

Vision *for the* Future

UNIVERSITY OF ROCHESTER

FLAUM EYE INSTITUTE

SPRING 2017 NEWSLETTER

Acquisition sees into the future of eye care

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In November, FEI purchased Visionary Eye Associates, one of the region's premiere optometric practices. Visionary co-founders, **Robert Ryan, O.D.**, and **Michael DePaolis, O.D.**, joined the FEI faculty as part of the acquisition. This marks an exciting expansion of FEI's footprint. The move alleviates a space crunch at the Eye Institute's main campus, expands offerings for both enterprises, and provides opportunity to satisfy a growing demand for specialty and subspecialty eye care in the region.

"We are pleased to welcome Dr. Ryan, Dr. DePaolis, the staff and patients of Visionary Eye," FEI Director **Steven Feldon, M.D., M.B.A.**, said. "Our growth during the past 15 years has mirrored the expansion of UR Medicine. This acquisition better positions us to deliver integrated eye care just as a growing senior segment of the population becomes more reliant on the services of ophthalmologists and optometrists."

Visionary Eye provided services from two locations in the eastern suburbs of Rochester, NY, serving more than 10,000 patients ranging in age

from children to seniors. The Brighton, NY, location moved to more spacious quarters that were part of a planned expansion already underway when FEI purchased the practice.

As systems are integrated into FEI and UR Medicine, FEI general ophthalmologists and subspecialists will begin seeing both former VEA and current FEI patients at both locations. These suburban offices will provide additional convenience to some FEI patients who previously were seen at the University of Rochester Medical Center.

"This is a true win, win," FEI Director of Clinical Operations, **Brenda Houtenbrink** said. "We were landlocked and running out of space to see patients at the University of Rochester Medical Center. Now we can appropriately send many of our current patients to our new locations, reduce lead times for appointments and in-office wait times to see their doctors."

The combined organizations will augment each other, sharing both unique and complimentary

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MacRae wins Barraquer Award

Scott MacRae, M.D., has been selected as the 2017 recipient of the José Barraquer Award. The annual prize honors an ophthalmologist who has made significant contributions in the field of refractive surgery during his or her career. The individual chosen exemplifies the character and scientific dedication of Dr. José I. Barraquer – known as one of the founding fathers of LASIK and other refractive procedures.

Barraquer Award recipients are chosen by a panel of the International Society of Refractive Surgeons – the world's leading authority on refractive surgery and an affiliate of the American Academy of Ophthalmology. Many Barraquer winners are clinicians and scientists who were "first" in developing new refractive surgical treatments or instrumentation that advance patient safety

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Flaum Eye Institute joins international Microsoft Intelligence Network for Eyecare

This past December, the LV Prasad Eye Institute and Microsoft India launched the Microsoft Intelligence Network for Eyecare (MINE), an international consortium of research institutions aimed at improving eye care worldwide. URM's Flaum Eye Institute is one of five institutions partnering with Microsoft to share data and apply artificial intelligence to better understand eye diseases and improve eye care delivery around the world.

"The Flaum Eye Institute is proud and excited to be a part of this international network," **Steven Feldon, M.D., M.B.A.**, said. "The network will offer great opportunities to leverage data science and preventative medicine to improve vision worldwide. It is aligned with several



elements of University of Rochester and URM's strategic plans."

MINE will allow Flaum Eye Institute researchers to share Electronic Health Record information with partners at LV Prasad Eye Institute (India), Bascom Palmer - University of Miami (USA), Federal University of Sao Paulo (Brazil), and Brien Holden Vision Institute (Australia). Not only will this vastly increase the volume of data at each

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DIRECTOR'S MESSAGE



Since our last issue, many exciting happenings have transpired at the Flaum Eye Institute (FEI). Chief among these is our acquisition of the Visionary Eye Associates practice (cover). This premiere optometry practice, founded by **Robert Ryan, O.D.**, and **Michael DePaolis, O.D.**, expands our footprint into the eastern suburbs of Rochester, NY. We welcome the staff and patients of VEA and look forward to extending our specialty care to these new locations.

Besides the addition of Dr. Ryan and Dr. DePaolis to our faculty practice group, we also welcomed additional providers to FEI during the past six months (page 7). Some filled gaps in coverage, while others represent expansion of existing services – both at our main campus and at satellite locations. Patients and referring providers alike have already welcomed them as their schedules are filling.

We are very pleased to receive notice that at least three new grants have been awarded by the National Eye Institute (NEI). FEI Research Director and James Aquavella Professor of Ophthalmology, **Krystal Huxlin, Ph.D.** (page 3), received notice of government funding (R01) to advance her investigations into restoring vision to persons blinded by stroke and traumatic brain injuries. We were also informed by the NEI that three of our graduate students were awarded prestigious F-31 training grants (page 9) to advance their careers. This is the first time that FEI research students have ever received this type of recognition.

Our outreach mission continues as we formally established a Lions Club at FEI to better coordinate regional pediatric vision screenings and bolster our emphasis on population eye health. With our Glover Crask Eye Glasses for Kids program as an example of numerous outreach activities, FEI continues to serve the eye health needs of those who may lack access to care or need educational and emotional support for sight threatening conditions.

Our faculty continues to be successful in publishing scientific articles, and they have been recognized for their successes. We are especially pleased that Director of Refractive Surgery, **Scott MacRae, M.D.**, has been singled out by the International Cornea Society and American Academy of Ophthalmology to receive the prestigious José Barraquer Award, which is presented to just one person annually who has made significant clinical and scientific contributions to this discipline.

In July, we welcomed four new residents (page 10). These talented young ophthalmologists-in-training have already begun making an impact in clinic, through their participation in outreach and by supporting research initiatives. They continue in the great tradition of our program.

