



DEPARTMENT OF OPHTHALMOLOGY AND VISUAL SCIENCES (DOVS)

RESEARCH INTERESTS

Basic Science Faculty



Curtis Brandt, PhD

DOVS
crbrandt@wisc.edu

- Ocular infections, gene delivery, retinal gene therapy, and immunology, cornea, CORE lab
- Genetic drivers of virulence in ocular viral infection
- Innate/intrinsic immune responses to ocular gene delivery vectors
- Gene therapy for ocular diseases
- Antimicrobial drug discovery and development
- The role of microtubule associated proteins in HSV neuronal infection



Amitha Domalpally, MD, PhD

DOVS
domalpally@wisc.edu

- Discovery, development, and translation of imaging biomarkers for clinical trials in retinal diseases
- Artificial Intelligence for retinal imaging
- Clinical Trials in diabetic retinopathy, AMD, retinal vein occlusion and uveitis
- Imaging artifacts



David Gamm, MD, PhD

DOVS
dgamm@wisc.edu

- Diseases of the retina, stem cell biology
- Human pluripotent stem cells
- Disease modeling
- Regenerative medicine
- Retinitis pigmentosa
- Age-related macular degeneration
- Retinal, photoreceptor, and RPE cell development
- Retinal stem cell biology/human pluripotent stem cell biology
- Retinal development biology
- Inherited and acquired retinal degenerations
- Cell and gene therapies for retinal degenerations
- Stem cell-based retinal disease modeling



Shaoqin "Sarah" Gong, PhD

DOVS
shaoqingong@wisc.edu

- Multifunctional drug/gene/cell delivery systems
- Nanomedicines
- Biomaterials
- CRISPR genome editing
- Tissue engineering
- Antimicrobial materials
- Cancer immunotherapy



Mrinalini Hoon, PhD

DOVS
mhoon@wisc.edu

- Diseases of the retina
- Determine the molecular and activity-dependent mechanisms that regulate synaptic connectivity between retinal neurons during development and circuit assembly
- Determine the structural and functional impact of retinal disease on synaptic connectivity between outer and inner retinal neurons
- Correlate synaptic plasticity mechanisms during retinal development and during disease conditions
- Determine genetic and/or pharmacological strategies that can recover synaptic organization and function in retinal disease conditions



Paul Kaufman, MD
DOVS
paul.kaufman@wisc.edu

- Glaucoma, accommodation/presbyopia, intraocular pressure regulation/aqueous humor dynamics
- Devise methods for obtaining accurate, reproducible measurements of Schlemm's canal pressure as the gateway to the distal aqueous outflow apparatus
- Develop gene therapies to enhance aqueous humor outflow and reduce intraocular pressure
- Study the anatomic and pathophysiological relationship between presbyopia and glaucomatous optic neuropathy
- Characterize all anatomical movements during accommodation (i.e., ciliary muscle, lens, sclera, choroid, vitreous fluid, vitreous membranes/ fibers/strands) and their changes with age
- Elucidate the full mechanism of accommodation and the extra lenticular pathophysiology of presbyopia



Julie Mares, PhD, MSPH
DOVS
jmarespe@wisc.edu

- Epidemiology, diet and nutrition and eye diseases
- Assess the status of retinal carotenoids and relationship to genotypes and phenotypes
- Retinal carotenoids to retinal neurodegeneration, and relation to age-related macular degeneration, glaucoma and vision function
- Conduct epidemiological studies of the relationships of healthy diets and lifestyles to common age-related eye diseases



Colleen McDowell, PhD
DOVS
cmmcdowell@wisc.edu

- Molecular mechanisms for glaucomatous trabecular meshwork damage
- Regulation of Intraocular Pressure (IOP)
- Effect of elevated IOP on retinal ganglion cells (RGC) and optic nerve head (ONH) damage
- Cell culture models
- Multiple mouse model systems
- Profusion organ culture system for human donor eyes
- Co-Director of DOVS Biobank



Gillian McLellan, BVMS, PhD
DOVS, School of Veterinary Medicine
gillian.mclellan@wisc.edu

