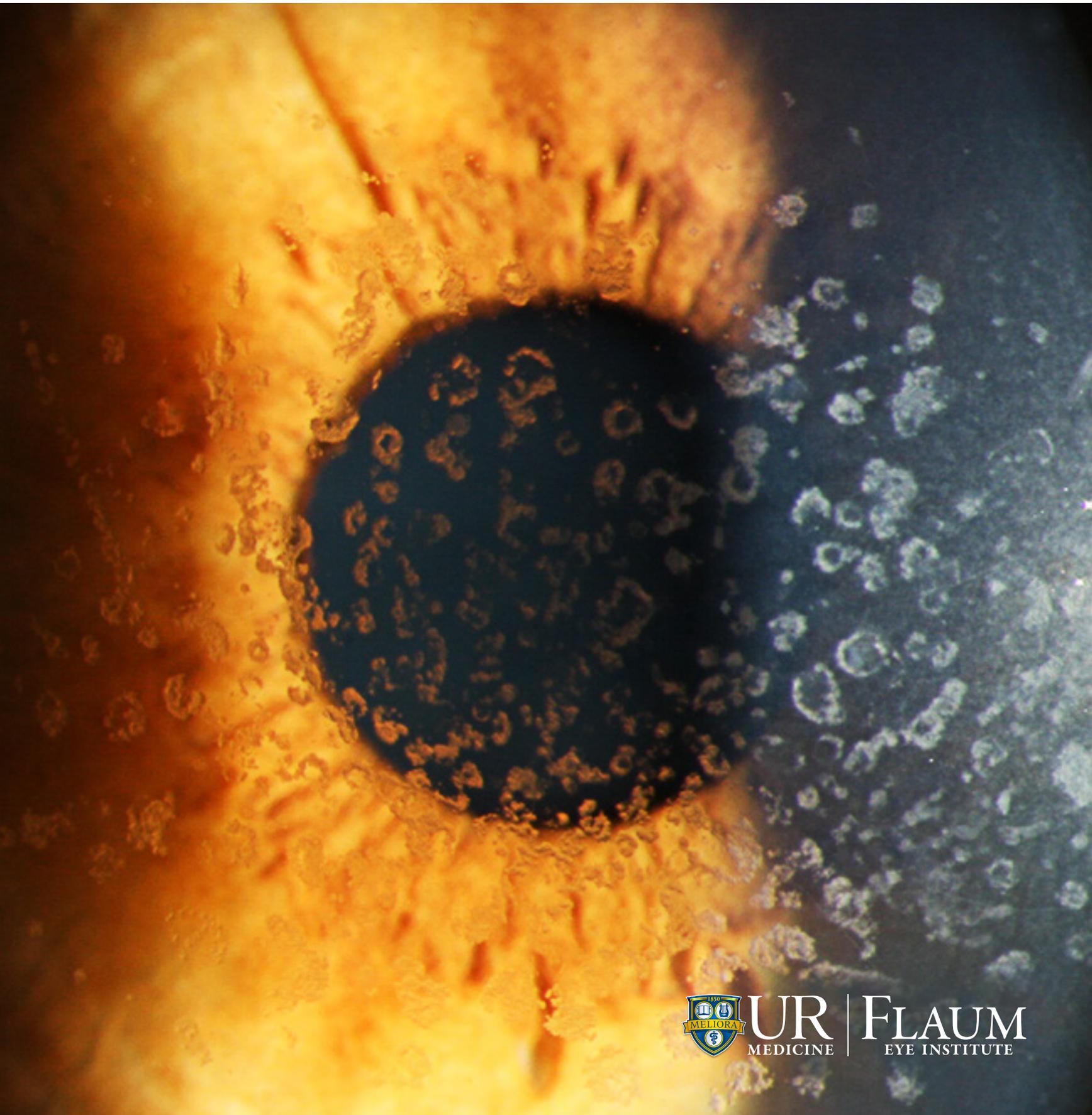




Vision FOR THE FUTURE

UNIVERSITY OF ROCHESTER | FLAUM EYE INSTITUTE

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Director's Message

In this issue, I am pleased to share with you our remembrance story of David Flaum, who passed away on August 20, 2020, and what he meant to our eye institute. His support to establish the David and Ilene Flaum Eye Institute, as well as his belief that this region should receive the best eye care in the country, has allowed us to grow considerably. And we continue to expand with the knowledge that his vision for creating unparalleled eye care in Upstate New York is coming to fruition. It is in his honor, and with the continued partnership with Ilene and the Flaum family, that we will continue to improve and move the field of ophthalmology to a new level. In this vein, Loren Flaum, David and Ilene's son, was recently named Chair of our Advisory Board to help guide us through our next phase of growth.

Growth...it seemed an impossible task since I became chair just before the pandemic hit. But grow we did. With support from the University, our patients, and donors (special thanks to the John Dengler Estate, which recently bequeathed us \$1.4 million), we were able to recruit seven new clinical faculty members between May 2020 and May of 2021. By May 2022, we expect seven additional clinical faculty and three new basic science researchers. The recruits thus far feature two international stars in the field of Ophthalmology, Alex Levin, M.D., and Susana Marcos, Ph.D. Alex is a world-renowned expert in Pediatric Ophthalmology and Ocular Genetics. He took over as Chief of Pediatric Ophthalmology in our department, established the Ocular Genetics Service, and holds our first named Professorship, the Ching - Lutz Chair of Ophthalmology (page 8). Susana Marcos, Ph.D., a world leader in cornea and refractive research, will be taking over as Director of the Center for Visual Sciences and Professor of Optics, with a joint appointment in our department (see story next issue).

We also welcome other international recruits, Dr. Bayan Al Othman (from Jordan), Dr. Ugur Celik (from Turkey), and Dr. Andrea Avila (from Argentina) (page 28).

But all of our growth is not just from the outside. Our

incredible faculty continue to make ground breaking discoveries. Dr. Jesse Schallek and his team recently were the first to show that we could image immune responses (without special dyes) in the living retina. Dr. Ruchira Singh and her team created a 3-D model of macular degeneration in a culture dish, which will enable us to more quickly discover ways to treat this disease.

Other accolades to share with you are the appointment of our new Program Administrator, Joe Gabriel. He is right-hand man to the Chair, confidant and friend, and someone who makes everything we imagine happen.

David Williams, Director of CVS for the last 30 years, and jointly appointed in Ophthalmology, was the third Rochester-related researcher in a row to receive the prestigious David Weeks Research Award (page 21).

Lastly, I would like to celebrate the life of Hobart "Hobie" Lerner, M.D., a cornerstone of ophthalmology in Rochester for more that 50 years, who passed away on September 28, 2020, at the age of 101—always involved, always learning, no one more dedicated to his patients. He will be missed.

Finally, if you see a Flaum Eye Institute trainee, staff, or faculty member, please thank them. We have been extremely short staffed this last year and have worked through a pandemic, yet we have seen an all-time record number of patients, nearly 90,000, this last year. This takes an incredible amount of dedication, efficiency, and collaboration from our Flaum team. It is a pleasure and honor to lead such a group of people.



Sincerely yours,

A handwritten signature in black ink, appearing to read "D. DiLoreto, Jr.", written in a cursive style.

David DiLoreto, Jr., M.D., Ph.D.
Director, David and Ilene Flaum
Eye Institute

Chair, Department of Ophthalmology
University of Rochester School of
Medicine & Dentistry

David Flaum:

A focus like no other

On August 20, 2020, the Eye Institute received terrible news. David Flaum had passed away at the age of 67. The Eye Institute is named for Flaum and his wife Ilene. They have been ardent supporters and friends since its founding as the University of Rochester Eye Institute in 2002.

David Flaum was known locally and nationally as an astute businessman and philanthropist. His generosity and positive influence on communities extended throughout Rochester and the United States. David was the son of Holocaust survivors and grew up on a chicken farm in New Jersey. From these humble beginnings, he rose to prominence in the Republican Party and was honored with Presidential appointments – including serving on the board of the U.S. Holocaust Museum – and recognition through high-level posts in political and community organizations.

While others saw Upstate New York as depressed economically, Flaum saw enormous potential in developing the region. He brought this vision of maximizing opportunities not only to the organizations and businesses that he led or participated in, at the board level, but also to the individuals he mentored. Flaum nurtured what



he touched through his leadership abilities and innate kindness.

He came to Upstate New York when he was recruited by Syracuse University as a wrestler. There he met his wife, Ilene. After graduating from Syracuse, he completed a law degree at Franklin Pierce Law Center. He would eventually go on to serve on SU's Board of Trustees.

As a star athlete in high school and college, Flaum was always bothered by what his son Loren described as Coke-bottle glasses. This frustration

led to an introduction to what was then a small ophthalmology department at the University of Rochester. It would someday become an international center of excellence bearing his name.

