

Vision *for the* Future

UNIVERSITY OF ROCHESTER

FLAUM EYE INSTITUTE

AUTUMN 2017 NEWSLETTER

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Cleared for takeoff

Craig Miller, M.D., is a busy person, and many count on him. The husband and father of five commutes daily from his suburban Rochester home to Niagara Falls, where he is a partner in Niagara Dermatology Associates. When he is not spending time with his family or taking care of patients, he is a flight surgeon in the United States Air Force Reserves who has done two tours of duty in Iraq.

One evening, he experienced a visual phenomenon which he described as a shower of floaters and transient flashes of green and white lights, "like lightning bolts." The next morning, during his drive, he noticed a slow progression of vision loss in his right peripheral field of view.

"It was subtle at first, but by the time I reached Buffalo it was clear that I was

losing my vision," Miller said. "As a physician, I thought of retinal detachment and

the seriousness of what was occurring. Even though I was only a few miles from the Buffalo medical centers, I immediately turned around to seek treatment at Flaum Eye Institute. As someone who has worked at university medical centers, I realized that FEI offered me the best chance for this serious sight-threatening condition, even if it meant an hour delay."

When Miller arrived, he was seen by an FEI optometrist who quickly confirmed his suspicion. There was a full retinal detachment of his right eye in progress and evidence that the retina in his left eye was just starting to detach. He was immediately sent to the FEI retina service to see **Mina Chung, M.D.**, who was the retina surgeon on call that day. Within hours, Chung performed an emergency surgery on the right eye – called a vitrectomy – used a laser to re-attach the retina, and placed a gas bubble in the eye to keep the retina in place while it healed. On the left eye, a laser procedure was performed to stabilize the retina and lessen the chance of it detaching in the future.

Weeks after the emergency, Miller returned and was seen by **David DiLoreto, M.D., Ph.D.**

CONTINUED ON PAGE 9

Retina specialist reveals shadowy side of private stem cell clinics in *New England Journal of Medicine* article.

Stem cell clinics around the country are offering experimental treatments to cure myriad ailments – from multiple sclerosis and paralysis to vision loss. However, these unproven treatments can cost patients thousands of dollars and potentially cause devastating side effects.

While serving as chief resident and co-director of Ocular Trauma at Bascom Palmer Eye Institute in Miami, FL, FEI Assistant Professor of Ophthalmology **Ajay Kuriyan, M.D.**, participated in the care of patients who experienced blinding complications after receiving stem cell injections in hopes of halting the progressive vision loss caused by age-related macular degeneration. The *New England Journal* recently published a summary of three of Kuriyan's case reports relating to these unfortunate events.

"In all three cases, each patient became legally blind within days of the treatments," Kuriyan said. "And one of them progressed to total blindness."

Stem cell clinics have cropped up all over the US in recent years and are operating in a possible regulatory loophole. They argue that deriving stem cells from a patient's own body and minimizing manipulation of those cells should excuse them from the level of Food and Drug

Administration (FDA) oversight used to vet traditional drugs.

The unregulated use of stem cells at these clinics is in stark contrast to the very responsible and appropriately regulated stem cell clinical trials being conducted at academic centers across the country. The actions of these stem cell clinics not only pose a risk to patients but also have the potential to erode trust in these legitimate stem cell studies. For patients, it's hard to know the difference between a legitimate clinical trial and an unregulated experimental therapy that might put them at risk.

"My best advice for all patients is to consult your physician about any experimental stem cell treatment that asks you to pay out-of-pocket; that is a huge red flag," Kuriyan continued. "Regulated clinical trials performed at academic medical centers are fully funded and do not require patients to pay for treatment."

In short, if you are asked to pay, walk away!



DIRECTOR'S MESSAGE



The start of the academic year in July is always a busy and exciting time.

Like clockwork, FEI welcomed four new residents (page 10) who begin their careers in ophthalmology with us. They show exceptional talent, and we look forward to working with them over the next three years as they develop into highly capable ophthalmologists. We also welcomed a new retina fellow who will be fully immersed in learning his

sub-specialty under the tutelage of our recently expanded retina service.

*We said farewell to four residents and two fellows (page 10). Some begin their careers in private practice while others begin subspecialty training. We are especially pleased that FEI corneal fellow **Rachel Wozniak, M.D., Ph.D.**, has joined our faculty. Her outstanding clinical and research skills are a welcome addition to the team.*

Our research efforts continue to be recognized at a national level. Several of our scientists recently received grants from the National Eye Institute and Research to Prevent Blindness (page 6) to study the fundamental mechanisms by which eye disease causes blindness. This work continues to build upon the knowledge that eventually leads to the prevention and cure of eye disease. FEI recently received notice of a patent awarded to treat thyroid eye disease (TED) (page 6). This technology could not only prove useful in treating TED, it could also revolutionize how medicine addresses obesity.

Both scientists and clinicians continue to be productive in publishing and presenting cutting edge research and important clinical information. (page 11) We are also pleased to announce participation in a number of important government- and industry-sponsored clinical trials, enabling our patients to gain access to the latest investigational therapies.

In this issue, we are delighted to share the story of a productive doctor who became a patient of FEI (cover). Thanks to the outstanding skills of our retina service, he is still able to practice medicine and serve his country as a flight surgeon with the U.S. Air Force. His recovery couldn't be possible without all the support we receive from our growing team of doctors and staff, government, philanthropic and research foundations, and individual donors.

As always, I would like to express my sincere gratitude to all those who help make our community a better place to live, work, and play. This especially includes our many generous donors and our Advisory Board, which welcomes new members and announces the transition of long-standing members to Honorary Board status.

FEI looks forward to serving all those who cherish the gift of sight and anticipates sharing more exciting news in the near future.

Sincerely,

Steven E. Feldon, M.D., M.B.A.

*Director, David and Ilene Flaum Eye Institute
Chair, Department of Ophthalmology*

University of Rochester School of Medicine & Dentistry

FEI in the Community

FEI continues to provide important information about eye care and community services through live educational programs, support groups and screenings. Future events can be found on our Friends of The Eye Institute Web page at www.foei.urmc.edu or by visiting our [facebook](#) page.

