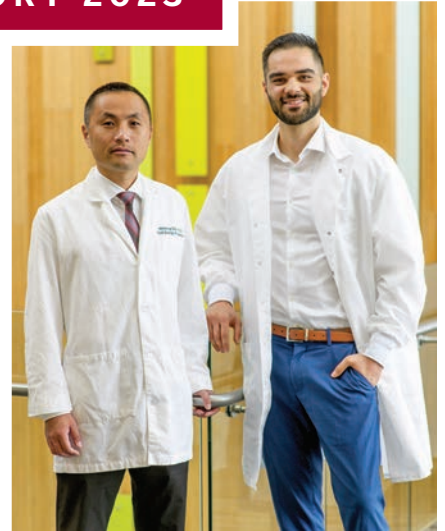




IU OPHTHALMOLOGY ANNUAL REPORT 2023



EUGENE AND MARILYN GLICK EYE INSTITUTE
INDIANA UNIVERSITY SCHOOL OF MEDICINE
DEPARTMENT OF OPHTHALMOLOGY

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The Eugene and Marilyn Glick Eye Institute is home to the IU School of Medicine Department of Ophthalmology and houses clinical facilities and vision research labs.

On the cover

All left to right: First row: Eugene and Marilyn Glick Eye Institute; Dr. David Camp and Dr. Shailaja Valluri (page 18); Dr. Tasneem Sharma and IU School of Medicine Dean Jay L. Hess, MD, PhD, MHSA (page 29) Second row: IMPRS/NIH T35 student presentations (page 15); IU School of Medicine Underrepresented in Medicine Student Surgical Skills Fair (photo on far right) (page 17) Third row: Dr. Charline Boente and Dr. Gregory Borschel (page 20); iCare Gala (page 13); Dr. Weiming Mao and Dr. Devon Harvey (page 8) Fourth row: AOPT Biennial Meeting Local Organizing Committee (page 32); Grand opening of pediatric ophthalmology clinic in Greenwood, Indiana (page 24)

A MESSAGE FROM THE INTERIM CHAIR



While on a family trip this summer, we decided to take our 10-year-old daughter to Plymouth, Massachusetts, to visit Plymouth Rock. Less than two weeks later, Dr. Dan Neely, a pediatric ophthalmologist in our department, posted on Facebook a photo of a Mayflower 1620 tribute. Just as I was about to comment, “I was just there,” on his post, I realized his post was from Plymouth, England. While we witnessed the “start” and “finish” of the transatlantic trip, it was the journey that tested the resolve and steadfastness of the voyagers.

In the nearly 20 years since I graduated from Indiana University School of Medicine, the journey of the Department of Ophthalmology has been remarkable. In 2011, we opened the Eugene and Marilyn Glick Eye Institute, as the department moved from its longstanding home in the Rotary Building. This monumental move allowed for a true intersection of research, patient care and education. The building is home to our clinics, wet lab, simulation lab, weekly case conferences, Basic and Translational Research Conferences and Grand Rounds. It also brings together a collaborative culture between our clinical and research faculty that is second to none.

While a physical structure allows for innovative discoveries and leading-edge patient care, it's the staff, learners and faculty who enable us to become national leaders in ophthalmology. Since joining the faculty in 2019, I have witnessed nearly 50 percent growth in our research and clinical teams. We have opened a new office at Indiana University Health Methodist Hospital in downtown Indianapolis, and an expanded pediatric ophthalmology clinic in Greenwood, Indiana. Our department continues to grow with new faculty members joining us in comprehensive ophthalmology, glaucoma and retina specialties. We are actively recruiting a basic science researcher who will complement our outstanding programs in retina and glaucoma pathophysiology.

In this report, we're pleased to highlight some amazing basic science and translational research conducted by Drs. Mao, Sharma and Boente. We were also honored in 2023 to host the international biennial Association of Ocular Pharmacology and Therapeutics meeting in Indianapolis and the Heartland Vision Symposium with the IU School of Optometry.

While our journey is far from complete, we are navigating the waters with our steadfast values of excellence, integrity, respect, diversity and cooperation. Whether you are a patient, advocate, former trainee, recruit, collaborator or community member, we want to express our gratitude for your support over the past 115 years of ophthalmology at Indiana University. We are truly here to support our community, our state and our nation through our missions of research, education and clinical care.

Sincerely,

John T. Lind, MD

Interim Chair, Department of Ophthalmology



*Hannah Lind at Plymouth Rock,
Plymouth, Massachusetts
(July 2023)*

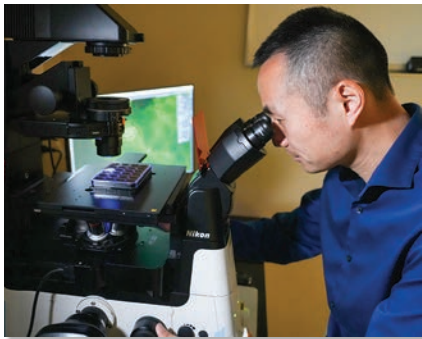


*Dr. Daniel and Lucy Neely in
Plymouth, England
(August 2023)*

Uncovering the mysteries of glaucoma

Vision scientists at IU School of Medicine are engaged in advanced research to learn more about the origins and potential treatments for glaucoma—the leading cause of irreversible blindness in the U.S. and worldwide. Weiming Mao, PhD, MB, associate professor of ophthalmology, is one of four basic and translational science researchers in the Department of Ophthalmology currently focused on glaucoma. With two grants from the National Institutes of Health (NIH) and a grant from the BrightFocus Foundation, Dr. Mao is investigating the molecular mechanisms that contribute to glaucoma.

“While glaucoma is a well-funded area of research, we still don’t know much about it,” Dr. Mao said. “The current treatment is to lower eye pressure, but eye drops tend to become less and less effective during treatment. If eye pressure is not well controlled, glaucoma patients will lose the neuronal cells forming the optic nerve.”



Dr. Mao



Weiming Mao, PhD, MB

The optic nerve serves as the bridge translating signals from the neuronal cells of the eye to the brain. In glaucoma, high intraocular pressure damages the neuronal cells, causing eventual blindness.

“Glaucoma is a very interesting and unique eye disease because it affects the entire eye globe,” Dr. Mao explained. “This presents lots of different angles for research.”

With the grant funding, Dr. Mao is investigating how molecular pathways interact to regulate intraocular pressure in primary open angle glaucoma. The research examines these pathways in a particular structure within the eye known as the trabecular meshwork, which enables fluid to exit the eye and control pressure.

“Trabecular meshwork functions like a filter or a safety valve. If it’s dysfunctional, one assumes the pressure will rise, and glaucoma may develop. My studies look at how the disease relates to changes in the trabecular meshwork,” Dr. Mao said.

Specifically, Dr. Mao is examining the TGF β pathway, the Wnt pathway and the glucocorticoid receptor pathway involved in cell functionality and cell communication. His research demonstrates how these pathways regulate one another to maintain the trabecular meshwork, a delicate process referred to as “cross-talk” in which one pathway balances the activation or inhibition of the other. In glaucoma patients, that delicate balance appears to be disrupted.

“While other researchers have examined these pathways independently, something different about my studies is that I’m looking at these pathways together,” Dr. Mao said. “We’re trying to map everything to create the big picture behind how these pathways might cause glaucoma.”

Dr. Mao’s most recent NIH grant, awarded in 2023, explores steroid-induced glaucoma. Steroids are frequently used to treat eye inflammation; however, they may increase eye pressure and induce glaucoma. Even after microinvasive glaucoma surgery, some patients still develop high eye pressure when they are treated with steroids.

This increased pressure is due to increased resistance in ocular fluid drainage. Two parts of the eye tissue are involved in fluid drainage and eye pressure—the proximal tissue (removed by glaucoma surgeries) and the distal tissue.

“While most studies focus on the proximal tissues and there is fundamental knowledge of the role of these tissues, my interest is how the distal tissue is involved in steroid-induced eye pressure elevation,”
Dr. Mao said. “Our study aim of this project is to pinpoint the mechanism and help identify new therapeutic targets for understanding and treating steroid-induced glaucoma.”

New focus area for glaucoma research

Dr. Mao is collaborating with a bioengineering expert from Georgia Tech University and an expert in mathematical modeling at Purdue University to study the function and impact of a structure called the crosslinked actin networks (CLANs) in the trabecular meshwork of the eye. It’s predicted that this special structure contributes to glaucoma. The research team plans to combine different research technologies to unveil the etiology of CLANs, as well as their effect on the eye.



Space biology research focuses on effects of microgravity and radiation on the eye

The future of human spaceflight depends on learning more about the impact of space's harsh conditions and discovering ways to mitigate detrimental effects on the body. Department of Ophthalmology researcher Tasneem Sharma, PhD, is conducting experiments to increase understanding of how microgravity and radiation—both present in space—affect the eye.

