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UPMC Eye Center Highlights

Dear Colleagues:

With this, our inaugural newsletter, I'd like to share with you just a handful of our achievements.

During the past year, we welcomed four new faculty members: Joseph Martel, MD; Shyam Kodati, MD; Michael Steketee, PhD; and Michelle Sandrian, PhD, whose work highlights our commitment to advancing the UPMC Eye Center's mission of improving patients' quality of life through vision preservation and restoration.

The department had the privilege of hosting our third annual Fox Center Conference for Vision Restoration in 2013, which brought together more than 150 multidisciplinary scientists, clinicians, engineers, and other professionals in the fields of ophthalmology and regenerative medicine. The department also hosted the Midwest Glaucoma Symposium, which was chaired by Nils Loewen, MD, our Glaucoma and Cataract service director, and provided updates on the latest advances in glaucoma diagnosis and therapies, including novel surgical techniques.

One of my personal highlights last year was having the great fortune of following in the footsteps of one of my mentors, W. Morton Grant, MD, by presenting the Robert N. Shaffer Lecture at the American Academy of Ophthalmology Annual Meeting. My lecture, *Glaucoma Changes—Reality Bites*, addressed how structure and function relate and how optical coherence tomography (OCT) can change the way glaucoma is detected.

As we move further into 2014, I am looking forward to the challenges and opportunities offered by the revolution we are experiencing in our health care delivery system, and pushing forward our research programs to discover basic mechanisms, etiologies, treatments, and cures for eye diseases.

I am extremely proud of the work done by the UPMC Eye Center team this year and look forward to sharing our good work with you in upcoming issues of our newsletter.

Sincerely,

A handwritten signature in black ink that reads "Joel S. Schuman".

Joel S. Schuman, MD, FACS

*Eye & Ear Foundation Professor and Chairman, Department of Ophthalmology
University of Pittsburgh School of Medicine*

Director, UPMC Eye Center

Director, Louis J. Fox Center for Vision Restoration of UPMC and the University of Pittsburgh

Conference Highlights

36th Annual Midwest Glaucoma Symposium

Last fall, the 36th Annual Midwest Glaucoma Symposium took place at UPMC under the direction of Nils Loewen, MD, PhD, the director of the UPMC Eye Center's Glaucoma and Cataract Service. The Symposium offered comprehensive lectures with extended discussions by leading glaucoma researchers and physicians. The conference highlighted innovations in classical glaucoma surgery and the development of new surgical modalities, while also debating the latest clinical and basic science advances.

Innovations in Glaucoma Surgery

iStent

The iStent®, a new procedure offered by UPMC, is a microstent device, similar to what cardiologists would use if a vessel of the heart is obstructed. The iStent is inserted to bypass a trabecular meshwork that has reduced flow and thereby lowers intraocular pressure.

Trabectome

The Trabectome® removes the trabecular meshwork that represents the flow resistance in glaucoma over a larger area than microstents. This procedure is highly effective and rivals more invasive, classic glaucoma surgery that uses tube shunts yet has a much decreased complication rate and leaves no hardware behind.

Endocyclophotocoagulation (ECP)

ECP is a laser probe used to reduce the amount of fluid produced in the eye by destroying part of the tissue that makes the fluid.

Innovations in Classical Glaucoma Surgery

Lectures at the conference discussed new ways of adding antimetabolites to prevent scar formation, as well as ways to manage tube shunts to allow these techniques to be more successful.

Highlighted Lectures

Biomechanics of the Optic Nerve

Ian Sigal, PhD

Assistant Professor of Ophthalmology

Laboratory of Ocular Biomechanics University of Pittsburgh School of Medicine

Dr. Sigal presented new data about the biomechanics of the optic nerve. His research shows that the area where the optic nerve enters the eye undergoes considerable stretching and deformation. The research being conducted by Dr. Sigal looks specifically at the lamina cribrosa where the optical nerve axons enter the eye. His presentation encouraged ophthalmologists to explore what can be done to modify the structure.