Winter and spring were exceptionally busy. Meetings were aimed at the general public and groups with interests in particular eye diseases. Recent offerings included:

FEBRUARY 11, MARCH 11, APRIL 8 & MAY 6:

The Glover-Crask sponsored *Eyeglasses for Kids* program continued to provide free Saturday screenings for children. The program's mission is to improve the confidence and academic performance of school-aged children who have routine vision problems, like nearsightedness or farsightedness, by providing them with free eyeglasses. If other vision problems are detected during the screenings, children are appropriately referred to FEI's pediatric

ophthalmology team for care. Special thanks go to the faculty and residency program physicians, who provide the screenings, and to the opticians and staff who make the glasses and make the families welcome.

APRIL 26: **Rebecca Nally, O.D.**, and **Tara Vaz, O.D.**, hosted *Dry Eye 101*, an educational seminar devoted to persons interested in the latest treatments for dry eye. The duo presented information about the causes of dry eye, current ways to treat it and the latest research related to future ways to address this condition that affects nearly 5 million Americans.

JULY 18: FEI Assistant Professor of Ophthalmology **Anand Rajani, D.O.**, led a group of resident physicians and volunteers attending a meeting of the Eastern Service Workers Association. There they provided free eye screenings to members of this group who work but don't receive a living wage. After the screening, Rajani gave a short lecture about the treatment of cataracts. Thanks to **Callie**

Appleby and **Andrea Rex** who coordinated the event. FEI residents **Brian Harrow, M.D.**, **Joon-Boom Kim, M.D.**, and **Brittany Simmons, M.D.**, assisted with the vision checks.

JULY 31: **David DiLoreto, M.D. Ph.D.**, highlighted an FEI macular degeneration support group. This recently formed organization helps to inform people about current best practices for treating both dry and wet age-related macular degeneration. It also provides patients a forum to share what's happening with their eye health and to offer each a shoulder to lean on as they face challenges caused by their disease.

IF YOU ARE INTERESTED IN . . .

*Inviting one of our faculty members to speak about eye health topics, starting a support group related to eye disease or scheduling a screening, please contact **Andrea Rex** at **585-275-0961**. We'll do our very best to accommodate your request.*

Advisory board welcomes new members

FEI's Advisory Board is a vital component to its success. This cross section of dedicated individuals from throughout the community helps guide the Eye Institute in strategic planning, community visibility and fundraising. The recent acquisition of the Visionary Eye Care practice is a prime example of where the Board lent expertise in finance and operational change management.

During the last 12 months the Board underwent dynamic change as new members joined and others were appointed to the Honorary Board. Recently elected Board Chair, John Harris, welcomed the following members:

Dennis Buchan	Anne Dwyer, D.V.M.
Loren Flaum	Carl Gerard, D.D.S.
Julian Goldstein	Christine Platt, M.D., Ph.D.

We also thank the following members who joined the ranks of our Honorary Board after their exceptional active service to FEI:

Ronald Billitier, Jr.	Barbara Kelley
Joanne Lobozzo	Thomas Muldoon, M.D.
Clay Osborne	

A Focus on Care and Cure

A hallmark of the UR School of Medicine and Dentistry is teaching students to focus on the entire patient, not just the illness.

For ophthalmologist Ronald Cole '62M, this approach helped him provide the very best care to his patients. After 22 years in retinal surgery and general ophthalmology, Dr. Cole chose to specialize in vision rehabilitation. "I saw it as an opportunity to focus on how the person functions and not just how the eye functions."

When Dr. Cole and his wife, Sheri, returned to Rochester for a class reunion, the couple decided to commemorate the milestone by making a gift to the David and Ilene Flaum Eye Institute.

After exploring a number of options, the Coles gifted a vacation home to a charitable remainder unitrust. They received a tax deduction, avoided capital gains tax, and established life income from the University. The Coles' gift will ultimately establish the *Dr. Ronald J. & Charlotte S. Cole Endowed Scholars Fund* in support of vision restoration, low vision research and vision rehabilitation.

"It was a matter of examining our assets and how to make the most of them. Creating a trust fit."

The Coles are recognized as Founding Members of the Wilson Society.



IMAGINE YOUR LEGACY. PLAN TODAY TO MAKE IT HAPPEN.

To learn more about charitable remainder unitrusts and other planned giving methods, contact the Office of Trusts, Estates & Gift Planning
 (800) 635-4672 • (585) 275-8894
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A MOST GRATEFUL THANK YOU TO OUR DONORS

The David and Ilene Flaum Eye Institute is most grateful to its donors for their generous gifts and ongoing support. We are especially appreciative to the friends, patients, alumni and faculty who contributed to our Annual Fund. The Annual Fund is an essential source of support that helps us to continue our groundbreaking work in vision care and research. This year, your donations had a direct impact on our mission, helping us recruit new faculty and purchase new equipment for our clinic and research laboratories. The following donors have contributed in meaningful ways to FEI between November 1, 2016 and August 31, 2017. Gifts can be designated to the Annual Fund and mailed to:

Jennifer Koehenlein, Senior Director of Advancement, FEI, 300 E. River Road, PO Box 278996, Rochester, NY 14627.

Or make a gift online by going to eyeinstitute.urmc.edu and clicking on "Ways to Help".

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Golden anniversary gift

Thomas Tuxill, M.D., graduated from the University of Rochester School of Medicine and Dentistry in 1967 and returned to complete his residency in ophthalmology in 1975. He practiced general ophthalmology, mostly in Concord, New Hampshire, until he retired in 1998. There, he introduced laser treatment for retinal vascular disease. **Don Grover**, Res '71, taught him how to perform the procedures through an intense post-resident mentorship. Tuxill and his wife Sue, have been long time supporters of the ophthalmology department through the Resident Education Fund.

In advance of Tuxill's 50th class reunion, the couple decided to express their appreciation for Tom's Rochester education. They made a generous estate gift to the University of Rochester. A significant portion of this has been earmarked for FEI to be used "where there is a need and the greatest opportunity for return on investment."

"I had a great experience at Rochester," Tuxill said. "**Al Snell (Jr.)**, **Don Zehl** and **Don Grover** were particularly influential in preparing me for a career in ophthalmology. As my 50th reunion approached, I began reflecting on my time here. I saw this as an opportunity to pay forward to others some of the same opportunities that were afforded to me as a medical student and resident."

