John F. Hardesty, MD, Department of Ophthalmology and Visual Sciences

Instruction begins during the first year with examination of the eye and a lecture on various aspects of ocular disease. During the second year, students will 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.

Website: http://ophthalmology.wustl.edu

Degrees & Requirements

Although the Department of Ophthalmology and Visual Sciences does not offer its own degree, some of the department's courses are open to students in the MD and MSTP (MD/PhD) programs. Further information about the MD and MSTP degrees can be found in the Degrees & Programs (http://bulletin.wustl.edu/medicine/degrees) section of this Bulletin.

Research

M50 Ophth 900

Further descriptions of our research labs can be found on the Vision Core Researchers webpage (http://vrcore.wustl.edu/residentstudentresearchopportunities/RSROHome).

Usha P. Andley, PhD
1114-C McMillan
Phone: 314-362-7167
Molecular basis of cataract; the function of molecular chaperones in cataract; proteomics, imaging and biochemical studies on cell culture and mouse models for crystallin gene mutations linked with cataract; testing drugs to inhibit cataract.

Rajendra S. Apte, MD, PhD
apt@vision.wustl.edu
Innate immunity and immune effector mechanisms in the retina; oxidative stress and cell death; models of developmental angiogenesis and neovascularization; inflammation and photoreceptor survival; macular degeneration.

Steven Bassnett, PhD
1114 McMillan
Phone: 314-362-1604
Eye development; stochastic models of lens growth; stem cell biology; age-related cataract; UV-induced somatic mutation; ocular manifestations of Marfan syndrome; cell death suppression on the optic axis; cell biology of transparent tissues.

Anjali Bhorade, MD
Phone: 314-362-5343
Evaluating the effect of glaucoma on visual function in older adults in the home; understanding the relationship between vision and driving in older adults with glaucoma.

Shiming Chen, PhD
618 McMillan
Phone: 314-747-4350
Our primary interests are molecular mechanisms regulating photoreceptor gene expression and the implications in understanding photoreceptor development and disease. We are focusing on three transcription factors (CRX, NRL and NR2E3) linked to photoreceptor degenerative diseases. Molecular genetics and biochemical approaches are used to identify the regulatory pathways associated with each factor. Mouse models are used to understand why mutations in these factors cause disease and develop therapeutic strategies, including AAV gene therapy.

Steven M. Couch, MD
couch@vision.wustl.edu
Orbital inflammatory diseases; surgical techniques and novel treatments of periocular/orbital disease.

Susan M. Culican, MD, PhD (Adjunct Professor)
culican@wustl.edu
Clinical: Development of a low-cost, simple visual function task for screening for macular disorders in the primary care setting. Education: Examination of the utility of assessment tools for evaluating resident clinical progression during residency training; development of new metrics to gauge resident progress.

Philip L. Custer, MD
custer@vision.wustl.edu
Enucleation and anophthalmic socket disorders; orbital fractures and implants; hemorrhagic complications during oculoplastic procedures.
Thomas A. Ferguson, PhD
1207 McMillan
Phone: 314-362-3745

Molecular basis of immune tolerance and how apoptotic cells tolerize the immune response; role of immune privilege in the pathogenesis of eye diseases such as age-related macular degeneration; role of basal autophagy in the cells of the eye by using the cre-loxP system to delete essential autophagy genes from specific cell types in the eye.

Mae Gordon, PhD
Phone: 314-362-3716

Ocular hypertension; glaucoma; keratoconus; adenoviral conjunctivitis; randomized clinical trial methodology; patient-reported outcome measures and measurement reliability.

George J. Harocopos, MD
harocopos@vision.wustl.edu
Age-related cataract; ophthalmic pathology.

Andrew Huang, MD, MPH
106 McMillan
Phone: 314-362-0403

Ocular surface stem cell biology; molecular therapy for corneal dystrophies and corneal neovascularization; oxidative stress of corneal endothelium; clinical research on dry eye and ocular surface disease.

Humeyra Karacal, MD
karacal@vision.wustl.edu
Treatment of uveitis; prevention of cataracts with antioxidants; antioxidants in age-related macular degeneration; retinal imaging and analysis using data mining techniques; designing operating room equipment to facilitate ophthalmic surgery.

