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)
Emerson Chair in Pediatric Cardiothoracic Surgery
Professor of Pediatrics
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.

Voluntary Clinical Assistant Professor of Surgery (General Surgery) Main Campus), 2005
Doctor of Osteopathic Medicine, Philadelphia College of Osteopathic Medicine, 2009

Catherine Enriken

Voluntary Clinical Assistant Professor of Surgery

Neil Anthony Ermitano, D.P.M.

Assistant Professor of Surgery (General Surgery) (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

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 in 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

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 Medicine
Professor of Biostatistics
Doctor of Philosophy, Emory University, 2003

Mathieu Garand, M.S., Ph.D.

Instructor in Surgery (Cardiothoracic Surgery) (primary appointment)
Bachelor of Science, Université de Sherbrooke, 2002
Master of Science, Queen's University, 2004
Doctor of Philosophy, Queen's University, 2009

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)
Jacqueline G and William E Maritz Endowed Chair in Immunology and Oncology
Professor of Pathology and Immunology
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)
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) (primary appointment)
Bachelor of Arts, Northwestern University, 1983
Doctor of Medicine, University of Missouri Columbia, 1987

Katherine LuBell Glover-Collins, Ph.D., M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, Xavier University of 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

Omar Guerra, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Arts, Saint Louis University, 1995

Doctor of Medicine, Universidad Central del Caribe, 1999

Zeynep Gul, M.D.

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)
Baccalaureatus, Princeton University, 2011
Doctor of Medicine, Case Western Reserve University, 2015

Jun Guo, M.S., Ph.D.

Associate Professor of Surgery (Pediatric Surgery) (primary appointment)
Bachelor of Science, Nanjing University (#####), 1991
Master of Science, Dalian Medical University (#####), 1997
Doctor of Philosophy, Fudan University (#####), 2000

H

Emily Hahn

Voluntary Clinical Assistant Professor of Surgery

Michael Harkins

Voluntary Clinical Instructor in Surgery (Plastic Surgery)

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

Katherine M. Holzem, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Arts, University of Pennsylvania, 2005

Doctor of Medicine, 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)

Assistant Professor of Occupational Therapy

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

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.

Professor of Surgery (Urologic Surgery) (primary appointment)
Bachelor of Arts, Dartmouth College, 2001
Doctor of Medicine, University of Washington, 2009

Charles Jones, M.D.

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)
Bachelor of Science, University of Missouri Columbia, 2012
Doctor of Medicine, University of Missouri Columbia, 2017

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) (primary appointment)
John M Shoenberg Professor of Surgery (Cardiothoracic Surgery)
Doctor of Medicine, Keio University, 2002

Kirsten Karkow

Voluntary Clinical Instructor in Surgery

Demetrios Katsikas, M.D.

Voluntary Clinical Instructor in 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.

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.

Associate Professor of Surgery (General Surgery) (primary appointment)
Associate Professor of Radiology
Doctor of Medicine, Karnataka Institute of Medical Sciences, 2007

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

Savannah Kipfer

Voluntary Clinical Assistant Professor of Surgery

John P. Kirby, M.S., M.D.

Associate Professor of Surgery (General Surgery) (primary appointment)
Champaign, 1988
Champaign, 1993
Champaign, 1999

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.B.A., M.D.

Associate Professor of Surgery (General Surgery) (primary appointment)
Maryland, 1999
Doctor of Medicine, Emory University, 2007
Master of Business Administration, Washington University in St Louis, 2023

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)
G Alexander Patterson MD and Mid America Transplant Endowed
Distinguished Chair in Lung Transplantation
Professor of Pathology and Immunology
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)
Gerald L Andriole Professorship in Urologic Surgery
Professor of Anesthesiology
Bachelor of Science, Rice University, 1994
Doctor of Medicine, Cornell University, 1999

Natasha Leigh-Matijakovich, M.D.

Assistant Professor of Surgery (General Surgery) (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 College of Medicine and Science, 2011

Doctor of Medicine, Mayo Clinic College of Medicine and Science, 2011

Lijin Li, Ph.D., DEGREE-3-150

Instructor in Surgery (General Surgery) (Pending Dean Approval)
(primary appointment)
Doctor of Philosophy, University of Arizona, 2005
Shanghai Medical University), 1991
Shanghai Medical University), 1994

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

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 Ann Arbor, 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

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.

Voluntary Clinical Instructor in Surgery (General Surgery)
Bachelor of Arts, Emory University, 1972
Doctor of Medicine, University of Chicago, 1976

Chongliang Luo, Ph.D.

Assistant Professor of Surgery (Public Health Sciences) (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 Medicine
Professor of Biostatistics
Bachelor of Science, Renmin University of China (#####), 1998
Master of Science, Renmin University of China (#####), 2001
Doctor of Philosophy, Duke University, 2006

M

Susan E Mackinnon, M.D.

Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)

Minot Packer Fryer Professor of Plastic Surgery

Professor of Occupational Therapy

Professor of Otolaryngology

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 Arts, Case Western Reserve University, 2007

Main Campus, 2011

Sara M Malone, M.S.W., Ph.D.

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)

Adjunct Lecturer

Adjunct Instructor

Bachelor of Science, Centre College, 2012

Master of Social Work, Washington University in St Louis, 2014

Doctor of Philosophy, Washington University in St Louis, 2022

Julie Ann Margenthaler, M.D.

Professor of Surgery (General Surgery) (primary appointment)

Endowed Chair for Surgical Excellence in Breast Cancer

Bachelor of Arts, Boston University, 1993

Doctor of Medicine, Southern Illinois University Carbondale, 1997

Gregory Martens, M.D.

Assistant Professor of Surgery (General Surgery) (Pending Executive Faculty Approval) (primary appointment)

Doctor of Medicine, Indiana University School of Medicine, 2012

Colin Martin, M.D.

Professor of Surgery (Pediatric Surgery) (primary appointment)

Drs. Brad and Barbara Warner Professor of Pediatric General Surgery

Division Chief - Division of Pediatric Surgery

Newman College, 1999

Doctor of Medicine, Wayne State University, 2003

Muhammad Faraz Masood, M.D.

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)

Doctor of Medicine, Dow Medical College Karachi, 2001

Patricia A McGuire, M.D.

Voluntary Clinical Instructor in 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

Lawrence Mendelow, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Doctor of Medicine, Duke University, 1983

Meredith Metcalf

Assistant Professor of Surgery (Urologic Surgery) (Pending Executive Faculty Approval) (primary appointment)

Bryan F Meyers, M.D.

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)

Patrick and Joy Williamson Endowed Professor of Surgery

(Cardiothoracic Surgery)

Bachelor of Arts, Yale University, 1982

Doctor of Medicine, University of Chicago, 1986

Jacob Ryan Miller, M.D.

Assistant Professor of Surgery (Cardiothoracic Surgery) (primary appointment)

Bachelor of Science, Indiana University Bloomington, 2020

Doctor of Medicine, Indiana University Indianapolis, 2020

Nabil A Munfakh, M.D.

Professor of Surgery (Cardiothoracic Surgery) (primary appointment)

Bachelor of Science, University of Michigan Ann Arbor, 1981

Doctor of Medicine, University of Michigan Ann Arbor, 1985

Takashi Murashita, M.D.

Assistant Professor of Surgery (Cardiothoracic Surgery) (Pending Executive Faculty Approval) (primary appointment)

Doctor of Medicine, Kyoto University, 2004

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 Amherst, 2011

Matthew G Mutch, M.D.

Professor of Surgery (General Surgery) (primary appointment)

Solon and Bettie Gershman Professorship in Colon and Rectal Surgery

Section Chief - Section of Colon-Rectal Surgery

Bachelor of Arts, Saint Olaf College, 1990

Doctor of Medicine, Washington University in St Louis, 1994

Meera Muthukrishnan, Ph.D.

Instructor in Surgery (Public Health Sciences) (Pending Dean Approval) (primary appointment)

Doctor of Philosophy, Saint Louis University, 2020

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.

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)
Doctor of Medicine, Univ of Armed Forces: Military, 2000

Todd Neuberger, M.D.

Instructor in Surgery (General Surgery) (primary appointment)
Bachelor of Science, Brigham Young University, 1985
Doctor of Medicine, University of Texas Southwestern Medical Center at Dallas, 1990

Thoi Hieu Ngo, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

College Park, 2010

Doctor of Medicine, New York Medical College, 2014

Trang Nguyen

Associate Professor of Surgery (General Surgery) (Pending Executive Faculty Approval) (primary appointment)

Richard James Nissen, M.S., D.Dent.

Voluntary Clinical Assistant Professor of 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

Grace Niziolek, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Doctor of Medicine, University of North Carolina at Chapel Hill, 2014
Bachelor of Science, Virginia Tech, 2021

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

O

Beryne Odeny, M.P.H., MB.ChB., Ph.D.

