

Vision *for the* Future

UNIVERSITY OF ROCHESTER

FLAUM EYE INSTITUTE

SUMMER 2016 NEWSLETTER

Handling the pressure

Rachel Varner is a remarkable young woman. Born 16 weeks early and now 25 years old, she has overcome many challenges related to her prematurity. The first thing you might notice about her is that she can't hear. Doctors believe her deafness was caused by large doses of antibiotics used to keep her alive as a baby. Because she communicates almost exclusively using American Sign Language, vision is a cherished sense.

Fast-forward to mid-January, 2016. The recent Rochester Institute of Technology Museum Studies and Hospitality graduate was finishing up an internship at a local Rochester business. It was the last thing she needed to do before returning home to St. Louis and beginning the next chapter in her life. Something wasn't right.

"I noticed that my left pupil was dilated, itchy, red and a little blurry," Rachel said. "But the worst part of it was a headache that just would not go away, not even when I took ibuprofen. I couldn't tell if my eye was in pain

because of the headache. I was concerned."

Due to her concern, Rachel contacted her mother, Linda, and explained the situation. Linda tried to get her daughter an appointment with

a local eye doctor. Unfortunately, getting an urgent appointment with out-of-network insurance proved fruitless.

"Rachel said the pain was bad enough that she couldn't go to work," Linda said. "Knowing that vision is so important to her ability to communicate, I told her to go to the emergency room."

Rachel arrived at the Strong Memorial Hospital Emergency Department at about 4 p.m. on January 15th. While waiting for a doctor, nurses checked her symptoms, drew

blood and asked her questions through an interpreter. A few hours later, she was seen by first-year ophthalmology resident **Brittany Simmons, M.D.**

"She asked me some questions, and I told her that I was born premature and that I had eye surgery when I was a few months old," Rachel said. "She tried to take my eye pressure, but I couldn't keep my eye wide open long enough to let her." Following

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ABDUALRAHMAN HAMAD, M.D., LINDA AND RACHEL VARNER, AND SHAKEEL SHAREEF, M.D.



then, RPB has maintained a steady and vital relationship with the University, providing more than \$3.8 million in funding. It has been a growth catalyst for the Department of Ophthalmology's research enterprise, promoting the careers of scientists who are at the forefront of the effort to cure blinding diseases.

Since the arrival of FEI director **Steven Feldon, M.D., M.B.A.**, in 2001, the partnership between the two organizations has grown. During this period, RPB has given FEI nearly \$3 million through unrestricted and individual investigator awards. The first award under Feldon, an RPB Challenge Grant, came in 2002. This award recognized the potential for growth in FEI's

Help getting started

A little more than 50 years ago, **Dr. Jules Stein**, ophthalmologist turned entertainment mogul, founded Research to Prevent Blindness (RPB) to coordinate and promote vision research throughout the United States. In just its fourth year, RPB awarded the University of Rochester a \$1,000 grant to support an ophthalmology biochemistry conference. Since

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DIRECTOR'S MESSAGE

The Flaum Eye Institute continues its development as a premiere center for patient care, research, education and outreach. Our faculty, staff and learning organization will shape the future of this organization established to serve you, promote eye health and to prevent blindness throughout the region. The future looks very promising as our team achieves milestones established as part of our 25 year anniversary plan to be recognized as one of the leading eye institutes nationally and internationally by 2026.

The scientific enterprise continues to generate excitement. **Ruchira Singh, Ph.D.**, recently published a high impact study suggesting a possible treatment for Best's disease, a blinding hereditary retinal degeneration (page 9). Children and adults may begin to hope for a treatment where none has existed. We also recognize senior scientist **Lin Gan, Ph.D.**, who recently received a grant from the National Institutes for Health to better understand the basic principles of how cells in the eye's retina develop (page 8). We celebrate **Geunyoung Yoon's** promotion to Professor of Ophthalmology. One of the original scientists recruited to FEI, his many accomplishments are pivotal to building our research portfolio.

In other news, scientist **Jesse Schallek, Ph.D.**, recently received a grant from Research to Prevent Blindness (RPB) (page 8). He will use his Career Development Award (CDA) to study the microscopic flow of blood in the living eye. This research may help us one day better detect, treat and prevent the growing epidemic of diabetic retinopathy among our population. Schallek and Singh both received RPB Career Development Awards during the 2015 calendar year. This marks the first time RPB has awarded the CDA to two scientists from the same institution in the same year (cover).

We continue to broaden our reach in the community, providing aid and educating the public about eye health. Our vision screening program for school age youth was recently renamed "Glover-Crask Eyeglasses for Kids," thanks to the generosity of the Glover-Crask Charitable Trust (page 7). The program received another boost with

additional philanthropy from a group of talented and enterprising high school students (back cover). Moreover, with the help of Canandaigua National Bank, FEI is establishing a Lions Club to foster our involvement with and reach into underserved areas.

FEI is extremely proud of this year's group of graduated residents. All of them matched into competitive and well-respected subspecialty fellowships. **Rachel Wozniak, M.D., Ph.D.**, will stay at FEI as our cornea fellow (page 11). She also received several prestigious awards and grants – including a Heed Fellowship – totaling nearly \$65,000. This is unprecedented for one of our third-year residents.

Our nationally renowned educational conference was well attended by ophthalmologists, optometrists and ophthalmic professionals from throughout the region. **Christopher Girkin, M.D.**, and **Victor Perez, M.D.**, highlighted a list of stellar guest faculty supporting our own faculty lecturers.