- Glaucoma, neuroprotection, ocular development, drug development, genetic ocular disease in animals
- Comparative glaucoma, including imaging of the retina and optic nerve, electrophysiology, aqueous humor dynamics, genetics and pathology of glaucoma in animals and humans
- Gene therapy for glaucoma
- Intersection of glaucoma and Alzheimer's disease pathology



Freya Mowat, BVSc, PhD
DOVS, School of Veterinary Medicine
mowat@wisc.edu

- Retinal aging and aging of the senses and the brain
- The relationship between diseases of the brain and diseases of the retina
- Multifactorial risk factors for retinal aging and age-related diseases
- Naturally occurring animal models of retinal dysfunction and degeneration
- Retinal diseases of dogs; Sudden Acquired Retinal Degeneration Syndrome (SARDS)
- Genetic variation in PPARGC1a and photoreceptor health in the aging retina



Donna Neumann, PhD
DOVS
dneumann3@wisc.edu

- HSV-1 infections in corneal scarring and blindness
- Epigenetic controls regulating HSV-1 latency



Robert Nickells, PhD

DOVS
nickells@wisc.edu

- Glaucoma, neuroprotection
- Regulation of ganglion cell death and the role of Bax
- Epigenetic changes in apoptotic ganglion cells leading to gene silencing
- Identification of ganglion cell death susceptibility alleles
- Development of a cold storage solution for the preservation of whole eyes used for transplantation



T. Michael Nork, MD, MS

DOVS
tmnork@wisc.edu

- Diseases and surgery of the retina and vitreous
- Mechanisms by which various ocular diseases affect the outer retina
- How injury to the outer retina might, in turn, affect disease pathogenesis



Nader Sheibani, PhD

DOVS
nsheibanikar@wisc.edu

- Ocular vascular biology
- Identification of molecular and cellular mechanisms driving ocular neovascularization
- Animal modeling of ocular neurovascular degenerative diseases
- Molecular and cellular action of endogenous inhibitors of angiogenesis
- Evaluation and development of new treatment modalities for ocular neovascular diseases
- Ocular metabolic activity and cellular dysfunction



Terri Young, MD, MBA

DOVS
tyoung6@wisc.edu

- Pediatric ophthalmology, molecular genetics of eye diseases, myopia
- Gene discovery and animal modeling of childhood glaucoma
- Gene discovery and animal modeling of heritable, degenerative high- grade myopia
- Whole-eye imaging in ocular development and with refractive states such as myopia



Ismail Zaitoun, PhD

DOVS
iszaitoun@wisc.edu

- Hypoxic ischemic insult on retinal vascular integrity and function
- Hypoxia-inducible factors (HIFs) to retinal vascular damage
- Ischemic stroke insult on the neurovascular unit at the cellular level, both in vivo and in vitro
- Pro- and anti-apoptotic proteins in eye vasculature under developmental and pathologic conditions

Clinical Faculty



Michael Altaweel, MD

DOVS

mmaltaweel@wisc.edu

- Retina imaging, reading center
- Diabetic retinopathy, uveitis, macular edema
- Diseases of the retina
- Adalimumab vs conventional Immunosuppression therapy for patients with non-infectious, intermediate, posterior, and panuveitides
- Uveitic macular edema
- Ocular melanoma



Barbara Blodi, MD

DOVS

bablodi@wisc.edu

- Clinical trials in dry and wet age-related macular degeneration, diabetic retinopathy, diabetic macular edema, retinal vein occlusion
- Retinal imaging research including new retinal modalities
- Use of artificial intelligence for retinal imaging in reading center research and clinical trials



Yasmin Bradfield, MD

DOVS

ysbradfield@wisc.edu

- Pediatric ophthalmology
- Anterior segment OCT imaging
- Pediatric glaucoma
- Pediatric access to eye care



Cat Burkat, MD

DOVS

cburkat@wisc.edu

- Ophthalmic reconstructive and cosmetic surgery



Jonathan Chang, MD

DOVS

jschang4@wisc.edu

- Diseases of the retina and vitreous
- Outcomes of retina surgery
- Determining cost-effectiveness and utility of clinical interventions
- Use of imaging to evaluate retinal diseases
- Big data