"FEI is grateful for Tom's support over the years," **Steven Feldon, M.D.**, said. "Beyond his financial contributions to the Resident Education Fund, Tom has been a consistent voice in promoting the Rochester program to others in our specialty. This latest gift will help us in continuance of our efforts to move FEI into the upper echelon of ophthalmology programs.

The Tuxill's estate provision qualifies them as members of the University's Wilson Society, which recognizes planned gifts such as these.

Trio patents treatment for thyroid eye disease

Molecular changes dictate the fate of cells that form the tissues and organs that give our bodies structure and function. Genetics, environment and a host of other factors play an essential role in either keeping us healthy or developing disease.

In the case of thyroid eye disease (TED), certain cell types are switched on to promote the growth of fatty tissue in the eye's socket. This buildup of fat and scar tissue, called tissue remodeling, results in unwanted consequences. These include bulging eyes and pressure on the optic nerve, which can cause double vision, pain, and even blindness. Current treatment involves medical or surgical interventions that address the symptoms but do not necessarily focus on tissue remodeling at its root.

Richard Phipps, Ph.D., Colleen Woller, Ph.D., and Steven Feldon, M.D., recently patented a potential therapy that may offer hope to those suffering from TED, as well as other diseases (such as obesity) where an excess buildup of fat cells affects health and quality of life. U.S. 9,694,050 relates to a protein, Thy1, that is thought to control whether an undifferentiated cell becomes a fat cell. When Thy1 is diminished, the production of fat cells increases.

Their invention consists of a Thy1 protein, or protein fragment, that can be incorporated into a pharmaceutical preparation safe for human use. By effectively modulating the amount of Thy1 present in diseases where there is a loss of Thy1 function, the excess production of unwanted fat cells is minimized in research models. This not only has implications for reducing unwanted fat production in TED, but it could be useful in treating obesity and obesity-related diseases such as Type 2 diabetes, cardiovascular disease and some cancers.

Important basic research leading to this invention has been supported in part by the National Institutes for Health, the Rochester/Finger Lakes Eye and Tissue Bank and Research to Prevent Blindness.

Understanding the basics of glaucoma

FEI Associate Professor of Ophthalmology **Richard Libby, Ph.D.**, is teaming up with Jackson Laboratory's **Gareth Howell, Ph.D.**, to find out how a little studied component in glaucoma may affect neurodegeneration in the disease. Neurodegeneration in glaucoma is the death of retinal ganglion cells that connect directly to the brain and may result in blindness.

The pair was awarded a National Eye Institute RO1 grant totaling more than \$2.6 million dollars to investigate how the endothelin system (EDN) contributes to cell death in glaucoma. The primary known function of EDN proteins is to constrict blood vessels, thereby raising blood pressure. They are part of a larger system of checks and balances that maintain proper vascular function, but if over expressed can contribute to hypertension and cardiovascular disease. In glaucoma, EDN signaling increases in retinal cells before any damage occurs, and blocking it lessens cell death.

Their work will focus on two distinct goals. The first will elucidate exactly how the EDN system contributes to retinal cell death. Second, they will assess which components of the EDN system are involved in both degeneration of the optic nerve and retinal cell death. Determining which components are critical for the damage – and how they do the damage – is essential for understanding the specific mechanisms of the EDN system. Libby and Howell hope that they will be able to determine the full potential for therapeutically targeting the EDN for early disease prevention, before nerve damage and cell death has occurred.

Shaffer Prize for Innovative Glaucoma Research awarded to FEI



THOMAS M. BRUNNER, RICHARD LIBBY, PH.D. AND JAMES WISE, M.D.

FEI reading center takes important role in \$19 million project to treat blinding disease affecting young women

The National Institutes of Health recently awarded more than \$19 million to conduct clinical research related to the treatment of idiopathic intra-cranial hypertension (IIH). IIH is a disorder of young women suffering from obesity that is characterized by elevated intracranial pressure of an unknown cause. Nearly 10,000 people per year who develop IIH will experience some amount of blinding visual loss. This is due to increased pressure on the optic nerve. In this multicenter randomized clinical trial, 180 newly diagnosed IIH patients from across 41 centers will be enrolled. Each will receive one of three treatments targeted at limiting visual loss by reducing pressure on the optic nerve.

Multimodal imagery of the optic nerve and related degrees of visual field loss will be gathered from each patient throughout the duration of the trial. FEI's image reading center will play a key part in the study. Participating centers will send images to the FEI reading center, which will grade the level of optic nerve swelling before and after treatment. The center is directed by **Steven Feldon, M.D.**, and managed by **Rachel Hollar**.

The study hopes to determine which intervention best reduces the effects of IIH, thereby providing an evidence base for treating individuals at high risk for developing vision loss from the disease. **Mark Kupersmith, M.D.**, of Mount Saini Medical Center is principal investigator for the trial, and **Michael Wall, M.D.**, from the University of Iowa is the study director.

Associate Professor of Ophthalmology **Richard Libby, Ph.D.**, received the 2017 Shaffer Prize for Innovative Glaucoma Research from the Glaucoma Research Foundation. The prize was presented in February at the foundation's annual gala. Libby's research project, "Understanding Axonal Degeneration Pathways in Glaucoma," was lauded by President and CEO of the Glaucoma Research Foundation, **Thomas Brunner**, who noted its importance for understanding this key event in glaucoma progression.

Singh to study gene's function in promoting retinal disease



RUCHIRA SINGH, PH.D.