“He was really near-sighted.” Scott MacRae, M.D., said of Flaum. “He came to me as we were doing some of the first customized LASIK cases in the country. At the time we were developing the technology for Bausch and Lomb. I remember him as inquisitive, with a very positive

Continued on Page 2

David Flaum, continued from page 1

outlook on life. We treated him and he did extremely well. He thought it was great to be able to do all his favorite activities without thick glasses or contacts.”

According to his son, Loren Flaum, David was immediately impressed with the results of his LASIK surgery. Moreover, he was also excited about what he learned from his experience as a patient.

“Through his discussions with Dr. MacRae and his contacts as a Trustee of the Medical Center Board, he also discovered that there was an incredible opportunity for the optics capital of the world to attract medical researchers investigating and treating eye disease to Rochester,” Flaum said. “Further, he heard that they were bringing in a new chair to lead ophthalmology and establish an eye institute here.”

The new department chair that Flaum heard about was Steven Feldon, M.D., who arrived in 2001 with far-reaching plans for making Rochester a leading center for ophthalmology that would encompass specialty eye care, vision research, and the training of leaders in ophthalmology. In early 2002, the University sponsored a gala to introduce Feldon to the community. It was held in the Sarah Flaum Atrium, named in honor of David’s mother as the result of a gift from the family. There Flaum and Feldon first met.

David was a force of nature.

– Danny Chessin

“David was one of two Medical Center Board members who attended,” Feldon said. “I had thought he came because the location was in a place bearing his mother’s name. However, during the evening we had a chance to chat. He seemed very enthusiastic about what I wanted to accomplish here. I also think that he was interested in my background, coming from Los Angeles and Doheny Eye Institute, and my ideas of what I thought our program could be.”

Feldon described Flaum as being captivated by an address given during that evening. It was presented by Gullapalli “Nag” Rao, a friend of Feldon’s and former University of Rochester cornea fellow. Rao founded the L.V. Prasad Eye Institute in Hyderabad, India. It is one of the world’s most respected centers for eye care, research, and education. That evening Rao spoke about the “right to sight.” To Flaum, he saw the potential to build a vision as equally impressive in Rochester. It would serve

the community and region for which he cared so much. From this point on, he and Feldon became intertwined as business associates and friends, their families developing a lasting relationship.

“The Eye Institute was just the kind of thing my dad liked,” Flaum’s daughter, Sara Ressler, said. “He always loved the idea of taking something that had great potential and then watching it grow. This included turning distressed properties into vibrant centers of commerce or coaching people. He was all in on the Eye Institute, and he knew that Dr. Feldon was a great CEO and the right person for the job.”

As Flaum and Feldon got to know each other, Feldon was convinced that David should join the Eye Institute’s newly formed advisory board. It would be made up of prominent local community members who would be brand ambassadors and help in fundraising activities. Because of the



synergy between the two, Feldon asked Flaum to be advisory board chairperson.

Flaum accepted a seat on the board but declined to be its chair. Instead he encouraged Feldon to meet Danny Chessin, the Co-President and CEO of Hahn Automotive. Chessin was experienced in growing businesses and Flaum trusted him, likening him to a younger brother.

“David loved Steve Feldon,” Chessin said. “I remember David asking me to meet him. He told me: ‘There’s this brilliant doctor from LA that you’re going to love. I was in LA and I saw Doheny (Eye Institute) – let’s have Doheny here. I really want to get behind this thing. I want you to go and meet Dr. Feldon, and I want you to join our board.’”

“And I agreed,” Chessin said.

“Given my respect for David, I was going to do anything he asked me to do within reason. I could tell that this was important to him. David confided in me that it was his plan to name this fledgling enterprise the Flaum Eye Institute.”



L to R: Steven Feldon; M.D., M.B.A.; David Flaum; Ilene Flaum; Joel Seligman, J.D.

After meeting Feldon, Chessin felt the same as Flaum did and joined the Eye Institute Advisory Board, becoming its first chairperson. The timing coincided with the meteoric rise of the department. In these initial years, the generically named “University of Rochester Eye Institute” would hire ophthalmologists from across all sub-specialties and double its number of research scientists. Spurred by Feldon’s relentless pursuit of excellence and his ability to obtain funding from the National Institutes for Health, private foundations, and industry, the organization transformed rapidly. By 2006, it employed more than 100 faculty and staff and was climbing the national rankings in research grant support. All the while, Flaum watched with enthusiasm, jumping in with advice and support when it was needed.

“David was extremely proud of the Eye Institute’s growth,” Chessin said. “If he got into something and he was passionate about it, he would go to the ends of the earth for it. Clearly the Eye Institute had captivated him.”

Flaum played an important role as the Eye Institute continued its upward trajectory. This included behind-the-scenes work, helping secure millions in state funding by using his influence in Albany. Flaum’s business acumen also put him in a favorable position to make a large gift to the Eye Institute. Combined, these capital infusions



David Flaum reflects during naming of Flaum Eye Institute press conference

helped complete some construction projects at the Eye Institute’s main campus.

In 2009, because of his continual advocacy and philanthropy – both for the Eye Institute and the University – Flaum was recognized through one of the highest honors the University of Rochester can bestow. The University of Rochester Eye Institute was renamed the David and Ilene Flaum Eye Institute, cementing the family’s legacy and commitment to vision care and research in the region and internationally.

“Since the naming, it’s amazing how many times my dad would be out in public, and a complete stranger would hear his name and then comment about how the Flaum Eye Institute helped them or one of their family members,” Loren Flaum said. “He would get letters from people thanking him because a doctor improved or restored their vision. It was an incredible source of pride and reflects his love for this community.”

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David Flaum, continued from page 3

Although Flaum had a light touch when it came to direct involvement in Eye Institute operations, he would from time to time lend his official support. This included championing the Eye Institute's Excubator. The 2011 idea was a brainchild of Feldon. It created partnerships between Eye Institute scientists, private investors, industry, and the University to commercialize niche medical technologies. The start-up costs of the projects were funded by government grants aimed at improving U.S. competitiveness in product development.

"It was a foreign concept to the University," Chessin said. "So the Excubator got stalled because it was so different. There were many legal issues that the University had to consider. David and I made sure that the administration knew we were behind the idea, and it eventually got approved. I think David's leadership and persuasiveness helped us clear those final hurdles."

"We are really just starting to see the fruits of the Excubator," said Loren Flaum. "My dad handled a lot of things like this in a similar way. He would let talented people do their jobs without much interference. But he was always ready to support them with advice, wisdom and advocacy whenever it was needed. It was in the same way that he prepared the family to manage our business. He



David and Ilene Flaum cut the ribbon at FEI Finger Lakes Center

recognized our talents, placed us in positions to succeed, and then let us go. He was always a sounding board, but it was important to him to let us do things on our own."

Flaum continued his involvement with the Eye Institute as it began regionalizing through acquisition of community ophthalmology and optometry practices. This expansion supported its growing number of sub-specialty ophthalmologists, vital to serving unmet community needs, and fed its educational, basic science and translational research missions. An active cheerleader, Flaum was present for ribbon-cutting ceremonies, recruited new Advisory Board members, and leveraged his network of friends and associates to participate in fundraising and advocacy events. During this time, Flaum's friendship with Feldon deepened.

"He was so very generous to my wife Diane and me," Feldon said. "He made us feel welcome in Rochester as part of his extended family. When our kids came into town we would all be

invited down to their lake house, and Diane and I would dine with Ilene and David fairly regularly. I'm grateful for this friendship and support. Having a branded eye institute helped make us recognizable to the public and raised our profile within the University of Rochester and beyond."

When Feldon announced his plans to transition from FEI director and Chair of Ophthalmology to become Associate Vice President and Director of Biomedical Research Development at the University of Rochester Medical Center, Flaum became involved. Although policy prevented him from serving on the search committee for the new chair, he participated in the interview process to the extent allowed by his schedule and University rules.

"My father was a big supporter of (current Chair) David DiLoreto," said Loren Flaum. "He thought it was wonderful that Steve Feldon had already recruited and cultivated the right person to take over. I think this is a tribute to both of their abilities to recognize and groom talented people."

Flaum was pleased when the selection process was over and DiLoreto came out on top. Ressler described, her father being confident that the eye institute bearing the family name would be in great hands.

“After the search process was completed, it was a compliment to find out that he was in my corner,” DiLoreto said. “He called me shortly after the announcement and gave me great advice about running an organization. It’s something I will always remember, and I am glad that though Loren, and the rest of the Family, we will have a meaningful connection for years to come.”

During the Eye Institute leadership search, unknown to many, Flaum was experiencing some serious health issues that would eventually claim his life. He would keep this very quiet, even with his close friend Chessin, who kept in touch with him and saw him on a regular basis.

“He was unselfish as always,” said Chessin. “He didn’t want people to worry or to be surrounded by a lot of fanfare. We still communicated at least a couple of times a week and did things – like attend Syracuse University sporting events together – right up to the pandemic.”

Chessin was in his car at the Eye Institute’s parking waiting to be called in for an eye appointment when he received the news of David’s passing.