Michael A. Kass, MD
kass@vision.wustl.edu
Principal Investigator of the Ocular Hypertension Treatment Study; diagnosis, treatment and public health aspects of glaucoma.

Vladimir Kefalov, PhD
625 McMillan
Phone: 314-362-4376

Our primary interests are photoreceptor neurobiology and retinal degeneration. We are a sensory neurobiology lab interested in the function of mammalian rod and cone photoreceptors. In addition, we are interested in the mechanisms of neurodegeneration in the retina, and we are working on developing pharmacological and gene therapy tools for preventing photoreceptor cell death.

Daniel Kersensteiner, MD
kerstensteinerd@vision.wustl.edu
(kerschensteinerd@vision.wustl.edu)

Our primary interest is in understanding the principles that guide the assembly of neural circuits and deciphering the way they process information. We hope to identify features of the retinal circuit architecture that perform particular computations and characterize how they arise during development. We will then probe underlying mechanisms of circuit assembly and function through genetically targeted manipulations of specific cells in the retina.

John T. Lind, MD, MS
lindj@vision.wustl.edu
Glaucoma education; resident education; pharmacologic and surgical treatment of glaucoma; ophthalmic microbiology.

Gregg T. Lueder, MD
lueder@vision.wustl.edu
Retinoblastoma; eye misalignment (strabismus); retinopathy of prematurity; abnormal tearing; nasolacrimal disorders; cataracts; glaucoma.

Peter Lukasiewicz, PhD
1003C McMillan
Phone: 314-362-4284

Neurotransmitters; synapses; retinal function in health and disease; retinal information processing.

Todd P. Margolis, MD, PhD
margolist@vision.wustl.edu
Cellular and molecular mechanisms that regulate herpes simplex infection neurons; inexpensive telemedicine for reducing blindness in underserved populations.

Josh Morgan, PhD
jlmorgan@wustl.edu

Our primary interest in in the synaptic connectivity of visual circuits. Our goal is to understand the structure, development and pathology of the synaptic connectivity that gives rise to vision. Our core approach is to reconstruct neural circuits in the retina and visual thalamus using large-scale 3D electron microscopy.
John R. Pruett Jr., MD, PhD
pruettj@wustl.edu

We use fcMRI to study the development of large-scale functional brain networks in infants at risk for autism spectrum disorder. We are specifically interested in fcMRI correlates of visual joint attention. Our collaborative projects involve fcMRI studies of visual-motor integration.

Kumar Rao, MD
rao@vision.wustl.edu

Surgical and medical therapies for disorders of retina and choroid; novel intraocular markers in uveitis and lymphoma; ultrasound therapy for choroidal melanoma.

Nathan Ravi, MD, PhD, MS, FAAO
ravi@vision.wustl.edu

Our research is directed toward understanding the pathophysiology of presbyopia and developing medical or surgical treatments for this condition.

Alan Shiels, PhD
1128 McMillan
Phone: 314-362-1637
shiels@vision.wustl.edu

Our primary interest is in the molecular genetic mechanisms underlying cataract, glaucoma and associated eye disorders. Specifically, we are interested in the following: (1) genome-wide linkage analysis and targeted (exome, amplicon) sequencing for the discovery of causative or susceptibility genes; and (2) genotype-phenotype and functional expression studies of naturally occurring and gene-targeted mouse models to characterize pathogenic mechanisms.

Carla J. Siegfried, MD
siegfried@vision.wustl.edu

Our research is focused on ocular oxygen metabolism and the development of open-angle glaucoma. We are studying how the oxygen gradient in the eye is altered in disease states as well as noninvasive methods of measuring corneal oxygen consumption.

Florentina Soto, PhD
sotolucasf@vision.wustl.edu

Studies in our laboratory aim to identify the molecular basis of dendrite and axon lamination and synapse formation during development and in the adult retina. In addition, we investigate how these molecules could be involved in the development of retinal pathologies, including retinal degeneration.

Larry Tychsen, MD
2SB9 Eye Clinic, St. Louis Children’s Hospital
Phone: 314-454-6026

Principal Investigator of NIH-funded studies of visual brain maldevelopment and repair in infant primates as well as of clinical studies of visuomotor abnormalities in cerebral palsy and pediatric refractive surgery.

