



Shiley Eye Institute

The Viterbi Family
Department of
Ophthalmology

UC San Diego Health
UC San Diego
SCHOOL OF MEDICINE

FOR SIGHT

Annual Report 2022

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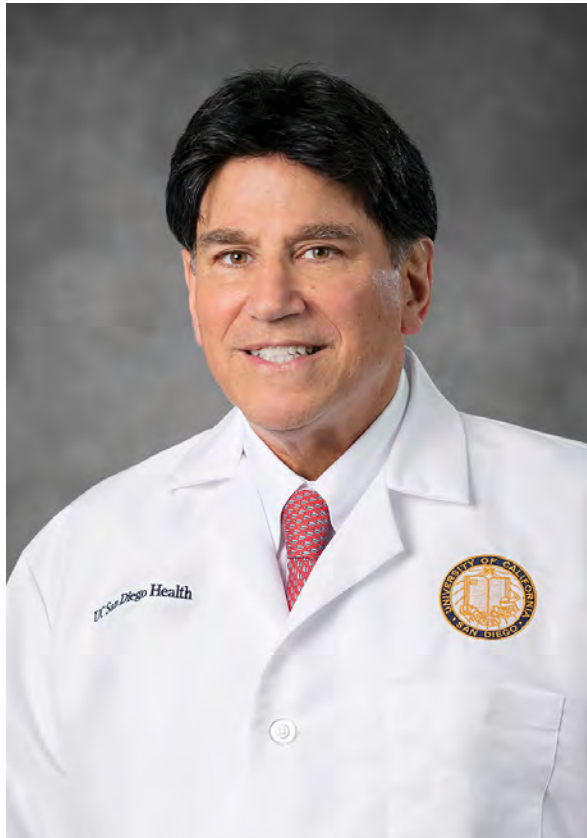
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On the Cover | *"Retinal Phantasm"*
courtesy of Richard F. Spaide, MD, New York, NY



Letter from the Chair

Dear Friends,

The past year has provided indisputable proof again that the Shiley Eye Institute (SEI) community can thrive even in the most challenging conditions. Adapting to the changing landscape in healthcare and in our world, we have remained focused and productive while maintaining our compassion, curiosity, and connectivity. Our staff, residents and fellows, researchers and clinicians never veered from their dedication to our primary missions in patient care excellence, groundbreaking discovery, and education, as well as their commitment to community service. Everyone who works and learns at the Shiley Eye Institute today contributes in a unique way to our environment, but we all share a commitment to excellence.

With the imminent groundbreaking of the Viterbi Family Vision Research Center, we are looking forward to accelerating our development of treatments and cures for preventable and blinding eye diseases in new state-of-the-art laboratory space and with the recruitment of key scientists. We particularly are grateful for the support of Hanna and Mark Gleiberman who have generously donated \$20 million to fund the Hanna and Mark Gleiberman Center for Glaucoma Research that will be housed in the new Viterbi Vision Research Center.

As our clinical activities continue to grow, there has been an increasing need for additional space to house them. Through the generosity of Darlene Shiley and with additional support from UCSD Health, a major remodeling of the second floor of the Shiley Eye Center was unveiled on February 10. Not only will the clinical space grow by ~25%, but there will be additional procedural space and a new laser treatment center.

You can read about some of the highlights in the Annual Report, including:

- Appointment of another Viterbi-endowed chair and recruitment of four stellar new faculty members
- Updates from the Richard C. Atkinson Laboratory for Regenerative Ophthalmology and the Nixon Visions Foundation initiative
- Broadening outreach to enhance diversity, equity and inclusion within our team and patients
- Fascinating work and research into strabismus, smoking effects in glaucoma, AI use in research, physician wellness and building "bridges" throughout UCSD

Building on the commitment to our community, we also are excited to have a new Shiley EyeMobile for Children. Moreover, it is our hope to refurbish the established EyeMobile to provide similar services to underserved seniors in our community.

With the engagement and the support of our entire Shiley Eye Institute team, there indeed is a bright future for our patients. We could not be more grateful for the year after year continued support of our family and friends that power our missions. There is no limit to what we can achieve to translate our groundbreaking discoveries to our patients.

A handwritten signature in black ink, which appears to read "Robert N. Weinreb".