We cannot begin to thank our donors, advisory board, patients and all those who support our missions. Without your generosity and time, we might not have been able to provide the kind of care that a brave young woman needed when her sight was threatened by an acute attack of glaucoma (cover). Her health and good vision exemplify and embody all of our efforts.

Best wishes.



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

October 15: FEI Chair **Steven Feldon, M.D.**, provided the Lion's Club of Cuba, New York, with a lecture about eye health and the aging eye as well as an overview of the Flaum Eye Institute. Lions from clubs around the region were in attendance and presented a generous \$2,000 gift in support of FEI's missions.

January 23: More than one dozen students from Nativity Preparatory Academy spent their Saturday morning receiving free eye check-ups. Most of them also walked away wearing stylish new glasses to help them see better at school. The event was part of the Glover-Crask Eyeglasses for Kids program. FEI pediatric Ophthalmologist **Matthew Gearing, M.D.**, and third-year resident **Tailun Zhao, M.D.**, were among the volunteers lending a hand.

March 24: FEI's Graves' Disease Support Group met and welcomed several new members. **Patricia Marino, Ph.D.**, provided the lecture: *Graves' Disease: the Elephant in the Room*. After the lecture, the group shared best practices on topics ranging from nutrition to coping with stress.

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 **Steve Kofron** at **585-275-3977**. We'll do our very best to accommodate your request.

FLASH: Join the Flaum Eye Institute Lions Club

Are you interested in making new friends? Would you like to share your talents in the pursuit of making an impact on the community – especially as it relates to vision? FEI is in the middle of a campaign to establish a Lions Club chapter. Lions are known for their good work in the community and are especially interested in supporting vision health, drawing their original inspiration from Helen Keller. Thanks to a generous donation from Canandaigua National Bank, charter members can receive a significant reduction in initiation fees. To learn how to join, please contact **Steve Kofron** at **585-275-3977** or visit the Friends of the Eye Institute Website at www.foei.urmc.edu, fill out the information request form and check the "Join the Flaum Eye Institute Lions Club" box.

emerging research programs.

Following the Challenge Grant, RPB awarded the Eye Institute an annual RPB Unrestricted Grant, which now stands at \$115,000, and has been used by Feldon to help build a highly successful vision research enterprise with national and global leadership in areas such as adaptive optics imaging and vision restoration.

"RPB's support is unique in that the fundamental institutional grants are to be used at the discretion of the chair," Feldon said. "These funds have supported faculty and research staff salaries over the years. Funds from other sources may not provide this flexibility. Moreover, having an unrestricted grant from RPB enables us to compete for individual awards. Without this type of support, FEI would have a difficult time transitioning young, developing scientists into independent investigators."

Currently, FEI has two investigators with RPB Career Development Awards. **Jesse Schallek, Ph.D.**, is conducting research with RPB Stein Innovation Award winner, **David Williams, Ph.D.**, to better understand ocular disease processes commonly associated with diabetes. **Ruchira Singh, Ph.D.**, recently published a paper showing the potential of treating a blinding retinal disease with a drug already approved by the FDA for other uses. As these scientists continue to develop their research, they will be able to successfully compete for National Institutes of Health funding as well as support from other private foundations.

The importance of these individual awards is not lost on FEI Director of Research, **Krystel Huxlin, Ph.D.** Early in her career she received an RPB Special Scholars Award and a Lew R. Wasserman Merit Award. Each played an important role in her growth as a scientist.

"These awards were instrumental early in my career when I first tried to start my visual rehabilitation research program," Huxlin said. "I was able to use the funding to gather preliminary data necessary for me to successfully attain National Eye Institute funding for that project. There are very few grants out there that allow investigators to test high-risk, creative ideas. These smaller awards from RPB really foster pushing the boundaries of science in ways that larger grants may not."

Huxlin's research productivity is testament to the RPB support model. Her visual rehabilitation work resulted in watershed publications that have advanced knowledge in this field. It has also touched the lives of patients who have stroke-induced blindness. Many of her initial research study subjects regained partial vision using the therapies that she developed. With further testing, the patented technology hatched in her laboratory could soon be helping thousands who have lost sight from strokes.

Rochester's importance in vision research is understood by RPB President **Brian Hofland, Ph.D.**, who recognizes FEI director **Steven Feldon, M.D., M.B.A.** for his leadership and identifies FEI collaborator and University of Rochester School of Arts & Engineering Dean David Williams as transformative in the field of ophthalmology.

"Williams has made Rochester the leader in adaptive optics imaging," Hofland said. "The team assembled there is extremely productive, and Williams has been an incredible teacher and mentor to other investigators across the country who started in his labs. I think that Rochester is wisely not trying to be all things to all people and is focusing on some of the most important areas of vision research – it is a national treasure."

Hofland also noted that Singh's and Schallek's Career Development Awards coming during the same year is the first time that this has happened and serves as further demonstration of the level of research occurring at the University of Rochester. "My hat is off," he said. "Two in one year is significant."

"We're incredibly grateful," Feldon said. "RPB's longstanding support of FEI has allowed us to make meaningful headway in advancing science to better detect and treat eye disease. We certainly look forward to expanding our research efforts even further. With RPB in our corner, we know that our scientific goals are more achievable than ever."