As always, I want to thank each of you who support FEI as patients, donors, volunteers or staff members. We couldn't pursue our missions without you. I especially recognize the service of our advisory board, including Chairman **Danny Chessin**, who recently completed his term, and to **John Harris**, who will now wield the gavel.

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

RPB award to foster innovation

FEI was recently informed that it was selected to receive an institutional grant from Research to Prevent Blindness (RPB). The \$115,000 in annual funding is unique in that it is used to spur vision research entirely at the discretion of FEI Chair, **Steven Feldon, M.D., M.B.A.** The Eye Institute is a previous recipient of this five-year award and went through a rigorous application process to secure the new one. Feldon intends to use these funds for creative projects that go beyond the scope of restricted grants that scientists normally depend upon

for their principal support.

“We are honored to be recognized by RPB again,” Feldon said. “Having an institutional grant not only provides flexibility to do innovative research, it also provides a platform for our researchers to secure individual awards from RPB, the National Institutes of Health and other private and public funding sources. It has been an important catalyst for our growth.”

Only departments of ophthalmology with a full-time, permanent chair at university-

affiliated medical schools are eligible for institutional grants. Since receiving its first grant from RPB – nearly 45 years ago – the total institutional support for vision research at the University of Rochester comes to almost \$4 million.



Research to Prevent Blindness

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MacRae wins Barraquer Award

and surgical results.

MacRae is the first and only American LASIK surgeon to develop a U.S. patented and FDA approved mathematical equation to improve LASIK outcomes. Called The Rochester Nomogram, it is used throughout the world on tens of thousands of people each year. Not only does the technology help nearly all patients achieve 20/20 or better eye sight, it actually improves the final quality and clarity of their vision.

In conjunction with the Award, MacRae will deliver a keynote lecture at the 2017 American Academy of Ophthalmology meeting in New Orleans.



SCOTT MACRAE, M.D.,
DIRECTOR OF MEDICAL
SERVICES
FLAUM EYE INSTITUTE
REFRACTIVE SURGERY



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Microsoft Intelligence Network

institution's disposal, it will also add geographic, socioeconomic, and genetic diversity.

In addition to sharing data, MINE will provide each partner institution with access to a trove of Microsoft analytical tools, which utilize machine learning to determine patterns and predict outcomes in eye care.

"A lot of institutions don't have access to these Microsoft tools," said **Rajeev Ramchandran, M.D., M.B.A.**, associate professor of Ophthalmology at URM. "MINE helps democratize or level the playing field – not only sharing data, but also sharing the tools to analyze it."

Each MINE partner institution will lead an initiative through the network. The Flaum Eye Institute's initiative centers on Ramchandran's research. He aims to automate detection of diabetic eye disease, which is the leading cause of blindness in the working age population in the US. Ramchandran has special cameras set up in primary care offices across the region and has collected many images of diabetic patients' eyes. Through MINE, he plans to apply machine learning to these images and others collected by partners in the network to see if a computer can pick out the subtle signs of diabetic eye disease better and faster than humans can.



Visual retraining for hemianopia moving ahead

Ten years ago, the prevailing medical opinion was that when someone lost vision due to a stroke or traumatic brain injury, the deficit was permanent. **Krystal Huxlin, Ph.D.**, the James V. Aquavella Professor of Ophthalmology, changed that paradigm. She, and a dedicated team of collaborators, graduate students and postdocs, discovered a novel way to circumvent damaged areas of the brain, thereby partially restoring sight to cortically blinded patients. Publications, patents and accolades followed.

Recently, the National Eye Institute awarded Huxlin more than \$1.5 million to take this science to the next level (1R01EY027314-01). Current vision retraining therapy relies on presenting a single stimulus in the blind field. Moreover, the subject must hold a constant gaze in the area where the training is taking place. This type of training is difficult, requiring weeks to months of daily computer work to effect, and the recovery attained is incomplete and specific to the location being exercised.

Together with **Marisa Carrasco, Ph.D.**, (Center for Neural Science, NYU) and **Duje Tadin, Ph.D.**, (Dept. Brain & Cognitive Sciences, UR), Huxlin is testing an alternative way of presenting stimuli that cues particular stimulus features (e.g. orientation, direction of motion) as a novel means of improving the effectiveness of visual retraining. Based on encouraging early results, this new approach will restore vision to a greater degree, faster and in more than one region of the blind field simultaneously. Ultimately, the unique insights gained by this research should allow scientists and physicians to improve training outcomes and visual functioning in persons with cortically-induced blindness who were previously considered untreatable.



KRYSTEL HUXLIN, PH.D.
JAMES V. AQUAVELLA
PROFESSOR OF
OPHTHALMOLOGY
FLAUM EYE INSTITUTE
RESEARCH DIRECTOR

Vision restoration symposium tackles current and future cures

What if you could “turn the lights back on” for someone without vision? What if you could change blurry to crystal clear? What if you could shrink the size of a blind spot to make life more manageable? These questions and more were addressed in September, 2016 as supporters from a cross section of FEI patients and other interested individuals attended FEI’s first ever Vision Restoration Symposium.

FEI professor and University of Rochester Dean for Research of Arts, Sciences & Engineering, **David Williams, Ph.D.**, captured the audience’s imagination as he presented, *Promising Technologies on the Horizon for Curing Retinal Degenerations*. He explained the latest technology that restores limited sight to persons with hereditary blindness by implanting a microchip in the eye. Then, he focused on ambitious therapies on the horizon that could restore damaged photoreceptors or turn other retinal cells into light gathering cells. He also described the pivotal role FEI scientists are playing in making this technology a reality. Eventually, these therapies could restore vision to persons suffering from macular degeneration and other forms of eye disease.