Robert N. Weinreb, MD

Chair and Distinguished Professor, Ophthalmology
Director, Shiley Eye Institute



Letter from the Chancellor

Dear Friends,

In this report, we celebrate another impactful year of success for the Shiley Eye Institute and Viterbi Family Department of Ophthalmology, which continue to set the standard of excellence in innovative clinical care, education, community service and collaborative research in ophthalmology. These featured stories recognize our talented new faculty, spotlight collaborations across the UC San Diego Health system and the university campus, and focus on the latest research, groundbreaking discoveries and successful treatment outcomes. With this report, we are pleased to share the impressive – and often life-changing – results we have delivered for our valued patients.

Our impact is not limited to the UC San Diego Health campus. We continue to focus on expanding access to quality healthcare throughout our region. The new Shiley EyeMobile for Children, a 33-foot-long vision clinic on wheels, started rolling through the community to remove barriers to vision care for underserved children and their families. Equipped with two exam rooms and a waiting area, the EyeMobile offers eye care services at no cost with the goal to serve 20,000 children each year. And this is only one example of UC San Diego's ongoing commitment to advancing health equity – one vision screening, one dilated eye exam, and one pair of glasses at a time.

This year, a \$20 million gift from Hanna and Mark Gleiberman will establish the Hanna and Mark Gleiberman Center for Glaucoma Research focused on protecting and restoring the vision of those affected by glaucoma. Inside this center, thanks to the transformative generosity of Dr. Andrew Viterbi, we are breaking ground on the new Viterbi Family Vision Research Center, a hub for interdisciplinary ophthalmology research. And recently, plans were unveiled for the expansion of the Shiley Eye Institute, which will markedly increase access, expand research infrastructure, and provide world-class facilities to diagnose, treat and develop therapies for vision diseases. This expansion is made possible by the more than \$20 million Darlene and her late husband Donald Shiley have generously donated throughout the years, establishing a remarkable and enduring legacy.

Every day, UC San Diego strives to be an impactful and accessible public asset and transform our society for the better. I extend my deepest gratitude to our generous supporters who make the vital work of world-class vision care possible in support of this commitment. Your partnership with UC San Diego and the Shiley Eye Institute drives new discoveries, accelerates treatments and cures, and improves patients' lives in our region and all over the world. Because of our visionary supporters, the next great discoveries are within reach. Together, we will transform vision care well into the future.

With Kind Regards,

A handwritten signature in black ink, reading "Pradeep K. Khosla".

Pradeep K. Khosla, PhD
Chancellor, UC San Diego

Letter from the Vice Chancellor

Dear Friends,

Back in 1991, when the Shiley Eye Center opened, the vision was already clear. Even a young professor of gastroenterology in UC San Diego Health could see it — and all of these years later, that vision has only become bigger and bolder.

It embraces both a personal and world view, a combination of superb, personalized patient care with an eye to addressing the great challenges to human health and sight, from glaucoma, cataracts and diabetic retinopathy to pediatric strabismus and the simple, childhood need for a good set of eyeglasses.

It is driven by compassion and sustained by incomparable basic and translational research that sees beyond the easy or obvious, bringing together the world-class faculty in the Viterbi Family Department of Ophthalmology with their equally esteemed collaborators across campus at Halıcıoğlu Data Science Institute, Moores Cancer Center and in more than a dozen academic department at UC San Diego.

It goes beyond to multidisciplinary academic and clinical projects across the nation and around the world, made possible by highly competitive grants from the National Eye Institute, private foundations and, particularly, transformative gifts from some of our most generous philanthropic partners.

The history of Shiley sparkles with success and achievement, a credit to faculty, staff and to donors who have shared the vision and helped make it a reality. The planned expansion of clinical services at Shiley Eye Institute and new Viterbi Family Vision Research Center, a five-story, 100,000-square-foot facility, conjure an even brighter future; indeed, a site to behold.

I look forward to it.



John M. Carethers, MD
Vice Chancellor for Health Sciences
UC San Diego



Letter from the CEO

Dear Friends,

For many of our patients, the Shiley Eye Institute is their first encounter with the level of care provided by a renowned academic medical center such as UC San Diego Health. From the start, Shiley has been at the forefront of vision expertise and outstanding eye care. Our clinical teams and internationally recognized faculty advance the field of ophthalmology every day, from treating diabetic retinopathy and macular degeneration to exploring the progression of glaucoma using artificial intelligence or developing gene therapies that can restore vision. They consistently provide the future of eye care today at UC San Diego Health.