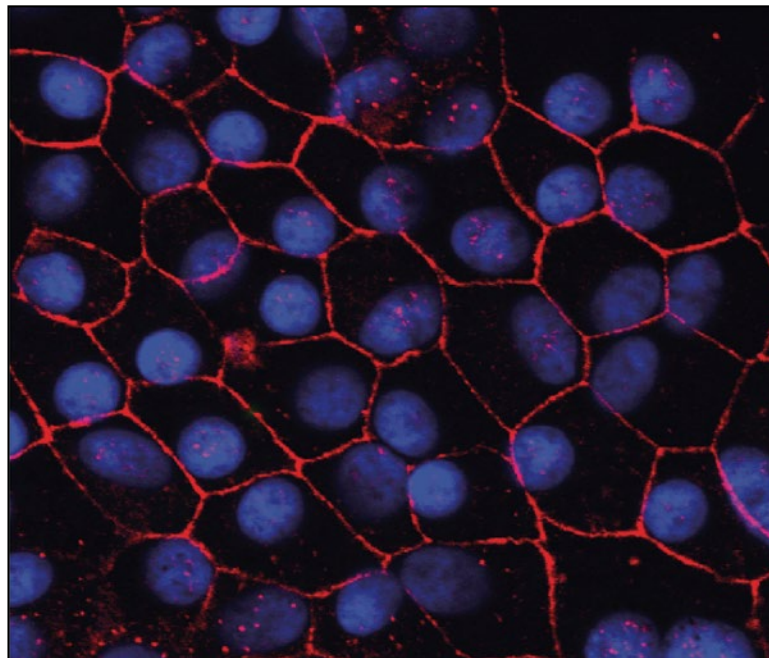
The retinal pigment epithelium (RPE) is a single layer of cells at the back of the eye that plays an indispensable role in supporting the light gathering photoreceptor cells that allow us to see. It is often thought of as a site where many blinding diseases begin, such as age related macular degeneration (AMD).

FEI Assistant Professor of Ophthalmology, **Ruchira Singh, Ph.D.**, was recently awarded \$1.95 million to study the role a gene called TIMP3 plays in regulating the extracellular matrix (ECM). The RPE's ECM provides structural and biochemical support to the RPE, which is necessary for normal function of RPE cells. In some retinal diseases, ECM abnormalities are linked to RPE dysfunction, suggesting that the ECM may be at the root.

Mutations to the TIMP3 gene, and its effect on the ECM, are responsible for Sorsby's Fundus Dystrophy (SFD). This disease

closely mimics AMD. Singh, proposes to create a living tissue model of RPE-ECM using patient-derived human pluripotent stem cells (hiPSC) taken from subjects with SFD. To achieve this, she harvests skin cells from a person with SFD, re-programs them into stem cells and then differentiates them into unique cell types that model the RPE-ECM diseased cells.

Using this model, Singh will study the fundamental biology underlying SFD and the role that TIMP3 dysfunction plays in regulating a sequence of events that result in signs of SFD, such as the formation of drusen and the eventual growth of unwanted blood vessels in the retina. The knowledge gained in this study will help identify potential drug therapies for treating SFD. These may also prove useful in treating other retinal maculopathies such as AMD.



NEI targets diabetic eye disease

The National Eye Institute awarded **Jesse Schallek, Ph.D.** \$2 million to better understand the effects of diabetes on the eyes.

Diabetic retinopathy is the leading cause of blindness in working aged Americans. The earliest manifestations of this disease are believed to be caused by the dysfunction of tiny blood vessels that supply the retina with either too little or too much blood. Changes that occur to these micro-vessels still remain unclear because of the difficulty in imaging them in a living eye. This is due to blurring caused by the optics of the eye and the fact that blood cells travel extremely fast through these capillaries.

Schallek will develop and deploy a first-of-its-kind 30,000 images per second high-speed camera to allow researchers to study retinal capillaries in microscopic detail. Combined with adaptive optics ophthalmoscopy, pioneered at the University of Rochester, he expects to "freeze" blood flow in time. This will let the team look at what is happening to individual blood cells as they squeeze through the tiniest vessels. With the ultrafast camera, the number of individual cells can be counted as they pass through a vessel, and their velocity can be measured. By tracking the progressive changes in capillary flow and microvascular structure in diabetes over time, Schallek's research group hopes to better understand the earliest events leading to vascular disease of the eye. This may result in faster diagnosis and treatment of diabetic retinopathy prior to permanent damage. The camera may also be useful in the study of new therapies aimed at preventing or lessening the severity of the disease.

Award to help FEI scientist get a better look at how cellular "garbage" affects eye disease

Jennifer Hunter, Ph.D., received a *Research to Prevent Blindness* (RPB) Ernest & Elizabeth Althouse Special Scholar Award to study how a substance called lipofuscin relates to eye disease. Lipofuscin is a fluorescent pigment composed of a fat-containing residue that is a byproduct of cellular metabolism. It is considered to be one of the aging or "wear and tear" pigments found throughout the body. In the eye, it is a byproduct of photoreceptor activity. These are the cells in the retina that allow us to capture and process light.

Supporting the photoreceptors is a layer of cells called the retinal pigment epithelium (RPE). It plays the important roles of cleaning up waste products and recycling molecules involved in vision. In many degenerative diseases, like age-related macular degeneration and Stargardt's Disease, the composition and quantity of lipofuscin is abnormal.

Hunter plans to observe lipofuscin production in the RPE by enhancing the capabilities of one of FEI's adaptive optics scanning laser ophthalmoscopes. These revolutionary instruments, pioneered by the University of Rochester, allow scientists to more clearly view the inner workings of the living eye at a cellular level. By studying and measuring the fluorescence of lipofuscin in the RPE, Hunter believes that she can develop a new methodology to better understand the structure and biologic function of RPE cells. This advance could facilitate the development of preventions, treatments and cures for those affected by potentially blinding retinal diseases.





FEI welcomes **Rachel Wozniak, M.D., Ph.D.**, to the Cornea Service. She provides expert and compassionate medical and surgical care to patients

challenged by hereditary and infectious corneal disease, anterior segment injuries, complications of systemic disease, cataract, and ocular surface disease. She also has a particular clinical interest in adult and pediatric keratoprosthesis (artificial cornea) implantation, continuing FEI's international reputation as a center of excellence for this procedure.

Dr. Wozniak earned her medical degree and a doctorate in genetics at Tufts University. She completed her ophthalmology residency at FEI, where she continued her training with a fellowship in cornea and external disease as a Heed Ophthalmic Foundation Fellow. She joins the faculty as Assistant Professor of Ophthalmology.