SUPPORTED BY



Research to Prevent Blindness

Accelerating Careers

Since beginning its relationship with the University of Rochester, RPB's individual grants have enhanced the careers of developing scientists, established researchers and students. Each has made significant contributions in the effort to prevent blindness:

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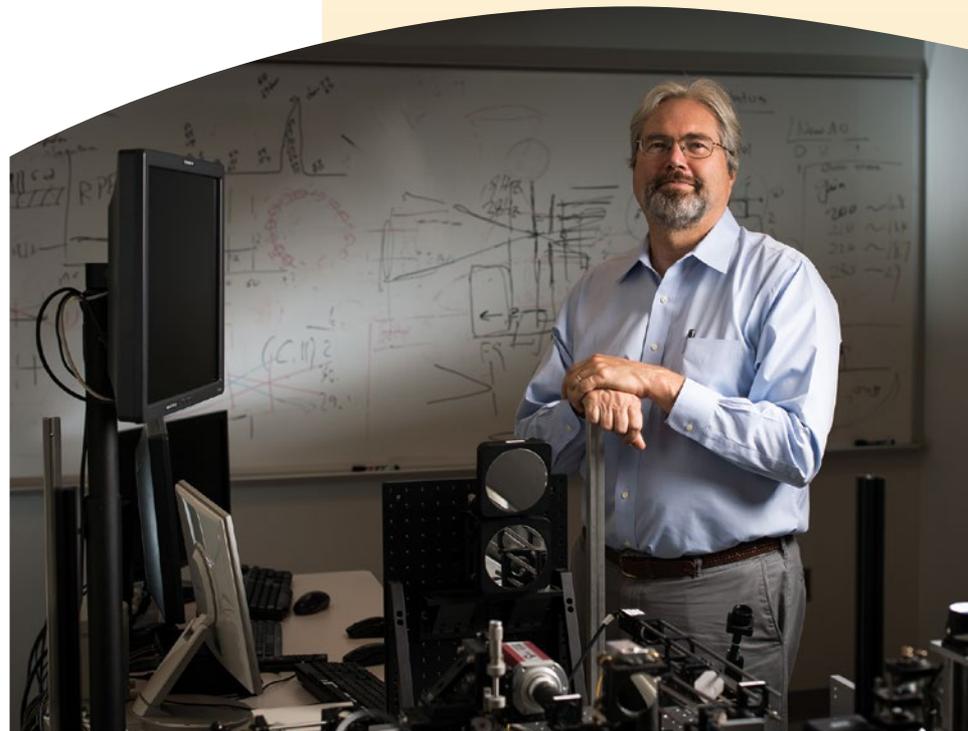
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RPB STEIN INNOVATION AWARD WINNER,
DAVID WILLIAMS, PH.D.

ADVANCING THE VISION

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 September 1, 2015 and April 1, 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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Maxine M. Rude and Robert P. Rude
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Anton V. Schutz and Laura S. Schutz
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Diana C. Soures '68, '71 (MA)
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Carol S. Williams and Ronald A. Williams
Dr. David A. DiLoreto Jr. '95 (MS), '95 (PhD),
'97 (MD) and Dr. Zoe Williams '08 (Res)
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Lillie Winston
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Gayl K. Worner
Katherine Worthington
H. Gray Wright
Xiaoling Xie '12 (MS) and Dr. Lin Gan
Dr. Marvin J. Hoffman '45, '50 (Res), '77 and
Nancy Yanes Hoffman '50, '68 (MA), '77
Laurence W. Yost '74
Loretta Zambuto and Thomas Zambuto
Charlene R. Zand and Robert Zand
Mary C. Zangari
Dr. Donald N. Zehl '63 (Res)
Chao Zhang
Denise Zierle

*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.*

extensive examination and treatments, including two CAT scans, Rachel was released from the emergency department nearly 24 hours after being admitted. For the next two months, she would be a frequent visitor to the Flaum Eye Institute.

The next day, she arrived for a follow-up visit with Simmons. The pressure inside her left eye was 70 mm Hg – normal eye pressure is between 10 and 21 mm Hg. Sustained high-pressure in the eye can cause irreversible damage to the optic nerve, leading to blindness. It is a defining characteristic of glaucoma.

Simmons performed a procedure on her left eye using a laser to make a small hole in her iris (the colored part of the eye) to relieve the pressure that was building up. Fluid that is naturally generated by the eye, called aqueous, wasn't draining right. She would have a second procedure on her left eye and a precautionary one on her right eye to help the fluid drain. She was also put on several medications including pressure lowering eye drops. Although her pressure got better, it still wasn't close to normal and the headaches and nausea continued. Examinations by her care team – including three FEI residents and four specialists – revealed the cause of her problem. It was likely related to the surgery that she had as a baby.

"Rachel's clear natural lens in her eye was pushing forward and bulging," glaucoma specialist **Shakeel Shareef, M.D.**, said. "Our thought was that the procedure she needed to make sure her eyes developed normally as an infant had done some damage, and now we were seeing the consequences."

Shareef explained that the cryotherapy

(freezing therapy) and laser treatment that Rachel had when she was a baby probably weakened elastic bands called zonules that suspend the lens in the center of the pupil. The weakened zonules allowed the lens to move forward in the eye and changed its shape so it was more rounded. The combination of these two effects caused the drainage system in Rachel's eye to become blocked – like a cork in a bottle. The fluid trying to get out was dammed up behind the lens and increasing pressure which resulted in Rachel's symptoms.

She was told that she would need surgery in the next two to three days to correct the problem.