The tremendous growth of these services over the past 30-plus years underscores the many successful outcomes experienced by our thankful patients. Their satisfaction continues to drive demand. In turn, we continue to increase our ophthalmology offerings at every opportunity.

The future of eye care remains within our sights thanks to the generosity and continued partnership of Donald and Darlene Shiley. Darlene's recent \$10 million gift, along with the additional funds provided by UC San Diego Health, will create more clinical space and significantly increase patient access to our world-class clinical team.

The Shiley Eye Institute continues its legacy of impact. It inspired the creation of the Ratner Children's Eye Center, the Hamilton Glaucoma Center, and the Viterbi Family Department of Ophthalmology building—opening right next door in 2025. And soon, researchers will be closer to finding ways to reverse the effects of glaucoma thanks to \$20 million gift from Hanna and Mark Gleiberman to establish the Hanna and Mark Gleiberman Center for Glaucoma Research.

Because of the generous support of donors like you, UC San Diego Health will continue to drive exploration, innovation and serve our community with the same compassion we always have in new facilities that afford our patients every advantage. We can't wait for you to experience the future of eye care at our transformed Shiley Eye Institute.



Patty Maysent, MPH, MBA
CEO, UC San Diego Health





Simply World Class

The UC San Diego Viterbi Family Department of Ophthalmology at the Shiley Eye Institute offers treatment across all areas of eye care. Our world class clinicians, surgeons, scientists, trainees and staff are dedicated to excellence and providing the best possible patient care to prevent, treat and cure eye diseases. Our research is at the forefront of developing new methods to diagnose, save and restore vision. In addition to educating the leaders of tomorrow, we are committed to serving the San Diego and global community.

Executive Committee



Top Row (L to R) Craig Kishaba, MBA, David B. Granet, MD, Sally Baxter, MD, MSc

*Bottom Row (L to R) Natalie A. Afshari, MD, William Freeman, MD, Robert N. Weinreb, MD,
Linda Zangwill, PhD, Don O. Kikkawa, MD*

ROBERT N. WEINREB, MD
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LINDA ZANGWILL, PhD
INTERIM DIRECTOR, RESEARCH

CRAIG KISHABA, MBA
ADMINISTRATIVE VICE CHAIR

SEI Clinical Expansion



Distinguished guests and faculty attended the celebration announcing the Shiley Eye Institute (SEI) Clinical Expansion on February 10, 2023 with benefactor Darlene Shiley, Chancellor Pradeep K. Khosla, Vice Chancellor of Health Sciences John M. Carethers, MD, CEO of UC San Diego Health Patty Maysent and **Robert N. Weinreb, MD**, Director of the Shiley Eye Institute and Chair of the Viterbi Family Department of Ophthalmology in attendance.

Chancellor Khosla praised Mrs. Shiley's long-term support of SEI through her most recent generous gift which made this expansion possible. Dr. Weinreb remarked on the Shileys' history of support for SEI and their lasting legacy.

Chancellor Pradeep K. Khosla, CEO of UC San Diego Health Patty Maysent, benefactor Darlene Shiley, Vice Chancellor of Health Sciences John M. Carethers, MD and Director of the Shiley Eye Institute and Chair of the Viterbi Family Department of Ophthalmology Robert N. Weinreb, MD



The finished renovations on the SEI second floor will add clinical space, ophthalmic procedure rooms, a refractive laser center and a microsurgery training center for residents and fellows. There also will be space to accommodate its ever-increasing high volume of patients more comfortably with this expansion which is expected to be completed in late 2024.

SEI Honored

The Optometric Glaucoma Society (OGS) Scientific Meeting 2022 recognized for the first time a group as their Honoree - the many contributions of the faculty and staff at the Shiley Eye Institute, UC San Diego. Under the direction of **Robert N. Weinreb, MD**, Distinguished Professor and Chair, SEI's accomplishments in glaucoma research, education and glaucoma care excellence have established the standard of care.