Besides her clinical pursuits, Dr. Wozniak is actively engaged in basic scientific research and she has already authored an impressive list of peer-reviewed publications. Her research interest focuses on the pathogenesis of bacterial corneal infections and novel antimicrobial drug discovery. She is board eligible in ophthalmology and a member of the American Academy of Ophthalmology, Women in Ophthalmology, the Association for Research in Vision and Ophthalmology and the American Society of Cataract and Refractive Surgery.

A large contingent of Flaum Eye Institute faculty, collaborators, residents and fellows presented at the Association for Research in Vision (ARVO) conference held in Baltimore. Thousands of vision researchers from academia and industry attend this meeting to learn about the latest advances in diagnosing and treating vision threatening diseases. This year, 27 posters and papers were presented by the University of Rochester, including members of FEI, the Institute of Optics, the Center for Visual Science and Biomedical Engineering. Four FEI residents were supported by travel grants from the Snell Fund of the Rochester Community Foundation. Highlighted presentations from the meeting included:

Len Zhelenyak, Ph.D., and collaborators **Krystel Huxlin, Ph.D.**, and **Wayne Knox, Ph.D.** presented, *First demonstration of human visual performance through refractive-index modified ophthalmic devices written in hydrogels*. For this project, the team used a femtosecond laser to change the refractive index of hydrogel lens material to correct 20/100 nearsightedness (- 1.5 D). Using a special device, test subjects were given simulated vision of 20/100 nearsightedness and then asked to look through the femtosecond treated lens material. The treated lens material provided remarkably accurate focusing power, correcting the simulated nearsightedness. This non-destructive method of changing refractive index shows great potential. With the ability to induce focusing changes in human corneal tissue, and in synthetic replacement lens material used in cataract surgery, the technology could change how medicine approaches surgical vision correction.

FEI resident **Brandon DeCaluwe, M.D.**, presented the poster, *The relationship between ocular surface temperature and tear film lipid heterogeneity*. DeCaluwe's research looked at how biological and physical changes affect tear film. Using data collected from FEI's Ocular Surface Laboratory, tear film characteristics from normal and dry eyes were analyzed. They found that a temperature sensitive fatty substance called meibum clumped as the temperature of the ocular surface dropped between blinks intervals. This clumping may increase tear evaporation and destabilize tear film smoothness, resulting in discomfort and ocular surface problems. Future research will test the hypothesis that this deterioration in the smoothness of the tear film caused by meibum clumping leads to symptomatic dry eye and visual deterioration. DeCaluwe's collaborators included **Christine Callan** and **Geunyoung Yoon, Ph.D.**

FEI's **Antoine Barbot, Ph.D.**, presented, *Neural re-adaption to improve optical quality with customized aberration correction*. FEI is one of 13 clinical centers for Boston Sight's prosthetic replacement of the ocular surface ecosystem (PROSE) devices. FEI performs advanced research to see how PROSE affects vision and how the optical properties of PROSE can be optimized to give patients the best possible eyesight. Using specialized technology, Barbot and colleagues customized PROSE devices for two patients suffering from the effects of advanced keratoconus. This condition of the eye's cornea causes numerous vision problems. Among them are large amounts of astigmatism, making daily activities difficult due to poor visual acuity. It also forces the brain to adapt to deformed light waves entering the eye that are caused by the highly irregular corneas. Customized PROSE devices provided both patients with much improved optics and markedly improved vision. Moreover, patients were able to adapt to the improved optics, suggesting that interactions between optical and neural factors play a large role in visual functions. Barbot's collaborators for this project were many, including **Tara Vaz, O.D.** and **Geunyoung Yoon, Ph.D.**

Main Campus Patient Care:

(585) 273-3937 (EYES)

LASIK: (585) 273-2020

Clinical Trials: (585) 276-8734

Research Laboratories: (585) 273-2609

Brighton: (585) 271-2990 ■ Geneva: (315) 788-4922 ■ Webster: (585) 671-3300
Collegetown: (585) 273-3937

www.EyeInstitute.urmc.edu

Unfortunately, there was a problem. The laser procedure used to treat the left retina wasn't enough, and Miller had what DiLoreto described as a breakthrough detachment.

"The detachment that had originally started in the left eye progressed through the barrier laser that was previously performed," DiLoreto said. "This is not uncommon because the clear jelly-like fluid that gives the eye its shape, called vitreous, can pull on the retina and cause it to detach despite performing a laser procedure. To treat the detachment, I performed a vitrectomy with more laser, a gas bubble and a scleral buckle. A scleral buckle is silicon band that goes around the back of the eye to decrease the tractional forces on the retina while it heals."

But Miller wasn't out of the woods yet. His right retina re-detached – three months after DiLoreto performed the procedure on the left eye – and he had to schedule Miller for another surgery.

"For a variety of reasons, about 10% of re-attachments fail," DiLoreto said. "In this case, there was some left over vitreous in the eye that caused persistent traction. The constant pulling of the vitreous caused a new tear to form. Fortunately, there were no inflammatory membranes. This is the best case for a re-detachment, and the prognosis for visual recovery is good."

During this period, Miller was disqualified from flying duties. As a flight surgeon, he is part of a C-130 crew that performs tactical airlift missions. Just like the pilots he works with, he is required to have best corrected vision of 20/20 at distance and near, with intact depth perception and full peripheral vision.

Miller's visual recovery took longer than usual. In addition, he needed cataract surgery on both eyes to improve his clarity of vision. DiLoreto noted that it is very common for patients who have vitrectomies to develop cataracts. In general, most people undergoing vitrectomy will need cataract surgery within a year. The procedures were successful but caused some swelling in Miller's central retina which DiLoreto treated.

"There was an 8 month period for both eyes to get to their best acuity," Miller said. "Throughout the process, I had total faith in my FEI physicians and I followed every patient instruction to the letter. I never lost hope."

Miller's recovery went as well as could be expected. Within a year he was seeing 20/20

and fully back to work. This pleased his entire surgical team, including DiLoreto who noted that Miller has an excellent chance to sustain this result for a long time to come.

"My vision is perfect," Miller said. "It's actually better than it was before I had the detachments. Prior to my surgeries, I had to wear magnifying loupes when performing intricate skin cancer procedures on the faces of my patients. Now I have no need for eye wear in the operating room."