“My nephew, Arie, called and

told me. I was in shock,” Chessin remembered.” I called my wife, Rina, and asked her to come pick me up. I couldn’t think, let alone drive myself home. It’s still tough to accept a world without David. I don’t think I’ll ever be able to fill the void he left. It was a once in a lifetime friendship. David was a force of nature; he had this natural charisma that just doesn’t exist. He was one of the most generous, gracious people you could ever meet. There’s just no one else like him.”

Despite the void left by Flaum’s absence, there remains a thriving legacy. Flaum was able to see many of his dreams for the Eye Institute completed, and he was optimistic about the future growth of FEI as DiLoreto took the reins in late 2019. In typical fashion, he made sure that talented people were in place so that the Institute flourishes. This includes

Loren taking a seat on the Advisory Board and recently becoming its chair.

“My dad never left things to chance,” Ressler said. “He loved this place and would want to see it grow. He was so pleased to have seven grandchildren in Rochester for whom he built his real estate business. It is our sincere hope and goal that all of them will be connected to FEI and will help direct it during the next generation. I am also extremely proud of Loren taking on a leadership role. We are all committed

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L to R: Eli N. Futerman, Danny Chessin, David Flaum, Philip Saunders



L to R: Asber Flaum, Monica Flaum, Ilene Flaum, David Flaum, Darren Ressler, Sara Flaum-Ressler, Jamie Flaum, Loren Flaum

Alex Levin: Caring for kids and restoring vision is in his DNA



Alex Levin, MD, MHSc, recently joined the Eye Institute as its new Chief of Pediatric Ophthalmology and Ocular Genetics and is the first to hold the Adeline Lutz – Steven Ching Distinguished Professorship in Ophthalmology. Levin is an ocular geneticist and pediatric ophthalmologist who is one of the world's foremost experts in diagnosing and caring for children and adults suffering from rare and blinding eye diseases. With an additional appointment as Chief of Genetics at Golisano Children's Hospital, his arrival has elevated Rochester to a leading center for research and care of patients with genetic eye disease.

Dr. Levin joined FEI after spending 12 years as Chief of Pediatrics and Ocular Genetics at Philadelphia's Wills Eye Hospital. Before that, he was on the faculty at Toronto's Hospital for Sick Children for 16 years, where he was Professor of Ophthalmology, Pediatrics and Genetics and established and directed its ocular genetics program. He is the only physician in the world to hold simultaneous specialty certifications in ophthalmology, pediatrics, and child-abuse pediatrics, and he has an MHSc degree in Biomedical Ethics.

Levin is charged with making Rochester a destination for families and individuals suffering from inherited retinal dystrophies and other developmental conditions, like Down's Syndrome, that involve the eyes. He specializes in treating pediatric cataracts and glaucoma related to these conditions. Since his arrival, he has been a collaborative force working to enhance FEI's patient care, research, and educational missions.

"In the short time since Alex came to FEI, he has established an ocular genetics program, including recruitment of a world-class ocular genetics counselor and development of two ocular genetics fellowship positions," said FEI Chair David DiLoreto, M.D., Ph.D. "He has also restructured our Pediatric Ophthalmology Division by

adding another full-time pediatric ophthalmologist and helping to recruit sub-specialty care in pediatric neuro-ophthalmology, pediatric cornea, and pediatric retina. This is in addition to his own world-class expertise in clinical care of pediatric uveitis and child abuse, and his clinical research experience in pediatric ophthalmology and ocular genetics. These changes have put us on par with the best programs in the country. His arrival has been transformative, and I am confident that this trajectory of success will continue."

We recently caught up with Dr. Levin to learn more about his vision for FEI and how he came to be here:

Why Rochester?

There are a lot of reasons, work-related and personal. For one, Rochester is much closer to my family in Canada, which is a big plus. But the important thing that brought me here is the fantastic opportunity to make a difference. Dave DiLoreto is committed to ocular genetics, and his plans for expansion really appealed to me. We've already begun building a world-class program with specialists and support staff who can manage the rarest and most complex diseases. I see Rochester as a destination for patients from throughout the region and beyond.

You also have a fantastic research infrastructure here. It's really outstanding, internally at the Eye Institute and through inter-departmental collaborations. I see real potential to better understand the causes of genetic eye disease and develop treatments that could restore vision.

The Golisano connection is great, too. Genetics is something that every service line in Golisano Children's Hospital needs – from pediatric cardiology to dermatology.

We plan to build capacity in responsible genetic testing and diagnosis, hire more geneticists and genetic counselors, and add a master's degree in genetic counseling at the University. I think we can become a resource for patients, their families, and scholars to learn all about genetics and ocular genetics.

What led you to a career in pediatric ophthalmology?

I love working with kids. I knew from my own childhood that I wanted to be in the field. After completing my fellowship in pediatrics, I joined the staff at Children's Hospital of Philadelphia (CHOP) as a child abuse pediatrician, an interest that has persisted to this day. This sometimes involves looking at the retinas of kids where abuse is suspected. I also discovered that I wanted to do surgery. Pediatric ophthalmology provides a wealth of opportunities to perform surgery. As a result, I started an ophthalmology residency at nearby Wills Eye Hospital while I continued on staff at CHOP. After that, I returned to Toronto and did my fellowship in pediatric ophthalmology. It was a wonderful decision.

What makes pediatric ophthalmology and ocular genetics a great specialty?

I get to come to work and play and use silly words and see the absolute cutest patients on the face of the earth! On top of that, almost all of my patients have someone in the room with them who loves them more than anybody else in the world – what an incredible partnership in the care of a child.

Being a rare-disease doctor lets me be like Sherlock Holmes. There's the thrill of the chase, where I'm using all my experience, advanced diagnostic equipment, and a holistic approach to medicine to uncover the answer to a clinical mystery. I get great satisfaction in helping families and individuals discover what they have, and it makes coming to work really fun. It is especially rewarding with my adult patients who have gone undiagnosed for years.

Recently a dad came in with a baby who has a cataract. He told me that he had the same condition when he was

a child, as did some of his other children. I asked some questions about his family, did a complete work-up and was able to explain to him exactly what he and his boys have and what it means going forward. He told me that he had learned more in one hour than he had in a lifetime. He finally knew.

What is the impact of genetics on eye disease?

Genetic disease is the number one cause of blindness. Its impact is huge. Almost every single ocular disorder has genetics behind it in some way, shape, or form. In complex diseases, like glaucoma, we may not understand it all yet, but it's there. These are hard diseases, they're chronic, and they're not easy to fix. But with advances in the field, the thought that unremitting loss of vision could be turned around gives hope to the families we see.

What part does genetic counseling play?

When patients know what they have, and receive the support to deal with it, they are reassured – even when it's a bad diagnosis. Genetic counselors are a tremendous help here. They can educate patients and families about their disease, connect them with support groups, or guide them to participate in scientific research to find treatments. It empowers the patient, even if we can't treat their disease yet. FEI and I are so blessed that my genetic counselor, Jenina Capasso, also moved from Wills to join us here. She is simply superb!

What treatments are available today for genetic eye disease?

The big thing we are going to see soon in Rochester is gene therapy. This is where we inject the correct copy of a gene, or some form of it, into the eye to treat inherited retinal dystrophies where a gene has gone wrong. Many of these diseases affect children, such as Leber congenital amaurosis, Stargardt's, and retinitis pigmentosa. Some treatments available are already proven to restore vision, and we plan to be one of the handful of authorized centers in the country to do them. What's even more exciting is that new gene therapies are being developed at a rapid

pace, and we hope to offer them first through clinical trials.

In the future, we also plan to do stem-cell therapy. These types of treatments will restore vision by injecting stem cells into someone's eyes where the light gathering cells are dead, not just dysfunctional. The stem cells will turn into healthy retinal cells, replace the dead cells, and restore vision to the patient.

What are your research directions for pediatric ophthalmology and genetic eye disease?

The sky is the limit. Much of my research now focuses on collaborations with colleagues at the University of Iowa, in particular, with Dr. Ed Stone, who focuses on understanding the genetics of hereditary eye diseases that affect the retina. Our hope is to develop treatments – like gene therapy and stem cells – to restore vision in children and adults.

I have also been developing great relationships between the FEI team and Golisano. We currently have projects working with GCH's Batten disease center that include the Eye Institute's Dr. Ruchira Singh. Batten disease is a devastating neurodegenerative condition that is characterized by vision loss. Many patients with Batten disease don't live past childhood, but we think that there is hope to understand the causes of the disease and develop therapies that can save lives and restore vision.

I also want to expand the department's research in pediatric glaucoma, cataract, and inherited corneal dystrophies. And I plan on continuing my research about retinal hemorrhage related to child abuse.

What is your big vision for pediatric ophthalmology and ocular genetics at FEI?

I envision us as a leading national center for pediatric ophthalmology. We should be able to see any child or adult who has a rare eye disease and offer them the latest testing and treatments, support and counseling, and hope for vision restoration. I also want us to be a go-to resource for the most complex surgical and medical treatments for pediatric eye disease not related to genetics. We already have three fantastic pediatric ophthalmologists in Drs. Matt

Gearinger, Ben Hammond, and (recently added) Andrea Avila, who provide outstanding care. And now we have a pediatric neuro-ophthalmologist (Bayan Al Othman), and within the next 12 months, specialists will arrive who can treat pediatric eye cancers, corneal dystrophies, and inflammatory diseases.