As mentioned by Murray Singeret, OD, cofounder of the OGS, "the list of individuals who trained in glaucoma at the SEI and then went to lead other eye departments is legendary and a "Who's Who of Eyecare". Beginning almost forty years ago, the Hamilton Glaucoma Center at the SEI consistently has led the way in development of ophthalmic imaging."

Other notable areas of innovation include the pioneering use of 24-hour IOP measurements, development of alternative perimetric techniques, laboratory and clinical studies of both the outflow pathways and also glaucoma neuroprotection, as well as application of artificial intelligence to glaucoma diagnostics.

Congratulations to SEI for this prestigious award!



Restoring Vision in Glaucoma

Researchers at the University of California San Diego are accelerating their efforts to reverse the vision loss of glaucoma, thanks to \$20 million in support from Hanna and Mark Gleiberman. The gift will establish the Hanna and Mark Gleiberman Center for Glaucoma Research at UC San Diego.

The center will be housed within the Viterbi Family Vision Research Center at UC San Diego. The funds are designated to stimulate research on advanced glaucoma, with the ultimate goal of protecting and restoring the vision of those who suffer from the condition.

As someone who was diagnosed with glaucoma, Mark Gleiberman understands the need and urgency to find a cure. Glaucoma is caused by damage to the optic nerve and can progressively lead to blindness. Gleiberman receives ongoing care from **Robert N. Weinreb, MD**, chair and Distinguished Professor

of Ophthalmology, Director of the Shiley Eye Institute and holder of the Morris Gleich, MD, Chair in Glaucoma at UC San Diego.

"We have seen the incredible work that is being done at the Shiley Eye Institute, both from a clinical and research perspective. I believe that the glaucoma team at Shiley, led by Dr. Weinreb, is truly a world leader," said Gleiberman, who is founder and CEO of MG Properties. "Hanna and I hope that our donation will greatly assist in accelerating and enhancing the groundbreaking work already being done."

In addition to establishing the new center, the Gleibermans' gift will create three new endowed chairs — Hanna and Mark Gleiberman Chancellor's Endowed Chair in Glaucoma Research I, II and III — to support the recruitment of exceptional vision scientists to the research team.

"UC San Diego has an established history as one of the nation's top places for vision care and research, and this gift will serve to bolster even further the leading-edge work taking place to combat glaucoma," said UC San Diego Chancellor Pradeep K. Khosla. "We are grateful to Hanna and Mark Gleiberman for their visionary support of this new center.

In recognition of their dedicated support of the campus, the Gleibermans were honored with the 2021 Chancellor's Medal, one of the highest honors given by UC San Diego to recognize exceptional service in support of the university's mission.

FINDING A CURE FOR GLAUCOMA

Glaucoma is the leading cause of irreversible blindness in people over 60 years of age, but it can affect patients of all ages, including children. The progressive eye disease affects more than 3 million people in the United States and 70 million individuals worldwide.

The Gleibermans' donation will bolster efforts to find effective ways of restoring vision to glaucoma patients in whom optic nerve damage has already occurred.

Researchers will be investigating various potential treatments, including utilizing stem cells to promote optic nerve regeneration. Researchers will also look at how to protect patients' existing

vision by identifying and rescuing retinal ganglion cells that have not yet died due to the condition.

"We are so grateful to Hanna and Mark Gleiberman for making this generous investment," said Weinreb, who will serve as the principal investigator. "Our team plans to consider therapeutic approaches that will help achieve the goal to restore the vision of those who suffer from glaucoma."

According to Weinreb, the gift will help UC San Diego grow the team of vision scientists who will focus on glaucoma research with the goal of accelerating the delivery of laboratory discoveries to patients in the clinical setting. The three new endowed chairs will support the recruitment of top researchers in the field.

"We understand that to regenerate the optic nerve damage which has already occurred is no small task, and likely to be a research project taking many years," said Gleiberman. "But we believe that the Shiley Eye Institute team is very well equipped to take this on with results which can potentially benefit millions of people worldwide."

BREAKING NEWS

Robert N. Weinreb, MD Named as Recipient of the Laureate Award from the World Glaucoma Association



The Association's highest honor, this biannual award recognizes "seminal research, meritorious service, leadership and mentorship, innovation, international contributions, public service, translation of science to practice, and lifetime achievement."