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)
Foreign MD equivalent, University of Nairobi, 2006
Seattle Campus, 2014
Seattle Campus, 2022

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 Ann Arbor, 2008
Doctor of Medicine, University of Michigan Ann Arbor, 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, Liverpool School of Tropical Medicine, 2009

P

Roheena Zainab Panni, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Doctor of Medicine, Aga Khan University, 2011

Yikyung Park, M.S., D.Sc.Epi.

Professor of Surgery (Public Health Sciences) (primary appointment)
Bachelor of Science, EWHA Womans University, 1994
Master of Science, EWHA Womans University, 1996
Doctor of Science Epidemiology, Harvard University, 2005

Jeffrey Andrew Parres, M.D.

Voluntary Clinical Instructor in 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 Radiology
Professor of Biomedical Engineering
Doctor of Medicine, University of Oklahoma, 1978

Kamleshkumar Patel, M.D.

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)
Foreign MD equivalent, Shivaji University, 2001

Mitchell A Pet, M.D.

Associate 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 Arts, 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)
Section Chief of Thoracic Surgery
Bachelor of Science, All India Institute of Medical Sciences, 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.

Voluntary Clinical Instructor in Surgery (General Surgery)
Bachelor of Arts, University of California San Diego, 1983
Doctor of Medicine, University of Missouri Columbia, 1987

Shuddhadeb Ray, M.D.

Assistant Professor of Surgery (Cardiothoracic Surgery) (primary appointment)
Doctor of Medicine, University of Kansas Medical Center, 2011

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

Matthew Randall Rosengart, M.P.H., M.D.

Professor of Surgery (General Surgery) (primary appointment)
Theodore and Bertha Bryan Professor of Environmental Medicine

Bachelor of Arts, Johns Hopkins University, 1991
Doctor of Medicine, University of Alabama at Birmingham School of Medicine, 1995
Master of Public Health, University of Washington School of Public Health, 2004

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)
Sydney M Jr and Robert H Shoenberg Endowed Chair in Plastic & Reconstructive Surgery
Division Chief - Division of Plastic Surgery
Bachelor of Science, Cornell University, 1993
Doctor of Medicine, Mount Sinai School of Medicine, 1998
Master of Business Administration, Johns Hopkins University, 2015

Elizabeth Ann Salerno, M.P.H., Ph.D.

Assistant Professor of Surgery (Public Health Sciences) (primary appointment)
Champaign, 2012
Champaign, 2017
Master of Public Health, Johns Hopkins University, 2018

Luis A Sanchez, M.D.

Professor of Surgery (General Surgery) (primary appointment)
Gregorio A. Sicard Distinguished Professor
Section Chief - Section of Vascular
Professor of Radiology
Bachelor of Science, Yale University, 1983
Doctor of Medicine, Harvard University, 1987

Dominic Sanford, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, Maryville University of Saint Louis, 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

Thomas Sensing

Voluntary Clinical Assistant Professor of Surgery

Courtney Shands, M.D.

Voluntary Clinical Instructor in Surgery (Urologic Surgery)
Bachelor of Arts, Stanford University, 1978
Doctor of Medicine, Vanderbilt University, 1982

Surendra Shenoy, Ph.D., MBBS

Professor of Surgery (General Surgery) (primary appointment)
Foreign MD equivalent, Kasturba Medical College, 1980
Doctor of Philosophy, All India Institute of Medical Sciences, 1989

Sachin Mahavir Shridharani

Voluntary Clinical 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.

Associate Professor of Surgery (General Surgery) (primary appointment)
Main Campus, 2001
Doctor of Medicine, Temple University, 2005
Master of Science, Temple University, 2010

Woodson Smelser, M.D.

Assistant Professor of Surgery (Urologic Surgery) (primary appointment)
Bachelor of Science, University of Missouri Columbia, 2011
Doctor of Medicine, University of Missouri Kansas City, 2015

Craig Robert Smith, M.B.A., M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, Bucknell University, 1989
Doctor of Medicine, Jefferson Medical College, 1995
Master of Business Administration, Washington University in St Louis, 2000

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)
Associate Professor of Developmental Biology
Bachelor of Arts, Knox College, 2000
Doctor of Medicine, Washington University in St Louis, 2004

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

Voluntary Clinical Assistant Professor of Surgery (General 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

Daniel Charles Stoeckel

Voluntary Clinical Instructor in Surgery

Steven M Strasberg, M.D.

Professor Emeritus of Surgery
Doctor of Medicine, University of Toronto, 1963

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

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 in Surgery

Lewis Jones Thomas, M.D.

Assistant Professor of Surgery (Urologic Surgery) (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 Ann Arbor, 1983

Adetunji Toriola, M.P.H., MB.ChB., Ph.D.

Professor of Surgery (Public Health Sciences) (primary appointment)
Foreign MD equivalent, Obafemi Awolowo University, 1998
Master of Public Health, University of Kuopio, 2007
Doctor of Philosophy, University of Tampere, 2011

Ralph J Torrence, M.D.

Voluntary Clinical Assistant Professor of 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, Technical College of the Lowcountry, 2002

Thomas H Tung, M.D.

Professor of Surgery (Plastic and Reconstructive Surgery) (primary appointment)
Bachelor of Science, Duke University, 1986
College Park, 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

W

Alyssa Danielle Wait, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Science, University of Notre Dame, 2001
Doctor of Medicine, Indiana University School of Medicine, 2005

Lisa Marie Waller, M.S., Ph.D.

Professor of Surgery (Public Health Sciences) (primary appointment)
Assistant Vice Provost and Special Advisor to the Office of Public Health

Bachelor of Science, Concordia College, 1982

Master of Science, University of Memphis (Formerly Memphis State University), 1991

Doctor of Philosophy, University of Minnesota, 1995

Fei Wan, M.S., Ph.D.

Associate Professor of Surgery (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)
Jessie L. Ternberg, M.D., PhD. Distinguished Professor of Pediatric Surgery in Surgery (Pediatric Surgery)
Professor of Pediatrics
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
New Brunswick, 2003
New Brunswick, 2006
Master of Public Health, Johns Hopkins University, 2007

Michael D Weiss, D.P.M.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Main Campus, 1977

Doctor of Podiatric Medicine, Ohio College of Podiatric Medicine, 1981

Nicholas Alan Welko, M.S., M.D.

Instructor in Surgery (General Surgery) (primary appointment)
Bachelor of Science, Case Western Reserve University, 2012
Master of Science, Case Western Reserve University, 2012
Doctor of Medicine, University of Pittsburgh, 2017

Jason R Wellen, M.D.

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

Brad C White, M.D.

Voluntary Clinical Instructor in 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

Andrew Wishy

Voluntary Clinical Assistant Professor of Surgery

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

X

Yan Xie

Voluntary Research Assistant Professor of Surgery

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
Master of Arts, 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

Andrew Yeh, M.D.

Assistant Professor of Surgery (Pediatric Surgery) (primary appointment)
Bachelor of Science, University of Toronto, 2007
Doctor of Medicine, University of Hawaii Oahu, 2012

Robert A Young, M.S., J.D., M.D.

Voluntary Clinical Instructor in 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.

Professor of Surgery (General Surgery) (primary appointment)
Professor of Radiology
Bachelor of Science, University North Carolina, 2002
Doctor of Philosophy, University of North Carolina at Chapel Hill, 2007
Doctor of Medicine, University of North Carolina at Chapel Hill, 2009

Christian W Zemlin, Ph.D.

Associate Professor of Surgery (Cardiothoracic Surgery) (primary appointment)

Adjunct Instructor

Doctor of Philosophy, Humboldt University, 2012

Jeffrey Zuke, M.D.

Assistant Professor of Surgery (General Surgery) (primary appointment)

Bachelor of Arts, University of Missouri Kansas City, 1976

Doctor of Medicine, University of Missouri Kansas City, null

Research Electives

Surgery Research Electives

Students at all levels are encouraged and welcomed to get involved with surgical research. Many opportunities exist within the Department of Surgery for students to participate in 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.

Courses

Visit online course listings to view offerings for M95 Surgery.

M95 Surgery 814 Acute and Critical Care Surgery (Clinical Elective)

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 elective, 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.
Credit variable, maximum 4 units.

M95 Surgery 817 Surgical Night Float / Emergency Surgical Consults and Trauma Night Rotation (Clinical Elective)

This elective 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. Medical students are also invited to participate in ongoing research projects under the mentorship of surgery faculty.
Credit 4 units.

M95 Surgery 820 Cardiothoracic Surgery (Clinical Elective)

The elective 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. Credit 4 units.

