INSIGHTS

2023

WVU Eye Institute

West Virginia University
DEPARTMENT OF OPHTHALMOLOGY
AND VISUAL SCIENCES

CONTENTS

Dear Friends,

I am pleased to present to you our 2023 Annual Report for the West Virginia University Department of Ophthalmology and Visual Sciences and the WVU Eye Institute, reviewing our activities and accomplishments throughout the past year, as well as our plans for future growth.

It is with great pleasure that I highlight the successful training of our residents, fellows and medical students. The education of trainees at all levels has been a priority for our department throughout our history. Training the next generation of comprehensive and subspecialty ophthalmologists to serve the people of West Virginia and beyond is always one of our most important activities each year. The dedication and commitment of our faculty and staff have undoubtedly played a pivotal role in shaping the future of ophthalmology on a statewide and national scale. Their accomplishments are a true testament to the high standard of education and mentorship within our department. Our residents, fellows and students continue to produce important clinical research. In this report, you will read about the contributions that our trainees and their faculty mentors have made to clinical research, the findings of which have been presented at national meetings on more than a dozen occasions throughout this past year.

> "Our primary commitment remains to serve the people of West Virginia and beyond with compassionate, state-of-the-art eye care."
>
> **THOMAS MAUGER, M.D**

Our basic research faculty continue to train undergraduate, graduate and post-doctoral students in their various laboratories. The research team also continues their work mentoring undergraduate students from universities across the country through the Summer Undergraduate Vision Research Fellowship Program. Our basic research team continues to explore the basic mechanisms of eye disease that may lead to innovative treatments and cures. You will read how the work of Jianhai Du, Ph.D., has applications in the area of Alzheimer's disease research.

In these pages, you will also learn about the education and career of one of the Department's most illustrious graduates, Judie Charlton, M.D. We will also share the story of one of our own medical students, Stephen Chen, who will begin his journey with us as a newly-matched resident in our residency program in July.

Outreach programs led by Rebecca Coakley, MA, CLVT, continue to have a tremendous impact on people in need across the state. You will learn how the Children's Vision Rehabilitation Program has impacted one participant, Tatyana Tolliver, throughout her childhood and into the beginning of her college career.

Our clinical impact in the region continues to grow with increases of two-thirds in major areas over the past five years.

In line with our vision for the future, I am excited to share that the plans for a new Eye Institute building have been approved by WVU Medicine and University leadership. This state-of-the-art facility, spanning approximately 150,000 square feet, will serve as a beacon of excellence in eye care for our region. It is incredibly exciting to know that this institute will not only house cutting-edge clinics and eight state-of-the-art operating rooms, but it will also provide increased educational space for our learners and our growing clinical research program.

As we look ahead, it is evident that the future of our department is filled with promise and potential. I am confident that the groundwork we have laid will serve as a solid foundation for continued growth and innovation. Our primary commitment remains to serve the people of West Virginia and beyond with compassionate, state-of-the-art eye care.

Thank you for your unwavering support. I look forward to the exciting journey that lies ahead for the Department of Ophthalmology and Visual Sciences and the WVU Eye Institute.

Sincerely,

Thomas Mauger MD

Thomas Mauger, M.D.
Jane McDermott Shott Chair, Professor
Department of Ophthalmology and Visual Sciences

FACULTY

C Clinical Faculty R Research Faculty

ANAHITA
AMIRESKANDARI M.D.
Assistant Professor

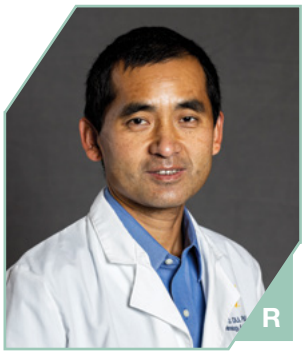
GEOFFREY
BRADFORD M.D., M.S.
Professor, Vice-Chair of Education, Director of Medical Student Education

JUDIE
CHARLTON M.D.
Professor Emeritus

LENA
CHEN M.D.
Assistant Professor

SOMYA
CHOWDHARY M.D.
Assistant Professor

WEN TAO
DENG PH.D.
Assistant Professor | Additional Appointment: Asst. Professor, Dept. of Biochemistry and Molecular Medicine



JIANHAI
DU PH.D.
Associate Professor | Additional Appointment: Assoc. Professor, Dept. of Biochemistry and Molecular Medicine

BRIAN
ELLIS M.D.
Associate Professor

GHASSAN
GHORAYEB M.D.
Associate Professor, Vitreoretinal Fellowship Program Director, Vitreoretinal Division Director, Vice-Chair of Clinical Affairs

JORDAN
GJOLBERG O.D.
Assistant Professor

KEVIN
HALENDA M.D.
Assistant Professor

MOHAMMADHADI
HEIDARI BALADEHI PH.D.
Postdoctoral Research Associate – Du Lab

MARYAM
HEKMATARA PH.D.
Postdoctoral Research Assistant – Robichaux Lab

ALISON
HIXENBAUGH O.D.
Assistant Professor

PRAVEEN
JEYASEELAN M.D., M.S.
Assistant Professor

SARAVANAN
KOLANDAIVELU PH.D.
Associate Professor | Additional Appointment: Assoc. Professor, Dept. of Biochemistry and Molecular Medicine

LINGO
LAI M.D.
Assistant Professor, Cornea Fellowship Program Director, Associate Residency Program Director

L. CAROL
LAXSON M.D., PH.D.
Assistant Professor, Diabetic Retinopathy Program Director

GRACE
LEVY-CLARKE M.D.
Associate Professor

MONIQUE
LEYS M.D., EBO
Professor

JOHN
LINBERG M.D.
Professor Emeritus

THOMAS
MAUGER M.D.
Jane McDermott Shott Chair for Department of Ophthalmology and Visual Sciences, Professor

RYAN
MCGUIRE M.D.
Assistant Professor, Division Director

BRIAN
MCMILLAN M.D.
Associate Professor, Glaucoma Fellowship Program Director, Anterior Segment Director

FACULTY

C Clinical Faculty R Research Faculty

CHARLES
MOORE M.D.
Assistant Professor, Medical Director

BRITTANY
NEWMAN O.D.
Assistant Professor

JOHN
NGUYEN M.D.
Professor, Ophthalmic Plastic and Reconstructive Surgery Fellowship Director, Division Director

J. VERNON
ODOM PH.D.
Professor | Additional Appointment: Professor, Department of Neuroscience

JOEL
PALKO M.D.
Assistant Professor

NICOLE
PUMARIEGA M.D.
Assistant Professor

VISVANATHAN
RAMAMURTHY PH.D.
Professor, Vice Chair of Research | Additional Appointments: Chair, Prof., Dept. of Biochemistry and Molecular Medicine

TONY
REALINI M.D., MPH
Professor, Vice-Chair for Clinical Research

SAMINATHAN
RAMASAMY PH.D.
Postdoctoral Research Assistant – Kolandaivelu Lab

MICHAEL
ROBICHAUX PH.D.
Assistant Professor | Additional Appointment: Asst. Professor, Dept. of Biochemistry and Molecular Medicine

EZEQUIEL
SALIDO M.D., PH.D.
Research Assistant Professor | Additional Appointment: Research Asst. Professor, Dept. of Biochemistry and Molecular Medicine

EMILY
SECHREST PH.D.
Postdoctoral Research Assistant – Deng Lab

ABOVE: Faculty members Bradley Thuro, M.D.; Geoffrey Bradford, M.D.; and Lingo Lai, M.D., pose for a photo as Dr. Bradford accepts an award recognizing his years of service to the residency program. Bradford served as the program director for the Department of Ophthalmology and Visual Sciences Residency Program at the WVU School of Medicine from 2007-2022.

MAXIM
SOKOLOV PH.D.

Professor | Additional Appointments: Prof., Dept. of Biochemistry and Molecular Medicine; Prof., Dept. of Neuroscience

BRADLEY
THURO M.D.

Associate Professor, Residency Program Director

EBRU
TOKER M.D.

Associate Professor

THOMAS
UIHLEIN M.D.

Assistant Professor (WVU Medicine Wheeling Hospital)

LEE
WILEY M.D.

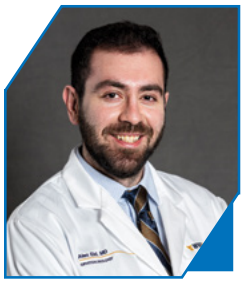
Professor Emeritus

YINXIAO
XIANG PH.D.

Postdoctoral Research Associate – Du Lab

RESIDENTS

PGY 4



ALEN
EID M.D.

EVAN
FRIGOLETTO M.D.

JORDAN
GUFFEY M.D.

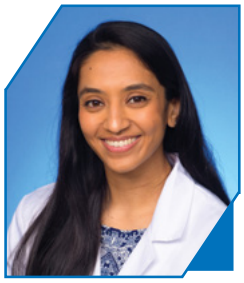
CLINTON
JORDAN M.D.

PGY 3

ANDREW
BEITER M.D.

PARKER
CAIN M.D.

APRIL
ENGER M.D.

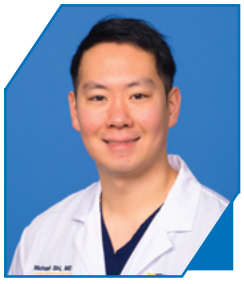


AMI
PATEL M.D.

PGY 2

DEENA
DAHSHAN M.D.

YONAH
LEVY M.D.



MICHAEL
SHI M.D.

SANYA
YADAV M.D.

PGY 1

RAWAN
ELHAMDANI M.D.

ROBERT
FINLEY M.D.

HASEEB
MAHMUD M.D.

OMAR
SADAT M.D.

Explore Ophthalmology Through Residency

The WVU Department of Ophthalmology and Visual Sciences Residency Program is an ACGME-accredited, three-year residency program with an additional joint transitional internship program hosted at the WVU Eye Institute in Morgantown, WV. The program is led by Residency Program Director Bradley Thuro, M.D.

The program accepts four residents per year from approximately 600 medical student applications. Of the 600 applicants, the committee selects the most promising candidates to interview in the fall. The matching process occurs in the winter, bringing four new residents to WVU each year. Residents begin their training in July, initially as hospital interns through the joint transitional year program for the first year, before transitioning to full-time residents in ophthalmology for the next three years of their training.

The joint transitional year program enables all ophthalmology interns to have experiences training in ophthalmology while they begin their training at WVU. Each intern will receive three months of ophthalmology training during the transitional year, with the remaining nine months spent pursuing rotations in a variety of other specialty areas.

Ophthalmology residents will conduct the majority of their training at the WVU Eye Institute, which proudly serves as the only tertiary eye care center in the state of West Virginia, providing service to patients from across the state and the neighboring states of Ohio, Pennsylvania and Maryland. Residents will spend two rotations per year at the Louis A. Johnson Veterans Administration Hospital in Clarksburg, W.Va.

During their three years of residency, residents will rotate in all ophthalmology subspecialty areas including comprehensive ophthalmology, medical and surgical retina, glaucoma, pediatric ophthalmology, neuro-ophthalmology, oculoplastics and cornea. Residents can expect to treat many patients with a variety of complex ocular disorders from throughout West Virginia and the surrounding region during their training.

WVU Ophthalmology Residents Achieve National Success Through Participation in Research

The schedule of an ophthalmology resident can be a demanding one, with academic pursuits such as participation in research having to be juggled between clinical duties and other learning objectives.

Despite those busy schedules, residents in the Department of Ophthalmology and Visual Sciences Residency Program at the WVU School of Medicine demonstrated excellence in research throughout the past year by giving more than a dozen presentations at several national conferences across the country.

"We only have a set amount of time with our residents, so objectives like research and publication have to occur alongside our busy clinical and surgical schedules," said Bradley Thuro, M.D., director of the ophthalmology residency program. "It is truly a proud moment for me as program director to see our residents overcome these barriers and reach this level of success at a national level."

Throughout the 2023-2024 academic year, eight ophthalmology residents had a total of 13 research projects accepted to be presented at six national conferences across the country. The conferences included the annual meetings of several national ophthalmology organizations, including the American Academy of Ophthalmology and the Association for Research in Vision and Ophthalmology. See the full list of residents and the conference(s) they presented at below:

Andrew Beiter, M.D. – American Academy of Neurology Annual Meeting, American Association for Pediatric Ophthalmology and Strabismus Annual Meeting

Deena Dahshan, M.D. – Association for Research in Vision and Ophthalmology Annual Meeting

Alen Eid, M.D. – American Academy of Ophthalmology Annual Meeting

April Enger, M.D. – American Academy of Ophthalmology Annual Meeting, Association for Research in Vision and Ophthalmology Annual Meeting

Yonah Levy, M.D. – North American Neuro-Ophthalmology Society Annual Meeting

Ami Patel, M.D. – Association for Research in Vision and Ophthalmology Annual Meeting

Michael Shi, M.D. – American Association for Pediatric Ophthalmology and Strabismus Annual Meeting, Association for Research in Vision and Ophthalmology Annual Meeting

Sanya Yadav, M.D. – American Society of Retina Specialists Annual Meeting, North American Neuro-Ophthalmology Society Annual Meeting, Women in Ophthalmology Summer Symposium

Topics covered in residents' various research projects included the exploration of clinical applications for artificial intelligence and significant focuses on several ocular conditions including thyroid eye disease, retinal diseases and anterior segment diseases.