Dr. Sharma, whose primary research focus is glaucoma, has studied SANS and the effects of microgravity on the eye since 2019. She received grant funding from the Translational Research Institute for Space Health (TRISH), a consortium affiliated with NASA, to conduct SANS-related studies. The studies used a model she developed—the Translaminar Autonomous System (TAS)—that

University in California. An expert in radiation in space biology, Dr. Mao has received extensive grant funding from NASA to study the effects of spaceflight conditions on mice.

“Dr. Mao was interested in TAS—our human eye model, and we discussed ways we could collaborate on research that combines my work in microgravity using human eyes and her focus on radiation with animal models,” Dr. Sharma said.

“We’re currently working together on a series of on-site studies at Loma Linda University to test radiation-based effects on the eye using high-proton beams.”

Photographed in front of the synchrotron accelerator at Loma Linda University Medical Center, Tasneem Sharma, PhD, is collaborating with scientists there to study radiation-based effects on the eye.

“Microgravity, or weightlessness, causes a headward shift of fluid that increases pressure inside the head and the eye that can alter the eye’s shape and cause vision changes, a condition known as spaceflight-associated neuro-ocular syndrome (SANS),” Dr. Sharma explained. “Radiation, which is more of a concern when astronauts go into deep space for longer periods, can induce DNA damage, significantly impacting eye health.”

in research with human donor eyes independently regulates intraocular and intracranial pressure near the optic nerve head.

Dr. Sharma’s involvement with TRISH’s B-Sure (Boosting Spaceflight Underrepresented Research Equality) project put her in contact with Xiao Wen “Vivien” Mao, MD, research professor, Division of Biomedical Engineering Sciences, at Loma Linda

Dr. Sharma and Nicole Bodi, a PhD student in the Sharma Lab, traveled to Loma Linda earlier this year for the first experiments, which involved high-beam irradiation of retinal organoids. Resembling a “mini retina,” the organoids are derived from corneal stem cells and artificially grown in the lab. Using organoids in basic science research is beneficial because they mimic the organ’s cellular structure and 3D architecture. It’s also possible to grow large numbers



of organoids from just one stem cell. For these experiments, Bodi grew 120 retinal organoids for the radiation experiments at Loma Linda.

“We’ve been working to extract messenger RNAs, microRNAs, proteins and other markers of interest from the irradiated retinal organoids we brought back from Loma Linda,” Bodi said. “These analyses will help us understand what kind of DNA damage may result from the radiation and how that could potentially impact the retinal ganglion cells.”

Specifically, the research team will be looking at how the DNA damage contributes to oxidative stress. This type of stress occurs when free radicals and antioxidants in the body are out of balance. Oxidative stress can result in damage to cells and tissues.

“If we determine that oxidative stress is an issue when the eye is exposed to radiation and microgravity, we can look at ways to help resolve it, for example with antioxidant supplements,” Dr. Sharma said. “The research will help us identify potential

measures for reducing some of the detrimental effects that progress as astronauts spend more time in space.”

The next stage of the research will include microgravity simulations with retinal organoids conducted in Dr. Sharma’s lab in the Department of Ophthalmology at IU School of Medicine. In early 2024, Dr. Sharma and Bodi plan to return to Loma Linda University with this second set of samples, which will provide additional data on the effects of microgravity and radiation on the eye.

Career development award enhances research experience

Nicole Bodi, second-year PhD student in the IU School of Medicine Department of Ophthalmology, earned a Women in Neuroscience Career Development Award from the Stark Neurosciences Research Institute at IU School of Medicine. The award helped fund her research contributions and travel as part of the Sharma Lab’s collaboration with radiation scientists at Loma Linda University.



Nicole Bodi

“It’s been really exciting to be part of the spaceflight research, and I feel fortunate as a graduate student to be able to accompany Dr. Sharma on these research trips,” Bodi said. “She is committed to ensuring I have firsthand experiences and exposure to researchers in other places.”

A native of Columbus, Indiana, Bodi had her sights set on becoming a cancer researcher. During a rotation in the Indiana BioMedical Gateway (IBMG) Program—the point of entry into biomedical science doctoral programs at IU—she met Dr. Sharma and developed an interest in ocular research. “I never imagined I would speak so passionately about the eye,” Bodi said. “Whether it’s glaucoma or human spaceflight or ocular cancer—there are so many areas of exploration within the eye because it’s such an interesting organ.”

2023 STATISTICS

RESEARCH

CLINICAL TRIALS

22

CLINICAL
RESEARCH
TRIALS
UNDERWAY



ACTIVE GRANTS

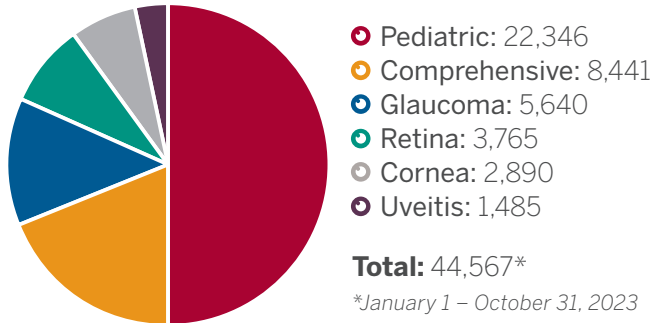


Federal **10**

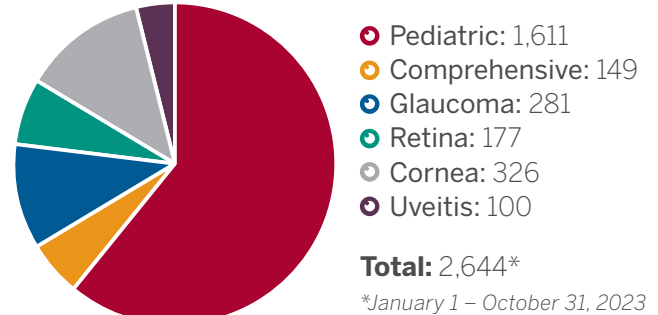
Non-federal **19**

PATIENT VOLUME

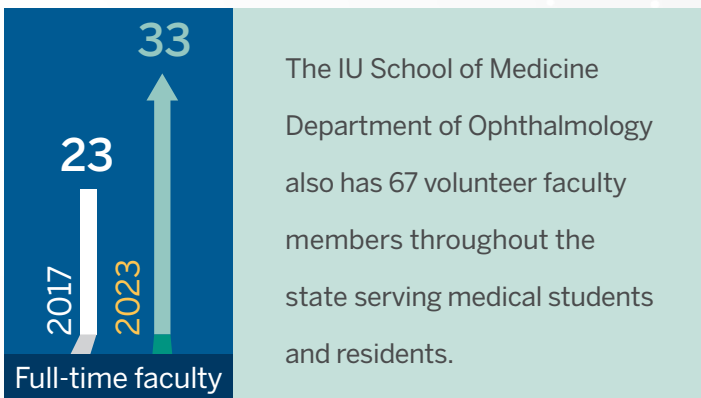
PATIENT VISITS*



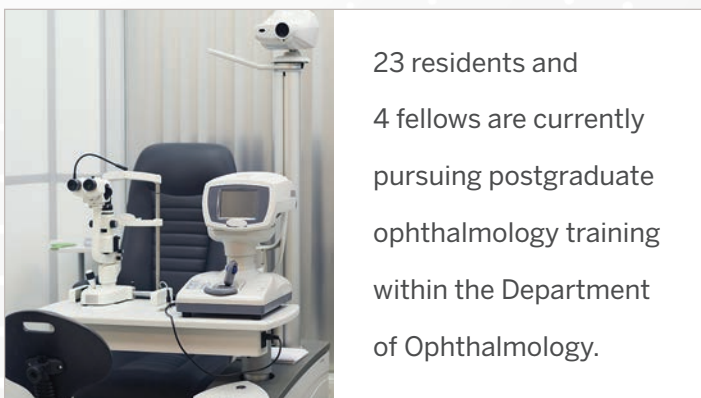
SURGERIES*



FACULTY, TRAINEES AND CLINICAL STAFF



GRADUATE MEDICAL EDUCATION



PATIENT CARE



Department launches postdoctoral ophthalmology research fellowship

The Department of Ophthalmology's new research fellowship offers an avenue for medical school graduates to gain valuable experience in academic scholarship prior to ophthalmology residency. IU School of Medicine is one of about a dozen medical schools in the nation to host an ophthalmology research fellowship.

"These fellowship programs give medical school graduates the chance to get involved in research to enhance

their residency applications for the coming year," said Weiming Mao, PhD, MB, associate professor of ophthalmology, who coordinated this year's fellowship. "The program is good for everyone—the trainee has the opportunity to learn and grow, and it's rewarding for the department to help train someone who could eventually become a physician scientist."

Devon Harvey, MD, who completed his medical degree at Ohio State

University this spring, was selected as the department's first postdoctoral research fellow in ophthalmology. His fellowship at IU School of Medicine is supported by a National Institutes of Health grant promoting diversity in health-related research. Dr. Harvey started the one-year fellowship in early May and shared insights about his journey to becoming a physician, his experience at IU School of Medicine and his future career plans.