M95 Surgery 830 Plastic & Reconstructive Surgery (Clinical Elective)

The period on Plastic Surgery may either be spent as a clinical clerkship or conducting a research project. The purpose of the clinical clerkship 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. Credit 4 units.

M95 Surgery 850 Urologic Surgery (Clinical Elective)

The four-week clinical elective 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. Credit 4 units.

M95 Surgery 862 Colon & Rectal Surgery (Clinical Elective)

This 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.

Credit variable, maximum 4 units.

M95 Surgery 863 Surgical Oncology & Endocrine Surgery (Clinical Elective)

This elective 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.

Credit variable, maximum 4 units.

M95 Surgery 864 Ethical Challenges in Surgery and Medicine (Non-Clinical Elective)

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.

Credit 4 units.

M95 Surgery 871 Vascular Surgery (Clinical Elective)

This 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. Credit variable, maximum 4 units.

M95 Surgery 879 Hepatobiliary-Pancreatic Surgery (Clinical Elective)

This course 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.

Credit variable, maximum 4 units.

M95 Surgery 880 Pediatric Surgery (Clinical Elective)

This course 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.

Credit variable, maximum 4 units.

M95 Surgery 891 Organ Transplantation (Clinical Elective)

The care of transplant patients requires the integration of multiple diverse medical and surgical disciplines. This course 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.

Credit variable, maximum 4 units.

M95 Surgery 893 Minimally Invasive Surgery (Clinical Elective)

This 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.

Credit variable, maximum 4 units.

M95 Surgery 910 General Surgery Advanced Clinical Rotation (ACR)

Students in the General Surgery ACR are placed in one of the following seven services. Students may enroll in this ACR twice. Acute and Critical Care Surgery: The ACCS service provides experience with a broad range of general surgical problems. Typically, students encounter patients with acute traumatic injuries or burns and are exposed to many acute surgical problems such as acute abdominal emergencies, skin and soft tissue infections (including some amputations), acute appendicitis, and acute cholecystitis. Students will likely experience a combination of laparoscopic, robotic, and open operations. Students also gain experience with pre-operative evaluation and operative management of patients undergoing elective surgical procedures such as hernia repair and cholecystectomy. Colorectal Surgery: The Colorectal Surgery rotation covers all aspects of benign and malignant colorectal and anal disease. The operative procedures vary from simple anorectal procedures to large open abdominal, robotic and laparoscopic operations. Students will likely encounter both urgent/emergent and elective operations. Hepatobiliary and Pancreatic Surgery: The HPB service exposes students to a variety of surgical conditions of the pancreas, liver, stomach, and biliary tract. This includes benign and cancerous conditions. Students may also encounter surgeries for various types of sarcomas. They will encounter laparoscopic, robotic, and large open operations. Minimally Invasive Surgery: The MIS service exposes students to patients with a variety of surgical problems (including hernias, gallstone disease, gastrointestinal foregut problems, morbid obesity, and endocrine disorders). Students are exposed to basic and advanced minimally invasive surgery (laparoscopic and robotic operations) as well as complex open operations. Pediatric Surgery: Pediatric surgery is essentially general surgery on children. Students are exposed to a wide variety of conditions involving the gastrointestinal tract, genitourinary tract, lung, diaphragm, etc. The service handles a significant amount of penetrating and blunt trauma, burns, and other acute surgical emergencies such as appendicitis, intestinal obstruction, and perforated viscus. In addition, the student will be exposed to surgery on newborns for vascular access and intestinal and abdominal wall conditions. Students will be exposed to a variety of surgical approaches including open, laparoscopic, and thoracoscopic procedures. Surgical Oncology: The Surgical Oncology (formerly Endo/Onc) service is primarily dedicated to the treatment of some of the most common cancers in adults (including breast, melanoma, and thyroid). Students will also obtain experience with many other surgeries for benign disease processes in breast and endocrine glands (thyroid, parathyroid, and adrenal). Students may also encounter surgery for sarcomas and a unique operation that involves heated intra-peritoneal chemotherapy for advanced cancers (HIPEC). They will likely encounter some laparoscopic procedures (adrenalectomy). Transplant Surgery: Abdominal Organ Transplantation exposes students to a blend of medical and surgical care of solid-organ transplant patients (kidney, pancreas, and liver). Organ procurements provide the ultimate exposure to human anatomy in a heart-beating, brain-dead donor. Students will likely experience other hepato-biliary procedures (liver resection, pancreatic resection, biliary tract surgery etc) for benign/malignant conditions and vascular access procedures (AV fistula formation), providing broad anatomical exposure. Most of these operations are performed with large, open incisions but students may encounter some laparoscopic procedures (cholecystectomy).

Credit 4 units.

M95 Surgery 915 Cardiothoracic Surgery Advanced Clinical Rotation (ACR)

Available blocks: TBD 4 week rotations

The description for this course will be added as soon as it is finalized.

Student time distribution: TBD

Patients seen weekly: TBD

On-call/weekend responsibility: TBD
Credit 4 units.

M95 Surgery 920 Plastic and Reconstructive Surgery Advanced Clinical Rotation (ACR)

The period on Plastic and Reconstructive Surgery will be spent as a clinical clerkship. The purpose of the clinical sub-internship is to familiarize the student with the basic principles of Plastic and Reconstructive Surgery and prepare for internship. 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 and reconstructive 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, although rotation will be required each week. Students will submit a preference list for service assignments prior to the rotation and efforts will be made to accommodate these preferences. The student will assume an active role on the plastic and reconstructive 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. Students will be expected to participate in patient care on morning and afternoon rounds, in clinic, the emergency department, and in the operating room. Students will gain basic procedural skills including wound care, splinting, and suturing. Student will perform a ten-minute case presentation at PRS Grand Rounds.

Credit 4 units.

M95 Surgery 925 Urologic Surgery Advanced Clinical Rotation (ACR)

The Phase 3 Urology ACR will provide exposure to the full spectrum of clinical urology over four weeks. The student will learn the basic evaluation of the urologic patient, including diagnostic procedures, as well as the management (both surgical and non-surgical) of urologic conditions, under the supervision of the attending staff and house staff. The majority of the rotation will be with the Adult Urology Service in both inpatient and outpatient settings along with a few days on Pediatric Urology.

Credit 4 units.

People of the School of Medicine

Faculty & Staff

Staff

For staff contact information, please visit the Washington University online 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.

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.

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*

Opeolu M. Adeoye

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

Regis J. O'Keefe

John A. Olson

David W. Piston

Linda J. Richards

Gary A. Silverman

Lilianna Solnica-Krezel

Ting Wang

Sean P. J. Whelan

Pamela K. Woodard

Gregory J. Zipfel

Timothy J. Eberlein
Director, Siteman Cancer Center

Susan Dutcher
Chair, Executive Committee of the Faculty Council

David Eisenberg
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)

Susan Dutcher
Chair

David Eisenberg
Vice Chair

For a full list of committee members, please visit the Executive Committee of the Faculty Council website.

Institutional Animal Care and Use Committee

Dr. John Cirrito
Chair

Please visit the Institutional Animal Care and Use Committee website for more information.

Committee on Admissions

Valerie S. Ratts
Chair

For a full list of committee members, please visit the Medical Student Admissions website.

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.

Human Research Protection Office (HRPO)

Washington University Institutional Review Board (IRB)

Derek E. Byers, MD, PhD
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.

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.

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
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

Maria Q. Baggstrom, MD
Co-Chair (2021)

James A.J. Fitzpatrick, BSc, PhD
Co-Chair (2021)

Judith E.C. Lieu, MD (2022-R)
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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.

Radiation Safety Committee

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Chair

Buck E. Rogers, PhD
Vice Chair

Briana Davis
Interim Radiation Safety Officer and Executive Secretary

For a full list of committee members, please visit the Department of Radiation Safety website.

Radioactive Drug Research Committee

Manu S. Goyal, MD, MSc
Chair

Barry A. Siegel, MD
Vice Chair

For a full list of committee members, please visit the Department of Radiation Safety website.

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- Brad Kahl, MD
- Julie Margenthaler, MD
- Yikyung Park, ScD
- Cliff Robinson, MD

For a full list of committee members, please visit the PRMC website.

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.

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Please visit the Board of Trustees website for the list of current trustees and other information concerning the board.

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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.

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.

- Demonstrations and Disruption (p. 359)
- Liability Insurance (p. 360)
- Needle Stick and Blood and Body Fluid Policy and Procedure (p. 360)

- Policy Against Abusive Conduct (p. 361)
- Policy on Student Rights Under the Family Educational Rights and Privacy Act (p. 361)

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.

- Research Integrity Policy (p. 362)
- Social Media Policy (p. 362)
- Student Mistreatment Reporting and Monitoring Policy (p. 362)
- Student Organization Alcohol Guidelines (p. 364)
- Voluntary Teaching Faculty Policy (p. 367)

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.