This will also be a place of learning. Ocular genetics is going to be a driving force in the future of eye care, yet in all the world there are only 70 to 80 of us who do it. Through adding clinical and research fellowships in ocular genetics and pediatric ophthalmology, we can ensure that future access to this specialized care is closer to those who need it. Soon our program will be receiving a fellow from Africa who will return there as the continent's first ocular geneticist.

What will it take to make this happen?

It's already happening. With the recruitments in genetic counseling and additions of clinicians and researchers at both Flaum and Golisano, we are on our way. But to achieve ultimate success depends on two things.

First we need the confidence of patients and their referring doctors to allow us to see any kid or adult who has a rare eye disease. That's what we do. We plan to send every patient back to their referring provider if they want them back. Each one we diagnose and help will bring us closer to our research and treatment goals.

The second is philanthropy. Doing genetics doesn't make money. I see fewer patients than most doctors because we spend more time with them. It's old-style holistic medicine. Gene therapy now costs about \$850,000 per patient.

Through research and experience, we think we can bring the cost of that down. But, we also need to raise money to provide access. Ultimately, I see us a philanthropically driven, non-commercial entity where every kid or adult can receive treatment at little or no cost to them. Raising money will not only help us underwrite treatment expenses, but it will help to keep research going so that ultimately everyone benefits.



Genetic counselors: trustworthy guides

Vision problems driven by genetic diagnoses are almost always complex. Discovery of the underlying cause of a hereditary or congenital eye disease is usually the starting point in an intricate chain of care where there are more questions than answers. For affected patients and their families, it can be overwhelming. Helping them navigate this confusing landscape is the role of genetic counseling.

FEI is fortunate to be joined by Jenina Capasso, M.S. She is a genetic counselor who specializes in eye disease. Capasso recently arrived in Rochester from Philadelphia, where she supported Alex Levin, M.D., for nine years. As part of the pediatric eye team, she works one-on-one with patients and their families to help them better understand, manage, and find possible treatments for their conditions.



Jenna Capasso, MS

“I really enjoy the marriage between science and counseling people,” Capasso said. “It’s important to explain to newly diagnosed patients and families about the genetics that are behind certain diagnoses. It is also crucial to inform them about the risks, limitations, and benefits of some of the tools we have developed to help them in their journeys.”

This includes the appropriate use of genetic testing.

Capasso explained that testing can be important as a targeted tool to refine the diagnosis of a disease and guide its treatment. It can also help families understand about the potential risks for siblings (current or planned). Used irresponsibly, it can cause undue anxiety by uncovering collateral information that may or may not affect health – including true biologic relationships.

“As genetic counselors, we develop long-term relationships with patients and families,” Capasso continued. “This might involve identifying for them sources of support, like other patients or groups of patients with the same condition. When a patient or family first receives diagnosis of a rare disease, it can be isolating. We are a conduit to these resources.”

Keeping open lines of communication includes more than educational, emotional, and logistical support. Capasso also carefully follows her patients as new therapies become available, commercially or through clinical trials.

“It’s exciting to think that someday soon we may be able to call a someone and offer them real hope of recovering vision,” she said.

Besides helping patients, Capasso’s short-term goals are to bring local and regional awareness about ocular genetics counseling at FEI. In the long-term, she hopes to contribute in making the Eye Institute an international center of excellence for ocular genetics.

Guidance counselor's estate gift a welcome surprise

Decades ago, John Dengler was a high school guidance counselor. According to Andy Dutcher, a former student of Dengler's who then became his estate attorney, he was kind and interested in other people. He was devoted to his church and was a long-time officer in the Knights of Columbus.

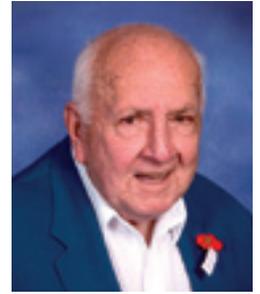
"He helped me fill out my application to attend the University of Rochester," Dutcher recalled.

Dengler died in December 2018. Predeceased by older siblings, he had nieces and nephews but never had children of his own. His children were the students of the school districts where he worked.

In 2006, he came to the Flaum Eye Institute. He had cataracts and became a patient of FEI cornea specialist Ronald Plotnik, M.D. Plotnik performed successful surgery on both of Dengler's eyes, clearing his cloudy vision. From conversations that Dutcher had with Dengler, he remembers that his client was happy with the results of his surgery – apparently very happy. Unbeknownst to most, he decided to include the FEI in his estate plans.

"John must have had a special interest in vision," Dutcher said. "He left 51 percent of his estate to the Eye Institute. He also left 10 percent to the Association for the Blind and Visually Impaired and another 10 percent to the Society for the Blind."

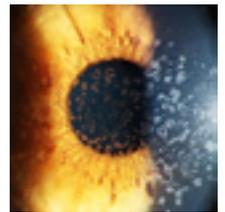
Dutcher described Dengler's estate as being valued at more than \$2 million. When all the disbursements are complete, FEI will receive over \$1 million to be used at the discretion of Chairman David DiLoreto for programmatic needs or endowment.



"We're very grateful for this gift," DiLoreto said. "As a new Chair, I can say that this means a lot to the department, especially considering some of the recent hardships we've endured. It was a pleasant surprise to hear about Mr. Dengler's generosity."

"Gifts like these happen more often than one thinks," said Karen Amico, from the University of Rochester's Office of Gifts and Estates. "It's not uncommon for a donor to remain anonymous."

ABOUT THE COVER IMAGE: *Corneal Dystrophy* by Amber Kates, BS, BSN, RN. Kates is a nurse at the University of Rochester Medical Center whose medical career includes working as an imaging professional at the Eye Institute. FEI has a storied history of developing award-winning ophthalmic photographers through a collaboration with Rochester Institute of Technology's Biomedical Photography Program.



CHUNG PROFESSORSHIP UPDATE In our last issue we announced the establishment of a fund to endow a professorship in the name of our dear friend and colleague, Mina Chung, M.D., who was so suddenly taken from us in February 2020. Shortly thereafter, we held a virtual ceremony of life for her that was attended by more than 400 family members, friends and colleagues from as far away as Australia.



Support of the fund has been inspiring, and we are very grateful to all those who have already contributed. We especially recognize three couples – Erin Casey & Dr. John Marshall, Dr. Melissa & Jim Covington, and Laura & Bob Mullin – who matched the first \$100,000 raised through a challenge pledge. Others who donated are recognized in this edition of *Vision for the Future*.

If you would like to join us in creating an enduring tribute to an accomplished and compassionate clinician, scientist, and mentor, we would be honored. Online contributions can still be made at www.chungmemorial.urmc.edu or by contacting Diane Quinlisk at (585) 733-1818.

The David and Ilene Flaum Eye Institute is most grateful to its donors for their generous gifts and ongoing support.

We are especially appreciative of the friends, patients, alumni, and faculty who contributed to our Annual Fund. The Annual Fund is an essential source of support that helps us to continue our groundbreaking work in vision care and research. This year, your donations had a direct impact on our mission, helping us recruit new faculty and purchase new equipment for our clinic and research laboratories. The following donors have contributed in meaningful ways to FEI between May 1, 2020, and May 1, 2021.

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REMEMBERING **HOBIE.**

Class of '49 resident Hobart "Hobie" Lerner, M.D., passed away in September 2020 at the age of 101. Recognized for his advocacy in ophthalmology, passion for knowledge, and dedication to his patients, he was a fixture in the medical community and a dear friend to many.

The son of ophthalmologist, Lerner knew from an early age that he wanted to follow in his father's footsteps. Graduating from a local Rochester high school, Lerner attended Harvard University, where he studied American History and was a track star. He graduated magna cum laude and was subsequently accepted to Columbia University Medical School. He then entered a medical internship at Michael Reese Hospital on Chicago's infamous South Side.

Lerner joined the Navy in 1944 – during World War II – and received additional medical training there. Upon completing his service, he returned to Rochester and entered the ophthalmology residency program at Strong Memorial Hospital. The program was then part of the department of surgery, and its two residents were under the tutelage of ophthalmologist John Gipner.

After his residency, Lerner joined his father's practice. Together they worked until the elder Lerner died. Not long after, Lerner built his own medical office where he saw patients

until he was 95. Many in his care spanned generations; it wasn't uncommon for him to see the grandchildren of original patients.

As ophthalmology evolved, so did Lerner. Many procedures new to the area were introduced by him, such as intra-ocular lens replacement surgery for cataracts and retinal lasers. Driven to be on the cutting edge of ophthalmology, he was always involved with local, regional, and national organizations, including the American Academy of Ophthalmology and the New York State Ophthalmological Society.