Despite being threatened with discharge from the Air Force, Miller is flying again. Following completion of his care, he petitioned for re-instatement. As part of the process he was examined by the top ophthalmologist in the Air Force Aeromedical Consultation Service at Wright-Patterson Air Force Base. After a series of intense examinations, he was found to surpass pilot standards, having 20/12 near and 20/15 distant visual acuities. The lead ophthalmologist examining Miller commented to him about the exceptional skill of his surgeon.

"As is obvious," Miller said. "I have been completely satisfied with everything Dr. DiLoreto and the FEI team did for me. Satisfied is really too weak a word. I am just so incredibly thankful for and impressed with everything. As a physician, I am in a unique position to evaluate medical talent. Dr. DiLoreto's ability with regard to his surgical skill, diagnostics, and overall patient care is phenomenal – really incomparable. He is a uniquely gifted physician."

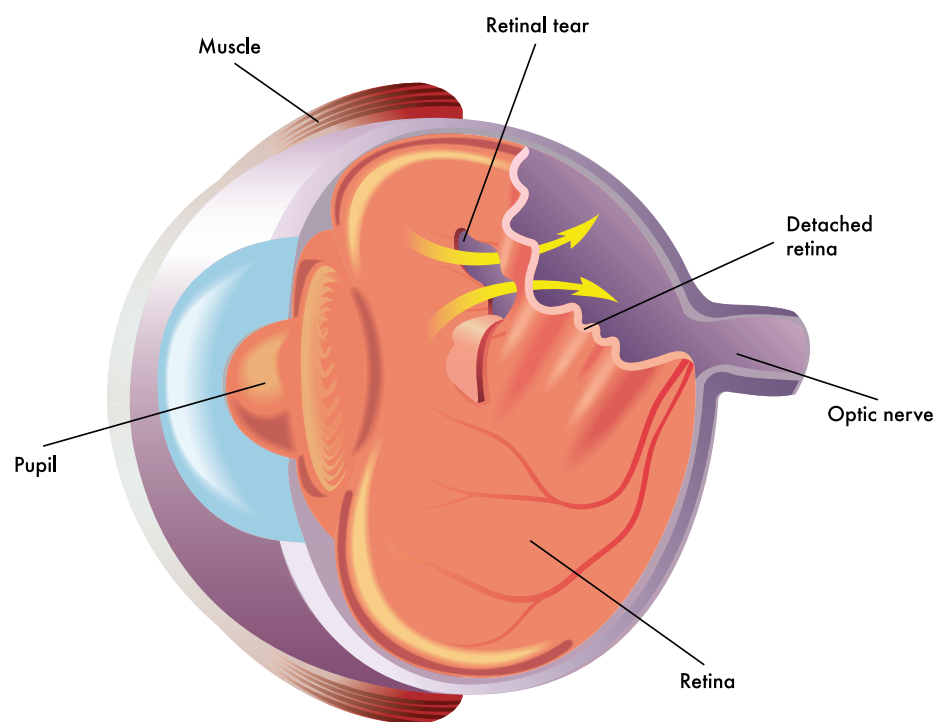
"As one can gather from my professional practice and Air Force duties, intact vision is necessary for the performance of my jobs. If not for Dr. DiLoreto and his team, I was in jeopardy of losing everything. FEI and the skills of its physicians and staff provide a valuable service to our community. It is really a jewel in Upstate New York that we are fortunate to have."

Anatomy of a detachment

Retinal detachments are one of the most serious eye emergencies that one can experience. Getting fast and appropriate treatment is important to achieving the best possible outcome. DiLoreto explains why detachments occur and some of the warning signs associated with them.

When we are young, the vitreous gel inside our eyes is fairly well formed and has the consistency that's a little less dense than egg white. It is attached over the entire retina. As the vitreous proteins break down during the normal aging process (and they do not regenerate), pockets of liquid form in the vitreous gel. Once the vitreous becomes more liquid than gel, it collapses and separates from the retina.

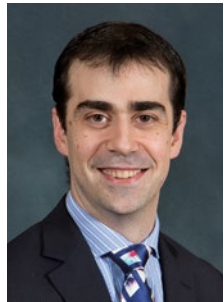
The "collapse" or final separation of the vitreous from the retina often occurs suddenly. Usually patients see a sudden onset of floaters and flashes when this happens. The flashes subside and the floaters gradually diminish over months to years.



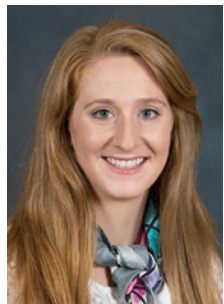
Most of the time, the vitreous separates without any problems. But once in a while it will tear the retina when it releases. This is often accompanied by a small hemorrhage which looks like a sand storm. If it goes untreated, the vitreous will continue to pull the tear open and allow fluid to go through the hole and under the retina and detach it. If the retina detaches, the patient will notice a gradual shade coming across their vision from the periphery progressing to the center of vision.

EDUCATION UPDATES

Four new residents arrived in July and began their training in the ophthalmology clinic. Guided by the second- year and third-year residents and an ever expanding group of faculty preceptors, all have settled into their learning environments – the clinics, the operating rooms, and the wet lab where they practice surgical techniques. We have high expectations for their academic and clinical development as well as participation in outreach, population health projects and research:



Matthew Nicholas, M.D., Ph.D., comes to FEI from the Albert Einstein School of Medicine. He has an undergraduate degree in physics from Yale University and completed his one-year internal medicine internship at St. Vincent Medical Center in Bridgeport, Connecticut. He is an avid musician and a self-taught computer programmer who ran a freelance programming business for 10 years.



Alyse Richard, M.D., is a graduate of Albany Medical College, where she received top honors. She has an undergraduate degree in biochemistry from Hobart and William Smith Colleges. Richard completed her internal medicine rotation at Rochester Regional Health System. While at Hobart and William Smith, she played on the Women's soccer team that made three appearances

in the NCAA Division III Final Four and was selected to the All American and Academic All American teams in 2011.



Gabriela Rifkin, M.D., received her undergraduate in English and creative writing from Emory University. After earning a law degree, then spending time as a social justice advocate, she completed her medical training at the University of Pennsylvania School of Medicine. She recently finished her internal medicine rotation at MacNeal Hospital in Berwyn, Illinois, before coming to Rochester.