Dr. Thuro said that participating in research helps residents stay current with the latest medical and surgical advancements

in ophthalmology and beyond. It also provides opportunities to hone crucial investigative skills that will aid them through residency and into the next stage of their careers.

"Through participating in research, residents will learn how to critically evaluate information for accuracy and validity," Thuro explained. "Understanding how to identify good versus heavily biased information can lead to better clinical decision-making for physicians, particularly when exploring potential treatment options for patients."

In addition to the skills it helps residents build, Thuro added that presenting research at national conferences provides residents with crucial networking opportunities, allowing them to engage in conversations with physicians from all over the world who bring new and different ideas to the table. He also said that it provides a platform for them to share their hard work with an audience of fellow residents and ophthalmologists.

"Participation at national conferences places WVU on the map for those who know little about West Virginia and what our program has to offer, especially when it comes to the incredible work done by our residents. I am proud to have watched our residents share so many new projects and ideas on the national stage throughout the past year," Thuro said.

RESIDENT PROFILE

EVAN **FRIGOLETTO** M.D.

PGY-4 Chief Resident

Evan Frigoletto, M.D., said serving as the chief resident during his final year in the Department of Ophthalmology and Visual Sciences Residency Program has been a personal highlight of his medical training because it allows him to further dedicate himself to helping others.

Dr. Frigoletto said the aspect that excited him most about serving as the chief resident was the opportunity to become more involved with providing guidance and support to his co-residents.

"As residents, we have to rely on one another a lot," Frigoletto said. "We succeed together, we fail together, but most importantly, we learn together. Being in a position where I can focus more on helping my co-residents has been one of the most rewarding challenges of my residency."

Frigoletto said that this responsibility paired well with the reason he developed an interest in medicine in the first place – to help people. He explained that he was initially inspired to pursue a career in medicine thanks to his aunt, Cathy, who worked as an ER nurse. He would periodically volunteer with her during her weekend shifts, and he said it was there that he developed his passion for helping others.

"Seeing firsthand the effects that healthcare workers can have on patients' lives was eye-opening to me," Frigoletto said. "I knew almost immediately that was what I wanted to do for my career."

This passion for helping others later compounded with Frigoletto's first exposure to ophthalmology as a medical student. He said he first developed an interest in the field due to its balance of medicine and surgery. However, he later fell in love with the specialty after seeing the overwhelmingly positive effects standard ophthalmic procedures can have on patients.

"Being able to perform a highly successful procedure on a patient, such as a cataract surgery that can instantly improve their vision, is such a rewarding feeling. One of the things that makes ophthalmology such a fulfilling career field is how often we get to have patients leaving us in a better condition than when they arrived," Frigoletto said.

Frigoletto said teamwork among residents is crucial to growth during residency and that through working together, they can ensure excellent care for patients.

"As residents, one of the best ways we help our patients is by helping each other become better physicians," he said. "I hope that I'm able to help our junior residents in the same way that former chief residents helped me and that we can come together and continue to provide the best care possible for our patients."

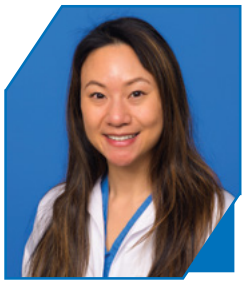
> "As residents, one of the best ways we help our patients is by helping each other become better physicians."
>
> **EVAN FRIGOLETTO, M.D.**

FELLOWS

CHRISTINE
CLAVELL M.D.
Fellow, Retina Service

JAMIE
DIETZE M.D.
Fellow, Glaucoma Service

JAMES
DOSSETT M.D.
Fellow, Retina Service



DIANE
WANG M.D.
Fellow, Oculoplastics Service

Fulfilling Subspecialty Passions Through Fellowships

The Department of Ophthalmology and Visual Sciences offers four distinct fellowship programs in the areas of cornea, glaucoma, ophthalmic plastic and reconstructive surgery and retina. The Department supports up to five clinical fellows each academic year across the four programs.

Each fellow serves as a member of Department of Ophthalmology and Visual Sciences faculty and functions as an instructor and mentor to residents and medical students in addition to their clinical duties. Fellows work closely with physicians in their given subspecialty, gradually developing their skills and knowledge to work independently in the clinic and operating room.

Cornea Fellowship Program

The Cornea Fellowship Program is led by program director Lingo Lai, M.D., and supported by cornea specialists Annahita Amireskandari, M.D., Lena Chen, M.D., Thomas Mauger, M.D., and Ebru Toker, M.D. The one-position, one-year fellowship provides extensive hands-on surgical training and offers clinical opportunities in an academic setting.

The fellow should expect to encounter a full-range of corneal diseases and surgeries during the fellowship including PK, DALK, DSAEK, DMEK, K Pro, ocular surface reconstruction, corneal neurotization, LASIK/PRK, PTK, anterior stromal puncture and corneal crosslinking.

Glaucoma Fellowship Program

The Glaucoma Fellowship Program is led by program director Brian McMillan, M.D. The one-year fellowship program is supported by glaucoma specialists Kevin Halenda, M.D., Joel Palko, M.D., and Tony Realini, M.D., MPH. The program, which supports one fellow per year, provides an advanced level of subspecialty training in the diagnosis and management of medical and surgical glaucoma.

Fellows provide outpatient glaucoma care alongside faculty three-to-four days per week, seeing between 110-120 patients in a typical week. Fellows also accompany faculty to the operating room one-to-two days per week to perform and/or assist in 10-15 surgical cases per week. Fellows can expect to be the primary surgeon on 40-50 trabeculectomy and/or tube shunt procedures, 70-80 MIGS procedures, 100+ phacoemulsification procedures, 100+ laser procedures and a variable number of revisions, examinations under anesthesia and other miscellaneous cases.

Ophthalmic Plastic and Reconstructive Surgery Fellowship Program

The Ophthalmic Plastic and Reconstructive Surgery Fellowship Program is led by program director John Nguyen, M.D., and supported by ophthalmic plastic and reconstructive surgery specialist Bradley Thuro, M.D.

The two-year fellowship supports one fellow per year and provides fellows with a well-rounded experience in ophthalmic plastic and reconstructive surgery, with an emphasis on disease and surgery of the orbit.

Fellows can expect to collaborate closely with services such as plastic surgery, neurosurgery, ENT, radiology and dermatology. During their tenure, fellows become a part of the WVU skull base team and the vascular malformation program. As members of these teams, fellows participate in all aspects of clinical evaluation, preparation, surgery and follow-up.

Vitreoretinal Fellowship Program

The Vitreoretinal Fellowship Program is led by Ghassan Ghorayeb, M.D., and supported by retina specialist Nicole Pumariega, M.D. The program has two fellows at all times, including one incumbent and one new fellow each year. The fellowship is structured to emphasize the surgical retina experience and to optimize the fellow's exposure to medical retina, ocular oncology and uveitis pathology.

Fellows spend two-to-three days a week in the operating room with faculty surgeons. They can expect to perform approximately 100 primary retinal surgeries during the first year of training and more than 450 primary cases by the end of their second year of training. Additionally, fellows spend approximately three days a week in clinic with four faculty members developing their skills in post-operative care and management of surgical complications, diagnosis and treatment of uveitis diseases and diagnosis and treatment of a broad spectrum of retinal diseases. Fellows also spend approximately one-half-day per week assisting in the screening and treatment of newborns at risk for retinopathy of prematurity.

FELLOWSHIP DIRECTOR PROFILE

GHASSAN **GHORAYEB** M.D.
Associate Professor, Vitreoretinal Fellowship Director, Vitreoretinal Division Director, Vice-Chair of Clinical Affairs

Ghassan Ghorayeb, M.D., said that growing up with a father and grandfather who were both physicians instilled the importance of medicine on him from a very young age. That appreciation eventually grew into passion when he decided to go to medical school.

It was during his third year in medical school at Boston University, that Dr. Ghorayeb discovered his next lifelong passion – ophthalmology. He said he had the opportunity to observe surgery as a student and that he immediately fell in love with the field of ophthalmology.

Following the completion of his residency and vitreoretinal fellowship at the University of Texas Medical Branch, Ghorayeb joined the WVU Department of Ophthalmology and Visual Sciences faculty in 2012 where he serves as an associate professor of vitreoretinal surgery. He is also the department's vice-chair of clinical affairs and the director of the Vitreoretinal Fellowship Program.

"What initially drew me to vitreoretinal surgery was the idea of assisting and remediating some of the most acute and devastating ocular pathologies," Ghorayeb explained. "As retina specialists, we are often the last line of defense in saving a person's sight from a wide array of traumatic injuries and ocular diseases."

Ghorayeb added that he enjoys the complexity of retinal disease treatments and that he takes great pride in being in a position where he can help restore and improve a patient's vision and give them their independence back.

As the director of the Vitreoretinal Fellowship program, Ghorayeb has the opportunity to train many retina fellows. He said he feels privileged not only to watch them flourish and excel with their own careers, but to also to be a part of that journey as their mentor.

"As retina specialists, the surgeries we do are extremely delicate, so often incoming fellows may feel a sense of hesitancy starting out," Ghorayeb explained. "It is very rewarding for me as a mentor and fellowship director to watch the trainees' initial apprehensiveness dissipate and see them evolve into outstanding and successful retina surgeons."

Ghorayeb said he also feels very lucky to have found WVU and to have made West Virginia his new home. Originally born in Lebanon, Ghorayeb came a long way to find a new home in Morgantown, but he says he wouldn't have it any other way.

"WVU is a hidden gem," Ghorayeb said. "We live in a state that may not be as nationally recognized as some larger states, but the patients we see and the physicians we get to work alongside are some of the kindest, and most generous people there are."

WVU Vision Researchers Explore Using AI to Help with Patient Education Materials

Through the help of AI, complex, patient-focused ophthalmic medical education materials could become more reader-friendly thanks to researchers in the West Virginia University Department of Ophthalmology and Visual Sciences.

The project assesses the readability of educational brochures created by the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS).

"Given that ASOPRS is comprised entirely of physicians, I began to wonder if the materials they distribute are sometimes too advanced and less readable for patients," John Nguyen, M.D., professor of ophthalmology and director of the Ophthalmic Plastic and Reconstructive Surgery Fellowship Program, said. "I wanted to explore new potential avenues for delivering complex information about ophthalmic plastic and reconstructive surgery to patients in plain language."

Dr. Nguyen and a team comprising of residents, fellows and medical students prompted two AI models, ChatGPT 4.0 and Google Bard, to produce written educational materials on 16 common ophthalmic plastic and reconstructive surgery topics. The goal was to create these materials with and without a sixth-grade reading level prompt modifier. Those materials were then analyzed using seven key readability metrics and compared to the equivalent ASOPRS materials.

Through this process, Nguyen and his team determined that when prompted to produce materials at a sixth-grade reading level, both ChatGPT 4.0 and Google Bard were able to significantly improve their readability scores when compared to the corresponding ASOPRS brochures. Nguyen added that they found ChatGPT to be the most successful of the AI models, as it was able to produce the highest readability scores the most consistently.

While the initial research phase is complete, the team will further assess the accuracy and completeness of the AI-produced reading materials and eventually share them with real patients to further evaluate their readability. The research team consisted of, Nguyen; Diane Wang, M.D., fellow; Alen Eid, M.D., resident; and Stephen Chen, medical student.

Dr. Wang, who primarily worked on data analysis throughout this study, said that as a fellow still early on in her medical career, that she is excited to see how implementations of AI will be applied to the medical field in the future.

"As clinicians, sometimes we forget that the complex information we discuss on a daily basis is far from the norm of what typical patients encounter in their day-to-day life," she said. "This makes it our responsibility to play a key role in directing our patients to comprehensible, accurate and accessible information online to help them make more informed decisions about their health."

> "I wanted to explore new potential avenues for delivering complex information about ophthalmic plastic and reconstructive surgery to patients in plain language."
>
> **JOHN NGUYEN, M.D.**
> professor of ophthalmology and director of the Ophthalmic Plastic and Reconstructive Surgery Fellowship Program

WVU Medical Student Partners with Researchers to Investigate the Effects of Thyroid Eye Disease Medication on Intraocular Pressure

West Virginia University fourth-year medical student Stephen Chen recently partnered with Department of Ophthalmology and Visual Sciences professor John Nguyen, M.D., to investigate the effects of teprotumumab on intraocular pressure among thyroid eye disease patients.

Intraocular pressure (IOP) Is a measurement of the fluid pressure of the eye. A substantial increase in a patient's IOP can result in the development of glaucoma, which is one of the leading causes of blindness.

Chen and Dr. Nguyen partnered to further explore the relationship between IOP and another ocular condition known as thyroid eye disease (TED), an autoimmune disorder that occurs when the immune system mistakenly attacks the muscle and fat tissue behind the eyes. TED causes inflammation and scar tissue to form and can lead to several ocular conditions, including glaucoma.

For this project, the researchers examined a relatively new TED treatment known as teprotumumab, a medical infusion that blocks the action of a protein in the body that causes ocular inflammation. The treatment is eight infusions given at three-week intervals, and with the results showing reduced inflammation among TED patients.

Nguyen served as the primary investigator for this project, while Chen focused on elements such as chart review, data collection and data analysis.