Devon Harvey, MD, (left) is the Department of Ophthalmology's first postdoctoral research fellow. He is working on research with Weiming Mao, PhD, MB, coordinator of this year's fellowship program.



Dr. Harvey

What inspired you to become a doctor and to specialize in ophthalmology?

While serving on a mission trip in Mexico, I worked with people who didn't have access to health care, and some of them were even afraid to go to the doctor or a hospital. At the time, I was also thinking about my future, and the trip really inspired me to become a doctor and to provide care that people could trust. When I was studying medicine at Ohio State University, I had a mentor who was an ophthalmologist. She did amazing work with underserved communities. My wife and I are from New Zealand, and it's common for Pacific Islanders to have problems with their eyesight, primarily due to the high rate of diabetes among this population. We had a dear friend who went

completely blind and eventually died due to complications from diabetes. These experiences helped me decide on a career in ophthalmology.

Why were you attracted to the IU School of Medicine Ophthalmology Research Fellowship?

From the beginning, the department showed a lot of support and interest in this program. I was interviewed by Dr. (Weiming) Mao and Dr. (Charline) Boente who really took the time to get to know me. I like the balance the fellowship offers of doing research and also working with patients in the clinics. On the research side, Dr. Mao takes the time to explain things to me and walk me through the different procedures in the lab. The clinicians have been wonderful and very encouraging. They will pull me aside to show me an interesting case or a diagnosis or condition that's uncommon.



Charline Boente,
MD, MS, Residency
Program Director

What research are you involved with as part of the fellowship?

I'm working in Dr. Mao's lab on his studies related to steroid-induced glaucoma. The research is focused on understanding the changes that happen in the eye's trabecular meshwork cells when they are exposed to steroid treatments. These cells are responsible for controlling pressure and help maintain a normal balance within the eye.

How has the fellowship influenced your future career plans?

Through shadowing the ophthalmologists and residents at Riley Hospital for Children, I've discovered that I really enjoy working with kids, so right now, I'm leaning towards pediatric ophthalmology. On the research side, working with Dr. Mao and the other vision scientists in the department has given me a lot of experience and confidence in research. I'd like to continue doing research and making it a part of my career moving forward.

Medical students make a difference through learning, leadership and service

They may be called a “student interest group,” but that doesn’t begin to describe their work and dedication. Reaching far beyond a shared interest in ophthalmology, the 50-plus medical students who make up the IU School of Medicine Ophthalmology Student Interest Group (OSIG) are learners, volunteers, leaders and advocates committed to making a positive impact on eye health for underserved populations.

Formed nearly 20 years ago, the OSIG is one of the oldest and largest student interest groups at IU School of Medicine. It’s also one of the most recognized, earning honors at IU Indianapolis for outstanding community service and outreach. The group is a partner in the IU Student Outreach Clinic (SOC), a free student-run clinic on Indianapolis’ east side. Led by IU School of Medicine, the SOC provides primary care-based medical and dental care, as well as social, legal and other services to the uninsured and people without access to health care. Students in the OSIG offer a free eye clinic once a month that’s part of the SOC. Gaining valuable experience working with patients, the medical students are supervised by Department of Ophthalmology faculty, residents and community ophthalmologists who volunteer their time. Since 2013, the OSIG eye clinic has provided essential eye care to more than 1,000 patients.

“We’ve worked hard over the years to fine tune our processes in the eye clinic so that we can take care of as many patients as possible,” said Sophia Bertot, OSIG president and a fourth-year medical student. “In doing this, OSIG members who volunteer at the eye clinic take an active role in patient care, which is something they may not otherwise get during medical school.”

To expand their reach and serve more patients, OSIG liaisons provide ophthalmology consultations at the SOC on the days the eye clinic isn’t open. The liaisons provide patient education and guidance on eye-related concerns and schedule patients for future appointments at the SOC eye clinic, if needed.

“The eye clinic liaison role provides a great opportunity to learn more about general ophthalmology,” said third-year medical student Aditya Belamkar, OSIG co-vice president of community

outreach and treasurer. “And working in the SOC medical clinic is a great way to gain experience taking care of patients before we get to clinical rotations. Learning from the medical students above us, as well as the residents and attendings is really beneficial.”

While OSIG members appreciate the rich learning environment, they are always looking for ways to ensure the clinic is meeting the health care needs of the local community.

■ When research led by former OSIG president Melanie Scheive revealed that only 20 percent of eye clinic patients were obtaining care at the county hospital following a referral, the OSIG started a patient navigator program to formalize a process for patient follow-up. In addition to calling patients who receive referrals, OSIG members work with them to eliminate any barriers to accessing care.

OSIG mission statement

Increase medical students’ awareness and exposure to the field of ophthalmology through specialty spotlight lectures, skills workshops, student-led outreach clinic, research opportunities and community service initiatives.



- Third-year medical student Margaret Tharp, who is currently serving as the eye clinic general manager, developed educational materials for Spanish-speaking patients diagnosed with common eye conditions.
- In 2022, the OSIG, under the leadership of Scheive and fellow medical student Nirupama Devanathan, launched a study to measure the collective impact of services offered by student-run eye clinics nationwide. The study served as the catalyst for establishing the Consortium of Student Led Eye Clinics. Founded by the OSIG at IU School of Medicine, the consortium now includes more than 20 member clinics across the nation, including eye clinics affiliated with Johns Hopkins University School of Medicine, Weill Cornell Medical College, University of Pittsburgh School of Medicine and Temple University Lewis Katz School of Medicine.

“We’ve taken big steps forward in elevating the consortium beyond a research organization to an organization focused on sharing resources and knowledge to better meet the needs of communities—not just here in Indiana but across the nation,” said Belamkar, who was co-director of the consortium in 2022.

Tharp, who developed the consortium’s website and served as co-director, said it’s been rewarding to help other student groups establish eye clinics in their communities.

“The consortium creates an opportunity for people with a shared mission to come together and share specific information that isn’t searchable online or available in any other way,” she said. “Through community and conversation, we’ve been able to create important connections, which is a great benefit for consortium members and the patients we serve.”

Chi Wah “Rudy” Yung, MD, faculty advisor to the OSIG since its inception, said the students’ determination to evolve and continually improve is what keeps the organization thriving.

“The most phenomenal part is the students pass on the knowledge and experience to the younger students who pick it up and take it to the next level,” Dr. Yung said. “It’s now to the point that the OSIG is developing and nurturing leaders from IU, which is very inspiring.”

(continued on page 12)



The IU Student Outreach Clinic recently moved to a new location. Shown from left to right are photos of the eye clinic exam room at the SOC’s former location, followed by the exam room at the current location. In the third photo, Margaret Tharp (second from left), eye clinic general manager, is pictured with some of her family and Javier Sevilla-Martir, MD, (third from left) faculty advisor for the IU SOC.

(continued from page 11)

Involvement in OSIG offers unique benefits

“

Before students can enroll in a formal ophthalmology rotation during the third and fourth year of medical school, the OSIG eye clinic allows them to shadow and work with patients under supervision in a realistic situation.

Chi Wah “Rudy” Yung, MD
OSIG faculty co-sponsor
Professor Emeritus of Ophthalmology

As a medical student, it's eye-opening to do work that improves health care in the community. Working and interacting with attendings, residents and fellows is an opportunity you don't get so early in medical school.

Melanie Scheive, MD
Former OSIG president
2023 IU School of Medicine graduate

Being a part of the eye clinic and the SOC has shown me the value of communicating with all partners to make sure there's one mission and goal. I've learned that there is always a way to do things, and in the end, it's all about making people healthier.

Nirupama Devanathan
Fourth-year medical student
Liaison manager, OSIG eye clinic

The OSIG eye clinic is a great way for medical students to gain an introduction to the eye problems encountered by an ophthalmologist and introduces them to basic components of an ophthalmic exam while helping to give back to the community.

Jennifer Eikenberry, MD
OSIG faculty co-sponsor
Associate Professor of Clinical Ophthalmology

”

OSIG gala raises funds for student-run eye clinic

In April, the OSIG celebrated the 10th anniversary of the eye clinic by hosting the iCare Gala. More than 60 students, faculty, donors and volunteers attended the event, which raised more than \$6,000 for the clinic. While the OSIG receives some funding support from IU School of Medicine and the Department of Ophthalmology, the eye clinic is primarily funded through grants the students apply for and through fundraising. Funds are needed each

year to update and maintain existing equipment, purchase new equipment and restock clinic supplies.

With questions about the 2024 iCare gala, contact Margaret Tharp, event organizer, at martharp@iu.edu.

For more information about opportunities to support the OSIG eye clinic, please contact Caitie Deranek Stewart at 317-278-2133 or cderanek@iu.edu.

To donate directly to the Department of Ophthalmology, scan the QR code to reach the Giving webpage.