"When they told me about the surgery, I contacted my parents and gave them the news," Rachel said. "My mom flew to Rochester the next day so that she could talk to the doctors at my next appointment."

When the Varners came to FEI, they learned that Shareef had decided to put off surgery for a week. It would be complicated, and he wanted to develop a game plan to give Rachel the best possible result.

"It was a relief to hear that," said Linda. "Dr. Shareef wanted to consult some of his colleagues in the American Glaucoma Society to ask their advice and confirm his approach. I thought that he was being very thorough. It was a good sign."

The surgical plan was to remove Rachel's clear lens that was blocking fluid outflow from her eye and then replace it with a thinner artificial lens. She would also require an additional surgical procedure called goniosynechialysis to improve fluid outflow. This would allow her eye's drainage system to start working

again and lower her pressure. The procedure of removing the lens is commonly performed in people who have cataracts. In mature eyes, however, a patient's visual acuity is usually more stable, which makes it easier to pick an artificial lens with the right focusing power. For Rachel, her visual acuity might change with age. Moreover, her acute glaucoma presented several surgical challenges.

"There were three things we needed to address to get it right," Shareef said. "First we had to alleviate the high pressure in her eye. Secondly we had to think about her eye's anatomy. She had a shallow, fluid-filled anterior chamber, making the surgical space tight for both maneuvering instruments and placing the artificial lens. Finally, we needed to pick a lens that worked well with her eye's anatomy and that would give her decent focusing power," he said.

After getting feedback from numerous colleagues – including world renowned cataract surgeon and former University of Rochester resident, **Waren Hill, M.D.** – Shareef developed a plan for the complex surgery. This included administering precisely timed pre-operative medications to reduce pressure and deepen Rachel's anterior chamber, ensuring the best chance for success.

The operation went as planned. Because a jelly-like fluid was left in her eye to help it keep its shape during the surgery, her pressure remained high the next day. Within a week, however, it was down to 14 mm Hg, well within the normal range.

"The aqueous fluid in her eye was draining normally and she wouldn't need any more

New Website teaches surgical gonioscopy for glaucoma angle surgery

Minimally Invasive Glaucoma Surgery (MIGS) is an increasingly popular method ophthalmologists use to reduce eye pressure. It is far less traumatic to the eye than many other glaucoma surgeries and is appropriate in many instances. However, many MIGS procedures involve the implantation of tiny medical devices into the eye. This presents a whole new set of challenges to glaucoma surgeons.

To help educate and improve the confidence of surgeons performing MIGS procedures, FEI's **Shakeel Shareef, M.D.**, has developed an online learning resource. www.anglesurgery.org offers residents, fellows and ophthalmologists a repository of information to familiarize them with intra-operative gonioscopy, the rate limiting step in successfully performing MIGS to relieve damaging eye pressure.

Launched during the 2015 American Academy of Ophthalmology Meeting in Las Vegas, Nevada – where Shareef was a senior course instructor – the Website is rich with information including powerpoint presentations, PDF articles and surgical videos. This includes an extensive discussion of intra-operative gonioscopy techniques used to help surgeons accurately place MIGS devices in the eye. Also discussed are many of the surgical lenses used in MIGS and other useful resources.

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Overview

Since 1856 - when von Graef demonstrated iridectomy as an effective treatment for acute glaucoma - there have been numerous surgical advances aimed at increasing aqueous outflow. Many of the techniques used to treat open angle glaucoma were introduced in the 1920's and are still used today. Procedures of note include:

- Trabeculectomy (filtering procedure)
- Valve and non-valve drainage devices
- Inflow
- Laser Trabeculoplasty

All of these surgeries have advantages as well as liabilities. They are generally performed only when the ophthalmologic determines that pharmaceutical options and aqueous lowering laser procedures are no longer effective, or pose undue hardships on patients.

2015 began the introduction of a continuing stream of technological advances to improve aqueous outflow that are less aggressive and reduce the risk of complication. Minimally Invasive Glaucoma Surgery (MIGS) is an option that may delay or eliminate altogether—the need for trabeculectomy and other procedures. Routinely combined with cataract removal, MIGS is shown to be effective at lowering pressure, minimizing complications and increasing patient comfort.

MIGS and Intraoperative Gonioscopy

With the increasing popularity of MIGS among anterior segment surgeons, knowledge of intra-operative gonioscopy is crucial. Many of the devices/technologies employed are minute, and their success at lowering pressure is highly dependent upon accurate placement. Therefore, visualizing the anterior chamber angle during surgery is vital. We hope that the techniques and technologies presented throughout will improve your surgical confidence and competence, thereby showing you to other MIGS to patients, expand your current MIGS practice or develop your technique as a resident or fellow.

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surgery in that eye to lower the pressure,” Shareef said. “We were able to discontinue most of her eye medications. The artificial lens we implanted developed a membrane that reduced her vision; this is quite common. We removed it with a laser procedure so that she could see normally. I was very happy to see how her spirit improved after the surgery. It was gratifying to hear her mother tell us ‘my Rachel is back.’”

Two months later, the same procedure was performed on Rachel’s right eye. The same anatomical conditions existed as in the left and surgery was done as a precaution to prevent a similar emergency from happening. Since then, Rachel has returned to St. Louis. More importantly, her optic nerve is undamaged, which is a relief to Shareef and the Varners.