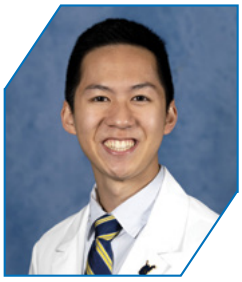
The team partnered with physicians from other tertiary referral centers to collect extensive data on TED patients who received teprotumumab treatment. Together, they worked to determine if teprotumumab could successfully reduce IOP and how drastically that change would differ between patients diagnosed with the different subtypes of TED.

Through this research, they found teprotumumab to be associated with a significant reduction in IOP, especially in patients diagnosed with acute TED, while those with chronic TED experienced a greater reduction in proptosis, a condition characterized by bulging eyes.

The overall findings suggested that teprotumumab may provide additional benefits of lowering IOP in TED patients, particularly in those who have also been diagnosed with glaucoma.

As a medical student, Chen said he was delighted by the opportunity to team up with Nguyen to come to new conclusions about teprotumumab and that he is excited about the outcomes this research has for future patients.

"I feel grateful to have been able to work alongside Dr. Nguyen to explore a treatment as new as teprotumumab and be on the forefront of new discoveries about its relationship to intraocular pressure," Chen said. "I hope that we can continue to explore this research further and help reduce our patients' risk for glaucoma, vision loss, and blindness."



"I feel grateful to have been able to work alongside Dr. Nguyen to explore a treatment as new as teprotumumab and be on the forefront of new discoveries about its relationship to intraocular pressure."

STEPHEN CHEN
WVU Medical Student

Chen presented this study at the American Society of Ophthalmic Plastic and Reconstructive Surgery 2023 Fall Meeting held in San Francisco in November 2023. He hopes to continue this research by expanding the study cohort while tracking IOP over time at follow-up appointments.

He and Nguyen are currently working on a manuscript for the study so the findings can be published in a peer-reviewed journal.

Suture Workshop Offers Crucial Introductory Ophthalmic Training to WVU Medical Students

A training workshop hosted by the West Virginia University Department of Ophthalmology and Visual Sciences is helping teach medical students some of the valuable skills necessary to perform delicate ophthalmic procedures.

The Department hosted a suture workshop in April 2023 for the students in the Ophthalmology Interest Group at the WVU School of Medicine. The purpose of the workshop, hosted by professor and director of medical student education Geoffrey Bradford, M.D., and assistant professor and residency program director Bradley Thuro, M.D., is to introduce students to the importance of dexterity for ocular surgeries.

"When it comes to ocular procedures such as suturing, we as ophthalmologists are quite literally threading the needle," Dr. Bradford said. "It's important that an ophthalmic surgeon's hands remain steady in order to pass the tiny needles we use carefully through sensitive parts of the eye, using suture that is often finer than a strand of human hair."

Bradford added that these procedures are also performed under high magnification, making hand steadiness even more important for an ophthalmologist to possess. He said these skills are some of the most important tools in an ophthalmologist's toolbelt and that learning and practicing them early, even as a medical student, is crucial.

The suture workshop began with an introductory lecture led by Bradford and Dr. Thuro, followed by a hands-on training session. Students were given a needle and thread, which they practiced suturing on pieces of raw chicken. As students practiced their suturing techniques, guidance and assistance was provided by faculty members, as well as some of the fourth-year medical students in the interest group.

Among those students in attendance was fourth-year medical student Sarah Shabih, who said she appreciated the opportunity to work on honing such important skills in a controlled setting.

"Hands-on training opportunities like this are probably some of the most valuable experiences a medical student can gain," Shabih said. "I really enjoyed the chance to get to learn from and work directly with the ophthalmology faculty. As someone who is relatively new to the field of ophthalmology, I especially appreciated the fact that I got to do it in such a positive and judgment-free setting."

Bradford said this is exactly the atmosphere these workshops are intended to promote, and that he hopes that students find value in the trainings and leave the sessions with a sense of accomplishment and a continued interest in the field of ophthalmology.

"Through these workshops, we hope to encourage interested medical students to consider ophthalmology as a future career in medicine. As an instructor, I enjoy observing the expressions of accomplishment on students' faces as they gain dexterity and confidence while practicing during the suture workshop. It is my hope that the students enjoy this experience as much as I do," Bradford said.

ALUMNI PROFILE

JUDIE **CHARLTON** M.D.
Professor Emeritus

After earning her bachelor's degree from the West Virginia University School of Pharmacy, Judie Charlton, M.D., began her journey at the WVU School of Medicine as a scholarship medical student in 1981. That journey led her through residency, fellowship and a successful career spanning more than 30 years with the WVU Department of Ophthalmology and Visual Sciences and WVU Medicine.

Dr. Charlton officially joined the Department's faculty as an assistant professor in 1989 following the completion of her residency. She said she saw the opportunity as a chance for her to give back to the state and the institution that made her education and training possible.

"Without the scholarships I received from the School of Medicine, my education and training would not have been possible," Charlton explained. "WVU and West Virginia as a whole invested in my education, so it only made sense for me to invest my career back into this state."

Throughout the next three decades, Charlton did just that. She provided ocular care to patients in need, all while helping train and inspire the next generation of ophthalmologists. She also became involved in several outreach projects, including a mobile clinic providing crucial services to rural West Virginia patients.

For 15 years, Charlton and a team of physicians traveled to Gilbert, West Virginia with medical students to provide ocular services to patients while educating students about practicing rural medicine. Charlton said the project was made possible through various fundraising and grant opportunities and that she looks back at it as one of the proudest accolades of her career.

"It is my hope that through the Gilbert Clinic, I was able to make an impact on not only the lives of the patients we served but also on the students we educated as we showed them firsthand the effects that medical care can have on a rural population," she said.

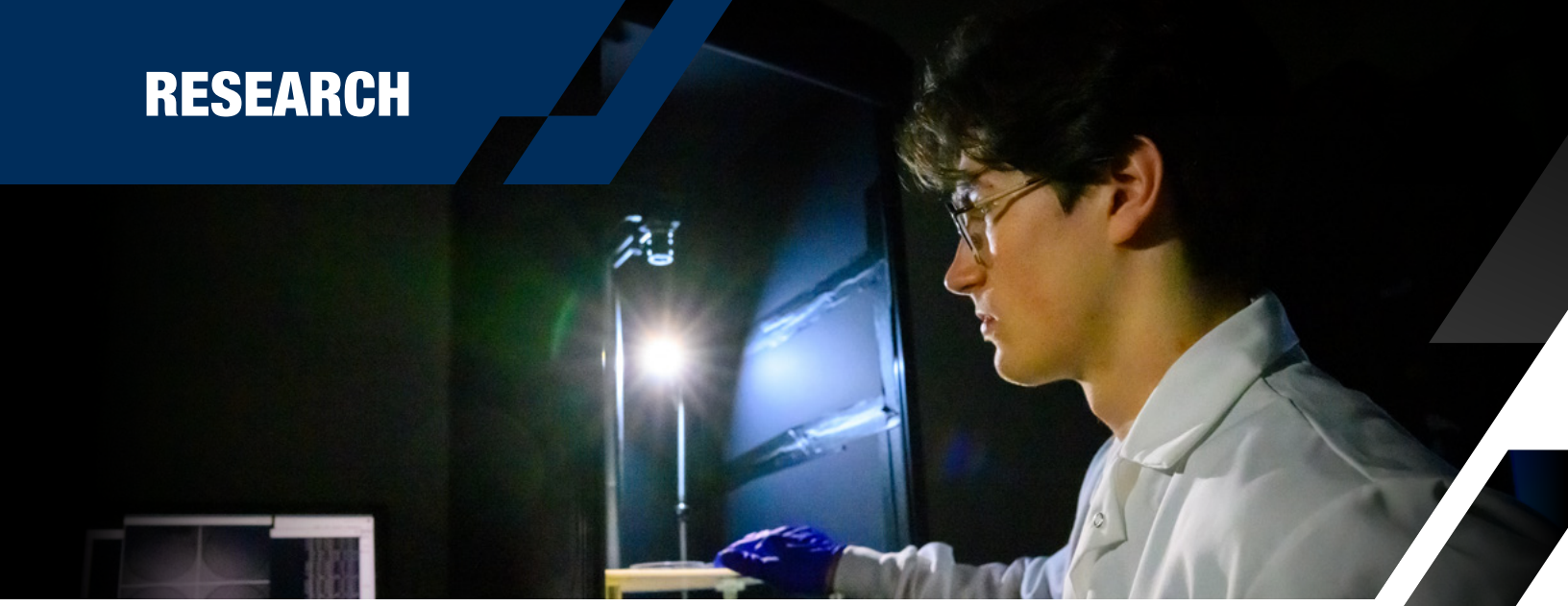
Charlton served in several leadership roles throughout her career at the School of Medicine, including chair of the Department of Ophthalmology and Visual Sciences from 2008-2011 and chief medical officer (CMO) of the WVU School of Medicine from 2010-2020.

As CMO, Charlton said she was fortunate enough to be involved in several key advancements for the state, including the addition of the WVU Heart and Vascular Institute and the WVU Medicine Children's Hospital. Though she acknowledges that she was a part of a larger team, she said she is grateful to WVU for putting her in a position where she could help make positive differences in the health of West Virginians on a large scale.

> "Thanks to the opportunities that were provided to me as a medical student, resident, fellow and faculty member, I was able to have a seat at the table and become involved in several key decisions that benefitted our state."
>
> **JUDIE CHARLTON, M.D.**

"Thanks to the opportunities that were provided to me as a medical student, resident, fellow and faculty member, I was able to have a seat at the table and become involved in several key decisions that benefitted our state," Charlton said. "As I look back on those years, I am proud of the work we have done so far and look forward to the advancements I know the University will continue to make in the future."

Charlton retired from the University in July, but remains an active alumnus and emeritus faculty member.



WVU Exercise Physiology Student Affirms Passion for Vision Research Through Summer Program

Seven students from colleges and universities across the country convened at the start of the summer on West Virginia University's campus to participate in the Summer Undergraduate Vision Research Fellowship Program, researching ocular diseases and working with faculty mentors to diagnose and treat those diseases in laboratory settings.

Ahead of the program's completion, fourth-year exercise physiology student Elijah Smith reflected on his experiences in the program that left him with not only a broader understanding of ocular diseases, but also a deeper appreciation for the research-side of medicine.

"When I first discovered this program and saw it was focused on the study of eye diseases and the research that goes towards developing new treatments, I knew that this was an opportunity I wanted to take advantage of," Smith said.

He first developed a passion for the field of visual sciences during his sophomore year of college, leading to him getting a job as an optician at a local optometrist's office in Morgantown. There he learned about various eye diseases and how they affect patients, ultimately leaving Smith with curiosity to learn more about treatment options and improving outcomes for patients in the future.

Throughout the 10-week-long program, Smith partnered with Eric Horstick, Ph.D., an assistant professor for the Department of Biology and the Department of Neuroscience. Together, they produced a small-scale research project which examined the effects that a change in lighting conditions has on the behavior of zebrafish.

Smith was in charge of data analysis for this project, helping him build his research toolbox and better interpret his results and their potential real-world applications, even in situations where his findings don't necessarily reflect the expected outcome.

Smith and the six other students enrolled in the program formally presented their research projects during a research symposium held at the conclusion of the fellowship in August.

"Something I have loved about this program has been getting to know the other researchers, and learn more about each of their unique and fascinating research projects. Although all of our projects are clearly different from one another, we all share the common goal of making discoveries that can be utilized to help people see better and live better lives," Smith said.

Smith added that he currently has his eyes set on a career in visual sciences and that he plans to apply to optometry school in the spring.

The research program is led by WVU Department of Ophthalmology and Visual Sciences and Department of Biochemistry and Molecular Medicine research faculty and is supported through the WVU Visual Sciences Center of Biomedical Research Excellence.

> "[W]e all share the common goal of making discoveries that can be utilized to help people see better and live better lives."
>
> **ELIJAH SMITH**

NEI Grant Provides Funding for Vision Research into Early Alzheimer's Disease Diagnoses

A West Virginia University School of Medicine researcher recently conducted vision research that he hopes can lead to earlier diagnoses of Alzheimer's disease thanks to a new grant, awarded by the National Eye Institute, National Institutes of Health.

Jianhai Du, Ph.D., an associate professor for the Departments of Ophthalmology and Visual Sciences and Biochemistry and Molecular Medicine, explained that prior to the neurological changes associated with Alzheimer's disease, many patients will experience visual defects, such as vision loss. This has resulted in researchers looking towards the eye as a diagnostic tool.

Through this grant, Dr. Du is specifically studying retinal mitochondrial metabolism.

"The discovery of these early-stage metabolic changes between eye tissues and the brain serve as a strong foundation for us to take this research even further and will hopefully allow us to develop novel strategies for early detection and treatment of this disease," Du explained.