OSIG eye clinic services

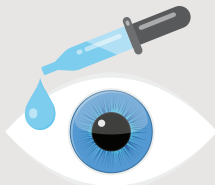


Screening services

- Visual acuity (near/distance)
- Auto refraction
- Glaucoma screening: iCare tonometry and optical coherence tomography (OCT) (new in 2023)
- Funduscopy imaging
- Slit lamp examination

Same-day services

- Eye drops for dry eyes
- Refraction: Free reading glasses and prescription glasses



Faculty mentors help medical students learn the value of research

There's no better way to learn about the role of scientific discovery in medicine than firsthand experience. To offer these real-world opportunities to medical students, each year faculty in the Department of Ophthalmology provide research mentorship through the Indiana University Medical Student Program for Research and Scholarship (IMPRS). This summer, the ophthalmology department hosted 10 students through IMPRS, with six students participating as part of the Short-Term Training in Ophthalmology Research for Medical Students Grant (T35) from the National Institutes of Health (NIH).

IMPRS is a competitive program that takes place during the summer before students' second year of medical school. As part of the application process, medical students reach out to faculty in fields they are interested in exploring. If accepted into the program, students are matched with their research mentors who help them design a self-contained research project. The research can be laboratory based, clinical research that involves medical chart review or a prospective study that follows a group of patients over time. The core program runs for 12 weeks for IMPRS students and three months for students in the NIH T35 program.

"Students aren't just plugged into research that's currently underway—we ask about their interests and then develop something that's unique to them, so they get the most out of the experience," said Professor Emeritus of Ophthalmology Louis Cantor, MD, who has mentored medical students through IMPRS and informally for nearly 40 years. "The students come up with very innovative ideas—some that I would never have thought of—which makes it fun and rewarding to explore something together."

Tasneem Sharma, PhD, assistant professor of ophthalmology, has mentored students through the NIH T35 program for the past three years. To expand the learning beyond the lab, she asks her students to read scholarly articles that they discuss during one-on-one meetings each week.

"The students ask really great questions and bring a different perspective that's fresh and new," Dr. Sharma said. "They're learning from me, but I also learn from them. They're energetic and highly engaged in making sure they get what they can out of the experience."

Tyler Knight, MD, assistant professor of clinical ophthalmology, volunteered as a first-time NIH T35 faculty mentor this summer. A graduate of IU School of Medicine who joined the faculty in 2022, Dr. Knight was interested in helping medical students gain an appreciation for research and its impact on the practice of medicine.

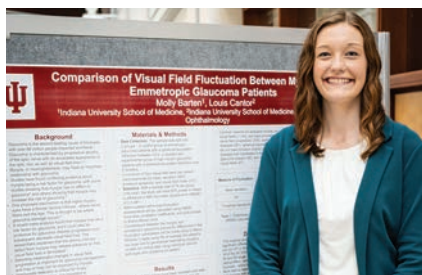
"Even for medical students who are only interested in clinical practice, early involvement in research helps develop critical thinking skills, improve understanding of the scientific method and refine the mental processing it takes to review existing and new medical literature," Dr. Knight said. "IMPRS and the T35 program reinforce all of this and help provide a well-rounded academic and clinical experience."

Dr. Cantor agrees, adding that for any clinician there are lifelong lessons in being exposed to research.

"There's an adage in medicine that in five years, 50 percent of what we know today will prove to be untrue," he said. "We're constantly evaluating new knowledge, adding to existing knowledge or replacing existing knowledge, and that's all done through research."

The value of summer research experience

Four of the six students participating in the 2023 IMPRS/NIH T35 program shared how the experience added value to their medical school education. In addition to completing a research project, the students also shadow faculty in ophthalmology clinics and operating rooms on the IU Indianapolis campus. Ashay Bhatwadekar, PhD, associate professor of ophthalmology, is the department's IMPRS/T35 program director.



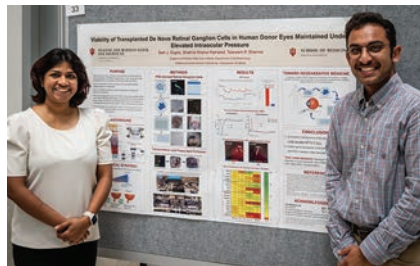
Molly Barten

Mentor: Louis Cantor, MD

Title of research project:

Comparison of Visual Field Fluctuation Between Myopic and Emmetropic Glaucoma Patients

"Through IMPRS, I've enjoyed learning what clinical research would look like as a practicing physician. I also did a lot of shadowing. It was great to get exposure to different fields of ophthalmology like pediatrics, glaucoma and oculoplastic surgery. I also met a lot of the ophthalmology residents who were very helpful with my research project."



Salil Gupta won an NEI-T35 Award for his oral presentation at the IMPRS symposium.

Salil Gupta

Mentor: Tasneem Sharma, PhD

Title of research project:

Viability of Transplanted De Novo Retinal Ganglion Cells in Human Donor Eyes Maintained Under Elevated Intraocular Pressure

"Dr. Sharma's work with NASA was what attracted my attention at first, but we chose to study glaucoma because of its widespread clinical relevance. We differentiated stem cells into healthy cells to replace dying cells in the retinas of human donor eyes. Working with human donor eyes was a unique opportunity and not something I would have otherwise been able to do in medical school."



Tate Lockwood

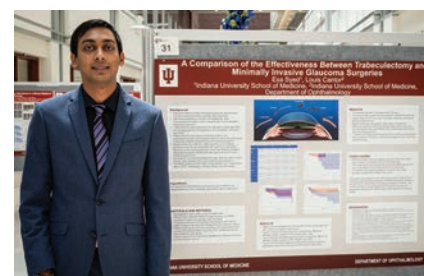
Mentor:

Tyler Knight, MD

Title of research project:

Factors Predictive of Surgical Success in Medial Rectus Resection and Advancement for Consecutive Exotropia

"I've wanted to be an ophthalmologist as long as I've wanted to become a doctor, so getting the chance to shadow alongside Dr. Knight in the pediatric ophthalmology clinic and the operating room sparked my interest even more. It's been interesting to learn about strabismus on a deeper level too. I gained a lot of experience with clinical research, which I'd never done before."



Esa Syed

Mentor: Louis Cantor, MD

Title of research project:

A Comparison of the Effectiveness Between Trabeculectomy and Minimally Invasive Glaucoma Surgeries

"I gained a lot of confidence and independence in completing this research project. It was clinical research, which I had never done before. I learned how to submit a research proposal for Institutional Review Board approval that was necessary for me to complete the project. I also learned a lot by shadowing Dr. Cantor in the clinic and the operating room and was able to ask questions about ophthalmology."

(continued on page 16)

(continued from page 15)

Other students and faculty members participating in this year's IMPRS/NIH T35 program

Connor Smith

Faculty mentor

Ashay Bhatwadekar, PhD

Clay Hepp

Faculty mentor

Padmanabhan
Pattabiraman, PhD

Chaman Kumar

Faculty mentor

Jason Meyer, PhD

Jeffrey Liu

Faculty mentor

Amir Hajrasouliha, MD

Shadia Tannir

Faculty mentor

Gregory Borschel, MD

Albab Uddin

Faculty mentor

David Gross, DO

Former NIH T35 students present at ARVO

Some IMPRS and NIH T35 students continue their research beyond the program and submit the findings for publication or apply to present at annual conferences. Two former NIH T35 students, Sophia Bertot and Margaret Tharp, were selected to present their research at the 2023 Association for Research in Vision and Ophthalmology (ARVO) conference.

"This was my first experience at an ophthalmology conference, so it was exciting to meet individuals with like-minded interests," said Bertot, a fourth-year medical student. "I enjoyed talking to other students and physicians about my research. It was fascinating to see all the different projects on display and the diverse ways researchers are working to advance the field."

ARVO also was the first national ophthalmology conference for Tharp, a third-year medical student.

"It was great to talk to so many interesting people and get so much valuable information," she said. "I was able to go to the exhibit floor and talk to people in all areas of eyecare and to make new connections."

Louis Cantor, MD, Jay C. and Lucile L. Kahn Professor Emeritus of Glaucoma Research and Education, mentored Bertot and Tharp through the IMPRS/NIH T35 program and encouraged them to submit their research to the ARVO conference for consideration.

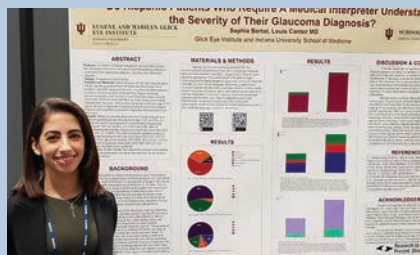
"Through early involvement in research and attending medical meetings, medical students learn lifelong lessons that will inform their entire careers," Dr. Cantor said.

"They gain an appreciation for what research requires and its limitations, and learn how to critically evaluate new evidence for themselves."