Professor of Ophthalmology **Geunyoung Yoon, Ph.D.**, presented, *Next Generation of Individualized Vision Correction*. He demon-

strated how diseases affecting the cornea, the lens at the front part of the eye, can distort light. Severe corneal disease may substantially interfere with a person’s ability to function normally. He then discussed available technologies and new innovations that can be customized to solve many of these problems. Some of these new therapies may be vital to helping people suffering from keratoconus, a disease that distorts the cornea, making it nearly impossible to accurately focus.

James V. Aquavella Professor of Ophthalmology **Krystel Huxlin, Ph.D.**, teamed with University of Rochester Assistant Professor of Neurology **Bogachan Sahin, M.D., Ph.D.**, to present, *A Light at the End of the Tunnel for Stroke-Induced Vision Loss*. Up to one-third of stroke patients experience some form of vision loss, manifesting itself in blind spots in their central or peripheral vision. Using training developed and patented at FEI, patients with compromised areas of vision learn to see again through specialized retraining that circumvents damage to the part of the brain that processes vision and strengthens what is left untouched by stroke. Current research efforts are directed toward improving the fidelity of restored vision and predicting the range of benefits that therapy can provide.

Friends of Strong gift helps fight glaucoma



Thanks to the generosity of Friends of Strong, the Flaum Eye Institute has a new tool in its armamentarium to fight glaucoma. An Iridex MicroPulse laser system was recently installed, and FEI glaucoma specialist **Regina Smolyak, M.D.**, began using the device in November. The laser helps lower eye pressure in open angle glaucoma by improving drainage of fluid in the eye through a fibrous structure called the trabecular meshwork. Unlike some lasers, the Iridex system causes less damage to tissues adjacent to the treatment area.

Friends of Strong made a gift of \$26,000 to purchase the laser which – according to the Iridex website – is the only one currently in the region. Since its inception in 1995, Friends of Strong has provided more than \$215,000 in support to the Eye Institute to purchase equipment that is directly related to patient and family care.

FEI in the Community

A busy autumn was highlighted by FEI’s first Age-related Macular Degeneration Educational Symposium on October 24th. Nearly 40 people attended the event that was hosted by FEI’s “Friends of the Eye Institute” organization. FEI patient **Muriel Maskalans** shared her experience with AMD before yielding the lectern to **David DiLoreto, M.D., Ph.D.** DiLoreto provided an overview about the physiology of the disease and the evolution of treatments to their current state. He then presented the latest updates about research happening throughout the world and the important role that FEI and the University of Rochester are playing in it.

The lively audience peppered DiLoreto with questions relating to current and future treatments. Based on participant feedback, more events are planned and a new format may include a lecture combined with a support group so that participants can gain encouragement from others who share similar experiences with AMD.

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 glaucoma (or other type of) screening, please contact **Andrea Rex** at **585-275-0961**. We’ll do our very best to accommodate your request.

OTHER RECENT OUTREACH EVENTS INCLUDED:

September 17-18: FEI’s **Callie Appleby** and **Andrea Rex** travelled to Cuba, NY to support the local Lions club at the Cuba Garlic Festival. The pair screened more than 40 people and handed out information about maintaining eye health.

Oct. 29 & Nov. 9: The **Glover-Crask** sponsored *Eyeglasses for Kids* program returned after a summer hiatus. 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. FEI faculty, opticians, support personnel and volunteers staff the events. During the screenings, if other vision problems are detected, children are appropriately referred to FEI’s pediatric ophthalmology team for care. Special thanks go to **Benjamin Hammond, M.D.**, and **Sarah Klein, O.D.**, who saw more than 40 kids during the two dates.

Oct. 29: FEI’s newest retina specialist, **Ajay Kuriyan, M.D.**, addressed more than 50 seniors at the Highlands of Pittsford. He presented the lecture, *Macular Degeneration: What is it and How do We Treat it?* He answered questions from the group about the disease and its treatment.

A MOST GRATEFUL THANK YOU TO OUR DONORS FOR THEIR GENEROUS GIFTS AND ONGOING SUPPORT

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 funding 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 various ways to FEI between July 1, 2016 and October 31, 2016. Gifts can be designated to the Annual Fund and mailed to:

Jennifer Richardson, Director of Advancement, FEI, 210 Crittenden Blvd., Box 659, Rochester, NY 14642.

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

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NOT-FOR-PROFITS

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American Society of Cataract and
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Research To Prevent Blindness Inc.
United Way of Greater Rochester

*deceased

We offer special thanks to Bausch+Lomb, Research to Prevent Blindness, Glover-Crask Charitable Trust, David & Ilene Flaum, James & Catherine Aquavella, and Lynn & Walter Lutz for their sustaining support.

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services. As a stand-alone optometric practice, Visionary Eye Associates referred complex medical patients and surgical candidates to outside offices – including FEI. Now care can be more seamlessly integrated, taking advantage of a common electronic medical record and shared diagnostic services. For FEI, Visionary Eye Associates greatly enhances its contact lens practice, including vision therapy that temporarily changes a patient’s corneal shape to reduce dependence on glasses.

“We’re thrilled to become a full part of Flaum,” Ryan said. He and DePaolis had been clinical faculty at FEI for more than 15 years, training Ophthalmology residents in contact lens therapy.



FEI VISIONARY EYE ASSOCIATES IN BRIGHTON, NY

“For a growing practice of our size, medicine has become increasingly complex in technology and regulation. We owe the very best to our patients. This change gives them access to the best technology, superb specialty care from colleagues that we know and trust, while freeing us from some of business and regulatory challenges that are better handled by University administration. It allows us to practice better medicine.”