Roomasa Channa, MD

DOVS

rchanna@wisc.edu

- Diabetic retinopathy and diabetic retinal neurodegeneration
- Leveraging technology, such as artificial intelligence, to reduce disparities in diabetic eye care
- Retinal imaging
- Diseases of the retina, macula and vitreous
- Big data



Yanjun "Judy" Chen, MD, PhD

DOVS
ychen344@wisc.edu

- The pupil as a biomarker of brain aging and degeneration
- Machine learning in pupil analyses
- Virtual reality mirror eye tracker
- Optic neuropathy related to MS, brain tumors, and genetic mutations



Karina Conlin, OD

DOVS
kconlin@uwhealth.org

- Specialty contact lens optometry
- Ocular surface disease



Justin Gottlieb, MD

DOVS
jlgottlieb@wisc.edu

- Age-related macular degeneration, diabetic retinopathy, diseases of the retina



Daniel Knoch, MD

DOVS
dwknoch@wisc.edu

- Research in medical student education
- Research in resident education
- Curriculum development and assessment
- Surgical procedures



Laura Kopplin, MD, PhD

DOVS
ljkopplin@wisc.edu

- Epidemiology and risk factors for inflammatory eye diseases
- Clinical trials of uveitis therapeutics
- Biomarkers for uveitis outcomes
- Clinical management of ocular inflammatory disease



Yao Liu, MD

DOVS
liu463@wisc.edu

- Clinical trials of new medications and surgical devices
- Telemedicine for diabetic eye screening
- Macular pigment as a glaucoma risk factor
- Clinical and surgical glaucoma management
- Community-based research and health equity



Mark Lucarelli, MD

DOVS
mlucarel@wisc.edu

- Oculoplastic, cosmetic facial and orbital surgery
- Small incision/minimal minimallyinvasive oculo-facial surgical techniques
- Facial synkinesis
- Orbital and adnexal malignancies
- Orbital, facial, and periocular anatomy
- Thyroid eye disease clinical trial (Immunovant)



Michele Martin, OD

DOVS
mmartin43@uwhealth.org

- Dry Eye
- Graft versus host disease



Alexander Miranda, MD

DOVS
armiranda@wisc.edu

- Pediatric eye diseases
- Eye disease registries
- Big data



Mihai Mititelu, MD, MPH

DOVS
mititelu@wisc.edu

- Retina, age-related macular degeneration, diabetic retinopathy
- Multimodal imaging, intravitreal injections, retinal vascular disease, medical education and mentoring
- Clinical trials
- International health
- Autoimmune retinopathy



Anna Momont, MD

DOVS
acmomont@wisc.edu

- Ergonomics in residency training
- Glaucoma therapies, clinical trials participation



Sanbrita Mondal, OD

DOVS
smondal4@wisc.edu

- Low vision disparities, quality improvement
- Low vision technology
- Wisconsin Low Vision Registry and Data Repository (WILVR)



Sarah Nehls, MD
DOVS
nehls@wisc.edu

- Cornea, infectious eye disorders, dry eye
- Clinical Trials



Nayan Patel, OD
DOVS
npatel3@uwhealth.org

- Pediatric myopia
- Clinical trials
- Specialty contact lenses



Heather Potter, MD
DOVS
hpotter@wisc.edu

- Comprehensive ophthalmology, anterior segment & cataract surgery, pathology
- Co-Director of DOVS Biobank



Kathleen Schildroth, MD
DOVS
kathleen.schildroth@wisc.edu

- Diabetic retinopathy
- Macular degeneration
- Ocular trauma
- Retinal detachment
- Retinal laser
- Retinal vascular disease
- Vitreoretinal surgery



Melanie Schmitt, MD

DOVS

maschmitt@wisc.edu

- Pediatric ophthalmology, hereditary retinal disorders
- Inherited Retinal Degeneration Database (IRD)



Kimberly Stepien, MD

DOVS

kstepien@wisc.edu

- Inherited Retinal Diseases
- Diseases of the Retina including age-related macular degeneration, diabetic retinopathy, vascular occlusion
- Adaptive Optics Retinal Imaging
- High Resolution Retinal Imaging
- PI – Inherited retinal disease clinical trials
- Co-founder Wisconsin Advanced Imaging of Visual Systems (WAIVS) lab at UW-Madison
- Developer, UW Ocular Genetic Disease Registry
- Investigator, Wisconsin Reading Center at UW-Madison