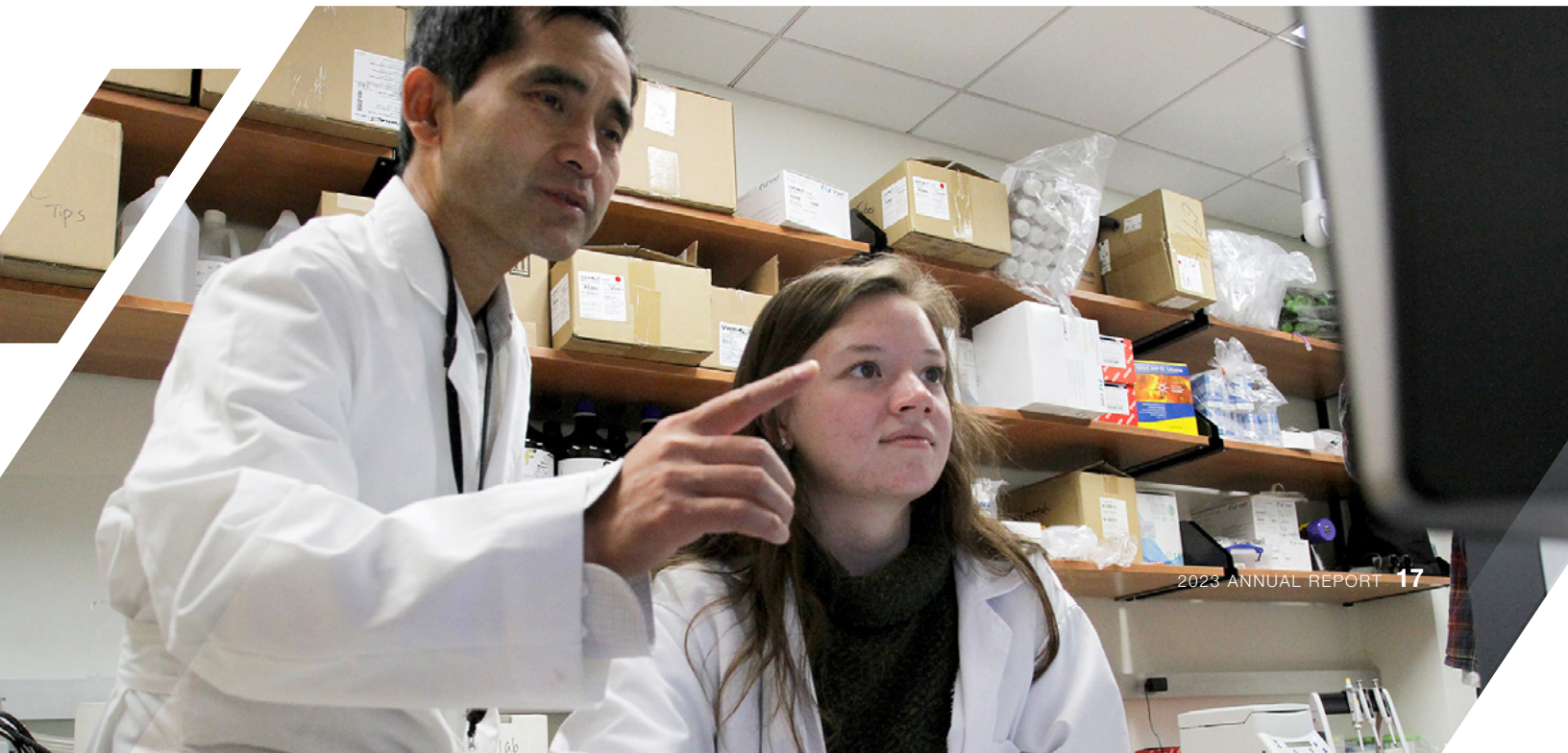
Du said that in addition to the early detection of Alzheimer's Disease, he is also hoping the research can lead to treatments to stop vision loss among Alzheimer's patients.

Du first began this research in 2022, when he served as a mentor to a senior chemistry major in the Eberly College of Arts and Sciences. Together, he and the student used a technique called mass spectrometry, which measures the mass-to-charge ratio of one or more molecules, in order to identify key changes in the biochemical processes within the eyes and brains of Alzheimer's disease model mice.

The one-year grant will provide $380,000 of funding, with Du serving as the principal investigator. Du said that he plans to continue to work with students in his lab, explaining that participation in such valuable research can be a crucial educational opportunity for students.

"For a young researcher, being able to directly contribute to research like this can be invaluable," Du said. "I'm looking forward to working with students in my lab, and to taking some large steps towards the diagnosis and treatment of this disease."

> "The discovery of these early-stage metabolic changes ... will hopefully allow us to develop novel strategies for early detection and treatment."
>
> **JIANHAI DU, PH.D.**



Department of Ophthalmology and Visual Sciences At-A-Glance

2019

47,546	WVU Eye Institute
51	Gilbert Clinic
131	SRMC Clinic
250	SJH Clinic
159	UHC Clinic
0	WHL Clinic
0	Waynesburg Clinic

2020

43,703	WVU Eye Institute
21	Gilbert Clinic
322	SRMC Clinic
2,218	SJH Clinic
1,037	UHC Clinic
0	WHL Clinic
0	Waynesburg Clinic

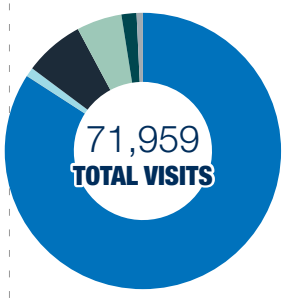
2021

52,338	WVU Eye Institute
36	Gilbert Clinic
437	SRMC Clinic
3,925	SJH Clinic
2,282	UHC Clinic
0	WHL Clinic
0	Waynesburg Clinic

2022

55,717	WVU Eye Institute
33	Gilbert Clinic
610	SRMC Clinic
4,405	SJH Clinic
2,986	UHC Clinic
0	WHL Clinic
585	Waynesburg Clinic

2023



60,523	WVU Eye Institute
21	Gilbert Clinic
766	SRMC Clinic
5,036	SJH Clinic
3,818	UHC Clinic
1,265	WHL Clinic
530	Waynesburg Clinic

Total Surgeries

2019

3,462

3,350	WVU Eye Institute
37	SRMC Clinic
59	SJH Clinic
16	UHC Clinic
0	WHL Clinic

2020

3,656

3,037	WVU Eye Institute
194	SRMC Clinic
325	SJH Clinic
100	UHC Clinic
0	WHL Clinic

2021

4,387

3,741	WVU Eye Institute
229	SRMC Clinic
327	SJH Clinic
90	UHC Clinic
0	WHL Clinic

2022

4,428

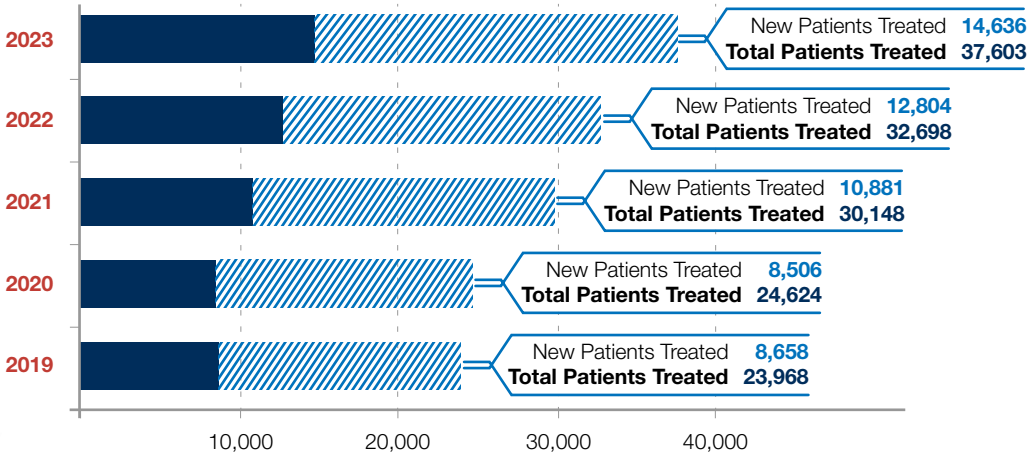
3,826	WVU Eye Institute
364	SRMC Clinic
99	SJH Clinic
139	UHC Clinic
0	WHL Clinic

2023

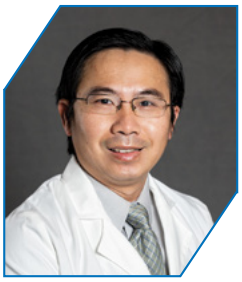
4,946

4,096	WVU Eye Institute
306	SRMC Clinic
389	SJH Clinic
113	UHC Clinic
42	WHL Clinic

Patients Treated



Study Led by WVU Professor Dr. John Nguyen Finds Alternative Source for Periocular Skin Grafts



JOHN **NGUYEN, M.D.**
professor

VLAD **CODREA, M.D., PH.D.**
assistant professor, director of Mohs microscopic surgery and dermatologic oncology

OMAR **SADAT, M.D.**
resident

A new study led by West Virginia University Department of Ophthalmology and Visual Sciences professor John Nguyen, M.D., could provide patients with a less invasive alternative to periocular skin grafts.

Dr. Nguyen's study examined the outcomes of utilizing decellularized fish skin for periocular repair on patients who had skin removed following skin cancer treatment. Nguyen explained that decellularized fish skin is skin tissue taken from a fish host that has undergone biomedical engineering to be used in artificial tissue regeneration processes such as skin grafts. He said that having additional options for traditional skin graft alternatives will widely benefit patients, as well as ophthalmic plastic surgeons as a whole.

"The addition of decellularized fish skin as an alternative source of tissue for periocular reconstruction further expands the surgical armamentarium for surgeons, while simultaneously providing a less invasive option for our patients," Nguyen said.

Specifically, his study examined the use of decellularized fish skin in periocular skin grafts following a procedure known as Mohs surgery, performed by Vlad Codrea, M.D., Ph.D., an assistant professor and the director of Mohs microscopic surgery and dermatologic oncology for the Department of Dermatology. Dr. Codrea explained that Mohs surgery is a highly specialized technique for treating skin cancer that involves the surgical removal of thin layers of skin one layer at a time. The layers of skin are then examined under a microscope to determine if the presence of any cancer remains.

Nguyen said the repair of the areas where the skin was removed during Mohs surgery typically requires the patient to either undergo an autologous skin graft or the presence of an allogenic skin donation from a separate patient. He explained that autologous skin grafts require skin to be transported from one area of the patient's body to another, while an allogeneic skin graft requires a separate patient to have skin removed and donated to the host. He added that both of these options are considered rather invasive, which is where the concept of xenografts comes into play.

A xenograft involves the transplantation of animal skin and can be a common practice due to the invasive nature of harvesting one's skin or the availability of donated human skin tissue, according to Nguyen. Nguyen's study explored the application of a new potential source of tissue for xenografts, decellularized fish skin, on four patients who recently underwent Mohs surgery. At the conclusion of the pilot study, all four of the xenografts were completed successfully and no post-operative complications were observed.

Nguyen served as the principal investigator for this project, which was conducted by various WVU Health Sciences team members. The research was also assisted by students and residents, including 2023 M.D. graduate Omar Sadat, M.D., who is now a first-year resident in the Department of Ophthalmology and Visual Sciences Residency Program at WVU and Janice Hernandez, M.D., a third-year resident in the Department of Ophthalmology Residency Program at George Washington University.

Sadat worked alongside Nguyen primarily in the areas of data gathering and manuscript preparation. Additionally, Nguyen presented the findings from his study at the American Society of Ophthalmic Plastic and Reconstructive Surgery Spring Scientific Symposium in Quebec, Canada on June 23.

Making an Impact Across West Virginia

The WVU Eye Institute and WVU Department of Ophthalmology and Visual Sciences provides crucial outreach services to West Virginians through three unique statewide programs, each aimed at delivering much-needed ocular care to specific demographics.

Providing ocular care to communities in need

The Appalachian Vision Outreach Program (AVOP) provides ocular care to patients across West Virginia who may not have access to routine care due to geographic and financial obstacles. AVOP clinics consist of a team from the Eye Institute traveling to locations across the state to provide patients in need with services such as vision screenings, eye exams, the prescription and distribution of glasses, and referrals for specialty care and services. In 2023, AVOP provided more than 1,800 patients with crucial eyecare services through 38 clinics held across 11 counties statewide.

Helping patients maximize their vision to reach new heights

The Adult Low Vision Program (ALVP) provides direct support to adult patients with low vision through in-depth screenings and follow-up training. Adult low vision patients are classified as those with a visual acuity of 20/70 or worse that cannot be corrected despite best glasses correction.

The program provides patients with an evaluation performed by a certified low-vision therapist at the WVU Eye Institute. Following the screenings, patients can trial low-vision devices and technology and receive orientation and mobility training with equipment such as white canes with the goal of reclaiming access to activities that were previously lost due to visual impairment. Patients may also receive referrals for additional treatment by Eye Institute ophthalmologists.

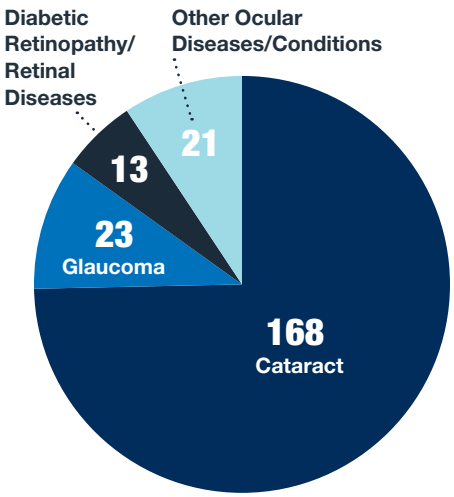
Appalachian Vision Outreach Program (AVOP) 2023 Highlights

21
VISION CLINICS hosted

17
GLASSES-DISPENSING clinics hosted

1,803
PATIENTS evaluated

Ocular Diseases Identified through AVOP Screenings for Additional Treatment



1,249
PAIRS OF GLASSES dispensed

264
DIABETIC EYE EXAMS administered

225
OCULAR DISEASES identified for additional treatment

2023 AVOP Clinic Locations

- Huntington (Cabell County)
- Clarksburg (Harrison County)
- Wheeling (Ohio County)
- Weirton (Hancock County)
- Charleston (Kanawha County)
- Summersville (Nicholas County)
- Beckley (Raleigh County)
- Marlinton (Pocahontas County)
- Charles Town (Jefferson County)
- Webster Springs (Webster County)
- West Union (Doddridge County)

2023 CVRP Low Vision Clinic Locations

- Logan County
- Kanawha County
- Jackson County
- Monongalia County
- Ohio County
- Raleigh County
- Berkeley County
- Wood County

CVRP students enjoy an afternoon of whitewater rafting on the New River Gorge during the adventure portion of the Career Exploration and Problem Solving Camp, held in Fayetteville, West Virginia in June 2023.