Patients of Visionary Eye Associates continue to see Ryan and DePaolis. Nearly all

of the technical and administrative staff was retained to maintain continuity. Months of planning went into the project to make the transition as smooth as possible. Because of the opening of the larger office in Brighton, two additional optometrists – Anthony Dell’Anno, O.D., and Melanie Shearer, O.D. – were hired to accommodate increased visit volumes.

“This is an exciting new chapter for us,” DePaolis said. “We have enjoyed working with Flaum for a long time and know the faculty and staff well. Many of our patients are like family and friends to us, so their well-being is extremely important. The Eye Institute is so much more than eye care. It’s a community asset that’s invested in the visual health of people throughout the region. That’s why this presents a fantastic opportunity for all of us. We know that our patients and future generations can count on exceptional care for decades to come.”

The two new offices, and a previous acquisition of a private practice in Geneva, NY, brings to six the number of FEI locations. This aligns with Feldon’s strategy to improve regional access to eye care through a population-based health model.

“The goal of population-based health is to reduce costs and improve patient care by detecting and preventing disease before it becomes advanced,” Feldon said. “We’re trying to shrink the number of surgeries that we perform and limit the volume of expensive medicines that we prescribe by promoting vision wellness. Expanding geographically helps by giving us access to more of the regional population. Our optometric services offer primary care for the eyes. Patients come in needing routine care, glasses or treatment of non-acute issues. At our multiple locations we can appropriately monitor, treat and educate people so that many may never need specialty care. But if eye disease progresses, we offer the most advanced medical and surgical treatments available. The expansion also improves access for our referring primary care physicians who send diabetic patients to us for vision screenings. We are pleased that, given our expanded footprint, fewer diabetics are going to slip through the cracks and progress to sight threatening disease.”

Based on demand, each location may undergo expansion, adding exam lanes, providers, or both. There are also plans underway to use the new satellites as centers for wellness education. FEI doctors and staff will connect with the communities served by providing health lectures and screenings on a local level.



Robert Ryan, O.D., joined FEI with the Visionary Eye Associates acquisition. He received his Doctorate in Optometry from the Pennsylvania College of Optometry and

established a thriving optometric practice with **Michael DePaolis, O.D.** Ryan has been appointed Clinical Associate Professor in Ophthalmology at the University of Rochester School of Medicine and Dentistry and is a Fellow in the American Academy of Optometry. He frequently lectures and publishes on issues pertaining to anterior segment and contact lens and actively participates in contact lens clinical trials.



Michael DePaolis, O.D. also came on board during recent acquisition of Visionary Eye Associates. He is a graduate of the Pennsylvania College of Optometry and has

practiced in the Rochester community since 1987. He serves as adjunct faculty at the Pennsylvania College of Optometry and is a Clinical Associate Professor in Ophthalmology at the University of Rochester School of Medicine and Dentistry. A Fellow in the Academy of Optometry and the Editor of *Primary Care Optometry News*, Dr. DePaolis frequently serves as a clinical investigator related to contact lenses and anterior segment care. The author of over 100 articles, papers and textbook chapters, he has lectured at over 400 eye care meetings worldwide.



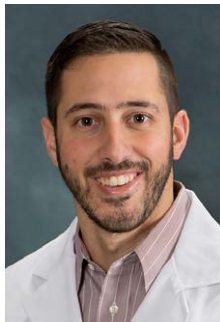
FEI VISIONARY EYE ASSOCIATES IN WEBSTER, NY

New faculty fuel exciting growth

Since July, FEI has welcomed many new faculty; some as part of the Visionary Eye Associates acquisition and others to fill a growing need for subspecialty and general eye care. Several will travel to satellite locations, expanding the availability of neuro-ophthalmology, retina and other disciplines throughout the region. New practitioners include:



Former FEI resident **Angela Bessette, M.D.**, joined the retina faculty and will anchor the uveitis service. She completed her medical degree at Columbia University's College of Physicians and Surgeons. After her residency at FEI, she continued her training at the Cleveland Clinic's Cole Eye Institute. There she completed two fellowships: the first in medical retina, and a second fellowship in uveitis. As Assistant Professor of Ophthalmology she treats patients at FEI's main campus and at the Webster satellite locations. She will also have an active role in resident education.



Senior Instructor of Clinical Ophthalmology **Anthony Dell'Anno, O.D.**, sees patients at our UR Medical Center, College Town and Brighton locations as part of our well eye care and contact lens services. He received his Doctorate of Optometry from New England College of Optometry and comes to us with more than five years of clinical experience in eye care, treating children and adults as well as managing pre- and post-operative LASIK patients. He screens for and treats common vision conditions and co-manages cataract patients with his ophthalmologist team.



Alex Hartmann, M.D., joined the neuro-ophthalmology service after completing his fellowship at Emory University in Atlanta, Georgia. He graduated from Eastern Virginia Medical School and served as Chief Resident at the University of Minnesota, while completing his residency in Neurology. The Assistant Professor of Ophthalmology diagnoses and treats patients with a variety of neurologic conditions affecting their vision at FEI's UR Medical Center and Geneva locations.

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

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Ajay Kuriyan, M.D., is our newest retina specialist and Assistant Professor of Ophthalmology, seeing patients at our UR Medical Center location. He is a graduate of the University of Rochester School of Medicine and Dentistry. He completed both his ophthalmology residency and retina fellowship at the University of Miami's Bascom Palmer Eye Institute. Dr. Kuriyan has recently lectured to international audiences about the safety risks associated with stem cell therapy offered by some private vision clinics.