Please note that the MD Program Policies & Guidelines are subject to change as needed; effective dates will be noted.

Academics

- Clinical Supervision Policy (p. 369)
- Credit Hour Definition (p. 370)
- Duty Hour Policy (p. 370)
- Monitoring of Student Time (p. 371)
- Phase 1 Attendance Policy (p. 372)
- Phase 2 Attendance Policy (p. 373)
- Phase 3 Attendance Policy (p. 374)
- Policy for the Preparation of the Medical Student Performance Evaluation (p. 375)
- Procedure to Request an Alternate Educational Site or Clinical Assignment (p. 375)
- Transportation Policy (p. 375)
- USMLE Policy for Students Entering the Match (p. 376)

Assessment, Promotion, and Appeals for the Gateway Curriculum

- Policy for Review of Student Attainment of Competency (p. 376)
 - Committee for Academic Promotion Bylaws (p. 377)
 - Competency Attainment and Clerkship Competency Committees' Bylaws (p. 378)
- Policy for Student Promotion and Appeals (p. 380)
 - Contesting Individual Assessments Procedure (p. 381)
 - Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 382)
 - Course Credit Procedures (p. 383)
- Challenging the MSPE and Individual Competency-Contributing Assessments (p. 384)
- Conflict of Interest During Student Assessment Policy (p. 384)
- Formative Assessment and Feedback (p. 385)
- Grade Notification Policy (p. 386)
- Narrative Assessment (p. 387)
- Policy for Non-Involvement of Providers of Student Health Services in Student Assessment (p. 387)

Financing Your Education

- Policy for Tuition Refund for the MD Program (p. 387)

Student Health, Professionalism, and Support

- Access to Healthcare Services Policy (p. 388)
- Leave of Absence Policy for Medical Students (p. 388)
- Professional Behaviors for Medical Students (p. 390)
- Technical Standards for the Medical Program (p. 390)

Non-Curricular-Related Policies

- Advanced Standing Transfers Policy for Medical Students (p. 391)
- Non-University-Affiliated Speaker Compensation (p. 391)
- Policy on External Factors (p. 392)
- Policy on the Final Authority of the Committee on Admissions (p. 392)
- Policy on Non-Employee Voluntary Faculty Appointments (p. 392)
- Policy on the Selection of Students (p. 394)
- Preparation of Non-Faculty Instructors for the MD Program (p. 394)

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
- Audiology and Communication Sciences
- Biology and Biomedical Sciences
- Clinical Investigation
- Genetic Counseling
- Informatics, Data Science & Biostatistics (PDF)
- Medical Physics (PDF)
- Occupational Therapy
- Physical Therapy
- Population Health Sciences

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. 358)
- Doctor of Medicine and Master of Science in Clinical Investigation
- Doctor of Medicine and Master of Population Health Sciences
- Doctor of Medicine and Master of Public Health
- Doctor of Medicine and Doctor of Philosophy
- PhD Program Policies & Guidelines (p. 394)

School of Medicine Policies and Guidelines

Demonstrations and Disruption

Washington University and School of Medicine Policy on Demonstrations and Disruption

The Washington University School of Medicine follows the Washington University Policy on Demonstrations and Disruption.

Please note that the medical school campus is a private institution. However, our campus serves members of the public as part of our critical patient care function, and accordingly demonstrations and activities that are disruptive to that patient care function or to patient and visitor access to the medical campus are strictly prohibited. Other areas of the medical campus may be restricted as well.

It is highly recommended that individuals or groups who intend to demonstrate or otherwise peacefully assemble to share opinions or debate issues at the School of Medicine campus contact the School of Medicine Protective Services at a minimum of one week before the event is planned so that the individuals or groups are aware of any such restrictions.

Failure to follow these policies may result in disciplinary action as appropriate to the violation and in accordance with the policies and procedures within the respective Washington University or School of Medicine programs.

Procedures for Monitoring and Managing Demonstrations and Disruption on the Washington University Medical Campus

When a faculty member, administrator, or staff member becomes aware of a protest or demonstration on campus, they should immediately notify the Senior Associate Dean and Vice Chancellor for Medical Education. The Senior Associate Dean will then follow the following procedure:

1. Notify the following individuals:
 - a. Protective Services
 - b. One or more senior administrators within the program(s)/group(s) involved in the planned demonstration
 - c. The Dean of the School of Medicine
 - d. The Chancellor of Washington University
 - e. The Vice Chancellor for Student Affairs on the Danforth Campus
2. One or more senior administrators/staff and members of the Protective Services team will be assigned to closely monitor and be present at all demonstrations/events. If a member of the School of Medicine senior administration/staff is unable to serve in this role or if advice/support is needed, the Vice Chancellor for Student Affairs on the Danforth Campus should be engaged.

3. Attempts will be made by the senior administrator/staff and Protective Services to meet with and review the policies and procedures for demonstrations and disruptions prior to the planned event whenever possible.
4. The senior administrator/staff member and Protective Services will be present primarily to ensure that all policies are followed and to ensure the safety and well-being of all involved
5. If members of the demonstration/event violate the policy or if there is concern at any time for the safety and well-being of the campus community, the senior administrator will read the following script(s):

First:

I am (Position and Name) at Washington University. At this time, I am directing you to stop (specific behavior) that is in violation of university policy. Your actions are in violation of the university's Policy on Demonstrations and Disruption. Please take the appropriate action so you are no longer in violation. If you do not do this now, I will be referring this matter to the Washington University School of Medicine Protective Services, which may engage the City of St. Louis police department.

Second:

I am (Position and Name) at Washington University. I asked you a few minutes ago to stop (specific behavior) that is in violation of university policy. Your actions are in violation of the university's Policy on Demonstrations and Disruption. Since you have not complied with my request, I am now referring this matter to the Washington University School of Medicine Protective Services, which may engage the City of St. Louis police department.

If this fails, Protective Services will step in to manage the situation.

Liability Insurance

Washington University provides professional liability insurance for all students or practicums while participating in required clinical experiences. In addition, Washington University 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 at 314-362-6956.

Needle Stick and Blood and Body Fluid Policy and Procedure

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, 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

members 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. 390) 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. 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 testing
 - 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 Against Abusive Conduct

Please visit the Human Resources website for the Policy Against Abusive Conduct.

Policy on Student Rights Under the Family Educational Rights and Privacy Act

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
- 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, 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 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.

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 posted on the Washington University website.

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
- WUSM Social Media Guidelines

School of Medicine Programs Student Mistreatment Reporting and Monitoring Policy

I. Student Mistreatment Definition

As explained in our Abusive Conduct and Discrimination and Harassment policies, the School of Medicine is committed to maintaining an environment free from behavior that is abusive, discriminatory, or harassing (including sexual) or that involves the mistreatment (including retaliation) 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. Please also be aware that some behaviors require mandatory reporting by certain members of the university community.

This document identifies the mechanisms and protocols for all School of Medicine students, including DBBS students on either campus or at partner institutions, to report mistreatment against them. It identifies mechanisms for bystanders 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 the mistreatment of a student — to report it immediately, without fear of retaliation, using the following resources:

1. WashU Learner Mistreatment Incident Report

Students and other community members may submit a report through the WashU Learner Mistreatment Form, which can also be found on the Supporting a Fair Environment (SAFE) website. Washington University Human Resources receives all reports and will direct the report to the appropriate university or hospital administrator(s) for a prompt response. The reporting portal allows for individuals to submit concerns anonymously if preferred and allows for bidirectional communication through the portal via a password, even if the report is submitted anonymously.

2. Any of the following administrators:

- Program Directors (see the respective program website or handbook for details)
- Relevant Associate Dean
- Senior Associate Dean and Vice Chancellor for Medical Education

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, take corrective action. For example, if a report identifies conduct that would fall within Title IX, 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 the 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 observer feels comfortable dealing with a situation that does not violate university policy 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 and its impact on the student, and it includes 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 Supporting A Fair Environment (SAFE) Committee member to meet with them or to speak to the person whose behavior is of concern; or
2. Consulting with one of the Student 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 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 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 orientations.

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 on a regular basis these data 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 upon 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
- Discrimination and Harassment Response Coordinator
- School of Medicine Office of Diversity, Equity and Inclusion
- Program-specific advisors (see the respective program website or handbook for details)
- Relevant Associate Dean
- Senior Associate Dean and Vice Chancellor for Medical Education

VI. Additional Resources

- School of Medicine Student Ombudsperson (confidential resource)
- Ombudsperson for Graduate Students (confidential resource)
- Medical Student Peer Advocates (medical students only)
- Relationship and Sexual Violence Prevention Center (confidential resource)

Last approved on May 19, 2023

Student Organization Alcohol Guidelines

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 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.