Live Outflow Tract Imaging

Larry Kagemann, PhD

Research Assistant Professor of Ophthalmology and Bioengineering

University of Pittsburgh School of Medicine

The lecture given by Dr. Kagemann discussed the research being conducted by UPMC's Optical Coherence Tomography (OCT) Imaging Group. The OCT Imaging Group led by Gadi Wollstein, MD, and Joel S. Schuman, MD, FACS, modified an imaging laser scanner system that usually images the optic nerve to obtain high-resolution images of the front part of the eye and enables the ophthalmologist to see the natural drainage system. This may help to better guide position stent implants.

Keynote Lecture: The RGC Index to Diagnose and Monitor Glaucoma

Robert N. Weinreb, MD

Chairman and Distinguished Professor of Ophthalmology

Director of the Shiley Eye Center

Director of the Hamilton Glaucoma Center

Morris Gleich MD Chair of Glaucoma

Shiley Eye Center, UC San Diego

Traditional glaucoma progression tracking follows the visual field of the optic nerve. Dr. Weinreb's research explores the retinal ganglion cells that form the optic nerve. The population of cells is the highest in the macular, which may allow to detect glaucoma and prevent functional decline.

Select presentations from the Midwest Glaucoma Symposium are available for CME on UPMCPPhysicianResources.com/Ophthalmology.

Hawaiian Eye 2014

The UPMC Eye Center has a long history as contributors to Hawaiian Eye, the annual gathering of comprehensive ophthalmologists and retina specialists, and this year was no different. Joel S. Schuman, MD, FACS, chair, Department of Ophthalmology; and Ken Nischal, MD, FRCOphth, director, Pediatric Ophthalmology, Strabismus, and Adult Motility represented UPMC as moderators and presenters.

Dr. Schuman moderated the glaucoma session and presented *Structure: Function and Care of the Glaucoma Patient*. The lecture examined the relationship between the change in structure and function when treating patients with glaucoma. Through research done at the UPMC Eye Center, Dr. Schuman and his colleagues have found that structure and function change concurrently. This evidence is a contrast to the current, mainstream understanding. Measures currently used to identify these changes show that, early in the disease, only structure changes. Then at later points in the disease, changes are seen in the function, while in the intermediate phases of the disease the structure and function change at approximately the same time. "This leads us to believe that structure and function are artifacts of how we measure," says Dr. Schuman. "When

measuring both, they change at the same time. This knowledge should inform how physicians care for glaucoma patients, how we identify disease and progress, and how we advance treatment."

Dr. Nischal presented *Angle Surgery in Pediatric Glaucoma*, which addressed the techniques used in pediatric angle surgery for glaucoma and how those techniques can be used in the treatment of adult glaucoma. Specifically, Dr. Nischal focused on the importance of gonioscopy to diagnose the abnormal angle seen in infantile glaucoma. For goniotomies he described a technique similar to the one used for uveitic glaucoma; once the microscope is in place, a needle can be used to go across the eye and make an incision at the point of the abnormal membrane. Although the results of this procedure have been varied, this technique has recently become more common.

For more information on the presentations given by Dr. Schuman and Dr. Nischal at Hawaiian Eye, or to ask questions of either doctor, please email EyeCenter@upmc.edu.

American Academy of Ophthalmology



In November, UPMC Eye Center had a number of faculty present at the American Academy of Ophthalmology Annual Meeting. Joel S. Schuman, MD, FACS, chair, Department of Ophthalmology, was recognized as this year's Robert N. Shaffer lecturer.

Dr. Schuman's lecture, *Glaucoma Changes, Reality Bites*, addressed:

- History of detecting glaucoma
- How structure and function relate and which change comes first
- Data showing a tipping point in glaucoma detection
- How optical coherence tomography (OCT) can change the way glaucoma is detected

In addition to Dr. Schuman, faculty members from the UPMC Eye Center presented:

Diagnosis, Optic Neuropathy: Now What?; Gabrielle Bonhomme, MD

Advances in Keratoplasty: Where We Are in 2013; Deepinder Dhaliwal, MD

Diabetic Macular Edema: 2013 Update on Management; Tom Friberg, MD

Trabeculectomy by Internal Approach (Trabectome) Surgery for Adult Open Angle Glaucoma; Nils Loewen, MD, PhD

Management of Pediatric Cataracts, Nightmares in Pediatric Cataract Surgery; Ken Nischal, MD