Naveen Mysore, M.D., Ph.D., joined FEI's cornea service as Assistant Professor of Ophthalmology, working predominantly at the UR Medical Center location. Dr. Mysore received his medical degree, and a Ph.D. in engineering, from McGill University in Montreal, Canada. There, he served as chief resident and completed his specialty training in ophthalmology. Mysore completed his corneal, external disease and refractive fellowships at the Cleveland Clinic's Cole Eye Institute. Prior to coming to Rochester, he performed LASIK and corneal surgery in Vancouver, British Columbia.

Anand Rajani, D.O., joined the comprehensive ophthalmology service as Assistant Professor of Ophthalmology and sees patients at the main campus and Geneva offices. Dr. Rajani received his medical degree from Philadelphia College of Osteopathic Medicine and completed a research fellowship at Duke University. He did his ophthalmology training at Lake Erie College of Osteopathic Medicine, where he served as Chief Resident. Most recently, he completed a Glaucoma Fellowship at the Beraja Medical Institute in Coral Gables, Florida.



Melanie Shearer, O.D., comes to FEI with more than seven years of clinical experience in eye care, as a private practitioner and through staffing low vision clinics at the Association for the Blind and Visually Impaired. She received her Doctorate of Optometry from S.U.N.Y. College of Optometry, where she was valedictorian of the Class of 2009. A Senior Instructor of Clinical Ophthalmology, Dr. Shearer screens for and treats common vision conditions in children and adults and co-manages cataracts with her ophthalmologist team. She sees patients at our UR Medical Center and Webster office offices.

CEIS grants spark technology transfer

FEI scientists have historically performed well at securing funding to push technology from the laboratory into the commercial sphere through a University of Rochester organization called the Center for Emerging & Innovative Sciences (CEIS). This group's mission is to promote economic development in New York State by bringing together companies and University researchers with primary interests in optics, photonics and imaging. Support for CEIS comes from a variety of sources including New York State, industry and business incubators. To receive a grant, corporate or institutional sponsors must match the funding that CEIS provides. Proposals are evaluated on the basis of:

- Potential economic impact for New York State
- Scientific and technical merit
- Level of corporate support in relation to requested state funding
- Demonstrated technical accomplishments and economic impacts (for continuing projects)

During the most recent twelve months, FEI investigators have received multiple awards including:

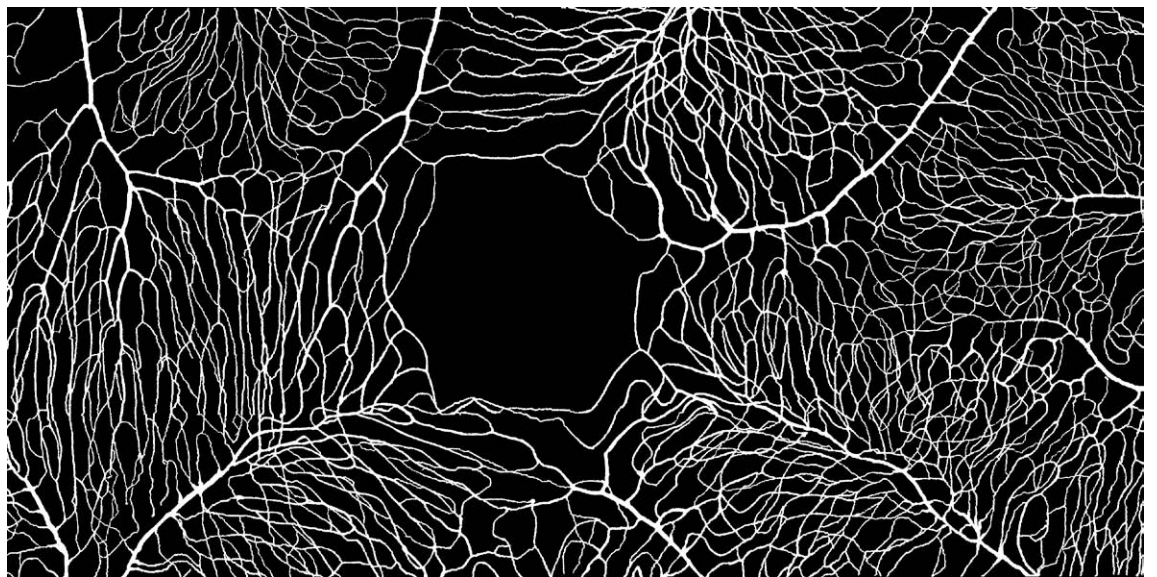
Tara Vaz, O.D., received nearly \$20,000 to help Ovitz Corporation develop a portable device that accurately measures different attributes of the cornea. The high tech start-up aims to better diagnose undetected vision problems in children and populations where there is limited access to eye care. Vaz is tasked with developing a database of measurements taken from 150 patients using the device. This information will be useful in refining the instrument and ensuring its accuracy across a wide range of prescriptions (refractive error) and demographics. The project is sponsored by local business development incubator High Tech Rochester, which helps encourage and establish fledgling businesses like Ovitz.

Geunyoung Yoon, Ph.D., was awarded \$30,000 to develop a bench testing system to evaluate the imaging performance of multifocal contact lenses designed to focus up close and at distance. The system will employ an "artificial eye" and use adaptive optics to help quantify the potential image quality based on light that passes through the lenses. Understanding the optical and visual properties of these lenses will help corporate sponsor Bausch + Lomb validate and refine multifocal contact lens designs, ultimately leading better satisfaction from the patients who use them.

NYS/Empire State Development helped **Krystel Huxlin, Ph.D.**, secure \$30,000 to study the biological impact of a new laser vision correction procedure that may change how we treat nearsightedness and farsightedness. Huxlin will perform critical experiments to test the relative effectiveness of the technology, hopefully leading to the first clinical trials on patients.