Nathaniel Simmons, M.D., completed his bachelor's degree in biology at Pennsylvania State University before earning his medical degree at Tufts University. Prior to starting his residency, he completed his internal medicine internship at Strong Memorial Hospital. He is also a musician and studied cello.



We are also pleased to welcome retina fellow **Daniel Simhaee, M.D.** He joins us after completing his residency at New York University Langone Medical Center. He received his medical degree from the University of Michigan and, prior to that, spent a short time in the financial industry after graduating from Columbia University.

Grand Rounds Ophthalmologists, physicians from other medical specialties, optometrists and allied health professionals are invited to attend.

There are no fees — except for the annual conference — and each Saturday lecture carries 4.0 hours of ACGME Category I credit. These CME credits may be applicable toward other professional certifications to maintain licensure in New York State or anywhere in the U.S.A. Please check with your corresponding accreditation council to determine how many credits transfer.

Grand Rounds begin at 8 a.m. in the FEI clinic area, located on the third floor. Free event parking in the Eye Institute lot at 210 Crittenden Blvd. is available.

October 21, 2017

Philip Rosenfeld, M.D., Ph.D.
Professor of Ophthalmology
University of Miami Miller School
of Medicine
Bascom Palmer Eye Institute

Retina

November 18, 2017

Kathryn Colby, M.D., Ph.D.
Louis Block Professor of Ophthalmology & Visual Science
Chair, Department of
Ophthalmology & Visual Science
University of Chicago

Cornea

December 16, 2017

Douglas Rhee, M.D.
Chairman, Department of
Ophthalmology & Visual Studies
Case Western University

Glaucoma

February 17, 2018

To be announced

March 23 & 24

*Rochester Ophthalmology
Conference (fee charged)*

Julia Haller, M.D.

*Ophthalmologist-in-Chief
Wills Eye Hospital*

Retina

Terrence O'Brien, M.D.

*Charlotte Breyer Rodgers Chair
in Ophthalmology
Professor of Ophthalmology
University of Miami,
Miller School of Medicine
Bascom Palmer Eye Institute*

**Cornea & Anterior
Segment**

April 21, 2018

Sophia Chung, M.D.

*Professor of Ophthalmology,
Neurology, Psychiatry &
Neurosurgery
St. Louis University Eye Institute*

Neuro-ophthalmology

June 16, 2018

Frank Nesi, M.D.

*Professor of Ophthalmology
Oakland University William
Beaumont School of Medicine*

Evan Black, M.D.

*Professor of Ophthalmology
Director, Ophthalmic Plastic
Surgery Division
Kresge Eye Institute*

Oculoplastics

Graduation opens new doors for third-year residents and fellows

Faculty, staff and families gathered to say farewell to our four departing residents and two fellows. The annual FEI graduation dinner was filled with heartfelt goodbyes, great memories and amusing presentations delivered by both resident director **Benjamin Hammond, M.D.**, and the residents. This year's class will be especially missed and were praised for their medical and surgical skills, kindness to patients and staff, and for their dedication to mentoring the second- and first-year residents.

Prior to entertaining the crowd, the residents recognized individuals who went the extra mile in providing them with an outstanding learning experience:

Matthew Gearing, M.D.
Resident Teaching Award

Xiaofei Wang, M.D., Ph.D.
Community Faculty Award

Sam Sullivan, R.N.

Gullapali N. Rao, M.D., '79 fel, and founder of the LV Prasad Eye Institute, was inducted into the American Society of Cataract and refractive Surgeons' (ASCRS) Hall of Fame. Rao was singled out by ASCRS for developing innovative models of eye care delivery. Through a hub and spoke model consisting of a main campus, three eye hospitals, 10 secondary and 68 primary centers, L.V. Prasad has served more than 15 million people – many do not pay regardless of the complexity of their treatment. In addition to his fellowship, Rao, now an adjunct professor at FEI, was also a clinical faculty member at the University of Rochester until 1986.

Patti Hogue, R.N., B.S.N., M.S., was appointed Nurse Manager in Ophthalmology. She brings more than 30 years of clinical experience and management and received her Master's in Health Care Organization and Leadership from the University of Rochester School of Nursing. She joins FEI from the Strong Memorial Hospital Department of Cardiology and is an expert in lean process improvement.

(CONTINUED ON BACK COVER)

Publications

SHARING DISCOVERIES: FEI faculty and residents share their findings with colleagues across ophthalmology and vision science. Scholarly publication is at the heart of making new discoveries and education. A recent sampling of FEI publications include:

Imaging invisible cells: new advances in adaptive optics reveal structure of the translucent retinal cells of the inner retina. Schallek, Jesse, et al. Journal of Vision. June, 2017.

Antifibrotic actions of peroxisome proliferator-activated receptor γ ligands in corneal fibroblasts are mediated by β -catenin-regulated pathways. Jeon, Kye-Im, et al. The American Journal of Pathology. June, 2017.

SOX2 is required for inner ear neurogenesis. Steevens, Aleta R., et al. Scientific Reports. 7 June, 2017.

Adalimumab for noninfectious uveitis. Bessette, Angela P. and Sumit Sharma. Ophthalmology Retina. May–June, 2017.

Visual discrimination training improves Humphrey perimetry in chronic cortically induced blindness. Cavanaugh, Matthew R. and Krystel R. Huxlin. Neurology. May, 2017.

Antibiotics in ophthalmology practice. Wozniak, Rachel AF, and James V. Aquavella. Expert Review of Ophthalmology. April, 2017.

The growing stem cell clinic problem. Kuriyan, Ajay E., Thomas A. Albin, and Harry W. Flynn. American Journal of Ophthalmology. May, 2017.

Target placement of multiple iStents. Shareef, Shakeel, and Sansar Sharma. Operative Dictations in Ophthalmology. Springer International Publishing, 2017.

Laser peripheral iridoplasty. Shareef, Shakeel. Operative Dictations in Ophthalmology. Springer International Publishing, 2017.

Keratoprosthesis. Aquavella, James V. Operative Dictations in Ophthalmology. Springer International Publishing, 2017.

Nonlinear optics: The future of vision correction. Knox, Wayne H. Nonlinear Optics. Optical Society of America, 2017.