OUTREACH

Providing gateways for blind and visually impaired children

The Children's Vision Rehabilitation Program (CVRP) is a needs-based program that responds to the individual needs of children with visual impairment, along with their parents, teachers and related professionals in West Virginia.

CVRP's mission is to provide comprehensive vision rehabilitation services to West Virginia's school-aged children who are blind and visually impaired, regardless of their ability to pay. The program aims to give children the tools they need to become independent and employable by optimizing visual function at home and school. CVRP provides access to the visual environment for children with incurable vision loss through medical eye care, optical devices, assistive technology, educational recommendations, support to local school systems and special educational events known as Institutes of Learning.

Evaluating Children's Vision through comprehensive screenings

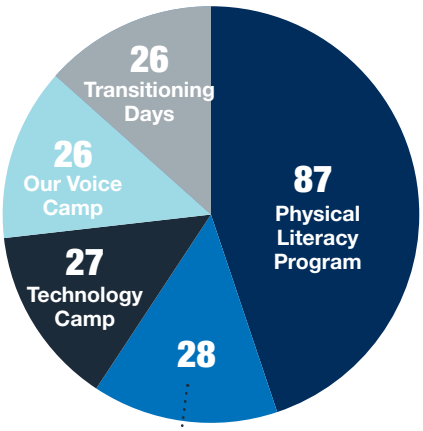
CVRP provides comprehensive low vision evaluations to children across the state through a traveling clinic led by a diverse team of professionals trained in all areas of low vision. The team consists of an ophthalmologist, a low vision technician, a low vision therapist, a technology specialist, a teacher of the visually impaired and an orientation and mobility specialist. The team evaluates how a student is functioning visually and explores a variety of tools, strategies and resources aimed at increasing a student's independence and employability. In 2023, CVRP evaluated a total of 80 children through 11 low vision evaluations in eight counties across the state.

Students and their families interact with wildlife during a CVRP Day Camp hosted at Hovatter's Wildlife Zoo in Kingwood, West Virginia.

Shaping futures and teaching skills through Institutes of Learning

CVRP hosts annual special educational events for children known as Institutes of Learning several times per year. The Institutes of Learning provide a forum for children who are blind or visually impaired to receive direct instruction on specific skills and are typically muti-day camps hosted during the summer months when school is no longer in session. In 2023, CVRP hosted five Institutes of Learning, each focused on providing a unique experience for students, with a total of 194 children in attendance across the five camps.

2023 Institute of Learning Attendance



A CVRP student participates in a cooking demonstration as a part of the Physical Literacy Program, which aims to increase children's independence in every-day life skills.

CVRP Opens Doors, Broadens Horizons for Blind and Visually-Impaired Children Across West Virginia

It may only have been one day out of the summer months during her childhood, but years later, Children's Vision Rehabilitation Program alumnus Tatyana Tolliver says that day has added up to a lasting impact on her life.

"For the first time in my life, I realized that I wasn't alone," Tolliver said. "I learned other kids like me were facing the same hurdles I was and understood what I was going through. I'd finally felt normal in a world that had otherwise made me feel othered."

Tolliver, now a sophomore African American Studies major at Washington University in St. Louis, Missouri, credits the first CVRP day camp she attended in seventh grade as a significant turning point, as it was the first opportunity she had to interact with other blind children her age.

"CVRP helped me completely change my perspective. It gave me the confidence I needed to accomplish things I might've never even tried to attempt before. I wouldn't be where I am today without the amazing CVRP community."

During the next six years, she continued to attend every CVRP event she could, where she forged lifelong friendships with the other children and CVRP staff while learning valuable independent living skills such as cooking, doing household chores and shopping for groceries. But of all the skills she learned through the program, she said the most valuable is how to believe in herself.

It's the camp's mission in action, says program founder Rebecca Coakley, MA, CLVT.

When CVRP launched in 1996, Coakley said it was with the goal of creating a community where blind and visually impaired children could come together, learn crucial skills and forge pathways to a successful future.

Coakley said that for nearly 30 years, the program has helped CVRP alumni like Tolliver accomplish just that through clinical vision evaluations, partnerships with educators and events like the CVRP day camps.

The camps provide a forum for blind and visually impaired children to gather together and receive direct instruction on specific skills such as reading braille, utilizing assistive technology and developing independent living and self-help skills.

"CVRP helped me completely change my perspective. It gave me the confidence I needed to accomplish things I might've never even tried." **TATYANA TOLLIVER**

"Tatyana is such a great role model for our kids," Coakley said. "She has already accomplished so much at such a young age. I know that she will achieve even more great things, both personally and professionally. Her infectious 'can-do attitude' inspires our students, and we're lucky to have her as a member of the CVRP family."

Tolliver plans to attend law school after completing her undergraduate studies. While home in West Virginia during summer breaks, Tolliver now volunteers at CVRP camps.

Department of Ophthalmology and Visual Sciences Publications (Jan. 1 - Dec. 31, 2023)

Cahill M, Chmelik K, Sechrest ER, Barbera RJ, Baehr W, Deng WT. Investigative Ophthalmology & Visual Science. 2023 Jun;64(8):769–769.

Chen Y, Zhang T, Zeng S, Xu R, Jin K, Coorey NJ, Wang Y, Wang K, Lee SR, Yam M, Zhu M, Chang A, Fan X, Zhang M, Du J, Gillies MC, Zhu L. Transketolase in human Müller cells is critical to resist light stress through the pentose phosphate and NRF2 pathways. Redox Biol. 2022 Aug;54:102379. doi: 10.1016/j.redox.2022.102379. Epub 2022 Jun 24. PMID: 35779441; PMCID: PMC9287732.

Cui X, Chang YJ, Jenny LA, Levi SR, Du J, Tsang SH. Metabolite Extraction from RPE Cells and Retinas Related to Retinitis Pigmentosa. Methods Mol Biol. 2023;2560:257-265. doi: 10.1007/978-1-0716-2651-1_24. PMID: 36481902.

Dericioğlu V, Akkaya Turhan S, Erdem HE, Sevik MO, Erdil E, Sünter G, Ağan K, Toker E. In Vivo Corneal Confocal Microscopy in Multiple Sclerosis: Can it Differentiate Disease Relapse in Multiple Sclerosis? Am J Ophthalmol. 2023 Jun;250:138-148. doi: 10.1016/j.ajo.2023.01.015. Epub 2023 Jan 18. PMID: 36669610.

Eid AT, Odom JV, Hinkle D, Leys MJ. Characterization of mutational variants in TOPORS leading to autosomal dominant retinitis pigmentosa in Rural Appalachia with a report of a novel mutation. Investigative Ophthalmology & Visual Science. 2023 Jun;64(8):1551–1551.

Eid K, Eid A, Wang D, Raiker RS, Chen S, Nguyen J. Optimizing Ophthalmology Patient Education via ChatBot-Generated Materials: Readability Analysis of AI-Generated Patient Education Materials and The American Society of Ophthalmic Plastic and Reconstructive Surgery Patient Brochures. Ophthalmic Plast Reconstr Surg. 2023 Nov 16. doi: 10.1097/IOP.0000000000002549. Epub ahead of print. PMID: 37972974.

Frigoletto E, Amireskandari A, Mauger TF, Transient band keratopathy associated with epithelial ingrowth treated with antimetabolites. JCRS Online Case Reports 11(4):p e00099, October 2023. | DOI: 10.1097/j.jcro.0000000000000099

Frigoletto E, Chen S, Teter D, Mitchell B, Elwarfalli I, Palko JR. Aqueous vein diameter as a predictor of intraocular pressure reduction following glaucoma angle surgery. Investigative Ophthalmology & Visual Science. 2023 Jun;64(8):3481–3481.

Gangaputra S, Newcomb C, Armour R, Choi D, Ying GS, Groth S, Begum H, Fitzgerald T, Artornsombudh P, Daniel E, Bhatt N, Foster S, Jabs D, Levy-Clarke G, Nussenblatt R, Rosenbaum JT, Sen HN, Suhler E, Thorne J, Dreger K, Buchanich J, Kempen JH; Systemic Immunosuppressive Therapy for Eye Diseases (SITE) Research Group. Long-term visual acuity outcomes following cataract surgery in eyes with ocular inflammatory disease. Br J Ophthalmol. 2023 Feb 21:bjo-2022-322236. doi: 10.1136/bjo-2022-322236. Epub ahead of print. PMID: 36810151.

Garg I, Gour V, Bhatnagar P, Janardhana P, Hale B, Ghorayeb G, Leys MJ, Hinkle D. Intervention in Acute Posterior Multifocal Placoid Pigment Epitheliopathy (APMPPE): Multi-Institutional Case Series Pooled with A Systematic Review and Meta-Analysis. Investigative Ophthalmology & Visual Science. 2023 Jun;64(8):3545–3545.

Gulkas S, Aydin FO, Turhan SA, Toker AE. In vivo corneal confocal microscopy as a non-invasive test to assess obesity induced small fibre nerve damage and inflammation. Eye (Lond). 2023 Aug;37(11):2226-2232. doi: 10.1038/s41433-022-02321-x. Epub 2022 Nov 28. PMID: 36443498; PMCID: PMC10366092.

Guner A, Can Sarinoglu R, Aydin FO, Akkaya Turhan S, Kuskucu MA, Toker AE, Karahasan Yagci A. Molecular analysis of human adenoviral keratoconjunctivitis cases: Results of a 2-Year survey. Marmara Medical Journal. 2023 Jan 31;36(1):1–6. doi:10.5472/marumj.1244369

Haggerty KN, Eshelman SC, Sexton LA, Frimpong E, Rogers LM, Agosto MA, Robichaux MA. Mapping rhodopsin trafficking in rod photoreceptors with quantitative super-resolution microscopy. bioRxiv [Preprint]. 2023 Apr 21:2023.04.20.537413. doi: 10.1101/2023.04.20.537413. Update in: PLoS Biol. 2024 Jan 8;22(1):e3002467. PMID: 37131638; PMCID: PMC10153271.

Hampton RF, Thuro BA. Lid Lacerations and Avulsions. In: Master Techniques in Ophthalmic Surgery. 2nd ed. Jaypee Brothers Medical Publishers; 2023. p. 357–64.

Hampton RF, Thuro BA. Lid Tumors. In: Master Techniques in Ophthalmic Surgery. 2nd ed. Jaypee Brothers Medical Publishers; 2023. p. 372–6.

Hancox Yaskanich A, Fang W, Elwarfalli I, Palko JR. Influence of ocular and systemic variables on intraocular pressure change following phacoemulsification in non-glaucomatous eyes. Investigative Ophthalmology & Visual Science. 2023 Jun;64(8):4250–4250.

Jeyaseelan P, Carey AR. A Diagnostic Conundrum of Bilateral Optic Disc Edema. J Neuroophthalmol. 2023 Mar 1;43(1):e40. doi: 10.1097/WNO.0000000000001773. Epub 2023 Jan 13. Erratum in: J Neuroophthalmol. 2023 Jun 1;43(2):e66. PMID: 36728252.

Kahaly GJ, Dolman PJ, Wolf J, Giers BC, Elflein HM, Jain AP, Srinivasan A, Hadjiiski L, Jordan D, Bradley EA, Stan MN, Eckstein A, Pitz S, Vorländer C, Wester ST, Nguyen J, Tucker N, Sales-Sanz M, Feldon SE, Nelson CC, Hardy I, Abia-Serrano M, Tedeschi P, Janes JM, Xu J, Vue P, Macias WL, Douglas RS. Proof-of-concept and Randomized, Placebo-controlled Trials of an FcRn Inhibitor, Batoclimab, for Thyroid Eye Disease. J Clin Endocrinol Metab. 2023 Nov 17;108(12):3122-3134. doi: 10.1210/clinem/dgad381. PMID: 37390454; PMCID: PMC10655547.

Kempen JH, Newcomb CW, Washington TL, Foster CS, Sobrin L, Thorne JE, Jabs DA, Suhler EB, Rosenbaum JT, Sen HN, Levy-Clarke GA, Nussenblatt RB, Bhatt NP, Lowder CY, Goldstein DA, Leiderman YI, Acharya NR, Holland GN, Read RW, Dunn JP, Dreger KA, Artornsombudh P, Begum HA, Fitzgerald TD, Kothari S, Payal AR, Daniel E, Gangaputra SS, Kaçmaz RO, Liesegang TL, Pujari SS, Khachatryan N, Maghsoudlou A, Suga HK, Pak CM, Helzlsouer KJ, Buchanich JM; Systemic Immunosuppressive Therapy for Eye Diseases Cohort Study Research Group. Use of Immunosuppression and the Risk of Subsequent Overall or Cancer Mortality. Ophthalmology. 2023 Dec;130(12):1258-1268. doi: 10.1016/j.ophtha.2023.07.023. Epub 2023 Jul 26. PMID: 37499954; PMCID: PMC10811288.