Foundation for neuroimaging supports diabetic eye disease research

The Dana foundation for Neuroimaging awarded FEI Assistant Professor of Ophthalmology, **Jesse Schallek, Ph.D.**, \$200,000 over the next three years to study the effects of diabetes. *Imaging single blood cell rheology and flux within the smallest vessels in diabetic retinopathy*, will take a microscopic look at the retina to discover the earliest stages of a disease that is a leading cause of blindness in US working age adults. By using an ultrafast adaptive optics camera that can see individual cells 1/100th the width of a human hair, Schallek proposes to image red blood cells as they flow through the tiniest capillaries in the human eye. This technology allows researchers to measure the speed and number of blood cells flowing through the retinal vessels. By studying subjects over time, changes in the microcirculation may provide clues about the process leading to diabetic eye disease. Armed with this knowledge, clinicians may someday have instruments that let them diagnose diabetic eye disease at the earliest stages and begin sight preserving treatments before structural damage occurs. The research may also provide pharmaceutical companies with targets for new drugs that correct abnormal blood flow in vessels in the eye and other parts of the body. This represents the first award that the University of Rochester has received from the Dana Foundation.



MICROSCOPIC LOOK AT THE RETINA'S TINIEST CAPILLARIES IN THE HUMAN EYE.

Young FEI scholars score triple play

As a world leader in vision research, FEI scientists and clinician scientists receive millions of dollars in federal and private support to understand and cure blindness. One of their underlying goals is to train the next generation of vision scientists. Accordingly, dozens of post-doctoral, graduate and undergraduate students perform vital work in each investigator's laboratory. Under the guidance of their faculty mentors, they are often at the leading edge of breakthrough ideas. Although recognized by the scientific community through publications and presentations at conferences, these trainees go largely unnoticed by the general public.

James V. Aquavella Professor and Director of Research, **Krystel Huxlin, Ph.D.**, recently received news that three FEI graduate students were chosen by the National Institutes for Health as recipients of Ruth L. Kirschstein Pre-doctoral Individual National Research Service Awards. Together the training grants are valued at almost \$400,000. This is the first time ever that any FEI graduate student has won this award, let alone three. The purpose of this NIH program is to enable promising pre-doctoral students to develop into productive, independent research scientists and to obtain mentored research training while conducting dissertation research. Receiving the three year grants, which also include a tuition stipend to pursue their doctorates, are **Matthew Cavanaugh, M.S.**, **Rebecca Rausch, M.S.**, and **Aleta Steevens, M.S.**

"This is a great achievement for these students and FEI," Huxlin said. "These awards can be a springboard for productive academic or industry careers. Students like these three are the powerhouses behind our laboratories and, ultimately, our success as faculty. We're extremely proud of them and have great expectations for their work."

Each doctoral student submitted extensive research plans that included large efforts from their faculty mentors. From the thousands of proposals that were submitted, the FEI trio's presentations were judged to be scientifically relevant and worthy of funding:

■ **Matthew Cavanaugh, M.S.** – faculty sponsor, **Krystel Huxlin, Ph.D.**
Properties of training-induced visual recovery in cortical blindness
(1 F31 EYE025918-01).

Stroke and other injuries often cause damage to the visual processing centers of the brain resulting in blind spots. Much progress has recently been made by retraining the brain to see. However, certain characteristics of the retrained vision, including the ability to discriminate contrast and fine differences in direction, are poorer compared to areas of vision

originally left intact prior to injury. Cavanaugh's research aims to find ways to improve the fidelity of the restored areas of vision in patients by introducing new elements to the training regimen. He will also conduct experiments to better understand and predict the extent of a patient's possible visual recovery prior to treatment.

■ **Rebecca Rausch, M.S.** – faculty sponsor, **Richard Libby, Ph.D.**
The role of notch and BMP signaling in anterior segment dysgenesis
(1 F31 EYE026301-01)

During human development, many genetic and molecular factors govern the formation of the front part of the eye – called the anterior segment – and maintain its health throughout life. Anterior Segment Dysgenesis (ASD) is a broad range of diseases that occur when structures of the anterior segment do not form properly during pre-natal development. One common result of ASD is a severe form of childhood glaucoma that is difficult to treat and can lead to blindness. Rausch proposes to better understand the effect of the absence of two molecules that are significantly diminished during development in poorly formed anterior segments. Results from these studies may ultimately provide fundamental insight into the biology that regulates ASD development as well as identify treatments for children who have related disease.

■ **Aleta Steevens, M.S.** – faculty sponsor, **Amy Kiernan, Ph.D.**
Elucidating the role of SOX2 in inner ear development
(1 F31 DC015153-01)

As with eyes, the inner ear undergoes a series of complex steps in development. During this process, sensory organs that function to maintain balance and transduce sound arise from a specific area of a growing embryo. However, it is not well understood what molecular mechanisms determine how these cells successfully develop or result in sensory impairments. Steevens will study how a specific molecule called SOX2 affects early development through the use of a genetic recombination model. Preliminary results suggest that SOX2 may be critical for generating both sensory and non-sensory cell fates and the earliest development of the inner ear. Understanding this interplay could be an important step in targeting cell replacement therapies for hearing and balance disorders.

"Frontiers in Optics" Meeting

Rochester is a hotbed for optics, so it was no surprise when the Optical Society of America held its centennial meeting here in October. "Frontiers in Optics" drew more than 2,300 optics and photonics thought leaders from diverse disciplines. Faculty, researchers, students, and collaborators from across the University of Rochester contributed more than two-dozen presentations and manuscripts to the five-day event. **Krystel Huxlin, Ph.D.**, and Associate Professor of Ophthalmology, **Jennifer Hunter, Ph.D.**, presented in the Color and Vision Science section of the meeting, as did **David Williams, Ph.D.** Huxlin and Hunter additionally chaired portions of the meeting.