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 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 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, Danforth Event Management, 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, 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.

Voluntary Teaching Faculty Policy

Background

Washington University School of Medicine (WUSM) is committed to providing the highest level of training for students and residents, which requires exposure to different clinical settings, career types, and care delivery systems. Providing broad and high-quality experiences requires the involvement of not only full-/part-time university faculty but also community-based voluntary educators. Such individuals perform a valuable service to WUSM and, as such, should be prepared, supported, and recognized for the work they do to educate our learners. This policy applies only to School of Medicine Voluntary Teaching Faculty and **specifically excludes full-/part-time faculty and other voluntary faculty appointments.**

In accordance with **LCME Element 9.2**, WUSM must ensure that medical student clinical learning experiences are supervised by members of the school's faculty. Therefore, community-based voluntary educators for medical students and/or residents/fellows will be appointed as Voluntary Teaching Faculty. Voluntary Teaching Faculty are neither employed nor compensated by WUSM. They are expected to participate in the education of medical students and/or residents in order to maintain the Voluntary Teaching Faculty appointment.

In keeping with **LCME Element 4.4**, all medical school faculty must receive regularly scheduled and timely feedback on their academic performance and progress toward promotion. This includes Voluntary Teaching Faculty.

Policies

1. **Department heads may appoint Voluntary Teaching Faculty** for the specific purpose of participation in the education and training of medical students and/or residents/fellows.
2. Voluntary Teaching Faculty may be appointed at the following **ranks**. The initial rank shall be commensurate with the level of professional/teaching accomplishment relative to other individuals within their relevant peer group.
 - Voluntary Teaching Instructor
 - Voluntary Teaching Assistant Professor
 - Voluntary Teaching Associate Professor
 - Voluntary Teaching Professor
3. Voluntary Teaching Faculty may simultaneously hold Voluntary Clinical or Research Faculty positions. The appointment, review, and termination process for Voluntary Clinical or Research Faculty positions lies solely with the department.
4. All Voluntary Teaching Faculty shall have a **biannual (every 2 years) management review** performed by the appropriate course/program leader or other designated administrative faculty member, which shall include an assessment of continuing participation, available learner feedback, adherence to teaching/assessment/faculty development requirements and policies, and progress toward promotion. Should issues or other needs arise, a review may occur at any time.
5. Voluntary Teaching Faculty may be considered for **promotion** after 6 years of annual participation with at least satisfactory teaching evaluations and compliance with policies, procedures, and practices relevant to their teaching role.
6. Two consecutive years of nonparticipation in an educational program may result in forfeiture of the Voluntary Teaching Faculty appointment.
7. In all activities carried out in connection with their appointment, Voluntary Teaching Faculty members must comply with the standards of conduct contained in all WUSM policies (including but not limited to the Code of Conduct and policies concerning abusive conduct, discrimination and harassment, mistreatment reporting and monitoring, and clinical supervision), except insofar as those policies apply only to employed faculty.
8. Voluntary Teaching Faculty must notify the Office of Education immediately if they voluntarily or involuntarily relinquish their license, Drug Enforcement Administration (DEA) registration, clinical privileges, or malpractice insurance.
9. Voluntary Teaching Faculty appointments may be terminated by the department head or designee or by the Office of Education in collaboration with the department before the end date of the appointment for any reason at any time. The Voluntary Teaching Faculty will ordinarily be notified in writing 30 calendar days before the effective date. Termination of a Voluntary Teaching Faculty appointment will not necessarily result in termination

of a simultaneously held Voluntary Clinical or Research Faculty appointment. A Voluntary Teaching Faculty member whose appointment is terminated may appeal the decision to the Dean of the School of Medicine or their designee.

Procedures

1. Voluntary Teaching Faculty are recruited by course/program leaders who will oversee their work with learners and ensure their readiness for the role.
2. Course/program leaders propose Voluntary Teaching Faculty to the Office of Education.
3. The Office of Education will collect the required data (a Proposed Voluntary Teaching Faculty Appointment form and a curriculum vitae) and present the proposals to the appropriate department head or their designee. Failure of the proposed Voluntary Teaching Faculty to submit required information will result in a delay or denial of the Voluntary Teaching Faculty appointment. The Office of Education will propose Voluntary Teaching Faculty as soon as practical after recruitment.
4. The Office of Education will conduct biannual (every 2 years) reviews of all Voluntary Teaching Faculty and provide summaries to department heads. The reviews will be conducted in collaboration with course/program leads. These reviews will include consideration for promotion and discussion of criteria for promotion.
5. The appropriate department head or their designee must approve or decline all Voluntary Teaching Faculty appointments and recommended promotions.
6. After receiving final approval from the department head or their designee, the Office of Education shall formally offer the appointment or promotion to the proposed and approved Voluntary Teaching Faculty by sending, as appropriate, a Voluntary Teaching Faculty Appointment (or Promotion) Letter. The appointment or promotion will not be official until the candidate returns to the Office of Education a countersigned copy of the letter accepting its terms and conditions. The Office of Education must forward the countersigned letter to Human Resources and the respective department.
7. When terminating the Voluntary Teaching Faculty appointment of an individual who also holds a Voluntary Clinical or Research Faculty appointment, the department chair will decide whether the latter will be terminated along with the former. This information will be included in the letter of termination provided to the individual.

Last approved February 2024

MD Program Policies and Guidelines Academics

Clinical Supervision Policy for Medical Students on Clinical Rotations

Background

Part of Washington University School of Medicine's mission is to develop and maintain excellent clinical programs that provide outstanding care. To fulfill this mission and ensure the safety of both learners and patients, we have created this clinical supervision policy to direct our clinical health care teams on the required oversight of medical students.

Liaison Committee on Medical Education Standards 9.2 and 9.3 require that a medical school ensures that the members of the school's faculty provide appropriate supervision of medical students in clinical learning situations involving patient care 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 supervised by an individual within the scope of their practice.

For the purposes of this policy, the following definitions will be used:

- *Direct supervision* means that the supervising provider is physically present (or continually present on virtual telehealth visits) with both the student and the patient.
- *Indirect supervision* means that the supervising provider is not physically (or continually on virtual telehealth visits) present with both 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 provider remain physically present within the hospital or other site of patient care. The supervising provider may include any member of the 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 other health care providers (e.g., registered nurses, advanced practice nurses, physician assistants, certified registered nurse anesthetists) if the specific clinical activity falls within their defined scope of practice.
- *Independent practice* is defined as a licensed practitioner providing medical care that is within their scope of practice.
- A *medical procedure* is defined as a noninvasive or minimally invasive action intended to measure, diagnose, evaluate, or treat a medical condition. It is inclusive of but not limited to breast/pelvic/bimanual/rectal exams, venipuncture, peripheral intravenous catheter placement, peripheral arterial puncture, urinary catheter placement, nasogastric tube placement, suturing, simple incision and drainage, lumbar puncture, thoracentesis, paracentesis, arthrocentesis, and central venous catheter placement.
- A *surgery* is a more invasive form of a medical procedure. It most often involves some form of incision, and it occurs only in specified environments such as an operating room or a procedure suite.

Policies

Medical students are *not* permitted to independently practice at any time. **Medical students may *not* under any circumstances assist or perform procedures or any portion of a surgery without continuous direct supervision.**

The oversight of medical student learning experiences involving patient care (e.g., immersions, clerkships, clinical electives) is provided by members of the school's faculty serving in course, clerkship, or other leadership roles. These leaders must set expectations regarding the level of student supervision required during the patient care activities that occur during the clinical experience, and they are responsible for communicating that information to all supervising providers. Specifically, these leaders are responsible for making any required skills/procedures and patient types/clinical conditions known to medical students and the supervising provider teams, including the required levels of supervision. This information must also be specified in any required clinical experience logs and syllabi.

Phase 1 medical students may do the following:

- Participate in the review of medical records, history-taking, physical examination (excluding sensitive portions of the exam; see "Physical Examination" below), and the analysis of clinical data with indirect supervision when deemed capable of doing so by the supervising provider.
- Document in the medical student section of the electronic health record. All medical student clinical documentation requires review and co-signature by a licensed physician who will be directly responsible for the documentation. The supervising physician must independently confirm the documented findings.
- Enter patient care orders into the electronic health record in a pended state that requires review and co-signature by a licensed physician who will be directly responsible for the orders.
- Observe/assist in procedures under continuous direct supervision and only when deemed capable of doing so by the supervisor.
- Observe/assist surgeries under continuous direct supervision when deemed capable of doing so by the supervisor.

Phase 2 and 3 medical students may do the following:

- Participate in the review of medical records, history-taking, physical examination (excluding sensitive portions of the exam; see "Physical Examination" below), the analysis of clinical data, patient counseling, shared decision making, and frontline communication with consulting services with indirect supervision when deemed capable of doing so by the supervising provider.