Keskiner-Ozturk E, Akkaya-Turhan S, Toker E, Uluc K, Alibas H, Tanridag T, Kahraman-Koytak P. Corneal nerve fiber involvement in chronic inflammatory demyelinating polyneuropathy. Neurol Sci. 2023 Jul;44(7):2509-2516. doi: 10.1007/s10072-023-06711-1. Epub 2023 Mar 1. Erratum in: Neurol Sci. 2023 Mar 9;: PMID: 36856905.

King J, Chen S, Goncz A, Palko J. Iris Chafing Syndrome Secondary to Iridociliary Adhesions in a Patient with a Single-Piece Acrylic Intraocular Lens: Case Report. Case Rep Ophthalmol. 2023 Dec 12;14(1):692-697. doi: 10.1159/000535167. PMID: 38090107; PMCID: PMC10715751.

Kornhauser T, Ponder CM, Dockery PW, Sharabura AB, Brock W, Nguyen J, Pemberton JD. Timing of Jones Tube Placement After Excision of Nasal or Lacrimal Drainage System Malignancy: A Survey of the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS). Clin Ophthalmol. 2023 Oct 16;17:3057-3062. doi: 10.2147/OPTH.S425716. PMID: 37869042; PMCID: PMC10589402.

Kurochkin P, Eid AT, Pumariega N. Medium-term perflurooctane as a tamponade in retinal detachment surgery. Investigative Ophthalmology & Visual Sciences. June 2023;64(8):4580.

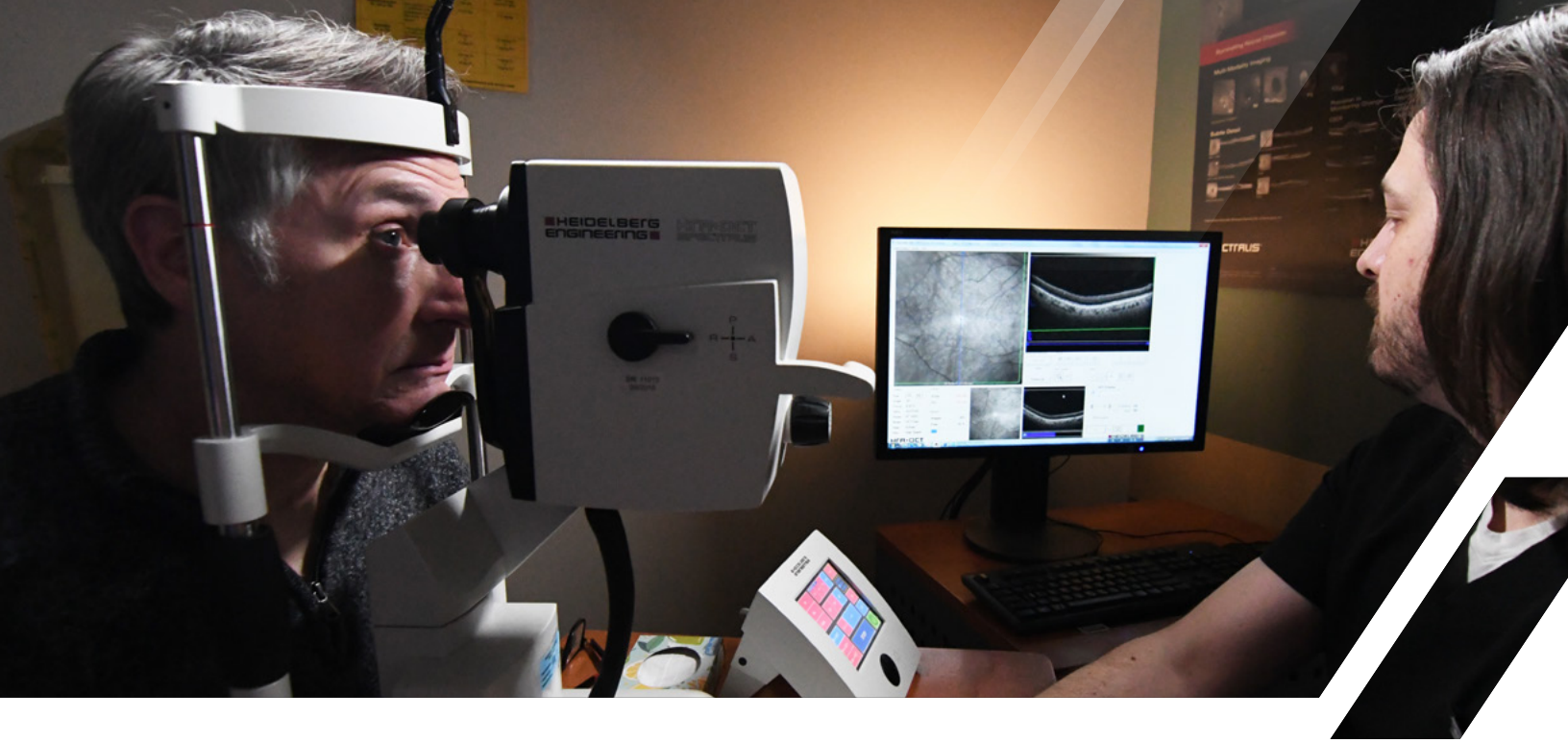
Lee IJ, Benjamin JE, Ghorayeb GR. Incidence of Epiretinal Membrane Formation After Pars Plana Vitrectomy for Giant Retinal Tear-Associated Retinal Detachment. Clin Ophthalmol. 2023 May 17;17:1415-1420. doi: 10.2147/OPTH.S407699. PMID: 37220588; PMCID: PMC10200112.

Levy-Clarke GA. Uveitis. In: Conn's Current Therapy 2023. 1st ed. Alpharetta, Georgia: Elsevier; 2023. p. 1632–1632.

Leys MJ, Lai L, Ellis B, Levy-Clarke GA, Pinion C, Odom JV, Characterization of POMGNT1 Retinopathy with late Onset and intrafamilial Phenotypic Heterogeneity. Doc. Ophthalmol. 2023, 146 (Suppl. 1), S3–S65.

Ma JX, Chuang AZ, Feldman RM, Mansberger SL, Tanna AP, Blieden LS, Shoham D, Bell NP, Gross RL, Pasquale LR, Greenfield DS, Liebmann JM, Weinreb RN; ASSISTS Study Group. Direct Costs of Second Aqueous Shunt Implant Versus Transscleral Cyclophotocoagulation (The Assists Trial). J Glaucoma. 2023 Mar 1;32(3):145-150. doi: 10.1097/IJG.0000000000002143. Epub 2023 Feb 1. PMID: 36848258; PMCID: PMC9991069.***

* CANDELA Study Investigators includes Ghassan Ghorayeb, M.D.
** YOSEMITE and RHINE Investigators includes Ghassan Ghorayeb, M.D.
*** ASSISTS Study Group includes Brian McMillan, M.D.



McCulloch DL, Bach M, Brigell M, Chan H, Hamilton R, Hogg C, Odom JV, Robson AG. ISCEV guidelines for calibration and verification of stimuli and recording instruments (2023 update). Doc Ophthalmol. 2023 Jun;146(3):199-210. doi: 10.1007/s10633-023-09932-z. Epub 2023 Jun 3. PMID: 37269394; PMCID: PMC10256657.

Mitchell B, Banna HU, Salido EM, Palko JR. Imaging of the posterior ocular vasculature of rat eyes using light sheet fluorescence microscopy (LSFM). Investigative Ophthalmology & Visual Science. 64(8):4727–4727.

Moakedi F, Aljammal R, Poria D, Saravanan T, Rhodes SB, Reid C, Guan T, Kefalov VJ, Ramamurthy V. Prenylation is essential for the enrichment of cone phosphodiesterase-6 (PDE6) in outer segments and efficient cone phototransduction. Hum Mol Genet. 2023 Aug 26;32(17):2735-2750. doi: 10.1093/hmg/ddad108. PMID: 37384398; PMCID: PMC10460490.

Motipally SI, Kolandaivelu S. Absence of PRCD Leads to Dysregulation in Lipid Homeostasis Resulting in Disorganization of Photoreceptor Outer Segment Structure. Adv Exp Med Biol. 2023;1415:389-394. doi: 10.1007/978-3-031-27681-1_57. PMID: 37440062.

Motipally SI, Myers B, Sechrest ER, Sokolov D, Murphy J, Kolandaivelu S. A Modified Acyl-RAC Method of Isolating Retinal Palmitoyl Proteome for Subsequent Detection through LC-MS/MS. Bio Protoc. 2023 Apr 20;13(8):e4654. doi: 10.21769/BioProtoc.4654. PMID: 37113337; PMCID: PMC10127047.

Moye AR, Robichaux MA, Wensel T. Expansion Microscopy of Mouse Photoreceptor Cilia. Adv Exp Med Biol. 2023;1415:395-402. doi: 10.1007/978-3-031-27681-1_58. Erratum in: Adv Exp Med Biol. 2023;1415:C1. PMID: 37440063; PMCID: PMC10697808.

Munezero D, Aliff H, Salido E, Saravanan T, Sanzhaeva U, Guan T, Ramamurthy V. HSP90α is needed for the survival of rod photoreceptors and regulates the expression of rod PDE6 subunits. J Biol Chem. 2023 Jun;299(6):104809. doi: 10.1016/j.jbc.2023.104809. Epub 2023 May 11. PMID: 37172722; PMCID: PMC10250166.

Odom JV. A search for the binocular VEP. Documenta Ophthalmologica. 2023 Mar;146(S1). doi:10.1007/s10633-023-09928-9

Papaliodis GN, Rosner BA, Dreger KA, Fitzgerald TD, Artornsombudh P, Kothari S, Gangaputra SS, Levy-Clarke GA, Nussenblatt RB, Rosenbaum JT, Sen HN, Suhler EB, Thorne JE, Bhatt NP, Foster CS, Jabs DA, Pak CM, Ying GS, Kempen JH; Systemic Immunosuppressive Therapy for Eye Diseases (SITE) Cohort Study Research Group. Incidence of and Risk Factors for Cataract in Anterior Uveitis. Am J Ophthalmol. 2023 Oct;254:221-232. doi: 10.1016/j.ajo.2023.06.021. Epub 2023 Jul 5. PMID: 37414328; PMCID: PMC10528977.

Patel A, Cui R, Odom JV, Leys M. Case Series on Autosomal Recessive Non-Syndromic Retinitis Pigmentosa Caused by POMGNT1 Mutations with a Report of a New Variant. J Clin Med. 2023 Dec 7;12(24):7549. doi: 10.3390/jcm12247549. PMID: 38137617; PMCID: PMC10743436.

Richards PJ, Kulkarni AD, Nork TM, Leys M, Hinkle D, Conlin KA, Chang S, Chang JS. Nonsurgical Resolution of Full-Thickness Macular Holes without Vitreomacular Traction. Retin Cases Brief Rep. 2023 Sep 1;17(5):584-587. doi: 10.1097/ICB.0000000000001249. PMID: 35446819.

Saravanan M, Xu R, Roby O, Wang Y, Zhu S, Lu A, Du J. Tissue-Specific Sex Difference in Mouse Eye and Brain Metabolome Under Fed and Fasted States. Invest Ophthalmol Vis Sci. 2023 Mar 1;64(3):18. doi: 10.1167/iovs.64.3.18. PMID: 36892534; PMCID: PMC10010444.

Schofield TS, Patel A, Palko J, Ghorayeb G, Laxson LC. Diabetic retinopathy screenings in West Virginia: an assessment of teleophthalmology implementation. BMC Ophthalmol. 2023 Mar 10;23(1):93. doi: 10.1186/s12886-023-02833-4. PMID: 36899342; PMCID: PMC9999538.

Schofield TS, Sup Lee C, Peppers BP, Mauger T. Corneal Ulcers with NOD2 Mutations Presenting with Mixed Syndromic Phenotype. Ocul Immunol Inflamm. 2023 Jan;31(1):119-122. doi: 10.1080/09273948.2021.1993268. Epub 2021 Nov 22. PMID: 34802386.

Sechrest ER, Chmelik K, Tan WD, Deng WT. Blue cone monochromacy and gene therapy. Vision Res. 2023 Jul;208:108221. doi: 10.1016/j.visres.2023.108221. Epub 2023 Mar 29. PMID: 37001420; PMCID: PMC10182257.

Sechrest ER, Robert BJ., Chmelik K, Cahill M, & Deng WT. (2023). Gene therapy rescues cone function and structure in a novel mouse model of blue cone monochromacy with the most common C203R missense mutation. Investigative Ophthalmology & Visual Science, 64(8), 797–797.

Shaikh N, Leonard A, Patton C, Boo S, Nguyen J, Turner M. Endoscopic Endonasal Orbital Apex Decompression for Carotid Cavernous Fistula. Ear Nose Throat J. 2023 Nov;102(11):693-695. doi: 10.1177/01455613211030347. Epub 2021 Jun 30. PMID: 34191645.