Medical student presentations at ARVO

New Orleans,
Louisiana

April 23–27, 2023



Sophia Bertot

Title of research project: *Do Hispanic Patients Who Require a Medical Interpreter Understand the Nature and Severity of Their Glaucoma Diagnosis?*



Margaret Tharp

Title of research project: *Evaluating Heru, Inc. Virtual Reality Technology for Use in Visual Field Diagnostic Testing*

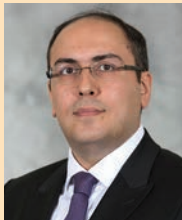
Faculty introduce students to ophthalmology during surgical skills fair

On March 4, 2023, medical students had the opportunity to learn about ophthalmology and other surgical specialties at the IU School of Medicine Underrepresented in Medicine (URiM) Student Surgical Skills Fair.

Four Department of Ophthalmology faculty members—**Charline Boente, MD, MS**, **Amir Hajrasouliha, MD**, **Tyler Knight, MD**, and **Shaohui Liu, MD, PhD**—led a hands-on ophthalmology skills lab for 37 URiM students from IU School of Medicine and the Marian University College of Osteopathic Medicine. Using pig eyes, the students learned how to make incisions and suture corneas under a microscope.



Charline Boente,
MD, MS



Amir
Hajrasouliha, MD



Tyler
Knight, MD



Shaohui
Liu, MD, PhD



Nearly 40 URiM students from IU School of Medicine and Marian University College of Osteopathic Medicine participated in a surgical skills fair in March 2023.

Training at VA hospital offers distinct advantages for ophthalmology residents

The four years of residency education are the cornerstone of a successful career in ophthalmology. Accredited by the Accreditation Council for Graduate Medical Education (ACGME), the Ophthalmology Residency Program at IU School of Medicine offers nationally recognized faculty, top-tier facilities and clinical partnerships with some of the state's leading hospitals. Residency training at the adult and pediatric hospitals of Indiana University Health, as well as Marion County's public hospital, Eskenazi Health, provides diverse

opportunities for learning. And unlike many other residency programs across the nation, ophthalmology trainees at IU School of Medicine also receive extensive training at a veterans' administration (VA) medical center located just steps away from the IU Indianapolis campus.

"I think there is a general consensus among people applying for ophthalmology residency that having a VA hospital as part of a residency program is a definite benefit," said David Camp, MD, former chief

resident and 2023 graduate of the Ophthalmology Residency Program. "It's attractive because one thing most applicants are looking for is surgical experience, particularly cataract surgery."

With a high-volume ophthalmology clinic serving a large population of older adults, the Richard L. Roudebush Veterans' Administration Medical Center exposes residents to the full range of age-related eye disease, including macular degeneration, glaucoma, diabetic



Former Chief Resident David Camp, MD, and Shailaja Valluri, MD, chief of ophthalmology, Roudebush Veterans' Administration Medical Center

retinopathy and cataracts. The center receives referrals from optometrists across Indiana.

“Residents learn a lot from training at the VA, not only because of our high volume, but also because we see a wide range of eye diseases and pathology from the most routine to the most complex,” said Shailaja Valluri, MD, chief of ophthalmology at the Roudebush VA medical center and adjunct clinical associate professor of ophthalmology at IU School of Medicine. “They receive extensive training in the conditions and procedures that are the bread and butter of what they’ll see when they go into practice.”

While ophthalmology residents train at the VA during all four years of the program, they receive most of their surgical training during the third and fourth years.

“A lot of my early learning in basic ophthalmic skills I learned at the VA from attending ophthalmologists and residents who had more experience,” Dr. Camp explained. “We spend a lot of our time in the fourth year in the operating room at the VA learning cataract surgery from experienced ophthalmologists. We get the most experience at the VA for what is the most important surgery to learn as a general ophthalmologist.”

In addition to surgical training provided by Dr. Valluri and three other ophthalmologists on staff at the VA, residents receive training and instruction from adjunct clinical faculty who practice in the community.

Daniel Robinson, MD, an IU School of Medicine graduate who also completed his residency at IU, has trained residents at the VA for a total of 18 years.

“From my own experience as a resident, having a VA hospital as part of the residency program is a huge benefit,” Dr. Robinson said.

“There’s a wide variety of cases, and of course there are a lot of cataracts, but cataract surgeries aren’t all the same, giving residents exposure to both routine and complex cases.”

Dr. Camp, who is spending his first post-residency year as a member of the ophthalmology department’s clinical faculty, agrees.



“Every resident wants to graduate feeling comfortable performing cataract surgery and managing complications,” he said. “I think the VA is where many of us, through repetition, gain confidence with the basic skills of cataract surgery and the knowledge and experience to manage more complex cases.”

Residency program clinical locations

Ophthalmology residents complete the majority of their training at these centers:

Eugene and Marilyn Glick Eye Institute

Richard L. Roudebush Veterans' Administration Medical Center

Sidney & Lois Eskenazi Hospital, Eskenazi Health

Riley Children's Health

IU Health Methodist Hospital

IU Health University Hospital

Vision for the future: Novel surgery treats blindness-causing corneal disease

Three-year-old Elena Troyer is able to see the world around her, thanks to a novel, minimally invasive surgery performed at Riley Children's Health. The cloudy white spots that first appeared in Elena's eye two years ago were signs of neurotrophic keratopathy—a rare condition in which the nerves in the cornea are either absent or diminished. People with neurotrophic keratopathy have no feeling in the cornea, making it vulnerable to frequent abrasions and scarring that can lead to decreased vision and eventual blindness, if left untreated. As in Elena's case, neurotrophic keratopathy can be congenital.



After corneal neurotization, Elena Troyer now has sensation in her cornea.

"It's a progressive condition that requires a lot of monitoring—responding to constant flare-ups with medications to prevent breakdowns

on the surface of the cornea that could result in perforation, infection and even loss of the eye," said pediatric ophthalmologist Charline Boente, MD, MS, associate professor of clinical ophthalmology. It's a tremendous relief to be able to offer patients and families a procedure that actually gets to the root of the problem."

The innovative solution is corneal neurotization—a minimally invasive surgery that redirects nerves from other parts of the body into the cornea to help establish or restore sensation. The procedure was pioneered by Gregory Borschel, MD, FAAP, FACS, FAAPS, chief of pediatric plastic surgery at Riley Children's and a specialist in nerve injuries. Dr. Borschel, who is also professor of plastic surgery and ophthalmology at IU School of Medicine, collaborates with Dr. Boente on the procedure at Riley Children's—one of the few centers worldwide where corneal neurotization is performed. Since Dr. Borschel joined Riley Children's in 2021, the specialists have used the procedure to treat more than 20 patients, including a 7-month-old infant. While most of these surgeries have been completed on children, corneal neurotization is also a solution for adults with congenital or acquired neurotrophic keratopathy. For these cases, Dr. Borschel works alongside

adult corneal specialist Shaohui Liu, MD, PhD, associate professor of clinical ophthalmology.

"The goal of the surgery is to introduce nerve power to the denervated cornea," Dr. Borschel explained. "We harvest a donor nerve from the patient's leg, which is long enough to conduct new nerve fibers, and use it to tap into a sensory nerve source in the face or neck. We then tunnel the nerve under the skin to the cornea and attach it to the limbus, or colored part of the eye, using microtechniques."

The nerve graft essentially rebuilds a new neural pathway that establishes sensation in the cornea, Dr. Borschel said. Depending on which sensory nerve is used for the procedure, it may take up to a year for the patient to feel any sensation. To gauge progress and outcomes following the surgery, corneal sensation is measured with a Cochet-Bonnet aesthesiometer, a device that applies pressure to the surface of the eye. The patient's response to the pressure is then used to give an objective measurement of sensation. Patients may also start to blink more and hesitate or flinch when eye drops are inserted. In the cases of young children like Elena, Dr. Boente said apprehension during eye exams is a subjective way to tell if corneal

sensation is present. Children with no corneal sensation will often allow eyedrops to be applied and eye testing to be done without even blinking.

“Elena has done remarkably well, and while children her age can only tell us so much, the surface of her eye is very healthy,” *Dr. Boente said*. “In the months since her surgery last year, she’s become hesitant when we come near her with eye drops or instruments, so that’s a good sign the procedure is working to establish feeling in the cornea.”

In addition to Elena’s eyes appearing whiter and brighter, Lori Troyer said her daughter is now able to enjoy playing outside.

“If the sun was too bright or there was even a little breeze, her eyes would be so red and dry when we came inside,” Lori said. “Since she’s blinking more, she’s able to play outside all day now and be fine, which is huge.”



Charline Boente, MD, and Gregory Borschel, MD, are one of the few surgical teams in the world performing corneal neurotization to treat neurotrophic keratopathy.

Options for corneal transplant and better vision

For patients with extensive corneal scarring due to neurotrophic keratopathy, corneal neurotization creates the conditions necessary for corneal transplant. The ability to innervate the cornea through the procedure is a real game changer, Dr. Borschel said, giving patients the nerve supply to support a newly transplanted cornea.