- Document in the medical student section of the electronic health record. All medical student clinical documentation requires review and co-signature by a licensed physician who will be directly responsible for the documentation. The supervising physician must independently confirm the documented findings.
- Enter patient care orders into the electronic health record in a pending state that requires review and co-signature by a licensed physician who will be directly responsible for the orders.
- Perform patient written and verbal handoffs with direct supervision and, in the case of Phase 3 medical students, with indirect supervision when deemed capable of doing so by the supervising provider.
- Assist/perform procedures under continuous direct supervision only when deemed capable of doing so by the supervising provider.
- Observe/assist surgeries under continuous direct supervision when deemed capable of doing so by the supervising provider.

Physical Examination

At the discretion of the physician health care team and in accordance with course-specific guidelines, students are able to perform general physical examination techniques under indirect supervision, excluding portions defined as “sensitive.” Sensitive portions of the physical examination must always be performed under continuous direct supervision, even if the supervising provider determines the student capable of performing these examinations under indirect supervision. These include but are not restricted to external genitalia, rectal, breast, and pelvic examinations. Infant (<24 months of age) external genital examinations can be performed under indirect supervision at the discretion of the supervising provider.

Guidelines

For the sake of patient safety and personal growth, medical students are expected to request assistance in all circumstances beyond their level of skill and comfort, regardless of concerns regarding assessment or reprisal. If a student has concerns about the 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, students can then approach the Associate Dean for Student Affairs or Medical Education, the Senior Associate Dean for Education, or the Office of the Ombuds for Washington University School of Medicine.

If any member of the 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.

Last approved October 30, 2023

Credit Hour Definition

Washington University School of Medicine credit for MD programs is awarded in credit hours. A credit hour is a 60-minute period of time containing at least 50 minutes of academic activity such as lecture, recitation, faculty-supervised laboratory or clinical immersion, or academic preparation for such.

The creation of courses is done at the program level. As part of the review process, the creation of courses is monitored by the School of Medicine Office of the Registrar. The length of the academic period along with the academic activity determines the credit hours assigned for each course.

Courses and credit hours are then entered into the Washington University course listings system, which is overseen by the University Registrar and the WUCRSL administrator. Changes are monitored and deadlines are provided to ensure compliance.

Duty Hour Policy for Medical Students on Clerkships and Other Clinical Rotations

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, clinical course 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 4 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 relevant attendance policy for additional details regarding excused time off from clinical duties.
- Individual clinical course 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 clinical course director. 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 Washington University School of Medicine.

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.
- Clinical course directors 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. Data will be presented periodically to the Committee on Oversight of Medical Student Education and its subcommittees, which will charge the appropriate individuals or offices with improvement plans, when necessary.

Last approved on November 5, 2019

Washington University School of Medicine Policy for Monitoring of Student Time

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. 370). 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. 370) 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. 388).

Time spent on all required learning activities will be accounted for in the learning management system.

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.

All 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 the required elements of the Gateway Curriculum will be monitored by the Office of Medical Student Education (OMSE) for each Phase 1 element 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 an element to the WUSM Policy for Monitoring Student Time, data substantiating said concerns will be presented by OMSE to the appropriate curriculum 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. Curriculum leads are encouraged to use only the time that is necessary.

All curriculum leads 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, curriculum leads are encouraged to use best practices, applicable Academy of Educator workshops, and/or consultation with the Instructional Design Studio.

Curriculum leads are strongly encouraged to be considerate of the periodic need for breaks during scheduled required learning activities.

Last approved on January 4, 2021

Phase 1 Attendance Policy

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. 388) for additional details.

Policies/Requirements

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). 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

Background

The profession of medicine requires the utmost commitment of time and energy to learning/education, patient care, and, when appropriate, other scholarly activities. 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 substantially decrease learning and impede effective assessment.

The clerkships in Phase 2 of the Gateway Curriculum consist of a foundational week, 6 weeks of clinical experiences divided into individual rotations based on the specific clerkship, and a final 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. 388) for details.

Policies

Students are expected to attend all required sessions within Phase 2 of the Gateway Curriculum as specified within the learning management system and expressed or directed by the clerkship leadership. In the unusual circumstance that a student finds themselves unable to attend a required session or clinical experience due to illness or a personal emergency, 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. The student needs to have documented that this discussion has occurred in the form of an email between the student and the clerkship director or associate clerkship director. This form must be completed prior to the session that the student must miss or as soon as possible after the session as allowed by the illness or emergency. Students unable to attend a team activity should additionally notify their team members 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, the student must also complete the Request to Delay Assignment/Assessment form.

When students encounter an unavoidable absence for required events within the foundational or ARCC weeks of a clerkship, students will work with the clerkship directors and/or other responsible parties to develop a plan for the missed session. All required assignments associated with a missed session must be completed, and clerkship directors may require additional makeup work for missed sessions.

Students will remain accountable for meeting all clerkship requirements. Any absences that compromise a student's ability to meet these requirements and/or other Phase 2 requirements may result in the need for additional clinical time to sufficiently meet the learning and assessment goals. Absences that compromise a student's ability to meet clerkship requirements are defined as the following:

- Missing $\geq 25\%$ of an individual learning experience (as defined by the clerkship leadership) and/or
- Impacting the ability for assessors to provide credible performance information to support competency decisions

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). For the rare circumstances in which these anticipated absences exist, students are expected to contact the clerkship leadership team in advance of the clerkship to determine if scheduling options exist that may minimize the impact on clinical experiences. **Note:** Travel prior to or following observed university holidays and breaks that occur outside of the officially designated times/dates on the MD Program Academic Calendar as well as extracurricular and/or research events or experiences do not constitute a significant personal event or unavoidable absence.

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 in collaboration with the OMSE and reviewed by the Competency Attainment Committee (CAC) as evidence contributing to the attainment of competency in PROF-2: Exhibit high standards of professional integrity.

Guidelines

Failure to adhere to the above policy requirements (e.g., failure to file an Absence Notification Form and/or appropriately notify clerkship leadership and clinical team members) may result in the submission of a Professional Behavior Form.

A trend of absences may be discussed with the Student Success Team to ensure that appropriate student support can be offered and provided and may be referred to the CAC in accordance with PROF-2.

Last approved on December 4, 2023

Phase 3 Attendance Policy

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. 388) 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 (PDF) 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 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 the Medical Student Performance Evaluation

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

Procedure to Request an Alternate Educational Site or Clinical Assignment

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.

Transportation Policy for Medical Students on Clinical Assignments

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 Phase Curriculum Committees. 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 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

USMLE Policy for Students Entering the Match

Background

Washington University School of Medicine states that all students are required to take the first and second steps of the United States Medical Licensing Exams (USMLE) prior to graduation. For students planning to enter the residency Match, the timing of when USMLE Steps 1 and 2 CK are completed is an important consideration to be a competitive applicant. Students are advised that failure to pass these exams in time substantially increases the risk of an unsuccessful Match.

This document outlines the policies related to timing of USMLE Step 1 and USMLE Step 2 CK completion by students intending to enter residency training after graduation.

Policies

All students are required to meet with the Assistant Dean of Career Counseling by the last business day of June of the year that they plan to enter the Match. Students are expected to schedule and complete Step 1 and Step 2 CK of the USMLE by September 1 of the fall prior to the year that they plan to graduate so that scores are available for residency program review prior to interview release. Exceptions to these requirements may be made only with the expressed guidance of the Assistant Dean of Career Counseling.

Students must take USMLE Step 1 and Step 2 CK and have passing score reports by the end of January of the year they plan to graduate in order to be certified for the Match. Students who do not intend to participate in the Match prior to graduation must still take Step 1 and Step 2 CK in order to graduate. Passing is not required to graduate, but it is required to be certified for the Match.

Guidelines

Students are encouraged to engage with the Office of Career Counseling to help guide decisions of specific USMLE Step 1 and Step 2 CK scheduling to ensure optimal success with the residency application and interview process.

Students are encouraged to engage with the Student Success Team should they have concerns about USMLE preparation and successful completion.

Last approved on 12/4/2023

Assessment, Promotion, and Appeals for the Gateway Curriculum

Washington University School of Medicine Policy for Review of Student Attainment of Competency

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. 143). 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. 380) and the Formal Appeal Procedures for Competency Attainment and Promotion Decisions (p. 382).

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

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, and the Associate Dean for Admissions.

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. 382).

Competency Attainment and Clerkship Competency Committees' Bylaws

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. 401)).

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, based on the individualized review of each student's unique performance and trajectory across the entirety of the EPO review, 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. 382).

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. 382).

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

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. 382).

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

Students wishing to dispute a specific assessment, not a competency decision, do so using the Qualtrics^{XM} 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 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. 382).