Gregory P. Van Stavern, MD
vanstaverng@vision.wustl.edu

Neuroimaging of the visual pathways; idiopathic intracranial hypertension; evidence-based medicine and clinical decision making; using the visual system as a model to study neurologic disorders.

Faculty

Pediatric Ophthalmology Director
R. Lawrence Tychsen, MD

Adult Ophthalmology Clinical Director
P. Kumar Rao, MD

Ophthalmology Research Director
Peter Lukasiewicz, PhD

Ophthalmology Director of Translational Research
Rajendra Apte, MD, PhD

Visit our website for more information about our faculty (http://ophthalmology.wustl.edu/Faculty) and their appointments.

A

Henry W Allhoff, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA University of Missouri 1976
OD Illinois College of Optometry 1981

Navinkumar J Amin, MS, UNKNOWN
Associate Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MS University of Bombay 1966
UNKNOWN University of Bombay 1960

Shilpa S Amin, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA University of MO Kansas City 1994
MD University of MO Kansas City 1994

Usha P Andley, MS, PHD
Professor of Ophthalmology and Visual Sciences (primary appointment)
Assistant Professor of Biochemistry and Molecular Biophysics
BS Delhi University 1970
MS Delhi University 1972
PHD Jawaharlal Nehru University 1977

Rajendra Apte, PHD, MD
Paul A. Cibis Distinguished Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Developmental Biology
Professor of Medicine
PHD University of Texas Southwest 1997
MD University of Bombay 1993

Steven Bassnett, PHD
Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Cell Biology and Physiology
BS University of Wales 1982
PHD University of East Anglia 1987

Paul Douglas Becherer, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA Southern Illinois University 1971
OD School Not Listed 1975

Stanley C Becker, MA, MD, PHD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Washington University in St. Louis 1948
MA Washington University in St. Louis 1950
MD University of Chicago 1955
PHD Washington University in St. Louis 1951

William L Becker, MA, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MA Washington University in St. Louis 1987
BA Earlham College 1982
MD Washington University in St. Louis 1987

Gregg Jonathan Berdy, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Saint Louis University 1983
BA Duke University 1979

Paul M Bernier, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Missouri 1987
BS Indiana State University 1983

Anjali Maruti Bhorade, MD
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
Associate Professor of Occupational Therapy
MD University of Chicago 1999

Frank Joseph Bier, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS University of Missouri 1979
OD University of MO St Louis 1984

Ronald C Bilchik, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS University of Toledo 1963
MD Washington University in St. Louis 1967

Mark Gerald Birkmann, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA University of Missouri 1988
OD University of Missouri 1992

Andrew N Blatt, MD, MA
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Washington University in St. Louis 1992
BA Duke University 1987
MA Washington University in St. Louis 1991

Kevin Jay Blinder, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD University of MO Kansas City 1985

James C Bobrow, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Yale University 1966
MD Johns Hopkins University Medic 1970

George M Bohigian, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Washington University in St. Louis 1961
MD Saint Louis University 1965

Bermita Born-Wolf, BN, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BN Saint Louis University 1978
OD University of MO St Louis 1987

Paul J Botelho, MD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
MD Boston University 1992
BA Holy Cross College 1988

Rebekah Arletta Braslow, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Stanford University 1981
MD Yale University 1987

Sean Michael Breit, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Ohio State University 2002

Larry G Brokering, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Illinois College of Optometry 1972

Marc Richard Brown, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD School Not Listed 1980
BA University of Missouri 1974

Nancy M Buchser, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
MD University of Miami 2007

Dean B Burgess, MD
Professor Emeritus of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Occidental College 1963
MD University of California 1967

C

Carmen F Castellano, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS Illinois College of Optometry 1980
BA University of MO St Louis 1977
OD Illinois College of Optometry 1982

Earl S Changar, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD School Not Listed 1957

Shiming Chen, PHD, MS
Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Developmental Biology
PHD State University of New York 1992
BS Beijing University 1981
MS Beijing Medical University 1984

Brian Stewart Clark, PHD
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Assistant Professor of Developmental Biology
PHD Medical College of Wisconsin 2013