Manual Small Incision Extracapsular Cataract Surgery: A Technique for the Developing and Developed World; Leela Raju, MD

OCT Imaging in Glaucoma; Gadi Wollstein, MD

For additional information on any of their presentations please email EyeCenter@upmc.edu

Large Referral Center Explores Efficacy of Trabectome-mediated Ab Interno Trabeculectomy

Good results were seen in challenging eyes, which should justify proceeding with a formal comparative trial of this MIGS system.



by **Nils A. Loewen, MD, PhD**

Eye surgeons who perform minimally invasive glaucoma surgeries, or MIGS, often wonder whether they buy reduced complications so common in traditional glaucoma surgeries at the cost of diminished IOP-lowering efficacy. This concern grew when first results of trabecular bypass micro stents seemed to indicate that the effect was only slightly

better than that of cataract surgery alone.

These disappointing results led the procedure to being termed “minimally effective glaucoma surgery, or MEGS” by Weinreb.

At UPMC, we reviewed our outcomes with a different MIGS modality, Trabectome®-mediated ab interno trabeculectomy, which differs from micro stents by accessing more outflow tract segments and not leaving hardware in the eye. We wanted to see whether results may justify proceeding with a randomized controlled trial to compare Trabectome (NeoMedix) with traditional glaucoma surgery.

An initial review showed that our patients who had Trabectome-mediated ab externo trabeculectomy had an average IOP of 14.5 mm Hg at 1 year, with minimal attrition at 2 years. Eighty-one percent of patients had an IOP below 18 mm Hg, 52% of patients had an IOP below 15 mm Hg, and 27% had an IOP below 12 mm Hg. Among our pseudoexfoliation glaucoma patients, 50% had an IOP of less than 12 mm Hg, rivaling published results of trabeculectomy.

Encouraged by this, we recently performed a more challenging comparison and put Trabectome surgery at a distinct disadvantage; We assessed outcomes of Trabectome after trabeculectomy; Trabectome vs. tube shunts in similar patient populations; and Trabectome in highly complex, advanced mixed-mechanism glaucomas.

Outcomes

First, in our “Trabectome after Trab” study, we found that Trabectome worked surprisingly well in patients who had failed trabeculectomy, lowering IOP by 28% from 23.7 4 5.5 mm Hg and medications from 2.8 4 1.2 to 2 4 1.3 in 58 patients. In phaco-Trabectome, the mean IOP decreased 19% from 20 4 5.9 mm Hg and medications from 2.5 4 1.5 to 1.6 4 1.4 in 15 patients. It was previously thought that once an outflow tract is bypassed by traditional filtering surgery, it atrophies and becomes useless. This is apparently not the case, and this group of patients can benefit from the benign, hands-off postoperative course Trabectome surgery affords.

Second, in our “Trabectome vs. Tube” study when we compared 1-year outcomes of Trabectome in 125 patients with Baerveldt glaucoma implant (Abbott Medical Optics) in 162 patients and Ahmed glaucoma valve (New World Medical) in 44 patients, in our patients with relatively similar disease stages we were surprised to see that postoperative IOPs and reduction of medications to achieve those were not significantly different. Trabectome patients had a final IOP of 14.9 4 3.9 mm Hg and medications were reduced by 0.9; Baerveldt patients had a final IOP of 14.5 4 4.9 mm Hg and medications

were reduced by 0.9; and Ahmed patients had a final IOP of 16.7 4 6.2 mm Hg and medications were reduced by 0.5. As the most striking difference, the rate of complications was about 10 times less in Trabectome patients.

Third, in the analysis of “Trabectome in Complex High-Risk Glaucomas,” we found that of 15 eyes with advanced glaucomas after open globe trauma, retinal detachment and buckles, neovascular glaucomas, or uveitis with secondary angle closure (or a combination of those), eyes with traumatic glaucoma experienced a reduction in IOP from 32 4 9 mm Hg to 14 4 4 mm Hg and in medication from 4 to 0; eyes with retinal detachments experienced a reduction in IOP from 31 4 10 mm Hg to 15 4 4 mm Hg and in medication from 4.4 to 1; eyes with neovascular glaucomas experienced a reduction in IOP from 46 4 12 mm Hg to 15 4 8 mm Hg and in medication from 3.3 to 1; and eyes with uveitic glaucomas experienced a reduction in IOP from 30 4 6 mm Hg to 12 4 5 mm Hg and in medication from 3.7 to 1.3.