“Even using the newer drug treatments for neurotrophic keratopathy, patients don’t become good candidates for corneal transplant,” Dr. Borschel said. “Corneal neurotization is the only solution we know of that gives patients the nerve power—the feeling and sensation that’s required to protect the cornea. For patients who need a transplant to see clearly, it can be life-changing.”

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Dr. Borschel's lab at IU School of Medicine is focused on studying the causes of neurotrophic keratopathy with the goal of uncovering new and better ways to treat it. He recently submitted a proposal to the National Institutes of Health for funding to dig deeper into the cellular and molecular underpinnings of the condition.

On the clinical side, the team's research efforts include an active international registry initiated by Dr. Borschel and Dr. Boente to gather clinical data about the procedure. In addition to formalizing a list of centers where corneal neurotization is offered, the registry is designed to determine the best candidates for the procedure and collect details about variations in surgical techniques and related outcomes to help develop best practices. As the lead site for the registry, Riley Children's/IU School of Medicine is the busiest center worldwide for corneal neurotization. In addition to treating patients in the United States, the team has received referrals and heard directly from patients in Canada, New Zealand, Ireland and Russia.

"A big source of our referrals right now is families participating in support groups for congenital conditions like neurotrophic keratopathy and other disorders that involve the cranial nerves," Dr. Boente said. "Especially when other senses are affected, these families really understand the

importance of their child's vision in helping them navigate the world, and this makes them highly motivated to learn about this procedure."

Although Dr. Borschel has been performing corneal neurotization for a decade, few ophthalmologists know about it because neurotrophic keratopathy is so rare. An important goal of the registry, in addition to gathering clinical data for publication, is to ensure more eye care professionals become aware of the procedure.

"This condition is vastly under-recognized and therefore undertreated," Dr. Borschel said.

"With this relatively noninvasive procedure, which so far has shown to have very few complications, patients can retain their eyesight and have the potential for transplant—both of which have profound impact on quality of life."

Lori hesitates to think about how Elena would have fared had the family not been referred to Dr. Boente two years ago.

"Elena's recovery from the surgery was a breeze, and we feel very lucky," Lori said. "If we hadn't heard about this, I think she would probably be blind in that eye now."



Riley Children's Health is the busiest center worldwide for corneal neurotization, a minimally invasive surgery to treat neurotrophic keratopathy.

New faculty members join the department

Joseph Bogaard, MD, PhD



Dr. Bogaard joined the Department of Ophthalmology in September after completing a two-year vitreoretinal surgery fellowship

at the University of Virginia. With a bachelor's degree in biomedical engineering from the University of Iowa, Dr. Bogaard graduated from the University of Illinois Chicago School of Medicine. He completed his first year of residency in internal medicine at Advocate Lutheran General Hospital, in Park Ridge, Illinois, followed by

ophthalmology residency training at Medical College of Wisconsin in Milwaukee.

A specialist in vitreoretinal surgery, Dr. Bogaard treats both adults and children with retinal disease. Teaching is also an important part of his career, and the opportunity to train residents at IU School of Medicine was appealing.

"It's one of my great joys to educate the next generation of ophthalmologists," Dr. Bogaard said.

"With 24 ophthalmology residents, IU has a big program; we have a retina fellow and are looking to expand the

retina fellowship program, which was something that drew me here."

While Dr. Bogaard is currently engaged in clinical ophthalmology research, his background includes research in bioinformatics and computational biology related to the human genome. He worked as part of a research team at the University of Iowa to design an informatics tool to make it easier for next-generation sequencers to automate processes and interpret genetic data.

In addition to specializing in retinal disease, Dr. Bogaard has a clinical interest in ocular oncology.

Massood Mohammadi, MD



Before joining the Department of Ophthalmology in August, Dr. Mohammadi was a glaucoma

fellow at the Stein Eye Institute at UCLA. He completed his medical training, including ophthalmology residency and a clinical glaucoma fellowship, at Farabi Eye Hospital, Tehran University of Medical Sciences. While at the university in Tehran, Dr. Mohammadi spent six years in leadership roles with the ophthalmology residency program and four years as director of research for the glaucoma service.

Interested in medicine and ophthalmology from an early age, Dr. Mohammadi decided to specialize in glaucoma because of the potential to build long-term, trusting relationships with patients.

"Glaucoma is a serious lifelong disease, and its management can sometimes be frustrating for patients," Dr. Mohammadi said. "Trust that is built on communication and shared interaction is instrumental and goes a long way in helping patients and also managing the disease."

As a clinical researcher, Dr. Mohammadi is involved in two main areas—imaging in glaucoma and the modification of current surgical techniques to

enhance patient outcomes. He looks forward to continuing this research at IU School of Medicine. In fact, he said the Department of Ophthalmology's long history of leadership in glaucoma care and research was one of the factors that attracted him to the school.

"The glaucoma division at IU School of Medicine is a very well-known glaucoma section internationally," Dr. Mohammadi said. "There are studies conducted by the faculty here—and research they are still working on—that are important to our understanding of glaucoma and to the medical and surgical management that we do for our patients."

New and expanded patient care clinic boosts access to leading pediatric ophthalmology program



David Plager, MD, division chief of pediatric ophthalmology, and clinic staff celebrate the opening of the department's new pediatric eye clinic in Greenwood, Indiana.

In April 2023, after nearly 20 years practicing in a shared office in Greenwood, Indiana, the IU School of Medicine Department of Ophthalmology and IU Health Physicians opened a new pediatric ophthalmology clinic not far from the former location.

"We're excited to have a dedicated pediatric ophthalmology clinic serving the southside of Indianapolis and the southern part of the state," said David Plager, MD, division chief of pediatric ophthalmology and professor emeritus. "The new office is bright and well-appointed with clinic rooms designed specifically for pediatric eye exams and a spacious waiting area appropriate for children and families."



The new Greenwood pediatric eye clinic includes seven exam rooms with state-of-the-art diagnostic equipment.



Adding to the experience for patients and families, the clinic features a bright, spacious waiting area and an expanded optical shop.

Serving more than 800 pediatric patients per month, IU Health Physicians Ophthalmology in Greenwood includes seven exam rooms—nearly double the clinical exam space of the previous location. The office features the latest diagnostic and testing equipment, including fundus photography, an optical coherence tomography (OCT) scanner, A-scan and B-scan ultrasound, visual field testing, and IOL Master ocular biometry. The new location also includes an expanded optical shop and dedicated area for contact lens fittings.

A leader in pediatric ophthalmology

With practice locations in Indianapolis (Riley Children's Health), Carmel and Greenwood, the IU School of Medicine pediatric ophthalmology division is the only faculty physician group in Indiana to treat complex pediatric eye diseases and conditions.

“We now have a significant presence in all parts of Indianapolis—downtown, north and south,” said Daniel Neely, MD, professor of ophthalmology, and one of the six pediatric eye care clinicians practicing at the Greenwood location. “This provides a great degree of convenience and easy access for our patients who travel to see us from all areas of Indiana, as well as adjoining states.”

Gavin Roberts, MD, associate professor of clinical ophthalmology, said it's not uncommon for clinicians in the Greenwood office to see patients from Bloomington, Columbus, Evansville and Terre Haute.

“Since we have more space in this new location, we'll be able to serve all of our patients better—they'll be able to get in to see us faster,” Dr. Roberts said. “And almost every week since we opened, I've had unsolicited comments from parents about how bright, airy and open our new office is and how nicely it's equipped for children and families, as well.”

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A new location for pediatric ophthalmology



IU Health Physicians Ophthalmology

Pediatric Ophthalmology Clinic
533 E. County Line Road
Suite 215
Greenwood, IN 46143

Pediatric ophthalmology faculty practicing in Greenwood

Tyler Knight, MD
Daniel Neely, MD
Gavin Roberts, MD
Dana Donaldson, OD
April Graves, OD
April Jones, OD

- 7 exam rooms – 6 for standard pediatric eye exams; 1 dedicated for examinations related to retinopathy of prematurity (ROP)
- Leading-edge diagnostic and testing equipment: fundus photography, optical coherence tomography (OCT) scanner, A-scan and B-scan ultrasound, visual field testing, IOL Master ocular biometry
- Optical shop
- 6 ophthalmologists/optometrists plus 10 clinical and administrative support staff

The Helveston-Ellis Professorship in Pediatric Ophthalmology

Over the course of their careers at IU School of Medicine, Eugene M. Helveston, MD, and Forrest D. Ellis, MD, built one of the leading pediatric ophthalmology divisions in the nation. In fall 2022, a professorship was created in their honor. The Helveston-Ellis Professorship in Pediatric Ophthalmology has already received financial support from generous donors and alumni. To date, 65 percent of the total needed to complete the endowment has been committed.

There are many ways to support the Helveston-Ellis Professorship, including gifts of assets and qualified charitable distributions from retirement funds. Thank you to all who have supported this fellowship honoring two trailblazers in the field of pediatric ophthalmology.