Bruce H Cohen, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Johns Hopkins University 1980
BA Harvard University 1976

Nicholas J Colosi, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Saint Louis University 1968
BA La Salle University 1964

Pamela Ann Coslick-Fada, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Missouri 1987

Steven Michael Couch, MD
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
MD University of MO Kansas City 2006

John Bruce Crane II, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA William Jewell College 1987
OD University of MO St Louis 1991

Philip L Custer, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
BS Vanderbilt University 1974
MD Vanderbilt University 1978

D

David L Davidson, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD School Not Listed 1964

Alicia Beatriz De Maria Leiva, PHD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
PHD Universidad de la Republica 2002

John James Deguire, MD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA Washington Univ in St. Louis 1983
MD University of Illinois 1988

Paul E Diehl, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Illinois College of Optometry 1959

E

John Robert Eigenbrodt, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Missouri 1988
BS Southern Ill Univ Edwardsville 1985
Nicholas Earl Engelbrecht
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)

Lawrence W Ernst, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Missouri 1990

Raymond F Fada Jr, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS University of Michigan 1984
OD University of Missouri 1989

Adam Ross Fedyk
Instructor in Clinical of Ophthalmology & Visual Sciences (primary appointment)

Robert M Feibel, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Johns Hopkins University 1965
MD Harvard University 1969

Thomas A Ferguson, MS, PHD
Professor of Ophthalmology and Visual Sciences (primary appointment)
Associate Professor of Pathology and Immunology
MS Kent St University 1976
PHD University of Cincinnati 1982
BA Kent St University 1974

Kurt W Finklang, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD State University of New York 1981
BS University of Missouri 1977

Frank Donald Fontana, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Illinois College of Optometry 1950

Bruce S Frank, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Mass Inst of Technology (MIT) 1972
MD Washington Univ in St. Louis 1976

Carrie S Gaines, OD

Mark Gilbert Grand, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Tufts University 1964
MD Yale University 1968

Kenneth O Green, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Saint Louis University 1956
MD University of Missouri 1960

Kevin William Greulich, MD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS University of Notre Dame 1995
MD University of Michigan 1999

Steven J Grondalski, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA Saint Louis University 1983
OD Penn College of Optometry 1987

George J Harocopos, MD
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
Assistant Professor of Pathology and Immunology
MD University of Virginia 2000
BA Harvard University 1995

Alexander D Harris, MA, OD
Adjunct Instructor in Ophthalmology and Visual Sciences
(primary appointment)
BA University of Evansville 1969
MA Washington Univ in St. Louis 1972
OD University of Missouri 1986

Charles R Harris, PhD
Instructor in Clinical Ophthalmology and Visual Sciences
(primary appointment)
BS University of Missouri 1970
PHD University of MO Columbia 1971

Lynn M Hassman, PhD, MD
Assistant Professor of Ophthalmology & Visual Science (primary appointment)
PHD University of Virginia 2010
BA Evangel University 2002
MD University of Virginia 2012

William L Herbold, OD
Adjunct Instructor in Ophthalmology and Visual Sciences
(primary appointment)
OD School Not Listed 1967
BS School Not Listed 1967

James R Hoekel, OD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of MO St Louis 1994
BS University of MO Columbia 1990

Nancy Melberg Holekamp, MD
Professor of Clinical Ophthalmology and Visual Sciences
(primary appointment)
MD Johns Hopkins University 1989
BA Wellesley College 1985

Augustine Richard Hong, MD
Assistant Professor in Ophthalmology and Visual Sciences
(primary appointment)
BA University of Illinois 2004
MD University of Illinois Chicago 2009

Jing-Wei Huang, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
MD National Taiwan University 1981

Douglas Lee Huff, OD
Adjunct Instructor in Ophthalmology and Visual Sciences
(primary appointment)
OD So Cal College of Optometry 1981
BS School Not Listed 1980

Michael J Isserman, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences
MD Washington Univ in St. Louis 1975
BA Harvard University 1971

Jeffrey H Jacob, OD
Adjunct Instructor in Ophthalmology and Visual Sciences
(primary appointment)
BS So Cal College of Optometry 1978
BA University of Missouri 1975
OD So Cal College of Optometry 1980