Shaikh N, Nguyen J, Bailey CE, Patel A, Ellis B, Makary CA. Rhinogenic Optic Neuropathy with No Light Perception Secondary to Onodi Cell Mucocele with Visual Recovery after Optic Nerve Decompression. Ear Nose Throat J. 2023 Apr 13:1455613231170600. doi: 10.1177/01455613231170600. Epub ahead of print. PMID: 37053194.

Shimura M, Kitano S, Ogata N, Mitamura Y, Oh H, Ochi H, Ohsawa S, Hirakata A; YOSEMITE and RHINE Investigators. Efficacy, durability, and safety of faricimab with extended dosing up to every 16 weeks in Japanese patients with diabetic macular edema: 1-year results from the Japan subgroup of the phase 3 YOSEMITE trial. Jpn J Ophthalmol. 2023 May;67(3):264-279. doi: 10.1007/s10384-023-00979-8. Epub 2023 Mar 10. PMID: 36897413; PMCID: PMC9999055.**

Tan WD, Odom JV, Leys M. Fundus Albipunctatus Associated with Biallelic LRAT Gene Mutation: A Case Report with Long-Term Follow-Up. J Clin Med. 2023 Nov 7;12(22):6960. doi: 10.3390/jcm12226960. PMID: 38002575; PMCID: PMC10672672.

Tzekov R, Odom JV. Has isolated check VEP finally come out of its infancy? Graefes Arch Clin Exp Ophthalmol. 2023 Jul;261(7):1809-1810. doi: 10.1007/s00417-023-05978-6. Epub 2023 Mar 1. PMID: 36856843.

Ul Banna H, Mitchell B, Chen S, Palko J. Super-Resolution Ultrasound Localization Microscopy Using High-Frequency Ultrasound to Measure Ocular Perfusion Velocity in the Rat Eye. Bioengineering (Basel). 2023 Jun 6;10(6):689. doi: 10.3390/bioengineering10060689. PMID: 37370620; PMCID: PMC10295416.

Vest SD, Coupland SE, Esmaeli B, Finger PT, Graue GF, Grossniklaus HE, Hindso TG, Holm F, Honavar SG, Khong JJ, Kirkegaard MK, McKelvie PA, Mikkelsen LH, Mulay K, Rasmussen PK, Siersma V, Sjö LD, Sniegowski MC, Thuro BA, Vemuganti GK, Heegaard S. Specific location of ocular adnexal lymphoma and mortality: an international multicentre retrospective study. Br J Ophthalmol. 2023 Sep;107(9):1231-1238. doi: 10.1136/bjophthalmol-2021-320466. Epub 2022 May 5. PMID: 35512851.

Wang D, Marous CL, Ozay F, Timashpolsky A, Gulati RD, Gottesman SRS, Boruk M, Shinder R, Hodgson NM. Intravascular Large B-cell Lymphoma Diagnosed by Nasal Biopsy in a Patient Presenting with Bilateral Ptosis and Ophthalmoplegia. Orbit. 2023 Aug;42(4):450-454. doi: 10.1080/01676830.2022.2034170. Epub 2022 Feb 28. PMID: 35226576.

Wang D, Shinder R. Comparison of Postoperative Infection Rates After Office-based Oculoplastic Procedures Using Sterile and Clean Gloves. Ophthalmic Plast Reconstr Surg. 2023 Mar-Apr 01;39(2):146-149. doi: 10.1097/IOP.0000000000002266. Epub 2022 Sep 9. PMID: 36095843.

Wykoff CC, Brown DM, Reed K, Berliner AJ, Gerstenblith AT, Breazna A, Abraham P, Fein JG, Chu KW, Clark WL, Leal S, Schmelter T, Hirshberg B, Yancopoulos GD, Vitti R; CANDELA Study Investigators. Effect of High-Dose Intravitreal Aflibercept, 8 mg, in Patients With Neovascular Age-Related Macular Degeneration: The Phase 2 CANDELA Randomized Clinical Trial. JAMA Ophthalmol. 2023 Sep 1;141(9):834-842. doi: 10.1001/jamaophthalmol.2023.2421. PMID: 37535382.*

Xu R, Wang Y, Du J, Salido EM. Retinal Metabolic Profile on IMPG2 Deficiency Mice with Subretinal Lesions. Adv Exp Med Biol. 2023;1415:457-463. doi: 10.1007/978-3-031-27681-1_67. PMID: 37440072.

Yan B, Viswanathan S, Brodie SE, Deng WT, Coleman KE, Hauswirth WW, Nirenberg S. A clinically viable approach to restoring visual function using optogenetic gene therapy. Mol Ther Methods Clin Dev. 2023 May 9;29:406-417. doi: 10.1016/j.omtm.2023.05.005. PMID: 37251979; PMCID: PMC10213293.

Zhu S, Xu R, Engel AL, Wang Y, McNeel R, Hurley JB, Chao JR, Du J. Proline provides a nitrogen source in the retinal pigment epithelium to synthesize and export amino acids for the neural retina. J Biol Chem. 2023 Nov;299(11):105275. doi: 10.1016/j.jbc.2023.105275. Epub 2023 Sep 21. PMID: 37741457; PMCID: PMC10616405.

Funding Jan 1 - Dec 31, 2023

Basic Science Grants

Wen Tao Deng, Ph.D., *Assistant Professor, Additional Appointment: Assistant Professor, Department of Biochemistry and Molecular Medicine*
Disease mechanisms of cone opsin mutants and treatment strategies
US DHHS-NIH-National Eye Institute
Duration: 8/1/2021 - 7/31/2024
Total Award Amount: $1,472,492

Intravitreal AAV Gene Therapy for Blue Cone Monochromacy: test of capsids and cone promoters on animal models and proof of concept study
BCM Families Foundation
Duration: 1/1/2023 - 11/02/2024
Total Award Amount: $130,888

Jianhai Du, Ph.D., *Associate Professor, Additional Appointment: Associate Professor, Department of Biochemistry and Molecular Medicine*
Proline metabolism in retinal health
US DHHS-NIH-National Eye Institute
Duration: 6/1/2021 - 3/31/2026
Total Award Amount: $1,900,000

Mitochondrial Pyruvate Transport in Retinal Health and Disease
US DHHS-NIH-National Eye Institute
Duration: 1/1/2021 - 11/30/2024
Total Award Amount: $1,980,105

Regulators of retinal metabolism in healthy and degenerating retinas
US DHHS-NIH-National Eye Institute – Subaward University of Pittsburgh
Duration: 7/1/2023 - 6/30/2024
Total Award Amount: $32,640

Mitochondrial Defects in the Retinal Pigment Epithelium and the CFH Risk Allele for Age-related Macular Degeneration
US DHHS-NIH-National Eye Institute – Subaward Doheny Eye Institute
Duration: 9/30/2022 – 6/30/2024
Total Award Amount: $151,307

Metabolic dysfunction from ECM remodeling in diseases of human RPE
US DHHS-NIH-National Eye Institute - University of Washington
Duration: 9/01/2022 – 6/30/2027
Total Award Amount: $195,140

Deciphering the Mechanisms Associated with High-risk AMD genotypes for ARMS2/HTRA1 and Complement Factor H
US DHHS-NIH-National Eye Institute – Subaward Doheny Eye Institute
Duration: 9/30/2022 – 8/31/2025
Total Award Amount: $182,400

Nutritional Strategies in Age-Related Macular Degeneration
International Retinal Research Foundation
Duration: 1/1/2023 - 12/31/2023
Total Award Amount: $43,000

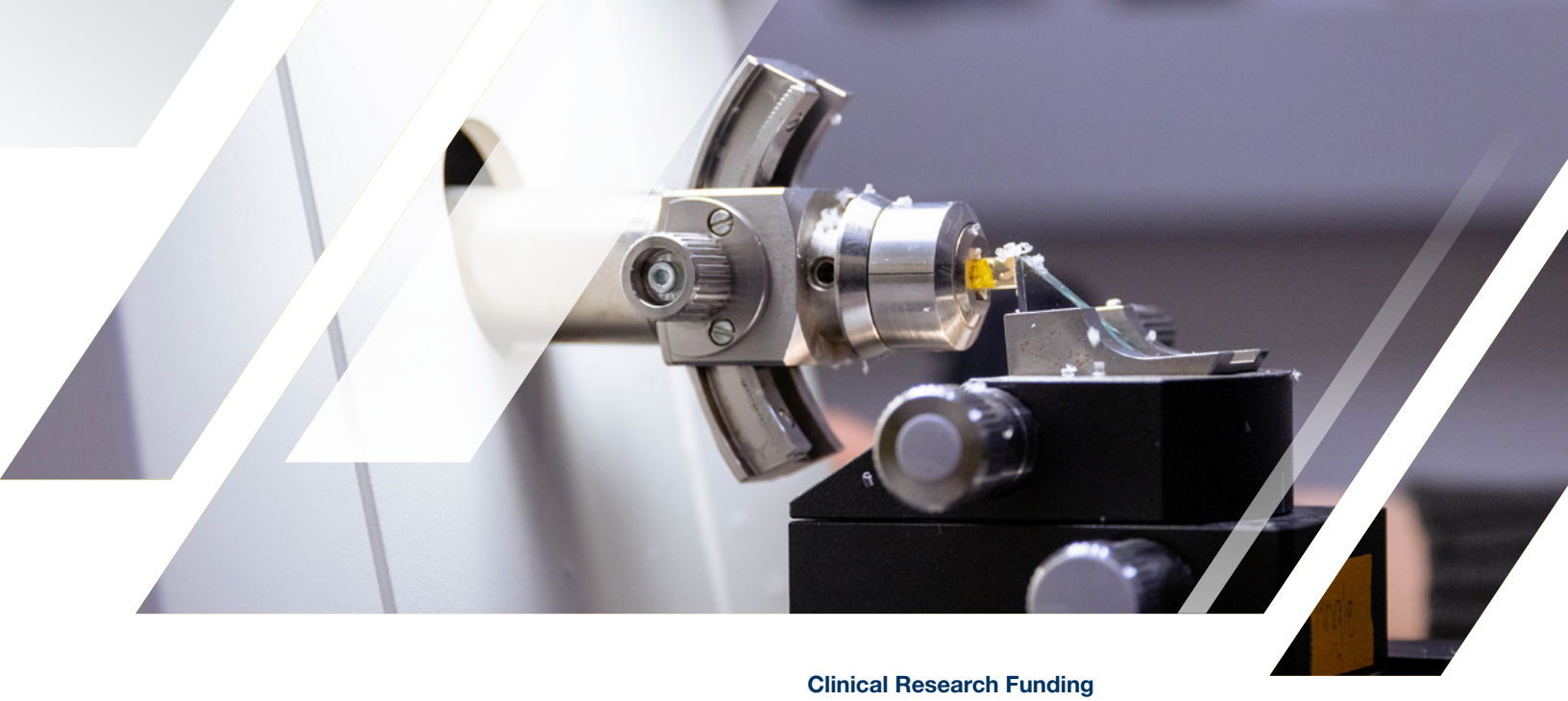
AMD iPSC-derived
US DHHS-NIH-National Eye Institute - University of Washington
Duration: 9/30/2022 – 8/31/2025
Total Award Amount: $155,122

Pathogenesis and motor neuron degeneration of a novel disease associated with a P158A mutation in NAMPT
US DHHS-NIH-National Eye Institute - Subaward University of Missouri
Duration: 4/1/2022 – 3/31/2027
Total Award Amount: $93,630

Saravanan Kolandaivelu, Ph.D., *Associate Professor, Additional Appointment: Associate Professor, Department of Biochemistry and Molecular Medicine*
Mechanisms Behind Retinal Photoreceptor Cells Outer Segment Biogenesis
US DHHS-NIH-National Eye Institute
Duration: 5/1/2018 - 4/30/2024
Total Award Amount: $1,488,750

Joel Palko, M.D., Ph.D., *Assistant Professor*
Visual Sciences Center of Biomedical Research Excellence
US DHHS-NIH-National Institute of General Medical Sciences
Duration: 3/20/2022 – 1/31/2024
Total Award Amount: $661,585

Michael Robichaux, Ph.D., *Assistant Professor, Additional Appointment: Assistant Professor, Department of Biochemistry and Molecular Medicine*
Visual Sciences Center of Biomedical Research Excellence
US DHHS-NIH-National Institute of General Medical Sciences
Duration: 3/20/2022 – 1/31/2024
Total Award Amount: $589,800



Clinical Research Funding

Subcellular Analysis of Photoreceptor Cell Health in Mouse Models for Retinitis Pigmentosa and Retinal Gene Therapy
Knights Templar Eye Foundation Inc.
Duration: 7/1/2022 – 6/30/2023
Total Award Amount: $103,114

Maxim Sokolov, Ph.D., *Professor, Additional Appointments: Professor, Department of Biochemistry and Molecular Medicine; Professor, Department of Neuroscience; Professor, Rockefeller Neuroscience Institute*
Protein-Unfolding Chaperones for the Treatment of Blindness
US DHHS-NIH-National Eye Institute
Duration: 6/1/2019 - 5/31/2024
Total Award Amount: $1,410,750

Visvanathan Ramamurthy, Ph.D., *Professor, Vice-Chair of Research; Additional Appointments: Chairman, Professor, Department of Biochemistry and Molecular Medicine*
Biosynthesis and Trafficking of Phosphodiesterase in the Retinal Photoreceptors
US DHHS-NIH-National Eye Institute
Duration: 4/1/2020 - 3/31/2025
Total Award Amount: $1,921,805