As a University of Rochester supporter, he was one of the first to call for Strong Memorial Hospital to establish an ophthalmology residency program independent of the surgery department. This resulted in the hiring of former resident Henry Metz '66, and helped set the wheels in motion for the establishment of a department of ophthalmology and, eventually, an eye institute in Rochester.

"Hobie was a larger than life figure in Rochester ophthalmology," former FEI Chair and University of Rochester Director of Biomedical Research Development, Steven Feldon, M.D., said. "He welcomed me into the Rochester community,



Hobie Lerner and Susan Bressler, M.D.

and I was honored to be his friend and colleague. His commitment to his profession was profound. He was a fixture at monthly grand rounds until his mobility failed. He always asked the very first and, often, the very best question of our visiting professors."

An Associate Professor of Ophthalmology at FEI, Lerner was passionate about the residency program. He often remarked that during his lifetime it went from turning out "great" residents to "exceptional ones."

Among the many traits that endeared Lerner was his devotion to his patients. Like Feldon, FEI Professor of Ophthalmology and Department Chair David DiLoreto M.D., Ph.D., admired this commitment.

"Hobie showed a dedication to his patients like no other physician," DiLoreto said. "He cared for many of them for their lifetimes. When he was getting ready to retire, he met with me to discuss the plan for the those that he had referred to me. Each one he reviewed started with a similar preface: 'I have been caring for her for 53 years,' or 'I have been

Continued on Page 20

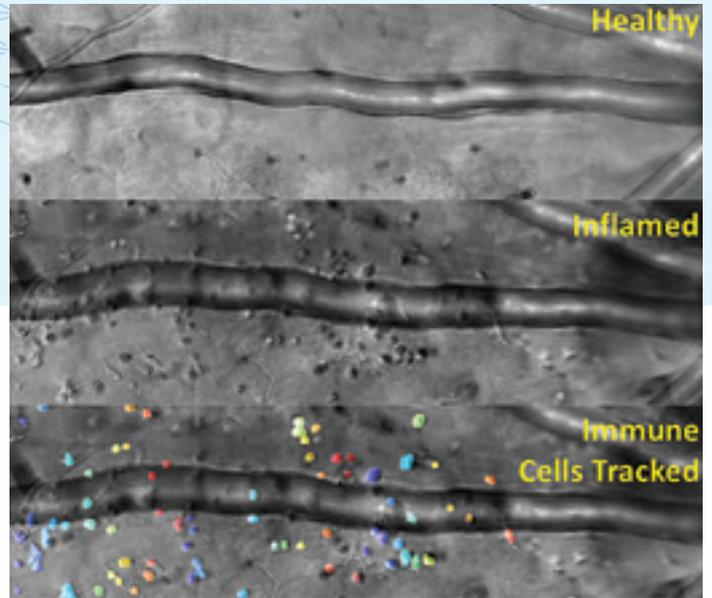
Uncovering hidden secrets of eye disease

Inflammation is the body's response to a number of injuries, including the acute and chronic conditions that lead to blindness in the eye. At the back of the eye resides the retina, a thin mosaic of structures and cells that turn light into vision. Inflammation happens when specialized cells, called immune cells, respond to something harmful to the body, like injury, disease, or the body's own cells gone wrong. Researchers for years have studied immune cell response in living tissue. But, much of this has been limited because the methods used are either destructive or employ marker dyes that may alter the immune cells.

The laboratory of **Jesse Schallek, PhD**, recently demonstrated for the first time a way to track the interactions of microscopic immune cells in the living eye without dyes or causing damage. The method combines adaptive optics imaging, time-lapse videography, and artificial intelligence. For vision scientists, ophthalmologists, and other medical specialists, this is breakthrough technology. The new technique was described in the journal *eLife*.

"We think of the eye as this beautiful window where we can peer in, noninvasively, without having to cut or insert a camera into places where we would rather it didn't go," said Schallek, an assistant professor of ophthalmology and neuroscience. "The eye is an extension of our brain, and therefore with this technology we have some of our first glimpses into immune cell function deep within the central nervous system. This is a critical step forward for basic science and clinical study alike."

In addition to Schallek, team members include Aby Joseph, a PhD candidate at the University of Rochester's Institute of Optics, and Colin Chu, an ophthalmologist and visiting senior research fellow from the University of Bristol, England. They helped develop the system that will be safe for human use. With it they can identify the once hidden behaviors of immune cells as they travel through the bloodstream and purposefully exit the vessel at the location of tissue injury or disease – just like tiny emergency responders



Video capture shows inflammatory response.

rushing to a fire.

In cases like diabetes and macular degeneration, it may ultimately allow researchers and doctors to detect the first signs of disease in patients and monitor how well inflammation reduction therapies are working. For pharmaceutical research, it may reveal new specific drug targets that boost or suppress the immune system to ultimately improve the efficacy of drugs that are already approved and others that are still in development.

The project was supported with funding from the National Eye Institute of the National Institutes of Health, Research to Prevent Blindness, F. Hoffmann-La Roche Ltd. Roche Academy of Distinguished Scholars, the Dana Foundation, and the World Universities Network WUN Research Mobility Programme award.

The pandemic-hardened class of 2021 said their final goodbyes at an intimate ceremony in line with medical school guidelines for safe public gatherings. The seniors, retina fellow Sana Idrees, and faculty gathered at the Chair's home with the program web-cast to family, staff, and friends. Resident Director Benjamin Hammond, M.D., emceed, recognizing the seniors for their accomplishments and sending them on to the next phases of their careers.

The graduating residents then took the stage, thanking many of the people who helped them throughout their training. This included giving teaching awards to instructors singled out for their dedication to education. The Mina Chung Award, given to a faculty member who epitomizes the personal excellence and guidance exemplified by Mina Chung, M.D., was awarded to resident clinic instructor and FEI Alumni Association Co-president, Christine Platt, M.D., Ph.D. The Frederick Dushay Teaching Award, named for long-time resident clinic preceptor, Frederick Dushay, M.D., was shared between Rachel Wozniak, M.D., Ph.D., and Christian Klein, M.D. Lastly, the Resident Guardian Award, for the faculty member who goes above and beyond the role of educator, recognized Hammond.

Besides the camaraderie shared

during the ceremony, some residents provided written thoughts about their experiences:

It takes a lot to develop a good ophthalmologist. Flaum definitely provided a good foundation for me. I feel very confident bringing what I learned here to the next stage. I will gladly share the knowledge I gained with the residents and staff at Maryland and will very much miss my "Flaumily" here.
– Sophie He, M.D.

My fondest memories are from this year. I can recall the words of several of my surgical mentors that made me feel like I was doing alright. These were special moments that validated my choice to become an ophthalmologist. The encouragement is a reflection of how amazingly supportive our surgical mentors are.
– Jack Tian, M.D.

Like any place, Flaum isn't remarkable for the location, or wall art, or the custom ties. It is remarkable for its people, and I can't thank each one of them enough for what I've learned and experienced here. You will be missed long after you've forgotten my name and face. Be excellent to each other.
– Matthew Haynie, M.D.

We wish the very best for our graduates as they move on to the next chapters in their careers:

Alexander Chen, M.D., is in Los Angeles pursuing a glaucoma

fellowship at Acuity Eye Group.

Matthew Haynie, M.D., began a pediatric ophthalmology fellowship at Duke University Eye Center.

Sophie He, M.D., traveled to Baltimore, where she is doing a fellowship in cornea and anterior segment.

Jack Tian, M.D., began practicing ophthalmology in Astoria, Oregon as part of Oregon Health Science University's Casey Eye Institute.

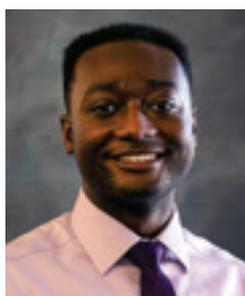
FEI also welcomed 2024 residents. All four ophthalmologists-in-training finished their internal medicine internships at the University of Rochester School of Medicine and started full-time in the eye clinic in July.

The incoming residents received the American Academy of Ophthalmology's 13-volume Basic Clinical Science Course as a gift presented by the FEI Alumni Council. The books are foundational to resident education, and the cost of the series is underwritten by the FEI Alumni Endowment Fund.

We are pleased to present:

Derick Ansah, M.D., a native of Ghana, Africa, who when young came to the United States with his family. He studied Neurology and Biology at the University of Maryland, College Park, earning a Bachelor's

of Science. He received his medical degree from Johns Hopkins University, where he was an active volunteer



Derick Ansah, M.D.

in vision screenings for underserved communities throughout Greater Baltimore. Ansah has a special interest in public health and hopes to make this part of his career. He relaxes by composing and producing music, playing soccer, and writing science fiction.

Phillip Braun, M.D., who graduated from Princeton University, where he received his AB in classics. He then completed a post-baccalaureate Premedical



Phillip Braun, M.D.