Sharon Leslie Jick
Instructor in Clinical Ophthalmology and Visual Sciences
(primary appointment)

Daniel Paul Joseph, PhD, MD
Associate Professor of Clinical Ophthalmology and Visual Sciences
MD Washington Univ in St. Louis 1975
BA University of Missouri 1975
OD So Cal College of Optometry 1980

Stephen A Kamenetzky, MD1, MD
Professor of Clinical Ophthalmology and Visual Sciences
MD1 School Not Listed 1970
BA Washington Univ in St. Louis 1967
MD Washington Univ in St. Louis 1970

Michael A Kass, MD, MS
Bernard Becker Professor of Ophthalmology and Visual Sciences
Senior Associate Dean for Human Research Protection
MD Northwestern University 1966
BS Northwestern University 1963
MS Northwestern University Med 1966

Vladimir Jivkov Kefalov, PHD
Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Neuroscience
PHD Boston University 1999

Deborah Lynn Kerber, OD
Adjunct Instructor in Ophthalmology and Visual Sciences
(primary appointment)
BS Southeast Missouri St Univers 1986
OD University of Missouri 1992

Daniel Kerschensteiner, MD
Associate Professor of Ophthalmology and Visual Sciences
(primary appointment)
Associate Professor of Biomedical Engineering (Courtesy)
Associate Professor of Neuroscience
MD Georg August University 2004

Sangeeta Khanna
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)

William F Kiefer Jr, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA Princeton University 1967
BS Illinois College of Optometry 1973
OD Illinois College of Optometry 1975

Mark Alan Kleindorfer, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS Indiana University Bloomington 1977
OD Indiana University Bloomington 1979

Vivian Marie Kloke, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS Mckendree College 1986
OD University of Missouri 1990

Harry L Knopf, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Harvard University 1963
MD Harvard University 1967

Ronald Joseph Knox, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD School Not Listed 1956

Michael S Korenfeld, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Washington Univ in St. Louis 1986
BS University of Arizona 1981

Thomas Errol Kraemer, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Indiana University Bloomington 1972
BS Indiana University Bloomington 1970
BA Millikin University 1968

L

Michael J Lachtrup, OD
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
OD University of MO St Louis 1989
BA Webster University 1980

Robert Louis Lamberg, MD

Associate Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS University of MO St Louis 1972
MD Washington Univ in St. Louis 1976

Paul Arthur Lapoint, AA, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS School Not Listed 1963
AA Harris Stowe St College 1959
OD School Not Listed 1963

Andrew R. Lee, MD
Assistant Professor of Ophthalmology & Visual Sciences (Pending Executive Faculty Approval) (primary appointment)
MD Washington Univ in St. Louis 2013

Steven F Lee, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
BS University of Maryland 1983
MD University of Maryland 1987

Scott W Lewis, BS1, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS1 So Cal College of Optometry 1975
OD So Cal College of Optometry 1977
BS University of Illinois 1968

James Walter Lieber, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS Wayne State University 1976
OD Illinois College of Optometry 1981

James C Liu, MD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS Harvard University 2010
MD Washington Univ in St. Louis 2015

Anthony J Lubniewski, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
BS University of Florida 1980
MD University of Florida 1985

Gregg T Lueder, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Pediatrics
BS Iowa State University 1981
MD University of Iowa 1985

Peter David Lukasiewicz, PHD
Janet and Bernard Becker Professor of Ophthalmology (primary appointment)
Professor of Neuroscience
Robi N Maamari, MD
Instructor in Ophthalmology and Visual Science (primary appointment)
MD University of CA Irvine 2014

Lisa Marie Mackey, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA University of Kansas 1989
OD University of Missouri 1993

Todd P Margolis, MD, PHD
Alan A and Edith L Wolff Distinguished Professor (primary appointment)
Head of the Department of Ophthalmology and Visual Sciences
MD University of CA San Francisco 1984
BS Stanford University 1977
PHD University of CA San Francisco 1983

Mary Kay Migneco, OD, BS1
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
BS University of Missouri 1986
OD University of MO St Louis 1991
BS1 University of Missouri 1986

Barry David Milder, MD
Associate Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Washington Univ in St. Louis 1973
BS Mass Inst of Technology (MIT) 1969