Advances in Glaucoma Surgery

One has to keep in mind that the studies above were not randomized controlled trials and do not allow a direct comparison. However, these results indicate that one can achieve surprisingly good results with a minimally invasive glaucoma surgery, not just in mild glaucomas but even in the most challenging eyes. This should justify proceeding with a formal trial.

At UPMC, we like to compare advances in glaucoma surgery to that in cardiac surgery and interventional cardiology. Similar to how open heart surgery compares with angiographic stenting, there will always be a place for tube shunts and trabeculectomy while MIGS will increase. We believe that, in analogy to angiography, glaucoma surgeons will become better at assessing the outflow tract before surgery to make an informed decision of what surgery to use. Eventually, Trabectome-mediated ab interno trabeculectomy and similar MIGS may do what phacoemulsification did to extracapsular cataract incision, allowing earlier, safer intervention that is also very effective.

Visit UPMCPPhysicianResources.com/Ocular to learn more about the use of MIGS. You can also submit clinical questions or read the most recent questions asked of the UPMC Eye Center’s ophthalmology experts.

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Disclosure: Loewen is a Trabectome trainer.

Welcoming New Faculty

Michelle Sandrian, PhD

Michelle Sandrian, PhD, joined the Department of Ophthalmology as an assistant professor. She received her doctorate in bioengineering from the University of Pittsburgh, where her research focused on the development of nanoparticle contrast agents for optical coherence tomography (OCT) imaging in the lab of Joel S. Schuman, MD, FACS, chair, Department of Ophthalmology. Dr. Sandrian has joined the department after working in the lab of Wolfgang Drexler in Vienna as a Whitaker Foundation International Postdoctoral Research Scholar. In Vienna, Dr. Sandrian's research focused on multimodal OCT and photoacoustic tomography (PAT) system development, and multimodal contrast enhancement.



Dr. Sandrian's research interests include:

- In-vivo optical imaging with photoacoustic tomography
- Optical probes for photoacoustic tomography contrast enhancement
- Widespread application of photoacoustic tomography in large-scale pre-clinical studies
- Translation of photoacoustic tomography into the clinic

Joseph Martel, MD

Joseph Martel, MD, is an assistant professor of ophthalmology at the UPMC Eye Center and specializes in vitreoretinal surgery. He received his medical degree from the University of Nevada School of Medicine in Reno, Nev. Dr. Martel completed his residency in ophthalmology at the University of California San Francisco, and his fellowship in vitreoretinal surgery at Duke University Eye Center in Durham, N.C.



His research interests include:

- Adaptive optics imaging for retinal diseases to better understand the pathophysiology of disease and assist in the management of surgical diseases of the retina
- Development of new surgical instrumentation to be used in the operating room for vitreoretinal surgery

Michael Steketee, PhD

Michael Steketee, PhD, is an assistant professor in the Department of Ophthalmology. Dr. Steketee received his PhD in neuroscience from the University of Michigan Medical School and completed his postdoctoral work in the laboratory of Jeffrey Goldberg, MD, PhD, at the Bascom Palmer Eye Institute at the University of Miami. Dr. Steketee also has a joint appointment in the Center for Neuroscience at the University of Pittsburgh. He is also part of the Louis Fox Center for Vision Restoration and the McGowan Institute for Regenerative Medicine.



Dr. Steketee's research interests include:

- Developing nanoparticle-based platforms to deliver molecular and genetic therapeutics to injured central nervous system axons in vivo
- Applying extracellular matrix technology to the injured retina and optic nerve to prevent neurodegeneration and reduce destructive immune system inflammation while promoting constructive immune system repair
- Identifying the molecular mechanisms regulating the activity-dependent localization of nuclear-encoded electron transport chain mRNAs to mitochondria in the retinal ganglion cell axons
- Determining how increasing intrinsic axon growth potential in retinal ganglion cells influences growth cone guidance decisions during regeneration with the long term goal of promoting axon target reinnervation with temporal and spatial specificity

Shyam Kodati, MD, FRCS

Shyam Kodati, MD, FRCS, is a clinical assistant professor of ophthalmology at the UPMC Eye Center. He is a graduate of Osmania Medical College in India. Dr. Kodati completed his residency in ophthalmology at the Royal College of Ophthalmology in London, and a fellowship in ocular oncology at the University of Toronto. He joins UPMC after working as an ophthalmic surgeon in the United Kingdom.