Program at Bryn Mawr College and went on to earn his medical degree at Yale University. Here he became interested in ophthalmology while doing an NIH-funded research internship at New England Eye Center, where he performed retinal imaging using Optical Coherence Tomography. His interests outside of ophthalmology include creative writing, wood-working, tailoring, tennis, and baseball.

Eric Chen, M.D., who received his medical training at Case Western University. He completed his Bachelor's Degree in Biology and a Master's Degree in Biotechnology at the University of Pennsylvania.

He has a passion for research and aspires to be a clinician-scientist in academic medicine. He has been involved in numerous public service activities in the Greater



Eric Chen, M.D.

Cleveland area and was elected Vice President of his medical school class. Chen has studied classical piano for 20 years and enjoys playing tennis and basketball, as well as the culinary arts.

Daniel Savage, M.D., Ph.D., is a native of Rochester, who grew up in Webster.

He completed a Bachelor's Degree and his Doctorate in Optical Physics at the University of Rochester, where he also



Daniel Savage, M.D., Ph.D.

received his medical degree. He has already co-authored peer-reviewed journal articles related to laser refractive surgery and has assisted in the development of exciting new

technology that may soon change the way doctors perform vision correction. Daniel aspires to be a clinician-scientist, combining his desire to serve patients with his love for optics. He is active in helping the underserved of the region through managing community medical clinics. In his spare time, he enjoys biking, skiing, kayaking, and other outdoor activities and has a particular interest in woodworking.

Rochester ophthalmology conference re-boot

Travel restrictions for visiting professors and University social-distancing policies forced the cancellation of the 65th Rochester Ophthalmology Conference in 2019. Not wishing to experience a two-year gap to one of the nation's longest-running regional meetings, the conference was shifted to an online format and held at the end of March. Separate programs were available for physicians and technicians with attendance at just over 100 for each meeting. The Frederick Dushay Distinguished Visiting Professor, was delivered by OCT co-inventor David Huang, M.D., Ph.D., and the 65th Snell Memorial Lecture was presented by Harvard University's Reza Dana, M.D., M.H.S.c. We are truly grateful to the attendees who gave the meeting high marks and for grant and exhibit support provided by ophthalmic industry partners.

EDUCATION UPDATE, CONTINUED

The 2022 conference will take place May 20 – 21 and will be a hybrid format of in-person attendance and streaming media. Stay tuned for more information about all of our CME events as attendance policies evolve.

We are also looking forward to this year's visiting professor series.

These free CME events, now held on Friday afternoons, feature a mix of nationally recognized speakers and a new twist: the FEI research spotlight. This added lecture highlights basic

and translational research being performed by FEI science faculty. This window into cutting-edge scientific trends has quickly become a favorite of attendees. Like the 2022 Annual Meeting, we hope to offer a hybrid learning format, allowing distant alumni to participate.

The series is free to attend, except for the annual conference, which requires a fee. Total credit hours awarded for in-person vs. online participation will be posted when available.

CME Event Tentative Dates

September 17, 2021
(Dale Meyer, SUNY Albany Medical College – Oculofacial Plastics)

November 19, 2021

December 17, 2021

January 21, 2022

February 18, 2022

April 15, 2022

May 21 – 22, 2022
(Annual Meeting)

June 17, 2022

Williams wins Weeks Award

In February, FEI collaborator and William G. Allyn Professor of Medical Optics David Williams, Ph.D., was presented with Research to Prevent Blindness' David F. Weeks Award for Outstanding Vision Research at the Association of University Professors of Ophthalmology's virtual annual meeting.

The award, which includes a \$50,000 unrestricted grant, recognizes and celebrates an outstanding ophthalmic vision scientist whose research has made meaningful contributions to the understanding and/or treatment of potentially blinding eye disease. The award carries the name of David F. Weeks, former President and Chairman of Research to Prevent Blindness, in honor of his contributions to the field of vision research.

Williams was recognized for his groundbreaking contributions to the science of adaptive optics imaging in ophthalmology. This technology has been instrumental in myriad areas of eye care, from the development of wavefront-guided refractive surgery to instrumentation used widely to study

normal and diseased retinas in the living eye at a microscopic scale.

Williams serves as director of the Center for Visual Science, a research program consisting of more than 37 faculty members from seven different University of Rochester departments dedicated to understanding how humans see, as well as the disorders that compromise sight.

He joined the Rochester faculty in 1981 and served as dean for research in Arts, Sciences & Engineering from 2011 to 2019. He is a fellow of the Association for Research in Vision and Ophthalmology, the Optical Society of America, and the American Association for the Advancement of Science. In 2017, he was named a member of the National Academy of Sciences.

This is the third consecutive year that the award has been presented to a person with Rochester roots. In 2020, former Ph.D. student Christine Curico was honored, and in 2019 former FEI Resident Jayakrishna Ambati received it.

ORBEYE

Forward looking technology improves eye surgery

Orbital surgery generally involves bone, nerve, muscle, and other tissues that surround the eyes. Any of these may require correction due to disease, trauma, or congenital issues. FEI orbital surgeons were the first in the world to begin using a new surgical visualization system to improve these types of procedures. Called ORBEYE, it replaces the traditional surgical microscope with a high-tech 4K / 3D camera that guides the hands of doctors performing these operations.

During ORBEYE procedures, team members wear specialized 3D glasses and use large high-definition monitors to better see the intricate structures of the orbit. Multiple illumination settings provide specialized options for enhanced surgical viewing. The device is mobile, and the high-definition camera is mounted on a remote-controlled arm. This allows for more flexible and precise positioning of the surgical team and the patient, providing several advantages over traditional microscopes in certain procedures.

“The ORBEYE allows for superior orientation of the surgical team to the patient,” **Mithra Gonzalez, M.D.**, said. “While before only one or two people could simultaneously visualize the surgical field, now the entire team, including anesthesia



Gonzalez and surgical team perform procedure using ORBEYE.

providers, can see what is happening. This allows for better patient-focused care.”

Pediatric ophthalmologist **Matthew Gearing** agreed, stating that the visualization of tissues is superb and likely allows for safer surgeries. Besides improving the patient experience for certain procedures, the device also enhances learning opportunities for FEI residents. It allows them to better view operations in real time, and its 4K video creates vivid recordings that they can review later. Because of its flexibility in positioning patients and surgeons, it also has ergonomic benefits.

“I felt much better after a full day using the ORBEYE,” Gearing said. “Performing surgery looking directly forward certainly improves my posture versus a traditional operating microscope. With the microscope, we are in a constant chin-down position to view the surgical field. This can cause serious neck/back issues over time.”

Originally developed for neurosurgery, ORBEYE was recently introduced into ophthalmology. Flaum Eye Institute was the first in the world to perform 4K / 3D strabismus surgery and orbital fracture repair.

Joseph Gabriel, B.S., was officially appointed Program Administrator of the Eye Institute after serving on an interim basis. A graduate of the State University of New York at Geneseo, he has an extensive background in IT development and organizational management. As Program Administrator, he is responsible for the daily operations of the clinical, research, and educational operations of FEI and is the department's liaison to Strong Memorial Hospital, the School of Medicine and Dentistry, and the University of Rochester Medical Faculty Group.

With a nine-year tenure at FEI, Gabriel said that he enjoys the dynamic atmosphere of his new position. He was instrumental in ensuring that FEI got through the COVID pandemic, safely seeing patients and protecting the health and wellbeing of clinicians and staff. With a focus on practice efficiencies – championed by Chair David DiLoreto – FEI was the first clinical department at the University of Rochester to emerge from the pandemic fully staffed and ready to serve the community.

"I am thrilled to have Joe as our Program Administrator," DiLoreto said. "His ability to look at issues objectively and arrive at fair and thoughtful decisions is a key asset to the



Joseph Gabriel, B.S.

department. He has the knowledge and ability to oversee the organizational structure of FEI as we look to achieve new heights of performance."

This was recently demonstrated through a project where Gabriel marshalled the resources of the department to help the optometry service increase its number of daily appointment slots without compromising its high standard of care.

"It's a great example of what teamwork can do," Gabriel said. "We were able to bring all the stakeholders to the table and make a concept a reality. There is an obvious gain for the Eye Institute because of the improved performance, but the real benefit is to our patients: Not only have we increased the availability of our doctors to them, but we've also reduced the time that they spend waiting in our offices."

Coming out of a year that was anything but normal, Gabriel looks forward to the expansion of FEI's missions and the role he'll play. This includes adding 14 doctors and three new scientists during a 15-month span and opening additional locations throughout the region, including merging its two Webster practices into a newly built facility. With his ability to empower teams and wear many hats, the future looks bright.

Hobie, continued from page 14

following him since he was born....' He made me promise not to hand off these patients to anyone else and to continue their care for as long as I practiced. It is an honor to uphold that promise."

When he wasn't practicing ophthalmology, Lerner and his wife, Elinor, were adventurers who traveled the world, sometimes in a single-engine plane that Hobie piloted. Lerner additionally loved music and played a variety of instruments. He would oftentimes spontaneously play a

harmonica he always carried with him, whether it was to make friends with strangers on a busy street in Paris or to serenade his colleagues at the annual Rochester Ophthalmology Meeting.