Formal Appeal Procedures for Competency Attainment and Promotion Decisions

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. 357) 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^{XM} 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 competence 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^{XM} 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) for more information.

Course Credit Procedures

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.

Challenging the MSPE and Individual Competency-Contributing Assessments

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. 381) 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. 376) and Promotion Decisions (p. 380).

Last approved on November 7, 2022

Conflict of Interest During Student Assessment Policy for Washington University School of Medicine

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

Formative Assessment and Feedback for Medical Students Policy

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 (WUSM 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 WUSM 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. 376) and the Policy for Student Promotion and Appeals (p. 380) 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 WUMS 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

Grade Notification Policy

Background

The Liaison Committee on Medical Education (LCME) element 9.8 requires that all final grades be recorded and available to students within 6 weeks of the end of a course, clerkship, and phase. At Washington University School of Medicine (WUSM), final grades are defined as the competent/not competent and the credit/no credit decisions made at the end of every course, clerkship, and phase. The Gateway Curriculum of WUSM 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, in Phase 2, each clerkship in patient care only. Decisions of course credit, which are based on the completion of required elements in a course, are made at the completion of each course in Phases 1 and 3. The purpose of this policy is to ensure that no summative assessment or course credit decision is delayed beyond 6 weeks from the end of or final requirement due date for any course, clerkship, and phase as mandated by our accrediting body.

Policies

- The Medical School Registrar is responsible for monitoring and reporting that all competency or credit decisions for WUSM courses, clerkships, and phases are submitted and available to students within 6 weeks of the end of the course, clerkship, and phase.
- Failure to submit 100% of decisions within this 6-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, clerkship, and Competency Attainment Committee (CAC) members at least annually. All course and clerkship directors and the CAC should be encouraged to create a streamlined process for the completion and integration of student assessments in order to meet submission deadlines.

Last approved on January 9, 2023

Narrative Assessment Policy

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

Policy for Non-Involvement of Providers of Student Health Services in Student Assessment

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

Financing Your Education Policy for Tuition Refund for the MD Program

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

Student Health, Professionalism, and Support

Medical Student Access to Healthcare Services Policy

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.

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 lead of the educational activity (e.g., module lead, clerkship director) and, if applicable, the supervising clinician of their clinical team as soon as possible. This applies to 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.

B. Responsibility of lead of required educational activities (e.g., module lead, clerkship director)

1. Curriculum leads 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 curriculum lead and take appropriate action.

Last approved on March 2, 2020

Leave of Absence Policy for Medical Students

Background

LCME element 12.2 states that a medical school is to have clear policies for the refund of a medical student's tuition, fees, and other allowable payments. Although there is a separate and distinct tuition refund policy (p. 387), the Leave of Absence (LOA) Policy does include language that directly relates to the impact on tuition. In addition, LCME element 12.4 states that a medical school provides its students with access to health care services. The LOA policy details student eligibility for student healthcare services (p. 388).

The LOA policy revision was necessitated by the implementation of the Gateway Curriculum and the entities that provide oversight on student progress. Within the Gateway Curriculum, the Competency Attainment Committee (CAC) and the Committee for Academic Promotion (CAP) are tasked with student promotion and remediation.

Policies

Leave of Absence Policy

Voluntary Leave of Absence

A student may request a separation for academic or personal reasons by submitting a statement in writing to the Office of Student Affairs (OSA). Such a request should include an indication of the beginning and anticipated ending dates and a brief statement of the reason. The OSA will forward the separation request to the Student Success Team (SST). Separations of 1 year or less will be considered by the SST and may be referred to the CAP at the discretion of the SST. Depending on length of the proposed separation, the SST will recommend an official LOA or an absence in accordance with the Attendance Policy. A separation request of greater than 1 year, at the discretion of the SST, may require approval from the CAP.

Students requesting a personal LOA for medical reasons must submit a supporting letter from the Director of Student Health Services with their request. The university may condition its approval of a request for an LOA on the student meeting certain requirements that the university deems appropriate based on the student's individual circumstances. The goal of such conditions is to prepare the student for a successful return to the School of Medicine. For example, any student who requests an LOA for medical reasons is required to obtain a written statement of medical clearance from the Director of Student Health Services before the student may return from leave. Such a statement and a request for return from leave should be provided to the Office of Student Affairs no more than 4 weeks before the student's anticipated return.

Involuntary Leave of Absence

In the rare circumstances in which a student's behavior is of such a serious nature that the university determines that the continued presence of the student on campus or in clinical rotations poses a substantial threat to the safety, well-being, or health of that student, patients, and/or others in the Washington University community or to the ability of that student or others to engage in their customary functions and activities at the university, the School of Medicine may place a student on an involuntary LOA. The School of Medicine will follow the policy and procedures outlined in the university's Involuntary Leave Policy for Undergraduate and Graduate Students.

Leave of Absence Impact on Financial Aid

Student status is not maintained during the LOA, although the 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 & Biomedical Sciences if funds are available. The Office of Student Financial Planning should be consulted for information regarding loan repayment and grace periods when on an LOA.

Students granted an LOA, whether voluntary or involuntary, are not considered to be enrolled and are therefore not eligible for federal or institutional financial aid. Federal regulations require a Return to Title Four (R2TIV) calculation be completed for any student who has a break in attendance and who is not considered to be enrolled. Recipients of federal aid who are granted an LOA must complete exit counseling within 30 days of their last date of attendance.

All students with institutional and/or federal aid contemplating or granted an LOA must have a meeting with the Assistant Dean and Director of Financial Aid within 15 days of the start of any LOA. Please note that extenuating circumstances may preclude a student from contacting the Director of Financial Aid. If that is the case, the student should do so as soon as possible.

Leave of Absence Impact on Tuition

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 10 academic years after matriculation. Therefore, students whose medical education is interrupted for any reason for more than 6 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 thus 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. Please refer to the Financial Information section on Registration, Payments, and Withdrawal & Refunds Policy (p. 405) for more information about the effect of an LOA on tuition and other financially related matters.

Policy on Student Status and Benefits During Research Years or Leaves of Absence

MD/PhD

Student status is maintained while the student is in the research phase of the MD/PhD programs. During their research years, students are registered under the program granting the master's degree or PhD. Both student health and disability coverage are provided by the Division of Biology & Biomedical Sciences.

Five-Year MD Program

Research Year at Washington University School of Medicine

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 they 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 not maintained throughout the approved research year away; students are no longer 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 Washington University School of Medicine

Student status is not maintained during the LOA, although the benefits of student health coverage and disability insurance are optional throughout an approved LOA. Costs are payable by the MD program students. MD/PhD students may request support for these costs from the Division of Biology & Biomedical Sciences if funds are available. The Office of Student Financial Planning should be consulted for information regarding loan repayment and grace periods when on an LOA.

Leave of Absence Year Away

Student status is not maintained during the LOA 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. The Office of Student Financial Planning should be consulted for information regarding loan repayment and grace periods when on an LOA.

Last approved on August 28, 2023

Professional Behaviors for MD Students in the Gateway Curriculum

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. 143) 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 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 Technical Standards for the Medical Program

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 when they enter each phase of the Gateway Curriculum.

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 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

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/Requirements

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 acceptance of an applicant during the regular season (prior to May 1) are made at the final acceptance meeting of the COA. Five voting COA members representing the diversity of the faculty who hold non-decanal positions with at least one member from each region must be present at the final acceptance meeting. The majority of voting members present must be members of the faculty for a quorum to be reached. 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 Non-Employee Voluntary Faculty Appointments

The Washington University Policy on Academic Freedom, Responsibility, and Tenure authorizes "grants of academic rank as a courtesy to persons not regular members of the University faculty." In the School of Medicine (WUSM), such academic appointments

are classified as “Voluntary appointments” and involve neither employment status nor financial compensation. This policy defines the nature and scope of Voluntary appointments and establishes standards and procedures for such appointments.

A. **Types of Voluntary Appointments.** There are two categories of Voluntary appointments: Clinical and Research.

- Clinical Voluntary Appointments (e.g., Voluntary Clinical Professor of Medicine, Voluntary Clinical Assistant Professor of Physical Therapy) are Voluntary appointments conferred on clinicians or other professionals who work in WUSM-affiliated hospitals or with WUSM-affiliated physician networks and who have roles in patient care, medical or health profession education, or administrative functions.
- Research Voluntary Appointments (e.g., Voluntary Research Associate Professor of Neuroscience, Voluntary Research Instructor of Radiology) are Voluntary appointments conferred on colleagues who collaborate on research or research-based education with employed members of the WUSM faculty.