*Eugene M.
Helveston, MD*



*Forrest D.
Ellis, MD*

To make a gift directly, please visit go.iu.edu/4Cia online or scan the QR code to reach the Giving webpage. To learn more about the professorship and its impact on the future of pediatric ophthalmology at IU School of Medicine, please contact Caitie Deranek Stewart at 317-278-2133 or cderanek@iu.edu.



Create for a Cause raises awareness, helps support pediatric ophthalmology

For Manya Suresh, art and photography are more than just hobbies. Creativity has been a way for her to cope with strabismus, an ophthalmic condition characterized by eye misalignment. Diagnosed in early childhood, through the years Manya has endured awkward and uncomfortable conversations about her eyes.



High school senior Manya Suresh (standing in top photo) organized an in-person event for young artists as part of Create for a Cause, an art competition she founded.

"People have questioned me about wearing glasses while participating in fun activities such as performing on stage for dancing and singing, and even called me chameleon eyes," writes Manya, a senior at Columbus North High School. "Creating art and taking pictures were outlets that helped me calm down and express my feelings. Now, as a high schooler, I'm resolved to change these experiences for other kids with ophthalmic conditions who might be struggling in silence."

Three years ago, she started Create for a Cause, an art competition aimed at increasing awareness of pediatric eye diseases and reducing stigma. With a \$5 donation to participate, the competition also raises funds for pediatric ophthalmology research and treatment at IU School of Medicine and Riley Children's Health. Manya has been an ophthalmology patient at Riley Children's for more than 10 years. Her sister Stavyah, who has uveitis (inflammation inside the eye), is also treated at Riley Children's.

Create for a Cause was an online-only competition for two years due to COVID. This year, Manya organized the first in-person event at the Bartholomew County Public Library, which featured a presentation by Manya's ophthalmologist, David Plager, MD, division chief of pediatric ophthalmology at IU School of Medicine.

"I've been very impressed with Manya's enthusiasm, dedication



David Plager, MD

and perseverance in getting Create for a Cause up and running over the past few years," Dr. Plager said.

"I was delighted to support her efforts by talking to young art enthusiasts and their parents about pediatric ophthalmology and what we do at Riley."

The first in-person Create for a Cause event attracted more than 45 school-age children and adults from the Columbus area and raised \$3,162. The total amount raised over the past three years is nearly \$8,000.

"We received lots of positive feedback from the people who attended the event, including my pediatrician," Manya said. "Dr. Plager's speech really increased the awareness aspect of the fundraiser, which was great, as it emphasized the importance of catching pediatric eye disorders early."

Faculty highlights

Ashay Bhatwadekar, PhD

- Earned a 2023 IU School of Medicine Ralph W. and Grace M. Showalter research award



- Named interim director of Basic and Translational Research for the Department of Ophthalmology

Charline Boente, MD, MS

- Selected as program champion for the American Academy of Ophthalmology Minority Ophthalmology Mentoring Program



Louis Cantor, MD

- Serves as chair of the American Glaucoma Society Foundation Advisory Board
- Serves as Global Glaucoma Advisor for Carl Zeiss Meditec



Arupratan Das, PhD

- Authored a journal article on his research that was published in Communications Biology
- Presented at the World Mitochondria Society in Berlin, Germany



Kathryn Haider, MD

- Selected for the Association of University Professors of Ophthalmology Academic Leadership Development Program



- Presented at the American Association for Pediatric Ophthalmology and Strabismus (AAPOS) National Meeting, the Southern Regional Ophthalmology Meeting, the American Academy of Ophthalmology Annual Meeting and the Indiana Academy of Ophthalmology Annual Meeting

- Serves as a consultant for the AAPOS Membership Committee
- Serves as a member of the AAPOS Genetics Committee

Amir Hajrasouliha, PhD

- Received a 2023 Indiana University Trustee Teaching Award
- Earned a Falk Medical Research Trust Catalyst Award



- Presented in the Advances in Pediatric Retina course provided by the Pediatric Retina Association

Yoshikazu Imanishi, PhD, MSC, BSC

- Recognized by the Journal for Investigative Ophthalmology and Visual Science for exceptional contributions as a reviewer



Tyler Knight, MD

- Appointed director of medical student education for the Department of Ophthalmology



John Lind, MD

- Participated as an oral examiner and question writer for the American Board of Ophthalmology
- Serves as a member of the American Academy of Ophthalmology Annual Program Committee



Shaohui Liu, MD, PhD

- Named a "Top Doctor" for 2023 in Indianapolis Monthly magazine
- Served as an oral board examiner for the American Board of Ophthalmology
- Serves as a member of the American Board of Ophthalmology Cornea Development Committee
- Wrote and reviewed article-based questions for the American Board of Ophthalmology continuing certification cycle
- Serves as a reviewer for the journal Cornea



Weiming Mao, PhD, MB

- Received an R21 from the National Eye Institute
- Earned a research grant from the BrightFocus Foundation
- Authored a book chapter in Methods in Molecular Biology
- Serves as associate editor of Frontiers in Cell and Developmental Biology



Padmanabhan Pattabiraman, PhD

- Received an IU School of Medicine Research Support Funds Grant
- Earned a 2023 IU School of Medicine Ralph W. and Grace M. Showalter research award



Tasneem Sharma, PhD

- Earned a Lions Gift of Sight research grant
- Received the IU School of Medicine Outstanding Faculty Commitment to Diversity Award



Chi Wah "Rudy" Yung, MD

- Served as mentor associate examiner for the American Board of Ophthalmology
- Serves as president-elect of the Indiana Academy of Ophthalmology



Jennifer Eikenberry, MD, Chi Wah "Rudy" Yung, MD, and John Lind, MD
Recognized for serving in the IU School of Medicine Physician Mentor Program for medical students



Heather Smith, MD, Denis Jusufbegovic, MD, and Charline Boente, MD, MS
Promoted to associate professor of clinical ophthalmology

Residents, fellows share strengths of graduate medical education

The IU School of Medicine Department of Ophthalmology offers robust graduate medical education that includes a residency program and fellowship training. Founded in 1908, the four-year residency program includes 24 residency positions and is accredited by the Accreditation Council for Graduate Medical Education. Residents are expertly trained in the clinical and surgical subspecialties of ophthalmology and assume increasing levels of responsibility as they progress through the program.

With the addition of the new research fellowship this year, the department now offers four competitive fellowship programs. Fellowship positions are available in the clinical specialties of pediatric ophthalmology, glaucoma and vitreoretinal surgery.

First-year residents and recent graduates share their experiences and highlight the strengths of the department's graduate medical education programs.

Residency graduates – June 2023

David Camp, MD



"The residency program provided broad training in the clinic and in the operating room. We had exposure to all

kinds of pathology by working in a variety of settings, including our county hospital, the VA, the children's hospital and private subspecialty clinics. By the time we finished residency, we had seen and managed so many complicated patients."

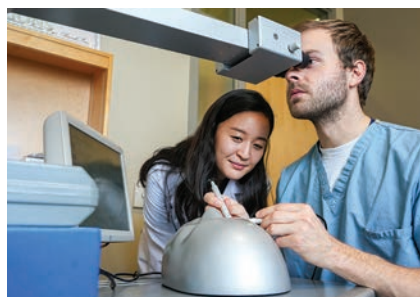
Rana Torabi, MD



"The IU School of Medicine Ophthalmology Residency Program challenged me and pushed me to become

the best ophthalmologist I can be. I felt well prepared upon entering my new fellowship. I'm confident that with this strong foundation and excellent mentorship, I'll continue to grow and become an even better surgeon, patient advocate, clinician and colleague."

Manisha Miller, MD, Shivam Patel, MD, Molly Scripture, MD, and Avrey Thau, MD, also graduated from the residency program in 2023.



Fellowship graduates – June 2023

Saaquib Bakhsh, MD



Vitreoretinal Surgery Fellowship

"As a fellow, I had experience treating every kind of retinal disease from common

ailments to rare cases, including retinopathy of prematurity, inherited retinal disease, uveitis, pediatric disease and injury, and oncology. Although I may not be treating such a wide variety of retinal disease in practice, having this solid foundation will serve me well."

Ayesha Badar, MD



Glaucoma Fellowship

"The fellowship gave me the surgical and clinical skills to manage different

types of glaucoma. It taught me how to work with patients to create individual treatment plans and manage postoperative care. The experiences that stand out include teaching residents, performing my first incisional glaucoma surgeries and making lifelong colleagues. The fellowship program also influenced my decision to pursue a career in academics."



Ryan House, MD



Pediatric Ophthalmology Fellowship

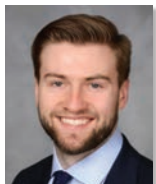
"My fellowship gave me excellent surgical and clinical training

to further my career as a pediatric ophthalmologist. Learning from leaders in pediatric ophthalmology is an experience I will always treasure. I'm now part of a large alumni group of IU pediatric ophthalmology fellows. Many of these doctors have already helped me along my career path. The sense of community in this group is wonderful, and I look forward to more interactions in the future."