Immediately following Frontiers in Optics, the Optical Society of America held its Fall Vision meeting at the University of Rochester. Nearly 200 vision scientists convened to discuss the optical industry, optical systems, vision science, color vision and spatial vision issues. Presenters came from more than a dozen institutions including NASA, the University of California at Berkeley, Pennsylvania University and the University of Rochester.



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, each has settled into their learning environments – the clinics, the operating rooms, and the wet lab for practicing surgical techniques. There are high expectations for their academic and clinical development as well as participation in outreach, population health projects and research:



Andrew Chen, M.D., comes to FEI from the David Geffen School of Medicine at UCLA, where he also received his undergraduate degree. He completed his one-year internal medicine internship at Cedars-Sinai Medical Center.

Brian Harrow, M.D., is a graduate of the University of Texas Southwestern Medical Center. He earned his undergraduate degree at Stanford University and did his internal medicine rotation at the University of Rochester School of Medicine and Dentistry. Harrow also has a law degree from Harvard University.



Sana Idrees, M.D., received her undergraduate and medical degrees at George Washington University. Before beginning her residency at FEI, she interned at Georgetown/Washington Hospital Center.

Rajinder Nirwan, M.D., completed his bachelor's degree at the University of Victoria in British Columbia, Canada. He graduated medical school and completed his internal medicine rotation at the University of Hawaii's John A. Burns School of Medicine.



62nd Rochester Ophthalmology Conference

March 24 - 25th marked the 62nd annual Rochester Ophthalmology Conference held at the University of Rochester School of Medicine and Dentistry. The program was highlighted by an impressive list of guest faculty as well as lectures delivered by FEI's own experts. Guest speakers included Snell Memorial Lecturer **Wallace "Lee" Alward, M.D.**, from the University of Iowa School of Medicine and Billitier Family Distinguished Visiting Professor **Mark Terry, M.D.**, of the Devers Eye Institute

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. 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.

April 22, 2017

Jody Piltz-Seymour, MD

*Director at Glaucoma Care Center;
Clinical Professor Perelman School of Medicine
University of Pennsylvania
Wills Eye Hospital*

Glaucoma

May 20, 2017

James Folk, MD

*Professor of Ophthalmology and Visual Sciences
University of Iowa Carver College of Medicine*

Retina

June 17, 2017

Kenneth Cahill, MD

*Professor of Ophthalmology
Co-Director of Oculoplastic Surgery
Ohio State University*

Oculoplastics

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:

“Changes in Keratometric Values and Corneal High Order Aberrations After Hydrogel Inlay Implantation.”

Whang WJ, Yoo YS, Joo CK, Yoon G.
American Journal of Ophthalmology,
January 2017

“Neural adaptation to peripheral blur in myopes and emmetropes.”

Ghosh A, Zheleznyak L, Barbot A, Jung H, Yoon G.
Vision Research, December, 2016

“Enhanced neural function in highly aberrated eyes following perceptual learning with adaptive optics.”

Sabesan R, Barbot A, Yoon G.
Vision Research, November 2016

“Label free measurement of retinal blood cell flux, velocity, hematocrit and capillary width in the living mouse eye.”

Guevara-Torres A, Joseph A, Schallek JB.
Biomedical Optics Express, September 2016

“Keratoprosthesis in ectodermal dysplasia.”

Wozniak RA, Gonzalez M, Aquavella JV.
Cornea, July 2016

“Quantitative measurement of retinal ganglion cell populations via histology-based random forest classification.”

Hedberg-Buenz A, Christopher MA, Lewis CJ, Fernandes KA, Dutca LM, Wang K, Scheetz TE, Abramoff MD, Libby RT, Garvin MK, Anderson MG.
Experimental Eye Research, May 2016

“Cis-regulatory architecture of a brain signaling center predates the origin of chordates.”

Yao Y, Minor PJ, Zhao YT, Jeong Y, Pani AM, King AN, Symmons O, Gan L, Cardoso WV, Spitz F, Lowe CJ, Epstein DJ.
Nature Genetics, May 2016

“Two-Photon Autofluorescence Imaging Reveals Cellular Structures Throughout the Retina of the Living Primate Eye.”

Sharma R, Williams DR, Palczewska G, Palczewski K, Hunter JJ.
Investigative Ophthalmology and Visual Science, February 2016

“Temperatures of the ocular surface, lid, and periorbital regions of sjogren’s, evaporative, and aqueous-deficient dry eyes relative to normals.”

Abreau K, Callan C, Kottaiyan R, Zhang A, Yoon G, Aquavella JV, Zavislan J, Hindman HB.
Ocular Surface, January 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:

⊙ DREAM (Dry Eye Assessment and Management): A multi-center, double masked safety study to evaluate the effectiveness and safety of Omega 3 fatty acids administered by taking 5 gel caps per day, in relieving the symptoms of moderate to severe dry eye disease. (*Tara Vaz, O.D.*)

⊙ 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.*)

⊙ DRCR-S: Prompt Panretinal Photocoagulation Versus Intravitreal Ranibizumab with Deferred Panretinal Photocoagulation for Proliferative Diabetic Retinopathy (*D. DiLoreto, M.D., Ph.D.*)

⊙ DRCR-U: Short-term Evaluation of Combination Corticosteroid+Anti-VEGF Treatment for Persistent Central-Involved Diabetic Macular Edema Following Anti-VEGF Therapy (*D. DiLoreto, M.D., Ph.D.*)