Dr. Kodati's research interests include:

- Retinal Imaging
- Medical retinal conditions including ARMD and diabetic retinopathy

Loewen, Nils. *Large Referral Center Explores Efficacy of Trabectome-mediated Ab Interno Trabeculectomy*. *Ocular Surgery News*. February 10, 2014. Copyright 2014 by SLACK Incorporated. Reprinted with permission.

Department Research

The Department of Ophthalmology recently ranked eighth in the country for National Institutes of Health (NIH) funding for departments of ophthalmology and has a well-known basic and clinical research program. The department's research focuses on ocular immunology, infectious disease, molecular genetics, molecular biology of retinal disease and glaucoma, and advanced diagnostic imaging technology development.

Part of the mission of the department is to train the next generation of clinical scientists. In order to achieve this mission, the faculty train the residents to be ophthalmologists, while also integrating research so that, at minimum, they can be conversational with research, in order to keep up with changes that will occur in the way their patients are treated in the future. The department also has a focus on training graduate students to be vision scientists. The department was awarded an NIH T32 training grant based on a strong track record of doctoral training, the success of the doctoral candidate who matriculated through our training program, and the excellent group of PhD candidates that are currently training with us.

Cornea Research



Stem cells grown in the lab of James Funderburgh, PhD.

James L. Funderburgh, PhD

Professor of Ophthalmology, Associate Director of the Fox Center for Vision Restoration

Dr. Funderburgh is a cell biologist whose work focuses on the use of stem cells to treat corneal scars. Dr. Funderburgh identified a stem cell that gives rise to the cells that populate the corneal stroma. He made the intriguing observation that injection of these cells into a scarred cornea can repair the scar tissue. This has the potential to replace corneal transplantation as a treatment for scarred corneas.

Kira Lathrop, MAMS

Research Instructor, Department of Ophthalmology

Kira uses optical coherence tomography (OCT) imaging to detect the palisades of Vogt that provide the niche in the peripheral cornea where the stem cells reside. Ms. Lathrop has adapted a hand-held optical coherence tomographer to image the palisades of children with corneal dystrophies

during surgery. This breakthrough will allow surgeons to assess the viability of the stem cell niche in these children, and thus predict their suitability for corneal transplantation.

Robert Shanks, PhD

Director of Basic Research in the Campbell Ophthalmic Microbiology Laboratory

Dr. Shanks' research focuses on bacterial genetics, specifically looking at why certain bacteria cause infections on the cornea, and how their ability to form colonies renders them resistant to the immune system and antibiotics that normally control the bacterial infection. The formation of these bacterial biofilms is particularly problematic when it occurs on the surfaces of contact lenses or interocular lenses. Dr. Shanks is attempting to understand why certain bacteria create biofilms, and which of their genes they use to do it.

Shivalingappa (Shiva) Swamynathan, PhD

Assistant Professor of Ophthalmology

Dr. Swamynathan studies the developmental biology and physiology of the cornea and conjunctiva. A current focus of research in Dr. Swamynathan's laboratory is understanding how the molecule Slurp-1 controls corneal inflammation.

Viral Infections of the Eye

Paul R. (Kip) Kinchington, PhD

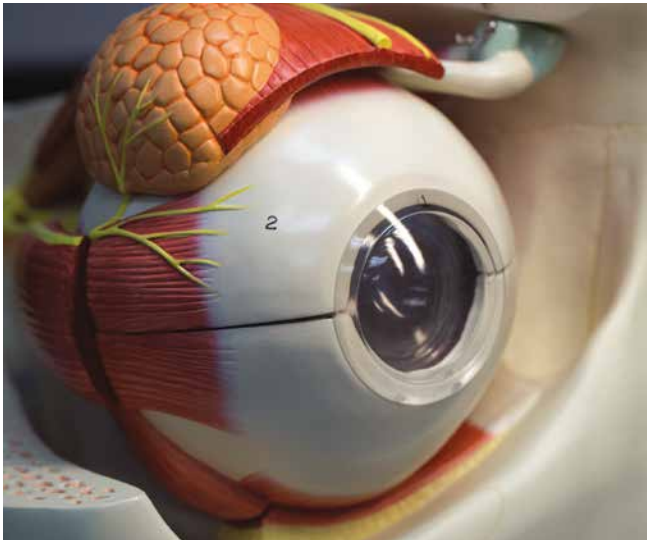
Professor of Ophthalmology, and Molecular Genetics Microbiology