Duane L Mitzel, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Washington Univ in St. Louis 1977
BS University of California 2000

Eugene James Mobley, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Northern Illinois University 1950

Robert L Mobley, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Illinois College of Optometry 1958

Cynthia L. Montana, PHD, MD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
PHD Washington Univ in St. Louis 2014
BS University of Virginia 2005
MD Washington Univ in St. Louis 2014

Joshua L. Morgan, PHD
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Assistant Professor of Neuroscience
PHD Washington Univ in St. Louis 2007
BA Florida Southern College 2001

Robert F Munsch, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
BA University of Colorado Boulder 1974
MD Saint Louis University 1977

Raymond I Myers, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Indiana University Bloomington 1970
BS University of Notre Dame 1966

Randall Earl Nacke
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)

Matthew Newman, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Columbia University 1959
BA Vanderbilt University 1956

Paul F Nichols III, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD University of California 1982

Judith Mosinger Ogilvie, MA, PHD1, PHD
Adjunct Research Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
MA Harvard University 1978
PHD1 Harvard University 1983
BS Brown University 1976
PHD Harvard University 1983

Jeffrey Robert Padousis, MD
Instructor in Clinical Ophthalmology and Visual Science (primary appointment)
BA Vanderbilt University 1995
MD Saint Louis University 2000

Anjali K Pathak, MD, MD1
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
BS West Virginia University 1993
MD West Virginia University 1997
John F. Hardesty, MD, Department of Ophthalmology and Visual Sciences (10/15/19)

BA West Virginia University 1993
MD West Virginia University 1997

Jay S Pepose, PHD, MA, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Brandeis University 1975
PHD University of California 1980
MA Brandeis University 1975
MD University of CA Los Angeles 1982

John Craig Perlmutter, MD
Associate Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Cornell University 1971
BA Queens College 1967

Kisha Deslee Piggott, MD, PHD
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
Ophthalmology and Visual Sciences (primary appointment)
BS Emory University 2011
PHD Emory University 2009

Mujtaba A Qazi
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)

Rithwick Rajagopal, MD
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
MD New York University 2007

Mark S Rallo, OD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Missouri 1990
BS Saint Louis University 1986

Prabakar Kumar Rao, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
BA University of CA San Diego 1991
MD University of Southern Calif 1995

V. Nathan Ravi, MD, PHD, MS
Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Energy, Environmental and Chemical Engineering
BS University of Bombay 1972
MD University of Miami 1988
PHD Virginia Tech 1980
MS University of Bombay 1975

Margaret Mary McGlynn Reynolds
Assistant Professor of Ophthalmology and Visual Sciences (Pending Executive Faculty Approval) (primary appointment)

Michael Dennis Rohde, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Missouri 1987
BS Valparaíso University 1983

Louis J Rosenbaum, MD
Associate Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Washington Univ in St. Louis 1963
BA University of Michigan 1959

Mark A Rothstein, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Williams College 1986
MD University of Utah 1991

Michael B Rumelt, MD
Assistant Professor Emeritus of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Lamar University 1962
MD Washington Univ in St. Louis 1966

Phillip A Ruzycki
Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS Davidson College 2008

Scott Geoffrey Sagett
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)

Jonathan C Schell, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Saint Louis University 2001
MD Saint Louis University 2005

Frederick W Schwagger, OD, BS1
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Illinois College of Optometry 1957
BS Illinois College of Optometry 1957
BS1 Washington Univ in St. Louis 2000

Christopher G Seep, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)

David Brian Seibel, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Missouri 1987

Gaurav Kirit Shah, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD University of Illinois 1993

James Banks Shepherd III, MD
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
MD Columbia University 1997
BA Amherst College 1992

Priya Saigal Shetty, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
MD University of Michigan 2007

Arsham Sheybani, MD
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
MD Washington Univ in St. Louis 2008

Steven M Shields, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Washington Univ in St. Louis 1986
BS Washington Univ in St. Louis 1981

Alan Shiels, PHD
Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Genetics
PHD University of London 1983
BS School Not Listed 1979

Howard Newton Short, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
BA Washington Univ in St. Louis 1974
MD Saint Louis University 1978