Emily Sechrest, *Post-Doctoral Research Assistant (Deng Lab)*
Disease mechanism of blue cone monochromacy and gene therapy approaches to extend the therapeutic window
Knights Templar Eye Foundation Inc
Duration: 7/1/2023 - 6/30/2024
Total Award Amount: $90,000

Tony Realini, M.D., M.P.H, *Professor, Vice-Chair for Clinical Research*
Clarifying the Optimal Application of SLT Therapy (COAST) Trial
US DHHS-NIH-National Eye Institute
Duration: 9/30/2020 - 8/31/2025
Total Award Amount: $2,667,572

Ghassan Ghorayeb, M.D., *Associate Professor, Vitreoretinal Fellowship Program Director, Vice-Chair of Clinical Affairs, Vitreoretinal Division Director*
A Multicenter, Prospective, Observational Study Of The Progression Of Intermediate Age-Related Macular Degeneration
Genentech Incorporated
Duration: 8/8/2022 – 8/30/2024
Total Award Amount: $5,500

A Phase 2, Outcomes Assessor-Masked, Multicentre, Randomized Study To Evaluate The Safety And Efficacy Of Two Doses Of GT005 Administered as a Single Subretinal Injection in Subjects with Geographic Atrophy Secondary to Age-Related Macular Degeneration
Gyroscope Therapeutics, Ltd
Duration: 10/6/2021 – 2/28/2024
Total Award Amount: $4,000

AND SAFETY OF HIGH-DOSE AFLIBERCEPT IN PATIENTS WITH DIABETIC MACULAR EDEMA
A Randomized, Double-Masked, Active-Controlled Phase 2/3 Study of the Efficacy and Safety of High-Dose Aflibercept in Patients with Diabetic Macular Edema
Regeneron Pharmaceuticals, Inc.
Duration: 12/8/2022 – 6/9/2023
Total Award Amount: $25,080

$16,801,461 IN FUNDS from **47 SOURCES**

A Phase 3, Multicenter, Double-masked, Randomized Study to Evaluate the Efficacy and Safety of Intravitreal OPT-302 in Combination with Aflibercept, Compared with Aflibercept Alone in Participants with Neovascular Age-related Macular Degeneration (nAMD)
Opthea
Duration: 5/24/2021 – 12/31/2025
Total Award Amount: $7,000

RAINBOW Extension Study: An Extension Study to Evaluate the Long-term Efficacy and Safety of Ranibizumab Compared with Laser Therapy for the Treatment of Infants Born Prematurely with Retinopathy of Prematurity
Novartis Pharmaceutical Corporation
Duration: 3/1/2017 – 10/30/2023
Total Award Amount: $21,233

Randomized, Double-Masked, Active-Controlled, Phase 3 Study of the Efficacy and Safety of High Dose Aflibercept in Patients with Neovascular Age-Related Macular Degeneration
Regeneron Pharmaceuticals, Inc.
Duration: 9/2/2020 - 5/27/2023
Total Award Amount: $66,182

GR41986 A Phase III, Multicenter, Randomized, Double-Masked, Active Comparator Controlled Study to Evaluate the Efficacy and Safety of Farcimimab in Patients with Macular Edema Secondary to Central Retinal or Hemiretinal Vein Occlusion
Hoffmann-La Roche Inc
Duration: 10/27/2020 - 1/18/2024
Total Award Amount: $33,652

A Phase 2, Randomized Multi-center Study to Assess the Dose level of Multiple THR-149 Injections and to Evaluate the Efficacy and Safety of THR-149 Vs. Aflibercept for the treatment of diabetic macular edema
Oxurion NV
Duration: 10/19/2020 - 3/31/2023
Total Award Amount: $11,965

A Multicenter, Open-Label Extension Study To Evaluate the Long-Term Safety And Tolerability of Faricimab in Patients With Diabetic Macular Edema
Genentech Incorporated
Duration: 12/3/2020 - 8/18/2023
Total Award Amount: $85,520

Kevin Halenda, M.D., *Assistant Professor*
Mentoring for the Advancement of Physician Scientists (MAPS)
American Glaucoma Society
Duration: 12/01/2023 - 12/1/2024
Total Award Amount: $10,000

Lingo Lai, M.D., *Assistant Professor, Cornea Fellowship Program Director, Associate Residency Program Director*
A Phase 2 Open Label Trial of ST266 Eye Drops in the Treatment of Persistent Corneal Epithelial Defects (PED)
Noveome Biotherapeutics, Inc.
Duration: 2/5/2020 - 4/21/2030
Total Award Amount: $10,905

ST266-PED-202: A PHASE 2B, MULTI-CENTER, RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY WITH OPEN-LABEL EXTENSION TO EVALUATE THE SAFETY AND EFFICACY OF ST266 EYE DROPS IN THE TREATMENT OF PERSISTENT CORNEAL EPITHELIAL DEFECTS
Noveome Biotherapeutics, Inc.
Duration: 1/27/2022 – 1/31/2024
Total Award Amount: $31,500

Grace Levy-Clarke, M.D., *Associate Professor*
A PHASE III, MULTI CENTER, RANDOMIZED, DOUBLE MASKED, SHAM CONTROLLED STUDY TO INVESTIGATE THE EFFICACY, SAFETY, PHARMACOKINETICS, AND PHARMACODYNAMICS OF RO7200220 ADMINISTERED INTRAVITREALLY IN PATIENTS WITH UVEITIC MACULAR EDEMA
Genentech Incorporated
Duration: 2/4/2021 - 1/30/2031
Total Award Amount: $6,491

Brian McMillan, M.D., *Associate Professor, Glaucoma Fellowship Program Director, Anterior Segment Director*
An Extension Trial to Evaluate the Long-term Safety and Efficacy of Bimatoprost SR in Patients with Open Angle Glaucoma or Ocular Hypertension
Allergan Inc.
Duration: 9/6/2019 - 1/21/2024
Total Award Amount: $6,000

Field Test of Glaucoma Outcomes Survey
The Emmes Corporation
Duration: 2/4/2021 - 1/30/2031
Total Award Amount: $1,450

John Nguyen, M.D., *Professor, Ophthalmic Plastic and Reconstructive Surgery Fellowship Director*
Establishment of an Ocular Disease and Injury Iris Dataset
US-DOJ-Federal Bureau of Investigations
Duration: 3/1/2022 – 8/30/2023
Total Award Amount: $227,095

A Phase 2b, Randomized, Double-Mask, Placebo-Controlled, Study to Evaluate the Safety, Pharmacokinetics and Efficacy of Linsitinib in Subjects with Active, Moderate to Severe Thyroid Eye Disease (TED)
VasaraGen, Inc
Duration: 1/24/2022 – 8/31/2025

Total Award Amount: $74,277

A Multicenter, Extension Study to Evaluate the Efficacy, Safety, Pharmacokinetics, and Pharmacodynamics of Two Doses of Linsitinib in Subjects with Active, Moderate to Severe Thyroid Eye Disease (TED)
VasaraGen, Inc
Duration: 4/17/2023 – 8/31/2025
Total Award Amount: $3,500

A Phase 4, Randomized, Double-masked, Placebo-controlled, Multicenter Trial to Evaluate the Efficacy and Safety of TEPEZZA(R) in Treating Patients with Chronic (Inactive) Thyroid Eye Disease
Horizon Therapeutics U.S.A., Inc
Duration: 6/20/2022 – 6/30/2026
Total Award Amount: $2,000

Students and their families enjoy a fun day at Marilla Park in Morgantown, West Virginia, during a CVRP Day Camp hosted for children ages 3-12 and their families.

Service Grant Funding — State & Foundation Awards

Rebecca Coakley, MA, CLVT, *Director of Outreach, West Virginia University Eye Institute*

West Virginia Department of Vision Rehabilitation
State of West Virginia
Duration: 2023
Total Award Amount: $429,000

Greater Kanawha Valley Foundation
Duration: 2023
Total Award Amount: $98,800

Benedum Foundation
Duration: 2023
Total Award Amount: $120,000

Teubert Foundation
Duration: 2023
Total Award Amount: $59,961

Pallottine Foundation
Duration: 2023
Total Award Amount: $25,000

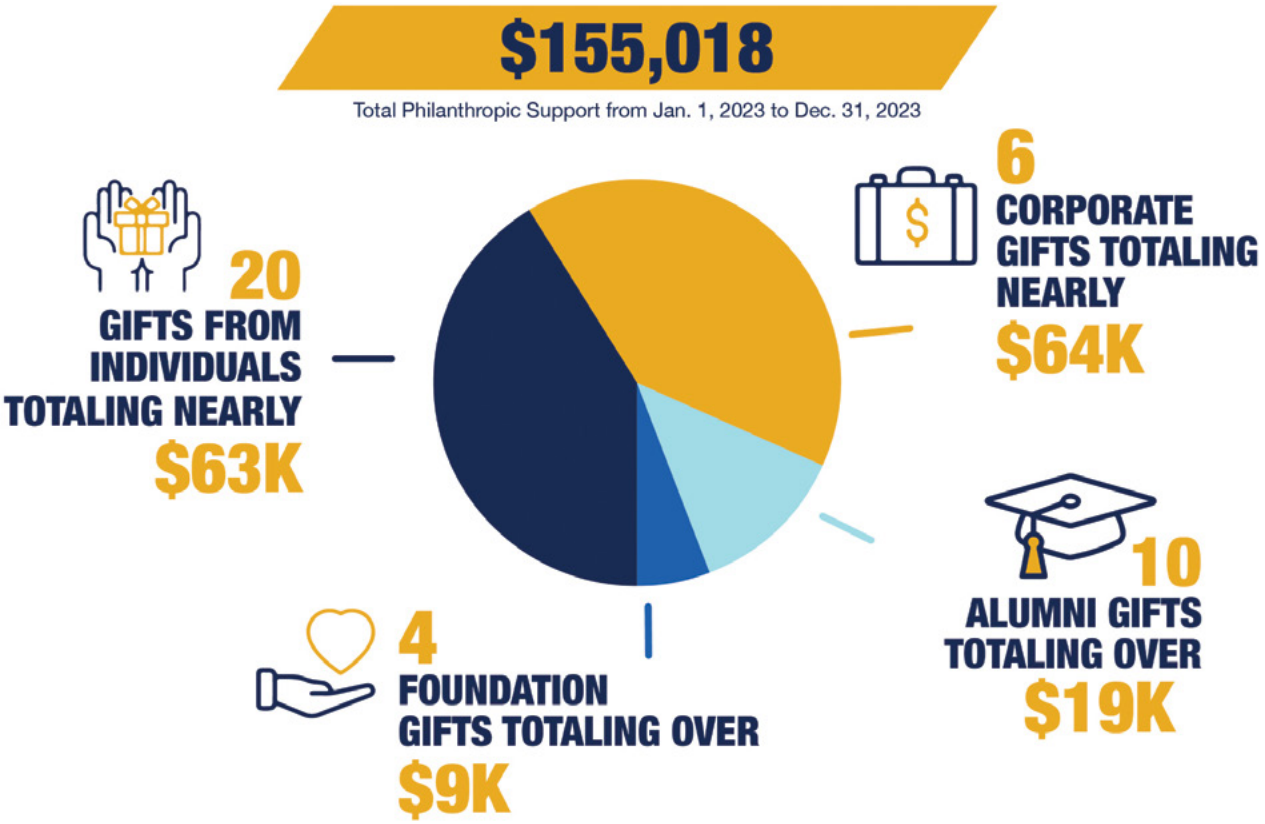
Alcon Foundation
Duration: 2023
Total Award Amount: 85,000

WVU NIP Grants
Duration: 2023
Total Award Amount: $25,000

Parkersburg Area Foundation
Duration: 2023
Total Award Amount: $5,250

Milan Puskar Foundation
Duration: 2023
Total Award Amount: $50,000

DONORS



Thank you!

We would like to thank our benefactors who have generously contributed to the Eye Institute over the past year. In 2023, we received more than $155,018 in funds from alumni, friends, grateful patients, corporations and foundations in support of our mission. When you give to the to the WVU Department of Ophthalmology and Visual Sciences and the WVU Eye Institute, you give the gift of vision. Private giving can often make the difference in the success of our programs by providing funding for additional support for an established program, financing a necessary piece of equipment, supplementing research projects and supporting our ophthalmology students and residents. Philanthropic support allows us to provide transformative vision care to the people we serve now and into the future. We are grateful for your support; we could not accomplish what we do without your help.

$63,641.00 Corporate Gifts:

American Printing House For The Blind

Moving Mountains

VIP Educational Services Company

American Electric Power Foundation

$19,120.00 Alumni Gifts:

10 gifts from 9 donors

$9,350.00 Foundation Gifts:

Lions Club of Parkersburg

Foundation for the Tri-State Community

Union Lions Club

$62,907.00 Individual Gifts:

20 gifts from 17 donors

“The dedication and commitment of our faculty and staff have undoubtedly played a pivotal role in shaping the future of ophthalmology on a statewide and national scale. Our residents, fellows and students continue to produce important clinical research.”

THOMAS MAUGER, **M.D.**
Jane McDermott Shott Chair, Profssor, Department of Ophthalmology and Visual Sciences

WVU Eye Institute

West Virginia University
DEPARTMENT OF OPHTHALMOLOGY
AND VISUAL SCIENCES

1 Medical Center Drive
P.O. Box 9100
Morgantown, WV 26506-9600

medicine.hsc.wvu.edu/eye
wvumedicine.org/eye