Suzanne van Landingham, MD

DOVS

svanlandingh@wisc.edu

- Oculoplastic, orbital, and facial cosmetic surgery
- Big data in ophthalmology - SOURCE and IRIS eye disease registries
- Facial nerve injury and facial synkinesis
- Functional impact of ophthalmic and adnexal disease, including the impact of vision loss on driving
- Clinical trials in thyroid eye disease



Evan Warner, MD

DOVS

ejwarner@wisc.edu

- Clinical trials in medical and surgical management of corneal disease
- Eye banking, cornea donor pool expansion, and cornea graft utilization
- Endothelial keratoplasty surgery and anesthesia
- Education and training of corneal transplantation
- Dry eye disease and neurotrophic keratitis

Affiliates



Anne Griep, PhD

Cell and Regenerative Biology
aegriep@wisc.edu

- Molecular and genetic pathways regulating mouse eye development and disease using mouse models
- Cell cycle regulation in the lens
- Molecular and genetic regulation of lens cell structure
- Transgenic, knockout and gene edited mice



Natascha Merten, PhD

Population Health Sciences
merten2@wisc.edu

- Investigation of general aging processes that affect multiple domains of brain aging focusing on sensory and cognitive aging and dementia
- Investigation of early biomarkers and potentially modifiable risk factors of brain aging to identify individuals at risk for decline in various health conditions



**Bikash Pattnaik, PhD,
MPhil**

Pediatrics
pattnaik@wisc.edu

- Retinal diseases due to ion channelopathy
- Genomic medicine targeting RPE and PR channelopathy IRD
- Viral and non-viral therapeutic delivery to the posterior retina
- Hypoxic-ischemic encephalopathy (HIE) impact on impairment in pediatric vision



Donna Peters, PhD

Pathology and Laboratory Medicine
dmpeter2@wisc.edu

- Fibronectin's role in the modulation of intraocular pressure
- Role of integrin signaling in the trabecular meshwork and glaucoma



Raunak Sinha, PhD

Neuroscience
raunak.sinha@wisc.edu

- Visual processing in the retina



Yuhang Zhao, PhD

Computer Sciences
yuhang.zhao@cs.wisc.edu

- Human Computer Interaction (HCI)
- Accessibility
- Augmented and Virtual Reality (AR/VR)
- AI-powered interactive systems

PI Scientists



Jeremy Rogers, PhD

DOVS
jdrogers5@wisc.edu

- Optical design and instrumentation development (OCT, microscopy, spectroscopy, polarimetry, AOSLO)
- Development of novel image contrast
- Quantitative measurement of optical scattering in tissue (goniometry, EBS)
- Computational modeling of light scattering in tissue using Monte Carlo simulations



Robert Slater, PhD

DOVS
rdslater@wisc.edu

- Artificial intelligence development and algorithms
- Deep neural networks
- Large scale databases
- Retinal AI



Stuart Tompson, PhD

DOVS
stompsom@wisc.edu

- Determine the molecular genetic causes underlying childhood glaucoma and high-grade myopia
- Map familial genetic disease loci using high-density SNP genotyping arrays and linkage analysis
- Determine gene/genome variants in families using exome and whole-genome sequencing
- Assay variant gene function through protein overexpression in cultured cells
- Generate rodent models of human genome variation using CRISPR-Cas9 genome editing
- Perform detailed ocular phenotyping of rodent models, including IOP, OCT, and histology (FFPE/cryo)
- Profile the transcriptomes of ocular tissues using single cell RNA sequencing (scRNAseq), including ocular tissue dissociation techniques and data analysis using Loupe Browser and Seurat



James Ver Hoeve, PhD

DOVS
verhoeve@wisc.edu

- Non-invasive Visual Electrophysiology
- Glaucoma
- Inherited retinal disease
- Visual Development, Normal and Abnormal
- Comparative Ophthalmology