B. **Roles of Voluntary Faculty.** Voluntary faculty members are expected to make valuable contributions to WUSM, as prescribed by their department or program. Voluntary faculty members may serve as mentors and advisors to students, residents, fellows, and postdoctoral trainees, but they should not be the only mentor or advisor for such individuals. Voluntary faculty members are encouraged to offer guest lectures, but they may not teach full-term courses or serve as course masters. Voluntary faculty members generally may serve on committees, but any such committee must also include employed faculty members. Voluntary faculty members may participate in clinical and basic research consistent with Washington University and WUSM policies relating to such activities.

C. **Procedures and Criteria for Appointing and Promoting Voluntary Faculty.**

1. Voluntary appointments may be made to the ranks of Voluntary (Clinical or Research) Instructor, Assistant Professor, Associate Professor, or Professor. Initial rank should be commensurate with the level of professional accomplishment relative to other individuals within the relevant peer group. Promotions within the Voluntary appointment ranks may be made based on criteria such as professional accomplishments, contributions to the department/program, and length of service. If an individual who has served as a Voluntary faculty member is subsequently hired as an employed faculty member, their rank as a regular faculty member will not necessarily be at the same rank it was while they were serving on the Voluntary faculty.
2. Voluntary appointments are initiated by department heads and program directors. At the outset of the process, department heads and program directors ordinarily should consult with their unit’s internal appointments and promotions committee.
3. Voluntary appointments must be approved by the dean or their designee. Review of proposed Voluntary faculty appointments and promotions is obtained by submitting a Proposed Voluntary Appointment packet consisting of

a Proposed Voluntary Faculty Appointment/Promotion form (Form A [PDF]) and a curriculum vitae in the approved Voluntary Appointment format (Form B [PDF]). The packet must be submitted to Human Resources, which will route it to the dean or their designee for review and approval.

4. After receiving approval from the dean or their designee, the department head or program director shall formally offer the appointment to the candidate by sending, as appropriate, a Voluntary Faculty Appointment Letter (Form C [PDF]) or a Voluntary Faculty Promotion Letter (Form D [PDF]). The appointment or promotion will not be official until the candidate returns to the department or program a countersigned copy of the letter accepting its terms and conditions. The department must forward the countersigned letter to Human Resources.

D. **Termination of Voluntary Appointments.** Voluntary appointments do not have a defined duration. They should be reviewed periodically by the department head or program director. A Voluntary appointment shall presumptively be terminated when there is a change of status such as the discontinuation of the hospital privileges or affiliation on which the appointment was based, unless the department head or program director determines that continuation of the appointment would be appropriate on some other basis. Voluntary appointments may be terminated for any reason at any time, with or without advance notice by the department head or program director. A Voluntary faculty member whose appointment is terminated may appeal the decision to the Dean of the School of Medicine. Voluntary appointments are not subject to Washington University or WUSM policies governing the nonrenewal or termination of employed faculty members.

E. **Compliance with Policies.** In all activities carried out in connection with their appointment, Voluntary faculty members must comply with the standards of conduct contained in all Washington University and WUSM policies (including but not limited to the Code of Conduct and policies concerning compliance, patient care, research, discrimination and harassment, and abusive conduct), except insofar as those policies apply only to employed faculty.

F. **Representation of Faculty Status.** In representing their status at Washington University/WUSM, Voluntary faculty shall use their full title (including the “Voluntary Clinical” or “Voluntary Research” modifier to their rank) and shall not represent themselves to be regular or employed members of the faculty.

* This policy does not apply to joint or additional academic appointments granted as a courtesy to persons who are employed by Washington University (commonly known as *courtesy appointments*) or to emeritus faculty appointments. An individual may not concurrently hold Voluntary and employed faculty appointments at WUSM.

**If a department or program wishes to ask a Voluntary faculty member to take on the role of course master or to teach full-term courses, the individual must receive a part-time, compensated employee position to perform those duties.

Last approved June 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 and the guiding principles of the Gateway Curriculum. 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. Furthermore, the AAMC Core Competencies for 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

Policy for the Preparation of Non-Faculty Instructors for the WUSM MD Program

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

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.

Course Level Policy

Undergraduate courses (399 and below), School of Continuing & Professional Studies 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 or the International English Language Testing System (IELTS) 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. 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. 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. 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.

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 reapplied.

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 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 the School of Continuing & Professional Studies; 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 the School of Continuing & Professional Studies 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 or the Office of Student Financial Planning.

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) 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. 34) 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. 362). 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) 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 the School of Continuing & Professional Studies 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. 400)
- Academic Calendars
- Advising and Career Counseling
- Diversity, Equity & Inclusion, Office of
- Diversity Programs, Office of
- Housing
- Education, Office of
- Medical Student Affairs, Office of
- Medical Student Education, Office of
- Medical Student Research, Office of
- Student Financial Planning, Office of
- Protective Services
- Registrar, Office of the
- Student Health Services

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) 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 or the Office of Medical Student Education (OMSE).

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 for free online exam preparation tools. For more information, contact the Becker Library at 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.

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.

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 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, 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 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

Washington University School of Medicine annually recognizes and rewards outstanding scholarship, research accomplishments and community service of individual students. As part of the festive Commencement activities in May, graduates are recognized for meritorious research and clinical achievements accomplished during their medical school careers.

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 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 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 Medical School Prize. 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.

Robert Carter Medical School Prize. Awarded to a senior student for outstanding, meritorious performance in the medical school curriculum.

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.

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.

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.

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.

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 Nash Family Pediatrics Award. Presented to the senior student showing the greatest promise in clinical pediatrics.

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 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. 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.

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.

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.

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), 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. F lance, 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 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.

Ann W. and Spencer T. Olin – Chancellor's Fellowship (OCF). The OCF is an elite cohort of outstanding graduate students with diverse backgrounds and from varied disciplines. The OCF is committed to promoting diversity in all dimensions and nurturing a variety of

distinctive backgrounds and perspectives. The OCF particularly values students who have demonstrated a commitment to gender and racial diversity, equity and inclusion. The OCF will begin admitting fellows for the 2023-24 academic year. The OCF offers a competitive award package and a best-in-class graduate fellowship experience including exceptional leadership and development opportunities, access to exemplary resources, and networking and mentorship opportunities that will empower fellows to demonstrate all-around excellence. Interested applicants should apply to the OCF at the same time they apply for admission to their chosen academic program. To learn more, visit the OCF website.

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. 415), Audiology and Communication Sciences (p. 415), Biology and Biomedical Sciences (p. 415), Biomedical Engineering (p. 415), Biostatistics (p. 415), Clinical Investigation (p. 415), Medical Physics, Occupational Therapy (p. 416), Physical Therapy (p. 416), Population Health Sciences (p. 416), and Public Health (p. 416).

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, Audiology and Communication Sciences, Biology and Biomedical Sciences (p. 415), Biomedical Engineering (p. 415), Biostatistics, Clinical Investigation, Medical Physics, Genetic Epidemiology, Occupational Therapy, Physical Therapy, and Population Health Sciences.

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).

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 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 2024-25 academic year is \$38,500. In addition, health coverage and disability insurance are also provided. Please visit the DBBS website for additional information.

Biomedical Engineering

For more information about the Biomedical Engineering program, including tuition and fees, please visit the McKelvey School of Engineering *Bulletin*.

Biostatistics

For tuition information, please visit our Biostatistics website, contact the program manager at 314-362-1384, send an email to 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 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.

Genetic Epidemiology

For tuition information, please visit the Division of Biostatistics website, contact the program manager at 314-362-1384, send an email to 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

Occupational Therapy

The total cost of tuition for the incoming MSOT class in fall 2024 is \$110,000. This breaks down to \$18,333 × five semesters and \$9,168 × two fieldwork experiences.

The total cost of tuition for the incoming OTD class in fall 2024 is \$145,750. This breaks down to \$18,333 × six semesters, \$9,168 × two fieldwork experiences, and \$17,416 for one doctoral capstone.

Part-time tuition is \$1,375 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, including tuition and fees, please visit the Population Health Sciences website.

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.

Dual Programs

The following policy applies to students pursuing graduate/professional training in the following dual degree programs: MD/PhD (p. 416), MD/MSCI (p. 417), MD/MPHS (p. 417) and MD/MPH (p. 417).

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 \$37,000 per year), health coverage, disability and life insurance, reimbursement of qualifying daycare expenses, and full tuition remission for both the MD and PhD phases of their training.

Individuals who are awarded an NIH National Research Service Award individual fellowship receive an additional \$5,000 per year for the duration of the award. Please visit the MSTP website 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 website for additional tuition information.

For information about tuition for the Medicine program, please visit the Medical Students section (p. 401) of this page.

Doctor of Medicine and Master of Population Health Sciences: MD/MPHS

For more information about the Population Health Sciences program, 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. 401) of this page.

Doctor of Medicine and Master of Public Health: MD/MPH

For more information about the MD/MPH program, 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. 401) of this page.

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