⊙ DRCR-V: Treatment for Central-Involved Diabetic Macular Edema in Eyes with Very Good Visual Acuity (*D. DiLoreto, M.D., Ph.D.*)

⊙ PEDIG C02: A Randomized Clinical Trial of Observation vs Occlusion Therapy for Intermittent Exotropia (*G. Gearinger, M.D./B. Hammond, M.D.*)

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

⊙ Alcon HAWK (Efficacy and Safety of RTH258 versus Aflibercept): A Two-Year, Randomized, Double-Masked, Multicenter, Three-Arm Study Comparing the Efficacy and Safety of RTH258 versus Aflibercept in Subjects with Neovascular Age-Related Macular Degeneration (*D. DiLoreto, M.D., Ph.D.*)

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

For more information please contact us at: **585-276-8734**

Flaum Eye Institute

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NEWS BYTES

Rajeev Ramchandran, M.D., M.B.A., was recently promoted to Associate Professor of Ophthalmology by the University of Rochester School of Medicine and Dentistry. Ramchandran has distinguished himself through his publications and initiatives in telemedicine and population-based healthcare. Ramchandran has also led many of FEI's international efforts partnering with India's L.V. Prasad Eye Institute. Recently this included joining a consortium with L.V. Prasad, Microsoft, and several other internationally-respected institutions, to use big data to better detect and treat vision problems in emerging and industrialized nations.

Zoe Williams, M.D., delivered the lecture, *Diagnosis and Management of Idiopathic Intracranial Hypertension: New Recommendations* at the SUNY Buffalo School of Medicine on April 13, 2016.

Shakeel Shareef, M.D., has been busy teaching ophthalmologists around the world about proper surgical techniques that optimize minimally invasive glaucoma procedures. He recently delivered lectures in Saudi Arabia at the 3rd Red Sea Ophthalmology Symposium; at the American Academy of Ophthalmology's annual meeting in Chicago; and at Cataract Surgery: Telling it Like it is in Naples, Florida. Many of his presentations and instructional videos can be found at the website www.anglesurgery.org, which he developed with the help of FEI staff.

FEI brought much-needed neuro-ophthalmological services to the region with the addition of **Alex Hartmann, M.D.** to the faculty. Practicing two days per month out of FEI's Geneva office, Hartmann provides vital services to patients who normally had to travel to larger population centers for care. Hartmann joins FEI subspecialists **David DiLoreto, M.D., Ph.D.** (retina) and **Benjamin Hammond, M.D.** (pediatric ophthalmology) as well as comprehensive ophthalmologists **Harold Ross, M.D.** and **Anand Rajani, D.O.** at the Finger Lakes Center.

Steven Feldon, M.D., M.B.A., recently presented lectures related to new treatment paradigms in thyroid eye disease at Moran Eye Center, University of Utah (October) and at Rocky Mountain Lions Eye Institute at University of Colorado (November).

Ann Marie Phelps joined FEI as practice manager for its busy main campus location. Phelps is a seasoned administrator who has extensive experience managing multi-location ophthalmology and optometry practices.

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FACULTY PRACTICE

Comprehensive Eye Care

Shobha Boghani, M.D.
Anthony Dell'Ano, O.D.
Michael DePaolis, O.D.
Christian Klein, M.D.
Sarah Klein, O.D.
Rebecca Nally, O.D.
Anand Rajani, D.O.
Robert Ryan, D.O.
Harold Ross, M.D.
Chester Scerra, O.D.
Melanie Shearer, O.D.
Tara Vaz, O.D.

Contact Lens Services

Anthony Dell'Ano, O.D.
Michael DePaolis, O.D.
Sarah Klein, O.D.
Rebecca Nally, O.D.
Robert Ryan, D.O.
Chester Scerra, O.D.
Melanie Shearer, O.D.
Tara Vaz, O.D.

Cornea and External Disease

James Aquavella, M.D.
Naveen Mysore, M.D., Ph.D.
Ronald Plotnik, M.D., M.B.A.

Glaucoma/Anterior Segment

Shakeel Shareef, M.D.
Regina Smolyak, M.D.

Neuro-Ophthalmology and Orbit

Steven Feldon, M.D., M.B.A.
Alexander Hartman, M.D.
Zoë Williams, M.D.

Oculofacial Plastics

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

Pediatric Ophthalmology

Matthew Gearing, M.D.
Benjamin Hammond, M.D.

Refractive Surgery

Kenneth Dickerson, O.D.
Scott MacRae, M.D.
Naveen Mysore, M.D., Ph.D.

Retina and Vitreous

Angela Bessette, M.D.
Mina Chung, M.D.
David DiLoreto, M.D., Ph.D.
David Kleinman, M.D., M.B.A.
Ajay Kuriyan, M.D.
Rajeev Ramchandran, M.D., M.B.A.

Uveitis

Angela Bessette, M.D.

Veterans Services

Shobha Boghani, M.D.
Shakeel Shareef, M.D.

RESEARCH FACULTY

| | |
|-------------------------|------------------------|
| Lin Gan, Ph.D. | Jesse Schallek, Ph.D. |
| Jennifer Hunter, Ph.D. | Ruchira Singh, Ph.D. |
| Krystal Huxlin, Ph.D. | Silvia Sörensen, Ph.D. |
| Amy Kiernan, Ph.D. | Duje Tadin, Ph.D. |
| Richard Libby, Ph.D. | David Williams, Ph.D. |
| William Merigan, Ph.D. | Geunyoung Yoon, Ph.D. |
| Gary Paige, M.D., Ph.D. | Jim Zavislan, Ph.D. |
| Richard Phipps, Ph.D. | |