Dr. Weinreb is Chair and Distinguished Professor of Ophthalmology at the University of California San Diego where he also is the Director of the Shiley Eye Institute, Distinguished Professor of Bioengineering, and holder of the Morris Gleich MD Chair of Glaucoma.

A graduate of Harvard Medical School, Dr. Weinreb is a clinician, a surgeon, scientist, mentor and educator. Patients from throughout the world seek his medical and surgical expertise. His clinical and research interests are diverse and range from the front to the back of the eye, including the diagnosis, as well as the medical and surgical treatment of glaucoma.

Dr. Weinreb has served as President of the Association for Research in Vision and Ophthalmology, World Glaucoma Association, American Glaucoma Society, American Glaucoma Society Foundation, and Latin American Glaucoma Society. He has trained and mentored more than 170 post-doctoral fellows including more than 20 department chairs and numerous professors in the US and throughout the world.

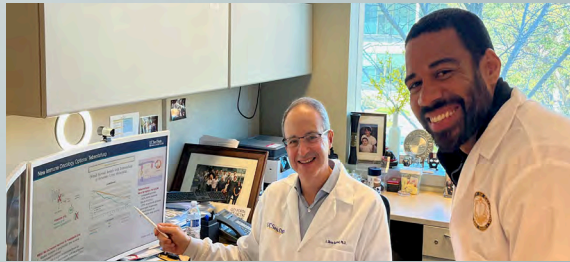
The Award will be presented at the biannual World Glaucoma Congress in Rome on June 28, 2023.

Comprised of 91 international glaucoma societies with more than 14,000 members, the World Glaucoma Association is a global organization for glaucoma science and care whose core purpose is to eliminate glaucoma-related disability worldwide.

SEI @ UCSD

K12 Scholars' Mentors

The faculty at the Shiley Eye Institute and Viterbi Family Department of Ophthalmology is fortunate to collaborate on research projects with many areas across the UC San Diego campus. These partnerships often open doors to funding and new relationships with outside companies but more importantly are translating our research into real world discoveries and treatments for patients with eye diseases and vision disorders.



Nathan L. Scott, MD with mentor J. Silvio Gutkind, PhD



Christopher B. Toomey, MD, PhD with mentor Jeffrey D. Esko, PhD

New SEI faculty members **Nathan L. Scott, MD, MPP** and **Christopher B. Toomey, MD, PhD** were appointed as K12 Scholars in the Ophthalmology and Visual Sciences Career Development Program and Mentored Clinical Scientist Development Program at UC San Diego and sponsored by the National Eye Institute (NEI) part of the National Institutes of Health (NIH). The objective is to develop outstanding clinician scientists to successfully compete at the national level for NIH grants and emerge as leaders within academic ophthalmology.

Nathan L. Scott, MD, MPP, Assistant Professor, is training under the mentorship of **J. Silvio Gutkind, PhD**, Professor of Pharmacology, Associate Director, Basic Science, as part of his research into development of a new mouse model to study metastatic uveal melanoma. Dr. Scott hopes to expand his knowledge of state-of-the-art molecular biology techniques as well as to take advantage of newly established high throughput mouse genetic models and RNA sequencing, single cell genetic analysis, and gene

editing technologies (including CRISPR-Cas9 screens) and bioinformatics analysis. Working in the Gutkind Lab, Dr. Scott's goals are to train in the highly relevant scientific environment, improving his critical thinking about ethical issues and regulations in biotechnology—ultimately becoming an independent investigator.

Christopher B. Toomey, MD, PhD, Assistant Professor, is training under the primary mentorship of **Jeffrey D. Esko, PhD**, Distinguished Professor, Department of Cellular and Molecular Medicine and Founding Director, Glycobiology Research and Training Center and co-mentor **Radha Ayyagari, PhD**, Professor of Ophthalmology and Pathology, Chief of Ophthalmic Molecular Genetics Laboratory (CLIA certified), Director of Shiley Eye Institute BioBank and Viterbi Family Chair III. Working within the Glycobiology Research and Training Center, Dr. Toomey will gain advanced training in glycobiology, in addition to advanced training in CRISPR/Cas9 and viral approaches to modifying gene expression, training in lipoprotein biology, and advanced training in electron microscopy analysis.