“I’m really pleased with the outcome,” Shareef said. “I think that there’s an excellent chance for Rachel to have a lifetime of good vision. I’m also grateful that I have an incredible group of peers across North America that I can rely on for advice. This was a difficult and uncommon case. I’ve already presented it at several conferences and plan to use it as a teaching experience throughout this year.”

“I’m feeling well,” Rachel said. “Other than a few floaters in my right eye, it’s alright. I’m slowly getting used to wearing bifocals / progressive lenses in my glasses. Normally people get those when they are in their 40s. I’m glad that there was no damage to the optic nerve in my left eye. Vision is very important to me. We are really grateful that there is a place like the Flaum Eye Institute in Rochester.”

Eyes on Art unites Friends of the Eye Institute volunteers

More than 60 sixty eager supporters met at the Memorial Art Gallery to officially kick off Friends of the Eye Institute (FOEI). The recently formed group is an auxiliary comprised of patients, their family and friends, and people interested in supporting clinical, research and fund-raising activities of the Eye Institute.

Benefactors **David and Ilene Flaum** were on hand to greet and chat with volunteers. David Flaum praised group members for their dedication to helping the missions of FEI during a short address. Throughout the event, attendees enjoyed docent led tours of the Gallery which, said FOEI chief organizer, Callie Appleby, “is a source of inspiration to the vision-related work that brought us together.”

The organization has already been active, with several members volunteering at Glover-Crask Eyeglasses for Kids program screenings. There are numerous activities planned for FOEI encompassing everything from helping vision-related patient support groups, to fund-raising, to helping with clinical research.

To learn more about Friends of the Eye Institute and how you can join, please visit www.foei.urmc.edu or contact **Callie Appleby** at **585-276-7311**.



FOEI MEMBERS ARE LED ON A DOCENT GUIDED TOUR OF THE MEMORIAL ART GALLERY.

Kids eye health takes center stage

Can you imagine how not being able to see the board at school might affect a child’s ability to learn? **John Harris**

of the Glover-Crask Charitable Trust asked that same question almost two years ago.

Since then, Harris, who is also a member of FEI’s advisory board, has made it a mission to eliminate uncorrected vision for some of the region’s most disadvantaged kids.

Because of these efforts and generosity of many others, the program evolved quickly.

What started as handful of screenings supported by Glover-Crask recently became an endowed program thanks to a \$250,000 pledge of support. Now called Glover-Crask Eyeglasses for Kids, the number of screenings is growing throughout the region.

The idea is simple: screen disadvantaged school aged children to see if they need glasses or might have some other vision problem. If a child’s vision falls below a certain line, let him or her pick out a stylish pair of frames, add lenses and wear the glasses home that day.

Although it sounds easy, the screenings are a complex coordination of volunteers and resources. FEI pediatric ophthalmologists, optometrists, ophthalmology residents and medical staff take care of the eye exams. Opticians stand by and help each child select a frame they like and use specialized machinery to make up a pair of finished glasses. The events – typically held on Saturdays – get busy. Since each child has been pre-screened by a nurse or staff member at their school, most will leave wearing their first pair of glasses.

Other volunteers, including FEI staff and Friends of the Eye Institute members, manage logistics and help to keep the families informed and entertained while they wait. Coordinating all this is FEI’s business development director **Callie Appleby**, who works with schools and organizations to schedule the screenings and identify kids who need help.



Schallek receives Career Development Award

Jesse Schallek, Ph.D., is FEI's latest researcher to be chosen by Research to Prevent Blindness for an individual grant. He will use the \$300,000 Career Development Award to study the genesis of retinal eye disease associated with diabetes. The assistant professor of ophthalmology is using a special camera equipped with adaptive optics to see tiny blood vessels that are less than 1/10th the thickness of a human hair. Schallek's research looks at how blood flow, structures, and cells inside the retina are affected by diabetes. Understanding this may help diagnose and treat diabetic eye disease before it damages the visual system and may also help to determine the effectiveness of treatments in the battle to prevent related vision loss. Diabetic retinopathy is one of America's leading causes of blindness and is a major concern among eye doctors, endocrinologists and primary care physicians. Schallek is just one of a select few to receive this prestigious award in 2016.



Ramchandran receives Prevent Blindness Angle Investigator Award

Rajeev Ramchandran, M.D., M.B.A., received a \$25,000 Joanne Angle Investigator Award from Prevent Blindness to measure the effectiveness of using telemedicine to monitor diabetic retinopathy.

"Diabetic retinopathy is the leading cause of blindness in working age U.S. adults, resulting in significant personal, social, and economic costs," Ramchandran said. "Annual dilated eye exams, with treatment for sight threatening retinopathy, can save vision for at least 90% of individuals. However, the annual rate for such exams is only about 50% for those with insurance, and much less for those who are under insured."

Telemedicine enabled diabetic retinopathy surveillance in primary care clinics has been shown to improve screening rates for vision threatening diabetic retinopathy, but successful and sustained implementation of such programs has been variable. Dr. Ramchandran seeks to better understand how best to introduce telemedicine enabled diabetic retinopathy surveillance to the workflow of primary care clinics and better connect patients to eye care, especially to save sight in vulnerable populations.

The goal for the project is to develop and refine an effective implementation strategy toolkit for telemedicine screening for diabetic retinopathy. The completed toolkit – including standards for tele ophthalmology program deployment and evaluation – will be made available through the Prevent Blindness network and on a publicly accessible website at the University of Rochester.