Dr. Kinchington is a molecular virologist who studies varicella-zoster virus and herpes simplex virus. These viruses belong to the family of herpes viruses and both can cause very serious ocular infections. HSV-1 corneal infections are the leading infectious cause of blindness in the U.S. Dr. Kinchington is studying the influence of viral proteins on ocular infectivity, viral induced pain, and the immune response to the viruses.

Robert Hendricks, PhD

Director, Ophthalmology & Visual Sciences Research Center

Dr. Hendricks is an immunologist whose work focuses on herpes simplex virus type 1 (HSV-1). A common feature of HSV-1 lesions (cold sores, genital lesions, corneal lesions) is that the virus tends to recur owing to reactivation of the virus from a latent (quiescent) state in sensory neurons. Dr. Hendricks' work demonstrated for the first time that white blood cells called CD8 T cells play an important role in preventing the viral reactivation that leads to recurrent lesions. He has also had a leading role in defining the HSV-1 triggered immune mechanisms that result in the corneal inflammation and scarring that lead to progressive loss of vision.



Glaucoma Research

Yiqin Du, MD, PhD

Assistant Professor of Ophthalmology and Developmental Biology

Dr. Du is studying the potential of stem cell therapy for glaucoma. Glaucoma is often associated with increased intraocular pressure that can result from blockage of the flow of fluid out of the eye through a mesh-like tissue called the trabecular meshwork. Such blockage is often associated with a loss of cells from the trabecular beams. Dr. Du's research uses stem cells to attempt to repopulate the cells of the trabecular meshwork, which should reestablish outflow and reduce intraocular pressure.

Ian Sigal, PhD

Assistant Professor of Ophthalmology

Dr. Sigal's lab is conducting research to determine how a buildup of intraocular pressure with glaucoma can influence the blood vessels that feed and nourish the retina in the back of the eye, which delivers visual images to the brain.

Retina Research

Hongjun Liu, PhD

*Assistant Professor of Ophthalmology
Age Related Macular Degeneration (AMD)*

Igor Nasonkin, PhD

Assistant Professor of Ophthalmology and Developmental Biology

Dr. Nasonkin and Dr. Liu are working together to study ways to use stem cells to regenerate photo receptor cells in the retina that are lost as a result of retinal degenerations like AMD or in diabetic retinopathy, some of the diseases that affect or cause breakdown of the photo receptor cells.

Michael Steketee, PhD

Assistant Professor of Ophthalmology

Dr. Steketee's research is focused on mechanisms of optic nerve degeneration and regeneration. He is attempting to use molecular and scaffolding approaches to repair damage to the axons of optic nerves that can result in permanent loss of vision.

Xiangyun Wei, PhD

Associate Professor of Ophthalmology and Developmental Biology

Dr. Wei is a developmental biologist who studies mechanisms by which retinal photoreceptor cells polarize during development. Photoreceptor cells have to be positioned in the retina so that one end can capture photons of light, and the other end can send electrical signals to the brain.

Artificial Vision Laboratory

Amy Nau, OD

Assistant Professor of Ophthalmology

Kevin Chan, PhD

Assistant Professor of Ophthalmology

Visual images are normally formed by information that comes from the eyes. Dr. Nau, in collaboration with Dr. Chan, is focused on developing and optimizing visual substitution devices and understanding the mechanisms by which these devices provide visual input to the brain. They are using a visual substitution device called BrainPort to determine if the eyes can be bypassed altogether in providing visual information to the brain.