Carla J Siegfried, MD
Jacquelyn E and Allan E Kolker M.D. Distinguished Professor of Ophthalmology (primary appointment)
BA University of MO Kansas City 1989
MD University of MO Kansas City 1989

Charles D Signorelli, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD School Not Listed 1957
BS School Not Listed 1957

Bradley Thomas Smith, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
MD University of AL Birmingham 2002

Claud Randall Snowden, OD

Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS Illinois College of Optometry 1972
OD Illinois College of Optometry 1974

Craig H Sorce, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA Southern Illinois University 1988
OD University of Missouri 1992

Florentina Soto Lucas, PHD
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
PHD University of Alicante 1992

Mark H Spurrier, MD
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Washington Univ in St. Louis 1980
BA Kansas State University 1976

Joseph Steska, OD
Instructor in Ophthalmology and Visual Science (primary appointment)
OD Illinois College of Optometry 2009

Michael Vincent Stock, BE1, BE, MD
Instructor in Ophthalmology and Visual Sciences (primary appointment)
BE1 Vanderbilt University 2008
BE Vanderbilt University 2008
MD Washington Univ in St. Louis 2012

James F Strieter, MBA, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS School Not Listed 1953
MBA Southern III Univ Edwardsville 1988
OD School Not Listed 1954

Brian Patrick Sumner, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Illinois College of Optometry 1978

Kenneth V Swanson
Instructor in Clinical Ophthalmology and Visual Sciences (primary appointment)

T

Paul M Tesser, PHD, MD
Associate Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Mass Inst of Technology (MIT) 1981
PHD State Univ of NY Stonybrook 1990
MD State Univ of NY Stonybrook 1991

Matthew A Thomas, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Harvard University 1977
MD Harvard University 1991

Linda Mei-Lin Tsai, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
BA Northwestern University 1990
MD Northwestern University 1995

Robert Lawrence Tychsen, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
John F Hardesty MD Distinguished Professor of Ophthalmology and Visual Sciences
Professor of Neuroscience
Professor of Ophthalmology and Visual Sciences in Pediatrics
MD Georgetown University 1979
BS Georgetown University 1975

V

Gregory Paul Van Stavern, MD
Professor of Ophthalmology and Visual Sciences (primary appointment)
Professor of Neurology
MD Pennsylvania State University 1993
BS La Salle University 1989

Gary Lee Vogel, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD Ohio State University 1977
BA University of Iowa 1970

David Edward Vollman, MD
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
MD Ohio State University 2006

W

James J Wachter, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BA Saint Louis University 1987
OD Illinois College of Optometry 1991
BS Illinois College of Optometry 1990

Donald E Walter Jr, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
OD University of Houston 1972
BS University of Houston 1971

William Lee Walter, MD
Assistant Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
MD Ohio State University 1954

BA De Paul University 1950
Stephen R Waltman, MD, MBA
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS Mass Inst of Technology (MIT) 1961
MD Yale University 1964

Stephen Alan Wexler, MD
Professor of Clinical Ophthalmology and Visual Sciences (primary appointment)
BS University of Michigan 1977
MD University of Michigan 1982

Richard Harris Wieder, MD
Associate Professor of Ophthalmology and Visual Sciences (primary appointment)
BS University of Illinois 1982
MD University of Illinois 1986

Philip Raymond Williams, PHD
Assistant Professor of Ophthalmology and Visual Sciences (primary appointment)
PHD Washington Univ in St. Louis 2009

Michael L Wolf, OD
Adjunct Instructor in Ophthalmology and Visual Sciences (primary appointment)
BS University of Missouri 1979
OD University of Missouri 1987

Ming-Fong Agnes Wong, PHD, MD
Adjunct Professor of Ophthalmology and Visual Sciences (primary appointment)
PHD University of Toronto 2001
BA Boston University 1990
MD McGill University 1994

Courses
Curriculum courses for Ophthalmology and Visual Sciences are listed below (p. 13).

First Year
Introduction to clinical ophthalmology begins during the first year with a lecture and practicum (peer exam) on taking an ocular history and performing an ocular exam. Emphasis is on ophthalmoscopy. The lectures and the practicum session will be led by Dr. Andrew Lee.

Second Year
During the second year, students will receive a refresher lecture and lab on direct ophthalmoscopy as well as a lecture on
ophthalmic manifestations of systemic disease and primary ocular diseases.