Due to COVID, Lerner was laid to rest at a private ceremony. He is missed by all, but remains enshrined in the memories of colleagues, protégés, and, most importantly, the thousands of patients who remember his kindness and dedication to their care. He has been recognized by the American Academy of Ophthalmology



Lerner asks question at Rochester Ophthalmology Conference.

multiple times, and the New York Society of Ophthalmology created its highest honor, the annual Hobie Award, in 1999 to highlight his extraordinary dedication to his profession.



Breakthrough **laboratory eye model** could be the key to better treating macular degeneration

Age-related macular degeneration (AMD), which leads to a loss of central vision, is the most frequent cause of blindness in adults 50 years of age and older, affecting an estimated 196 million people worldwide. There is no cure, though treatment can slow the onset and preserve some vision.



Ruchira Singh, Ph.D.

Recently, researchers at the University of Rochester, including **Ruchira Singh, Ph.D.**, have made an important breakthrough in the quest for an AMD cure. Their first three-dimensional (3D) lab eye model mimics the part of the human retina affected in macular degeneration. Their work was recently reported in the journal *Stem Cell*.

Their model combines stem cell-derived retinal tissue and vascular networks from human patients with bioengineered synthetic materials in a three-dimensional “matrix.” Using patient-derived 3D retinal tissue allows the researchers to investigate the underlying mechanisms involved in advanced wet form macular degeneration, which is the more debilitating and blinding form of the disease.

The researchers have also demonstrated that wet-AMD-related changes in their human retina model could be targeted with drugs.

“Once we have validated this over a large sample, the next hope would be to develop rational drug therapies and potentially even test the efficacy of a specific drug to work for individual patients,” Singh said.

The lab of **Danielle Benoit, Ph.D.**, professor of biomedical engineering and director of the Materials Science Program, engineered the synthetic materials for the matrix and helped configure it.

Singh says the findings should help resolve a “huge” debate among researchers in the field who have been trying to determine whether:

- Defects in the retina itself are responsible for the disease (and if so, which parts of the retina are responsible); or
- The disease is caused by other “systemic issues,” for example, in blood supply.

Their research points strongly to retinal defects as being responsible—and in particular, to defects in an area called

Continued on page 22

the retinal pigment epithelium (RPE), a pigmented cell layer that nourishes the retina's photo receptor cells.

Until now, researchers have relied largely on rodent models. But the anatomy and physiology of the human and rodent retinæ are very different. According to Singh, it was essential to create "an *in vitro* human model of the choriocapillaris layer integrated with the RPE to study the entire complex that is affected by this disease."

For example, in a previous study, Singh's lab used only a single retina cell type—patient-derived retinal pigment epithelium (RPE)—to show that symptoms of early and dry forms of AMD could be mimicked in culture, and could be solely caused by dysfunction in the RPE cells. However, the role of the choriocapillaris layer had remained "a mystery that nobody has ever been able to model in culture," she said.

That's why it was so important to develop an *in vitro* and modular human eye model that could integrate a choriocapillaris layer with the RPE "to get the entire complex that is affected by this disease, so that properties of each individual cell type can be controlled independently," Singh said.

And that's why Benoit's lab, which specializes in creating synthetic hydrogels for cell culture, tissue engineering, and target drug delivery, was important.

Benoit's lab engineered the 3D matrix in which the choriocapillaris could be safely placed and also "properly oriented in the overall vasculature," Benoit said. "We also facilitated the adhesion of the RPE cells within the model. It was a small, but important contribution. A three-dimensional model was essential to describe the really amazing things that have been identified and discovered using this model."

The findings offer a possible resolution to the debate over the causes of macular degeneration. The researchers now show for the first time that defects in RPE cells alone are

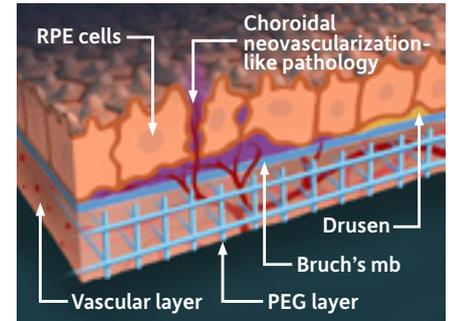
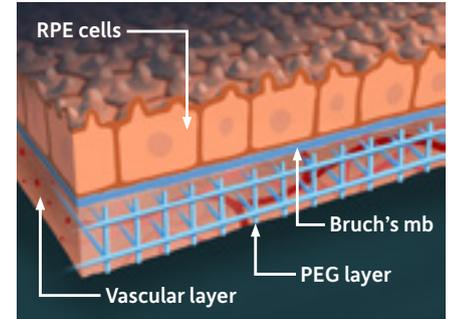
sufficient to cause the disease. "You can have completely normal choriocapillaris, but if your RPEs are dysfunctional it will cause the choriocapillaris to dysfunction," Singh said.

Similarly, using blood samples from patients with wet AMD in the human retina model, their data for the first time also shows that blood-derived factors from patients can independently contribute to the development and progression of wet AMD.

The collaborations, Singh said, have succeeded in:

- Creating an accurate human eye model of the RPE/choriocapillaris complex
- Confirming that RPE and mesenchymal stem cells play a role in the development of the choriocapillaris layer
- Mimicking aspects of macular degeneration in the human eye model
- Understanding the role of specific cell types and blood-derived factors in the development of macular degeneration
- Targeting the disease, using a drug in a patient derived cell model

Dr. Singh's research is supported by grants from the National Institutes for Health and Research to Prevent Blindness.



(Michael Osadciw/University of Rochester)

Research funded to study efficacy of early visual training after occipital stroke

Up to half a million people each year suffer occipital strokes that cause loss to some portion of their vision, permanently affecting how they navigate through life.

A team at the University of Rochester recently showed that visual rehabilitation can more effectively reverse some of this blindness if patients are treated within the first few months after their stroke. Such patients will now have the opportunity to become part of a research study at FEI, sponsored by the National Institutes of Health.

“In occipital strokes, there is a loss of conscious vision opposite the side of the brain where the stroke occurred,” said James V. Aquavella Professor of Ophthalmology Krystel Huxlin, Ph.D. The occipital lobe of the brain contains the primary visual cortex, the first cerebral region responsible for complex visual processing and interpretation of signals received from the eye via the optic nerve.



Krystel Huxlin, Ph.D.

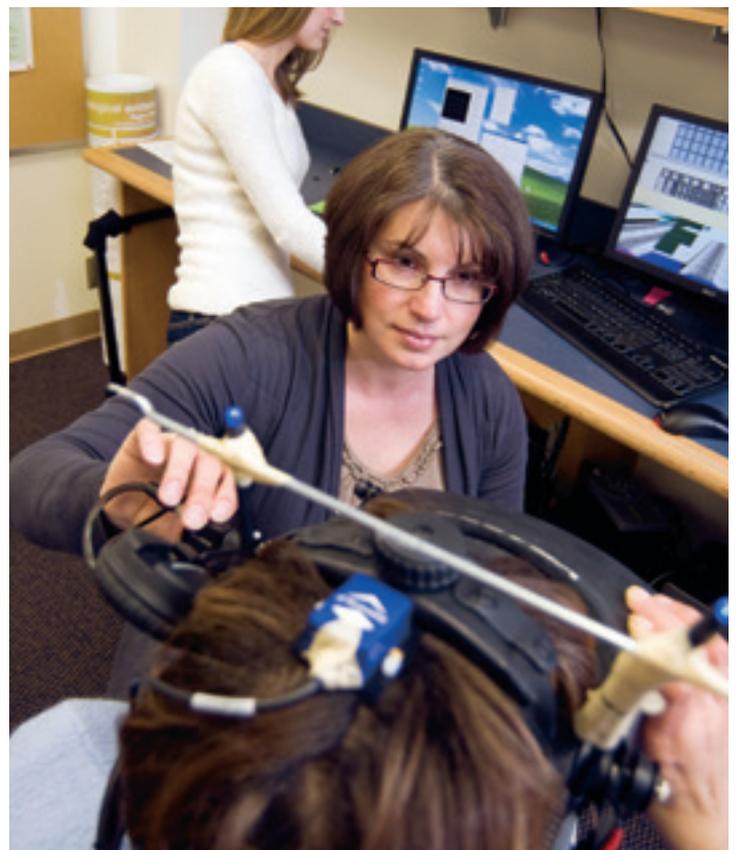
“After two decades of discovery in our lab, we believe we have arrived at a critical point in our understanding of how to maximize vision restoration for cortically blinded patients,” she said. “Within the first few months of having an occipital stroke, retinal ganglion cells, which transmit signals from the eye to the brain, are still largely intact. After six months, these cells show signs of degeneration, making later-onset rehabilitation more difficult to achieve. And any vision recovered at later stages is grainy and limited to the border of the patients’ blind fields. It’s as if we are looking at a window of opportunity slowly closing.”