Gan grant to investigate retinal development



Good vision depends on the flow of visual information through a precisely wired network of differentiated nerve cells and the connections between them that

make up our retinas. These include photoreceptor cells, ganglion cells and other cells that can be further divided into many other subtypes based on their location, structure and function. Of all the cells in the retina that help us process vision, perhaps the most diverse and least understood are amacrine cells. With more than 30 subtypes, they contribute to a majority of visual processing functions in the retina.

FEI's Lin Gan, Ph.D., is the recipient of a National Eye Institute R01 grant (1 R01 EYE 026614-01) that funds his goal of understanding the development and function of specific types of amacrine cells. GABAergic amacrine cells are thought to play a role in visual direction selectivity, the detection of directional motion, the modulation of light adaptation and circadian rhythms. Gan proposed to use the \$1.9 million to develop a model to study the impact on retinal development of a specific transcription factor, LHX9. This genetic regulator likely plays a critical role in retinal amacrine cell specification. It offers a unique opportunity to ultimately understand the genetic pathway governing the formation of the layer of the retina where photoreceptor cells convert and transmit light information to nerve cells that send these signals to the brain.

Discovering the basic principles of how these cells and structures develop and function in vision may lead to a better understanding of hereditary and acquired eye diseases. This may ultimately result in better methods to screen and treat for eye disease.

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Singh discovery may improve prognosis for blinding disease

Best's disease is one of a handful of inherited macular degenerations resulting in the eventual loss of central vision. The condition affects the macula, which is the "sweet spot" of the retina at the back of the eye. The macula provides the hi-fidelity vision for reading, looking at computer screens and recognizing faces. There is no current treatment for the disease, which has its onset between the ages 3 to 15. Visual difficulties related to Best's may not be noticed until later in life.

FEI scientist **Ruchira Singh, Ph.D.**, recently published promising news in The American Society of Gene & Cell Therapy's journal, *Molecular Therapy*, related to a potential treatment for Best's disease. Using a special technique, Singh takes a person's skin cells, converts them into stem cells, and then differentiates those stem cells into retinal cells. The newly formed retinal cells mirror the same genetic traits and disease predispositions that the cell donor has. These human induced pluripotent stem cells (hiPSC) are proving useful to Singh in studying both inherited and acquired retinal diseases, as well as the role of environmental factors in the development of these eye diseases.

In her experiments, Singh has grown the part of the retina that is affected in Best's disease, – "retinal pigment epithelium (RPE) cells" – in a dish. The RPE cells are generated from the skin cells of persons who have Best's disease and skin cells from genetically similar siblings without Best's disease. This allows her a model suitable for studying mechanisms involved in the disease and also to be able to test drugs on the tissue cultures derived from patient's own cells.

Singh has discovered that photoreceptors in Best's disease have a problem getting rid of waste material resulting from the chemical reaction that turns light into nerve impulses going to the brain. A portion of the photoreceptor, called the photoreceptor outer segment (POS), stores chemicals that react when exposed to light. Each day, photoreceptors normally shed about 10% of their outer segments which are then regenerated. The shed POS is ingested and degraded by the RPE. In Best's disease, this process is impeded, leading to accumulations of toxic waste build up that eventually kills the light sensing photoreceptor cells. *This causes blindness.*

Using this model, Singh looked at the process of how the regulation of waste products differs in normal cells versus diseased ones. With an understanding of the underlying process of how waste builds up, she was able to test two widely used drugs to see what effect – if any – they had on waste removal. Valproic Acid (VPA) commonly used to treat epilepsy, and Rampamycin, used as an anti-rejection drug in kidney transplants, were introduced into the hiPSC model. Each proved successful at improving the removal of waste materials in the tissue. Together, the two had an even better effect.

Using a naturally occurring *in-vivo* model of the disease, Singh further tested her assumptions. Experiments again showed that VPA had positive influence on stopping the progression of disease in retinas with Best's. However, the paper noted, to achieve greatest success, retinas carrying the Best's mutation needed to be treated before the cellular manifestations of the disease were evident.

Singh is optimistic that the results observed during the study may soon lead to human clinical trials. She cautions that to be most effective, patients will have to be treated early in childhood, prior to deposits of waste materials building up in the RPE. She also thinks that the process and the specific mechanism of action should be verified on patient-derived hiPSC-RPE cells from many more patient samples before moving into clinical trials.



CLINICAL TRIALS

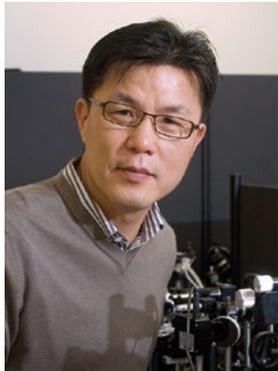
Volunteering for a clinical research study is one of the greatest things a person can do to advance medicine. Clinical trials allow doctors and scientists to evaluate new ways to prevent, detect, or treat disease. Although these studies offer no guarantee for cure, they are one of the cornerstones for 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. (*H. Hindman, M.D., M.P.H.; Tara Vaz, O.D.*)
- ⦿ Short-term Evaluation of Combination Corticosteroid+AntiVEGF Treatment for Persistent Central-Involved Diabetic Macular Edema Following Anti-VEGF Therapy in Pseudophakic Eyes (*D. DiLoreto, M.D., Ph.D.*)
- ⦿ 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.*)
- ⦿ Intravitreal Anti-VEGF Treatment for Prevention of Vision Threatening Diabetic Retinopathy in Eyes at High Risk (DRCRW) (*D. DiLoreto, M.D., Ph.D.*)

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

Yoon promotion

Geunyoung Yoon, Ph.D., was promoted to Professor of Ophthalmology by the University of Rochester School of Medicine and Dentistry. Yoon, who arrived in 2001, has been integral



in the growth of vision research at the University of Rochester and the Flaum Eye Institute. Throughout his career he has been a prolific investigator, collaborating with scientists

within and outside of the University. This has resulted in the development and commercialization of technologies that have improved the lives of patients – like LASIK eye surgery and customized contact lenses – and have helped other clinicians and scientists better understand how the optics of the eye affect vision.