Katherine Brown, MD, also completed the Pediatric Ophthalmology Fellowship at IU School of Medicine in 2023.

First-year residents – Fall 2023

Gunnar Goebel, MD



"I did several ophthalmology rotations while I was in medical school at IU, and I got to know a lot of the residents

and faculty in the program. The attendings are all very engaged in teaching and learning, and it's such a great team environment. It was the level of training, the pathology I'd be exposed to and the people that made me want to apply for ophthalmology residency at IU School of Medicine."

Masha Kolesnikova, MD



"I was most attracted to the sense of overall community in this program. It was clear during the interview process how close

the residents were. Additionally, the camaraderie between the faculty and residents and the willingness of our program directors to listen to feedback was very alluring."

Nicholas Palmer, MD



"As an IU School of Medicine graduate, I was able to rotate through the ophthalmology department at IU

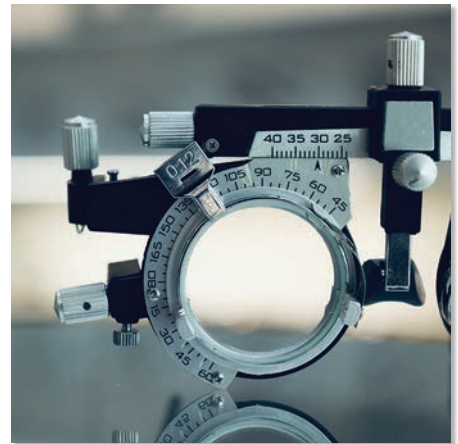
and immediately recognized the camaraderie between residents, the intentionality of attendings in educating the residents, and a sense of family within the department. I knew it would be an amazing place for me to learn."

Aishwarya Rao, MD



"There are a lot of great aspects about the training at IU, including the high volume and diverse patient population,

but I have to say the culture and camaraderie really stood out to me. Even during my interview, it was easy to see how close all the residents are. I don't have any personal ties to the Midwest, but I knew that I'd be able to build a strong community here based on how welcoming and supportive everyone was."



Paul Sohn, MD, PhD



"As a medical student at IU, I had a chance to get to know the residents and faculty who were very inviting and supportive during

my rotations in ophthalmology. The program here truly felt like a family. I was also looking for a program like IU that allows for a strong clinical training environment by providing care throughout the state of Indiana, allowing trainees to participate in many diverse and complex cases."

Katerina Tori, MD



"I am thrilled that we get to see so many diverse patients at IU. Between Eskenazi Health, IU Health Methodist Hospital,

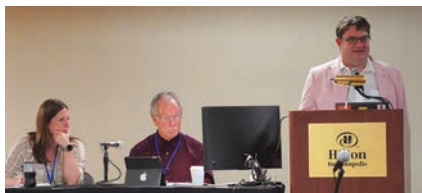
Riley Children's Health and the VA, we see an amalgamation of cultural backgrounds, as well as disease. My hope is to become as well-rounded an ophthalmologist and human as possible through my experiences with my patients."

Department hosts AOPT Biennial Meeting

In August, the IU School of Medicine Department of Ophthalmology hosted the 16th Biennial Meeting of the Association for Ocular Pharmacology and Therapeutics (AOPT) at the Hilton Indianapolis. With the theme, "Crossing Barriers," the event included a four-day, in-person meeting in Indianapolis with a satellite meeting held at the Medical University in Shenyang, China. Approximately 200 physicians, researchers, ophthalmologists, optometrists and professors attended the in-person meeting in Indianapolis. The 2023 event was the 30th anniversary of the meeting.

The keynote speakers were Katherine High, MD, co-founder, president and chief scientific officer, Spark Therapeutics; and José-Alain Sahel, MD, Distinguished Professor and chairman, Department of Ophthalmology, University of Pittsburgh School of Medicine.

Many of the trainees from the IU School of Medicine Department of Ophthalmology won travel awards to the meeting. Ting Wang, an ophthalmology PhD student in the Pattabiraman Lab at IU School of Medicine, won the award for best poster.



Several IU School of Medicine faculty members were presenters at this year's meeting.

Therapeutic applications of pluripotent stem cells for ocular disorders

Tasneem Sharma, PhD, and Jason Meyer, PhD

Models and therapies for inherited retinal disease

Yoshikazu Imanishi, PhD, MSC, BSC

Novel strategies to treat retinal diseases

Ashay Bhatwadekar, PhD

Glaucoma therapeutics and drug delivery

John Lind, MD

Aligning biophysics and omics to therapeutics in ocular biology

Padmanabhan Pattabiraman, PhD

16th AOPT Biennial Meeting – Indianapolis Programming Committee

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Tasneem Sharma, PhD

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David Wallace MD, MPH



Researchers, ophthalmologists, optometrists and professors attended AOPT's biennial meeting in Indianapolis in August (above). John Lind, MD, interim chair, IU School of Medicine Department of Ophthalmology, (left) welcomed attendees to the meeting.

Residency Alumni Profile: Sonal S. Tuli, MD, MEd



Sonal Tuli, MD, MEd, traces her passion for education back to her days as an ophthalmology resident at IU

School of Medicine. A graduate of Grant Medical College in Mumbai, India, Dr. Tuli spent her final three years of residency in the Department of Ophthalmology at IU. By the time she graduated from the residency program in 2000, she had developed a lifelong interest in training and education.

"It was great to learn from people I admired, and who were very invested in education," said Dr. Tuli, who is currently a professor and chair of the University of Florida Department of Ophthalmology. "I was surrounded by faculty at IU who loved teaching and really took the time to make trainees better ophthalmologists."

After leaving IU School of Medicine, Dr. Tuli completed a fellowship in corneal and external diseases at the Bascom Palmer Eye Institute in Miami before joining the ophthalmology faculty at the University of Florida in 2001. Within two years, she was appointed director of the division of corneal and external diseases and director of the division's fellowship program, positions she still holds. She also served from 2007 to 2017 as director of the department's residency program. Fueling her desire to become

a better educator, Dr. Tuli completed a master's degree in education at the University of Florida in 2012.

"I wanted to learn more about the art and science of good teaching," Dr. Tuli said.

"I also learned about the theory behind good instruction and applied some of that in our department's training programs."

Appointed interim department chair in 2013, Dr. Tuli was named chair of the department in 2015 after a national search. She currently spends half of her time in teaching and clinical care and the other half in academic administration. With more than 75 peer-reviewed publications, Dr. Tuli has been actively involved in both clinical and basic science research. Her main areas of research focus are cornea scarring modulation, herpetic eye disease and infectious corneal diseases. As an adult and family-based clinical practitioner, she specializes in cataracts, corneal transplants, ocular surface cancers, dry eye disease and infectious eye diseases.

"When I got to the ophthalmology rotation, which was mandatory in medical school in India, I was just wowed by everything about it,"

she recalled. "You get to work with your hands and use fascinating instruments, build long-term relationships with patients who are so grateful for what you do for them, and then there's the challenge and 'coolness factor' that I've always loved about ophthalmology."

Dr. Tuli is involved at the national level as vice-chair of the American Academy of Ophthalmology (AAO) Practicing Ophthalmologists Curriculum Committee and educational representative to the AAO Continuing Medical Education Task Force. She was also the COVID-19 spokesperson for the AAO and received a Distinguished Service Award for her work for the academy. Dr. Tuli has served as an oral examiner for the American Board of Ophthalmology since 2006. She is a member of the board of trustees of the Association for University Professors of Ophthalmology, the Cornea Society and the Florida Society of Ophthalmology.

Dr. Tuli returned to IU School of Medicine in 2019 to speak at the Department of Ophthalmology's annual Trainees' Day. She said the visit brought back special memories of her residency.

"IU was a wonderful place to train with a lot of passionate people who really want to see their trainees succeed," Dr. Tuli said. "I use what I learned at IU every day."

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If you would like to give to our department, you may designate that your gift be used in one of several ways, including supporting the missions of excellence in research and education. Endowment gifts that create resources in perpetuity, as well as gifts to help purchase surgical simulation equipment, help trainees gain critical skills that impact thousands of patients each year.

Gifts can also be directed toward any of the subspecialty clinical or research areas within the department, including pediatric ophthalmology and adult strabismus, corneal and external ocular disease, glaucoma, neuro-ophthalmology, oculoplastic surgery, vitreoretinal disease, and comprehensive ophthalmology.

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IU School of Medicine Department of Ophthalmology

MISSION

To advance eye health in the state of Indiana and worldwide by delivering excellence in patient care, education and research

VISION

To be recognized as a leader in patient care, education, and eye and vision research

CORE VALUES

- Excellence in innovation and advancement of patient care, education and research
- Respect for individuals affiliated with or in contact with us: staff, students, residents, fellows, faculty, patients and families
- Integrity that embraces the highest standards of ethical behavior and exemplary moral character
- Diversity reflected in actions that appreciate all individuals
- Cooperation manifested by collegial communication and collaboration within and beyond the department



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