**Third Year**

**Third-Year Clerkship Opportunities**

During the third year, students are given the opportunity to spend four weeks of their surgery rotation on the ophthalmology service. The students work closely with the ophthalmology residents and review the differential diagnosis of the "red eye," how to interpret an ophthalmologic consult note, and how to handle ocular emergencies. During this rotation, there is again emphasis on the use of the ophthalmoscope. Additional clinical skills introduced to student rotators include the use of the slit lamp and indirect ophthalmoscopy. All third-year students must complete the "Case Studies in Ophthalmology for Medical Students" and attend the periodic "feedback/oral exam" session with Dr. Andrew Lee.

**Third Year/Fourth Year**

Ophthalmology Sub-Internship Rotation ("The Sub-Eye") occurs during this time. During the month of June prior to 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. There will be an intense schedule of both live and recorded lectures delivered by ophthalmology faculty members, with post-lecture quizzes. Students will be expected to perform daily required reading. Retention and understanding of reading materials will be gauged by frequent quizzes. Students are strongly encouraged to present a case at the department's grand rounds. By the end of the rotation, students will be expected to function at the level of a first-year ophthalmology resident.

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**Curriculum Courses**

**M50 Ophth 801 Ophthalmology**

This elective is for senior students who plan to apply for a residency in Ophthalmology. In accordance with any subinternship, medical students will be expected to function at the level of a beginning first-year ophthalmology resident on this rotation. The students will rotate through the resident eye clinic and the subspecialty clinics of the full time faculty of the Washington University Medical School Department of Ophthalmology and Visual Sciences (e.g., neuro-ophthalmology service, cornea/external disease service, etc.). The first day of the rotation will consist of an orientation day in which students will receive extensive didactics and participate in workshops to learn the basics of a complete ophthalmic history and examination. Students may opt to check out indirect ophthalmoscopy lenses that may be used for the month to facilitate the acquisition of fundoscopy skills. During the rotation, the student’s responsibilities range from observation (including observing surgery) to working at a resident level and completing full eye examinations. There will be a rigorous academic curriculum for the rotation, including a weekly case presentation, bi-monthly wet lab sessions with a resident, weekly attendance at grand rounds, and a mix of medical student-oriented and resident-oriented conferences. On day one, students will receive a rotating call schedule for the entire month. A medical student is expected to be present at all times to assist the primary call ophthalmology resident during the rotation. By the end of the four-week rotation, the student is expected to be proficient in taking an ocular history and performing a complete eye exam including slit lamp biomicroscopy and indirect ophthalmoscopy.

**M50 Ophth 816 Away Rotation in Ophthalmology**

This four-week elective is for senior students from medical schools across the United States who are in good standing at their home institution and who are planning to apply for a residency in ophthalmology. To enroll in this elective, students must first apply online for the elective via the visiting student application service (VSAS). These applications will be reviewed and invitations will then be sent to individuals to enroll in the elective. Due to large demand, not all eligible away students will be accepted for the rotation. The dates for this elective are not flexible. The students will rotate through the resident eye clinic and the subspecialty clinics of the full time faculty of the Washington University Medical School Department of Ophthalmology and Visual Sciences (e.g., neuro-ophthalmology service, cornea/external disease service, etc.). In exchange for a refundable deposit, students may opt to check-out indirect ophthalmoscopy lenses that may be used for the month to facilitate the acquisition of fundoscopy skills. During the rotation, the student's responsibilities range from observation (including observing surgery) to working at a resident level and completing full eye examinations. Didactics will include weekly case presentation sessions, weekly attendance at grand rounds, and a mix of medical student-oriented and resident-oriented conferences. Also, there will be medical student-oriented workshops to learn the basics of the slit lamp and indirect ophthalmoscopy. On day one, students will receive a schedule of conferences that they are expected to attend during the month. By the end of the four-week rotation, the student is expected to be proficient in taking an ocular history and performing a complete eye exam including slit lamp biomicroscopy and indirect ophthalmoscopy.

**M50 Ophth 900 Research Elective — Ophthalmology**

Research opportunities may be available. If interested, please contact the Department of Ophthalmology.