Besides his research, which has contributed tens of millions of dollars in grant funding and resulted in multiple patents and publications, Yoon has been the consummate educator. Since receiving his first faculty appointment at the University of Rochester, he has mentored more than 100 graduate and undergraduate students, post-doctoral fellows and laboratory staff. Many cite Yoon for helping them develop successful careers in vision science through his leadership and guidance.

Williams receives Beckman-Argyros Award

FEI professor and University of Rochester Dean for Research of Arts, Sciences & Engineering, **David Williams, Ph.D.**, was recently honored by the Beckman Foundation which presented to him the Beckman-Argyros Award in Vision Research. The half-million dollar prize is given to one vision scientist each year who has made significant transformative breakthroughs in vision research. This may include those whose contributions to science in general, or through the development of an innovative technology or fundamental scientific breakthrough, have been applied to, aided and/or improved the vision sciences.

Williams is using the award to fund continuing research into creating an optogenetic interface to restore vision where disease has killed photoreceptors. His team proposes to do this by turning intact retinal nerve cells into working photoreceptors by introducing a photopigment extracted from algae.

AAO and NIH honor two FEI faculty members

The American Academy of Ophthalmology (AAO) recently recognized **James Aquavella, M.D.**, with its Lifetime Achievement Award. The honor recognizes individuals for their contributions to AAO through their participation as an instructor / presenter at the annual meeting; support of AAO through advocacy; or by serving the Academy as a councilor, representative, committee member, author, co-author or reviewer. Aquavella is the Catherine Aquavella Distinguished Professor of Ophthalmology and a leading clinician-scientist in the field of cornea.



William Merigan, Ph.D., accepted an invitation from the National Institutes of Health (NIH) Center for Scientific Review to serve as a member of the Bioengineering of Neuroscience, Vision and Low Vision Technologies study section beginning July 1, 2016. Study section members review scientific grant applications made to the NIH and recommend research proposals that show the highest potential to result in medical discoveries beneficial to humankind.

Rochester Ophthalmology Conference

In late March more than 250 Ophthalmologists, Optometrists, residents and allied health professionals gathered at the University for the 61st Rochester Ophthalmology Conference. Separate educational tracks were held for ophthalmologists and optometrists and for ophthalmic technicians and support personnel. Highlighting the meeting was the annual Snell Memorial Lecture delivered by noted cornea specialist, **Victor Perez, M.D.**, Chair of Vision Research at the University of Miami's Bascom Palmer Eye Institute.

Giving the Billitier Family Distinguished Visiting Professor Lecture was **Christopher Girkin, M.D.**, who is Chair of Ophthalmology at the University of Alabama at Birmingham and Chief Medical Officer of the Callahan Eye Hospital. Additional guest faculty included **Robert Fante, M.D.**, **Suber Huang, M.D.**, **Randy Kardon, M.D.**, and **Laurence Sperber, M.D.** FEI acknowledges the exhibitors and companies who supported the event through educational grants and, of course, those who attended.



Please reserve **March 24 – 25, 2017** for the **62nd meeting.**

Senior resident scores three major kudos



When recently graduated ophthalmologists receive developmental grants to fund their academic pursuits, it is big news. When they win multiple awards while still residents and haven't even completed fellowships, it's a major achievement. Senior standout **Rachel Wozniak, M.D., Ph.D.**, was recently notified of three such honors with funding totaling more than \$62,000.

- ✓ The American Society of Cataract and Refractive Surgery (ASCRS) recognized Wozniak with one of its Resident Excellence Awards. These \$5,000 grants are given to just 10 recipients nationwide to pursue research in their chosen field. Wozniak will use the funds to further her study of developing an FDA-library screen of medicines that may be used in the treatment of corneal infections.
- ✓ The Heed Ophthalmic foundation honored Wozniak with a \$10,000 fellowship. The unrestricted grants are awarded to promising men and women who are pursuing postgraduate studies in ophthalmology. Since its inception more than 70 years ago, the Heed Foundation has supported more than 1,100 ophthalmologists. Wozniak – who will pursue a cornea fellowship at the Flaum Eye Institute – is one of 20 young ophthalmologists singled out this year.
- ✓ Wozniak and UR Medicine microbiologist, **Paul Dunman, Ph.D.**, were awarded a \$47,500 grant by the University of Rochester's UR Ventures. They will use the funding to pursue an *in vivo* model of infectious keratitis – a debilitating infection of the cornea commonly associated with improper contact lens wear. They hope to develop new antibiotic combinations that may better treat the disease.

We offer deserved congratulations to Wozniak and look forward to her assuming her role as FEI's 2017 cornea fellow.

Additional graduate news

In addition to Wozniak being chosen as FEI's cornea fellow, senior residents all received appointments to major fellowship positions at some of the country's premiere institutions for ophthalmology training:



Katherine Fallano, M.D., continues her studies at the University of Pittsburgh School of Medicine. There she began a glaucoma fellowship under the tutelage of a world-renowned faculty.