Crystalline retinopathy from hyperoxaluria: Long-term follow-up. Sangave, Amit A., Matthew D. Gearinger, and David A. Diloreto. Retinal Cases and Brief Reports. Winter, 2017.

Imaging features of idiopathic intracranial hypertension in children. Hartmann, Alexander JPW, et al. Journal of Child Neurology. October, 2016.

Clinical Trials

Volunteering for a clinical research study is one of the greatest things a person can do to advance medicine. Clinical trials allow doctors and scientists to evaluate new ways to prevent, detect, or treat disease. Although these studies offer no guarantee for cure, they are one of the cornerstones for nearly every single breakthrough in medicine. Each is rigorously conducted, following the highest patient safety protocols. FEI offers participation in the following studies:

⊙ **Quark QRK207:** A Phase 2/3, Randomized, Double Masked, Sham-Controlled Trial of QPI-1007 Delivered By Single or Multi-Dose Intravitreal Injection(s) to Subjects with Acute Nonarteritic Anterior Ischemic Optic Neuropathy (NAION) (*Z. Williams, M.D.*)

⊙ **Clerio Vision Refractive-Index Shaped Wavefront Corrector Study:** Evaluation of Refractive-Index Shaped Wavefront Correctors (*S. MacRae, M.D.*)

⊙ **Lumetrics Retinal Imaging Camera:** Assessment of Prototype Hand-held Fundus Camera (*D. Kleinman, M.D.*)

⊙ **Shire SHP639-101:** A Randomized, Double-masked, Placebo-controlled Phase 1 Study to Assess the Safety, Tolerability, Pharmacokinetics, and Pharmacodynamics of Single Daily and Multiple Daily Ascending Doses of SHP639 Topical Ophthalmic Solution in Subjects with Ocular Hypertension or Primary Open-angle Glaucoma (POAG) (*R. Smolyak, M.D.*)

⊙ **Massachusetts Eye and Ear Infirmary (Department of Defense):** A Phase I/II Prospective, Randomized, Multicenter, Double-Masked, Vehicle-Controlled Clinical Trial to Evaluate the Safety and Efficacy of Corneal Collagen Cross-Linking of Keratoprosthesis Carrier Tissue in High-Risk Keratoprosthesis Implantation (*J. Aquavella, M.D., R. Wozniak, M.D.*)

We wish them all well as they continue their pursuit of excellence and look forward to keeping in contact with them as they travel near and far:

Abdualrahman Hamad, M.D.
Retina Fellowship,
Retina & Vitreous
Houston, TX

Lynn Hassman, M.D., Ph.D
Uveitis Fellowship
University of Utah
Salt Lake City, UT

Luis Leon-Alvarado, M.D.
Shannon Medical Center
San Angelo, TX

Tyler Ofstad, M.D., Ph.D.
Retina Fellowship
University of California at San Diego
San Diego, CA

Christopher Tanzie, M.D., Ph.D.
Private Practice
Graystone Eye
Hickory, NC

Rachel Wozniak, M.D., Ph.D.
Flaum Eye Faculty
Rochester, NY

Flaum Eye Institute

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585 273-EYES

NEWS BYTES

(CONTINUED FROM PAGE 11)

FEI's nursing ranks were also joined by **Scott Fiore, R.N.** Most recently he worked at Auburn community Hospital. Fiore received an Associate's Degree from the Pomeroy School of Nursing, which is part of Crouse Irving Hospital in Syracuse. He has expertise in emergency, medical-surgical and cardiac nursing and is a welcome addition to the team.

Wavefront Congress is an international meeting where key opinion leaders in refractive vision correction meet to exchange ideas about the latest technology to improve vision. This year's event, held in San Jose, California, was organized by a group including FEI's **Scott MacRae, M.D.**, and **Geunyoung Yoon, Ph.D.** Both contributed presentations during the two-day conference. FEI collaborator **Len Zheleznyak's, Ph.D.**, presentation: *Femtosecond Laser Induced Changes in Refractive Index of Cornea and Lens*, was voted most outstanding of the meeting.

M.D., Ph.D. candidate, **Libby Saionz**, received a grant from the University of Rochester's Center for Translational Science Institute to study vision rehabilitation after stroke. Saionz proposes to determine if visual training initiated within three months of an occipital stroke generates greater recovery than seen in chronic cortically blind (CB) patients. Evidence from other types of stroke suggests that earlier rehabilitation leads to greater recovery, likely because of increased neuroplasticity in the post-injury environment. Her research could provide substantial new evidence supporting

the importance of early visual rehabilitation after occipital stroke. It will also provide mechanistic insights into how post-stroke plasticity can be shaped to recover vision when the visual cortex is permanently damaged. Saionz is a graduate student in the lab of **Krystel Huxlin, Ph.D.**

Rachel Hollar, B.S., has been promoted to director of FEI's photographic reading center. The center has national prominence in assisting clinical research projects sponsored by government and industry. It's main function is viewing, grading and reporting on diagnostic images related to eye disease.

Danielle Moon and **Kortnye Alexander** have been promoted to office Managers at FEI's Brighton and Webster locations.



REGINA SMOLYAK, M.D.,
ASSOCIATE PROFESSOR
OF OPHTHALMOLOGY

Glaucoma specialist **Regina Smolyak, M.D.**, has been promoted to Associate Professor of Ophthalmology. Besides providing expert patient care, she is involved in FEI's population health initiatives. She also has taken training to become an EPIC physician builder. With this designation, Smolyak is playing a vital role in improving FEI's utilization of electronic medical records, optimizing it for streamlined patient care and research.

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Regina Smolyak, M.D.

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Steven Feldon, M.D., M.B.A.
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Steven Feldon, M.D., M.B.A.
Mithra Gonzalez, M.D.

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Matthew Gearing, M.D.
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Angela Bessette, M.D.

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RESEARCH FACULTY

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Jennifer Hunter, Ph.D.	Ruchira Singh, Ph.D.
Krystel Huxlin, Ph.D.	Silvia Sörensen, Ph.D.
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Richard Libby, Ph.D.	David Williams, Ph.D.
William Merigan, Ph.D.	Geunyoung Yoon, Ph.D.
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