The \$2.5 million National Eye Institute-sponsored R01 grant (2R01EYO27314705), which includes funding for a small clinical trial, will support a collaborative team under Huxlin’s leadership, that brings together cross-campus expertise from Dujie Tadin, Ph.D. (Department of Brain & Cognitive Sciences, UR) and Brent Johnson, Ph.D. (Department of

Biostatistics, UR). NYU’s Dr. Marisa Carrasco (Department of Psychology and Neural Science) will also contribute to the research.

Patients who have recently suffered a visual stroke—within zero to five months—will be divided into groups to receive vision rehabilitation training. Their first week will be spent in Huxlin’s laboratories at FEI and Center for Visual Science. Here, a team of graduate students, postdoctoral fellows, and ophthalmic imaging specialists will measure each participant’s baseline visual functions and ocular and brain structures, before teaching them the complex rehabilitation routine they must perform. Each patient will then receive equipment to take home, where their therapy will be performed with remote monitoring. They will return to the laboratory at six and 12 months post-stroke for assessments of training efficacy, as well as to measure changes in their ocular and brain structures.

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Huxlin uses multiple modalities to stimulate vision.

NEW FACULTY

In addition to Alex Levin as Chief of Pediatric Ophthalmology and Ocular Genetics, FEI's Neuro-ophthalmology, Pediatric Ophthalmology, Cornea, and Comprehensive Ophthalmology Services recently welcomed more faculty:

Bayan Al Othman, M.D., joined the Neuro-ophthalmology Department, making it the most comprehensive in the region. She gained extensive experience practicing specialty ophthalmology in her home country of Jordan before traveling to the United States to study Neuro-ophthalmology.

Here, she completed two fellowships in Neuro-ophthalmology: one at Michigan State University



Bayan Al Othman, M.D.

and a second at Houston Methodist Hospital. She continued her training at the University of Iowa School of Medicine, where she did a fellowship in Pediatric Ophthalmology.

As a neuro-ophthalmologist, Al Othman diagnoses and treats vision problems that are related to the nervous system and conditions of the eye that may interfere with how the brain processes vision. These might include things like double vision and unexplained vision loss, problems

related to the optic nerve, abnormal eye movements, and thyroid eye disease. Her experience in Pediatric Ophthalmology makes her uniquely qualified to treat specific illnesses in children and teens.

Al Othman has extensive research and teaching experience and has authored or co-authored dozens of journal articles and is an editor for the American Academy of Ophthalmology's Neuro-Ophthalmology and Pediatric Ophthalmology sections of Eye Wiki. She is also a member of the North American Neuro-ophthalmology Society.

Andrea Avila, M.D., is the most recent addition to the Pediatric Ophthalmology team. Before coming to Rochester, she practiced at Dr. Ricardo Gutierrez Children's hospital in Buenos Aires, Argentina. Prior to this, she was Assistant Professor of Ophthalmology at Case Western University's Rainbow Babies and Children's Hospital in Cleveland.



Andrea Avila, M.D.

Dr. Avila offers expert medical and surgical care to infants, children, and adolescents suffering from eye disease and performs corrective surgery on

adults and kids with misaligned eyes. She has a specific interest in treating pediatric corneal disease.

Avila received her medical degree from Universidad Maimonides, Argentina, in 2007. She then completed her residency training in pediatrics at Nassau University Medical Center in Nassau, NY. She returned to Buenos Aires to complete an ophthalmology residency at Universidad Maimonides in 2015. She continued her training with a fellowship in pediatric ophthalmology at Case Western University / Rainbow Babies and Children's Hospital, where she joined the faculty and remained on staff for four years. She has more than two dozen peer-reviewed journal articles and research abstracts and is fluent in English and Spanish.

Ugur Celik, M.D., recently became part of the comprehensive ophthalmology faculty. He is an experienced ophthalmologist who is multi-specialty trained. Besides his experience in general ophthalmology,



Ugur Celik, M.D.

he has training in medical retina, cataract, cornea, and refractive surgery. He completed medical school and an ophthalmology residency

in his native Turkey. There he also performed a fellowship in cataract, cornea, and refractive surgery. For several years he was in private and academic practices in Turkey before moving to Florida. There he completed separate fellowships in Pediatric Ophthalmology and Medical Retina. Afterwards, he practiced privately and on the faculty of the University of Miami's Bascom Palmer

Eye Institute.

Celik specializes in patients who need advanced medical and surgical care. Conditions he treats include cataracts, age-related macular degeneration, corneal disease, and diabetic eye disease. He performs a variety of surgeries and in-office procedures.

Celik also has an impressive record of clinical research, teaching and

publication. He has authored or co-authored more than 80 journal articles and abstracts and has trained numerous residents and medical students in Turkey and at Bascom Palmer. He is fluent in Turkish and practices at FEI's Medical Center location, FEI Geneva, and at FEI Meridian Centre.

Huxlin, continued from page 23

This study is designed to assess how visual-restoration potential changes with time after occipital stroke in humans. It will first measure structural and mechanistic aspects of progressive degeneration along the early visual pathways induced by the stroke, correlating them with changes in visual performance in the blind field. It will then contrast the impact of visual training administered at different stages of degeneration, both on the magnitude of recovery and on the process of degeneration itself. These findings will be key to ascertain the degree to which visual training interventions administered early after stroke can prevent or slow retrograde degeneration, preserve the vision that is still present, and help recover some of the vision already lost.

In addition, knowing how long blind-field visual abilities are preserved after stroke, and how this relates to the rate of structural degeneration of early visual pathways, is critical in assessing whether interventions that promote neuronal survival and regeneration could be beneficial for this condition. The project is designed to advance scientific knowledge, technical capability, and, ultimately, clinical practices for restoring vision and quality of life for people suffering from occipital strokes.

David Flaum, continued from page 5

to the success of the Eye Institute.”

“The future for us is keeping alive the family name and the legacy that my father left with my mom and the next generation,” said Loren Flaum. “The Eye Institute is a big part of this. For the family it gives us a great feeling of community that we are able to help so many people. Vision is important to life. We are excited to play a role in ensuring that the Eye Institute continues to serve every community in this region and grow its national reputation as a place of care, science, and learning. It’s a testament to Steve (Feldon) and my father and what they were able to build. And now I look forward to what we can all do to continue my father’s vision.”

“I still remember a conversation with my dad early on in his relationship with the Eye Institute. He told us: ‘Oh, we’re going to name an eye institute.’ And we said, ‘there’s an eye institute in Rochester?’ There is no doubt about that now,” Flaum said. “My dad’s greatest mitzvah, or calling, was to help people. He would do a hundred favors and expect none in return. In every way, the Flaum Eye Institute is his perpetual favor to the world.”

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[www. EyeInstitute.urmc.edu](http://www.EyeInstitute.urmc.edu)
(585) 273-EYES



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Comprehensive Ophthalmology

Christian Klein, M.D.
Ugur Celik, M.D.

Cornea and External Disease

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

Glaucoma/Anterior Segment

Regina Smolyak, M.D.

Neuro-Ophthalmology

Steven Feldon, M.D., M.B.A.
Bayan Al Othman, M.D.
Zoë Williams, M.D.

Oculofacial Plastics and Orbit

Mithra Gonzalez, M.D.

Optometry and Contact Lens

Kristen Bowles-Johnson, O.D., Ph.D.
Jessica DaSilva, O.D.
Anthony Dell'Anno, O.D.
Michael DePaolis, O.D.

Kenneth Dickerson, O.D.
Brooke Donaher, O.D.
Therese Farugia, O.D.
Blair Germain, O.D.
Sarah Klein, O.D.
Jennifer Krech, O.D.
Robert Ryan, O.D.
Chester Scerra, O.D.
Melanie Shearer, O.D.
Tara Vaz, O.D.
Cathy Yuen, O.D.

Pediatric Ophthalmology

Andrea Avila, M.D.
Matthew Gearinger, M.D.
Benjamin Hammond, M.D.
Alex Levin, M.D., M.H.Sc.

Refractive Surgery

Scott MacRae, M.D.
Naveen Mysore, M.D.
Rachel Wozniak, M.D., Ph.D.

Retina and Vitreous

Ugur Celik, M.D.
David DiLoreto, M.D., Ph.D.

Vamsi Gullapalli, M.D., Ph.D.
David Kleinman, M.D., M.B.A.
Rajeev Ramchandran, M.D.,
M.B.A.

Uveitis

Veterans Services

Regina Smolyak, M.D.

RESEARCH FACULTY

Kristen Bowles-Johnson,
O.D., Ph.D.
Jennifer Hunter, Ph.D.
Amy Kiernan, Ph.D.
Richard Libby, Ph.D.
Susana Marcos, Ph.D.
William Merigan, Ph.D.
Jesse Schallek, Ph.D.
Ruchira Singh, Ph.D.
Silvia Sorensen, Ph.D.
Duje Tadin, Ph.D.
David Williams, Ph.D.
Collynn Woeller, Ph.D.
Jim Zavislan, Ph.D.