School of Medicine graduate and FEI resident, **Amit Sangave, M.D.**, left Rochester and traveled to Detroit, MI where he is pursuing his goal of becoming a retinal surgeon at Henry Ford Hospital.



Tailun Zhao, M.D., also headed to Pittsburgh. Like Sangave, he began a two-year training program in retina vitreous.



The faculty and staff congratulate them on completing their residencies and look forward to keeping in contact with the new alumni as they pursue their careers.

Alumni update

Former residents, fellows and ophthalmologists who attended medical school at the University of Rochester, mark *Sunday, October 16th* on your calendar. Flaum Eye Institute will be hosting a reception at the American Academy of Ophthalmology meeting at the Chicago Hyatt Regency McCormick Place. Invitations and more information will follow.



Alumni please stay tuned. During the next month, we will be launching FEI's new alumni Website. There you'll be able to network and see where fellow alumni are and what they are doing. The site will also feature a secure "members only" area where you can post and find up to date contact information. To learn more, please contact **Callie Appleby** at 585-276-7311.

New additions to administrative team

We are pleased to announce the arrival of additional members to the FEI management team.

Jeff Brust, M.B.A., joined FEI as Director of Finance and Business Operations. In this role, Brust oversees the FEI finance team as well as the retail operations of Strong Vision Optical. In addition to the roles of managing the budget and retail operations, he is also responsible the growth and development of the clinical enterprise. Brust has an extensive background in managing finance, operations and strategic planning for a variety of regional and national service companies. He received his M.B.A. from the University of Rochester Simon School of Business.

Also joining the management team are Financial Analyst **Linda Morris** and Managing Optician **Michele Johnson**, who will oversee retail operations at Strong Vision College Town. We welcome them and all new members of the growing FEI family.

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Grand Rounds dates announced

We are busily recruiting speakers for FEI's monthly Visiting Professor Series. These lectures provide excellent opportunities for doctors throughout the region to learn the latest medical, surgical and diagnostic pearls while earning continuing professional education. The dates for the upcoming academic year are as follows:

- October 22
- November 12
- December 17
- February 18
- March 24 - 25 (*Rochester Ophthalmology Conference*)
- April 22
- May 20
- June 17

Except for the Rochester Ophthalmology Conference, the series is free to attend and begins at 8:00 a.m. in the Eye Institute's third floor reception area.



Flaum Eye Institute

210 Crittenden Blvd.
Box 659
Rochester, NY 14642

www.EyeInstitute.urmc.edu
585 273-EYES



Teen talents raise money for eye care

In October, a group of local students raised \$40,000 to advance the mission of children’s eye care in the Rochester area and in India. Kids Reaching Hearts Through Performing Arts staged a charity gala and dinner – featuring a night of performances – that drew more than 200 people.

The funds raised were split equally. \$20,000 went to the Flaum Eye Institute in support of the Glover-Crask Eyeglasses for Kids program. The other half of the money went to FEI’s sister organization, the L.V. Prasad Eye Institute in Hyderabad, India, where it will support a similar program to screen and care for children there.

“We are grateful to see such talented students dedicated to helping others,” said **Steven Feldon, M.D., M.B.A.**, “It saddens us to know that children go to school and are not able to perform to the best of their ability because of a vision problem. These funds will help children succeed.”

FROM LEFT ARE: SHWETA KOUL, ROHAN GUPTA, ASHIMA SHARMA, PARTH PATEL, DR. Y.M. JAY, STEVEN FELDON, M.D, JOHN HARRIS, SRIHARI CHARI, NIDHI DONTULA, AND SUHINA PATEL.

Fund-raising dinner supports education

This past September, FEI Advisory Board member **Ron Billitier**, chaired a Vision Dinner to the delight of more than 100 guests providing outstanding company, excellent fare and superb wines. The event was held at Tournedo’s restaurant and raised funds for FEI’s educational mission to support a distinguished visiting professor lecture at FEI’s annual meeting.

Through corporate and table sponsorships, donations and a silent auction, including signed sports memorabilia, close to \$18,000 was raised. FEI gratefully acknowledges all those who came in support of eye care and especially recognize **Bob and Lynn Fallone** of Tournedos and the Billitier family for the hard work and generosity that made it such a special evening.

FACULTY PRACTICE

Comprehensive Eye Care

Shobha Boghani, M.D.
Christian Klein, M.D.
Sarah Klein, O.D.
Rebecca Nally, O.D.
Harold Ross, M.D.
Chester Scerra, O.D.
Tara Vaz, O.D.

Contact Lens Services

Sarah Klein, O.D.
Rebecca Nally, O.D.
Chester Scerra, O.D.
Tara Vaz, O.D.

Cornea and External Disease

James Aquavella, M.D.
Holly Hindman, M.D., M.P.H.
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.
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.
Holly Hindman, M.D., M.P.H.
Scott MacRae, M.D.

Retina and Vitreous

Mina Chung, M.D.
David DiLoreto, M.D., Ph.D.
David Kleinman, M.D., M.B.A.
Rajeev Ramchandran, M.D., M.B.A.

Veterans Services

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

RESEARCH FACULTY

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

Patient Care: (585) 273-3937 (EYES) ■ LASIK: (585) 273-2020

Clinical Trials: (585) 276-8734 ■ Research Laboratories: (585) 273-2609

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