Visual Neuroscience

Kevin Chan, PhD

Assistant Professor of Ophthalmology

Dr. Chan uses magnetic resonance imaging (MRI) to study chemical changes in the visual cortex of the brain that result from electrical input from the eyes. He is also studying changes that occur in the brain during the progression of glaucoma.

Matthew A. Smith, PhD

Assistant Professor of Ophthalmology

Dr. Smith studies patterns of neuronal activity in the visual cortex of the brain in response to visual stimulus. He strives to determine how our brains convert electrical input from our eyes into visual images.

Ocular Immune Privilege

Kyle C. McKenna, PhD

Assistant Professor of Ophthalmology

Dr. McKenna is an immunologist whose research focuses on a phenomenon called ocular immune privilege. Because function of the tissues of the eye that make up the visual axis require absolute clarity, the eye has developed mechanisms to inhibit inflammation that can lead to scarring and opacity. Dr. McKenna is particularly interested in how this immune privilege of the eye influences rejection of intraocular tumors.

CME Opportunities

Selected Presentations from the Midwest Glaucoma Symposium

This online CME course is the first in a two-part series recorded at the 36th Annual Midwest Glaucoma Symposium. Hosted by UPMC, the symposium brought together glaucoma specialists to discuss disease progression and the latest techniques for treating patients.

Retinal Cell Plasticity and Stem Cell Therapies for Treating Blindness

Igor Nasonkin, PhD

In this course, Dr. Nasonkin presents an overview of retinal cell plasticity and stem cell therapies for treating blindness.

Video Rounds

Video Rounds is a series of informative and educational short videos, created for physicians and covering a variety of medical and surgical disciplines.

Importance of Early Glaucoma Detection and Treatment

Joel Schuman, MD, FACS, chair of the Department of Ophthalmology, discusses how OCT helps ophthalmologists more accurately visualize and measure optic nerve tissue damage; resulting in early treatment, reduced risk, and improved patient outcomes.

New Imaging Technology for Retinal Diseases

Joseph Martel, MD, discusses how new technology allows physicians to detect more diseases and tailor effective treatment plans for each patient.

About the UPMC Eye Center

The UPMC Eye Center is a recognized leader in the diagnosis and treatment of eye diseases and disorders and is helping to advance the field through extensive research.

- Seeing more than 50,000 patients annually, the UPMC Eye Center provides state-of-the-art testing, including electrophysiology and psychophysics services, to diagnose eye, retinal, and optic nerve disorders.
- The Department of Ophthalmology has one of the top basic and clinical research programs in the country. As a leader in National Eye Institute funding, the department's research focuses on ocular immunology, infectious disease, molecular genetics and molecular biology of retinal disease, glaucoma, and advanced diagnostic imaging technology development.
- The Louis J. Fox Center for Vision Restoration is the world's first comprehensive program dedicated to ocular regenerative medicine. Researchers at the Fox Center and the University of Pittsburgh developed innovative solutions such as bioengineering of ocular tissue, cameras that bypass the eye and send visual information to the brain, laser-based treatments, new vaccination approaches, and novel drugs or drug delivery systems.



UPMC Eye Center Pittsburgh, Pennsylvania

Joel S. Schuman, MD, FACS
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UPMC Eye Center's mission is to improve the quality of life through the preservation and restoration of vision.

As part of the commitment to delivering high-quality clinical and research information to physicians, the UPMC Eye Center partnered with Ocular Surgery News for a monthly column. More information and links to the articles can be found on UPMCPhysicianResources.com/Ocular.

Related Links:

Louis J. Fox Center for Vision Restoration
FoxCenter.Pitt.edu

A world-renowned health care provider and insurer, Pittsburgh-based UPMC is inventing new models of accountable, cost-effective, patient-centered care. It provides more than \$887 million a year in benefits to its communities, including more care to the region's most vulnerable citizens than any other health care institution. The largest nongovernmental employer in Pennsylvania, UPMC integrates more than 62,000 employees, 22 hospitals, 400 doctors' offices and outpatient sites, a nearly 2.3-million-member health insurance division, and international and commercial operations. Affiliated with the University of Pittsburgh Schools of the Health Sciences, UPMC ranks No. 10 in the prestigious *U.S. News & World Report* annual Honor Roll of America's Best Hospitals — and No. 1 in Pennsylvania. For more information, go to UPMC.com

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