Gene Therapy

At the November 2022 Clinical Trials in Gene Therapy Symposium part of the French American Innovation Day (FAID) hosted by UC San Diego School of Medicine, the Embassy of France and Assistance Publique-Hopitaux de Paris, researchers and physicians discussed clinical trial collaborations and treatments in gene therapy in the U.S. and abroad. Gene therapy repairs or replaces a defective gene to treat or cure a disease caused by an abnormality.

At UC San Diego, there is a diverse group of scientists and physicians exploring the potential of gene therapy to treat a myriad of conditions.

Featured speaker in the Eye Disorders section of the symposium, **Shyamanga Borooah, MD, PhD**, Assistant Professor in the Viterbi Family Department of Ophthalmology, spoke about gene therapies for inherited retinal degeneration.

He stated, "The eye is an ideal target organ for gene therapy because it is easy

to access and monitor, separated from the systemic circulation and relatively immunosuppressed."

Dr. Borooah is working on gene therapies to test novel treatments in stem cell models of eye "diseases in a dish." This is part of the work he oversees in a clinic that diagnoses and treats patients with retinal, macular and inherited diseases.

"Gene therapy has had a profound impact in my precision ophthalmology and ophthalmic genetics clinic," said Borooah. "Previously, the main function of the clinic was to diagnose patients and provide low-vision support. Now the paradigm has shifted, and the question is often which treatment or which gene therapy trial patients can participate in. Gene therapy has not only given hope but has also restored vision in specific cases."

More research needs to be done, and typically, gene therapy is offered only as part of clinical trials at places like UC San Diego.

JAMA - AI and Physician Stress

Sally Baxter, MD, MSc, Assistant Professor of Ophthalmology and Biomedical Informatics at UC San Diego published a paper in the *Journal of American Medical Association (JAMA)* Open Network titled “Association of Electronic Health Record Inbasket Message Characteristics with Physician



Burnout.” The research team looked at how the number of messages physicians receive in their “in-basket” as well as the quality/content of those messages may affect their wellbeing and possibly cause burnout.

Dr. Baxter and colleagues at UC San Diego Health discovered that there is a correlation in the high number of messages in the in-basket of physicians who self-identified themselves as feeling burnout. Because many healthcare providers use electronic health records (EHR), patients have more access to messaging their providers.

The researchers analyzed more than 1.4 million messages sent to 609 physicians. About half the physicians considered themselves as burned out.

These physicians had a higher volume of messages in their in-basket. The content of the messages, whether they were positive, negative, or contained expletives and violent language, did not influence the physicians’ feelings of burnout. However, the findings showed that younger, female, and Hispanic/Latino physicians were more likely to be in the group considering themselves as burned out.

The study used natural language processing (NLP), which is a branch of computer science using artificial intelligence (AI) to give computers the ability to understand text and spoken words like human beings. Using NLP, researchers believe it can help with the negative messages received through automated in-basket filters, analysis of patients’ frustrations to find out what caused the frustrations, and ways to improve the patient experience.

New Strabismus Treatments

There are six muscles in the eye that help move your eyes and focus on the same object. This is what normally happens, but when the muscles do not work together, strabismus occurs.

Strabismus is a disorder resulting in the misalignment of the eyes, and the eyes do not appear to be working together. Untreated strabismus is highly correlated with amblyopia, one of the most common causes of irreversible vision loss in children, and strabismus has a significant impact on the quality of life in children and in adults.

Jolene Rudell, MD, PhD, Assistant Professor of Ophthalmology at the SEI Ratner Children's Eye Center, recently received a generous grant from the Strabismus Research Foundation in San Francisco to investigate using local injections of bupivacaine in the extraocular muscles of patients with strabismus. Bupivacaine is a local anesthetic that has been used to numb parts of the body during or after surgery or other procedures. Its use has been effective in treatment for strabismus.

"The specific mechanism for why bupivacaine works is still unknown," said Dr. Rudell. Her work will investigate why bupivacaine works for strabismus and to understand the biology of effective treatments for patients. Dr. Rudell has been studying the biology of strabismus and extraocular muscles since she was in residency training.

The lack of treatments for strabismus and the highly unpredictable and variable rates of success of more invasive surgeries on extraocular muscles have fueled Dr. Rudell's desire to learn more about the pathogenesis of strabismus in search of treatments for her patients. She believes the lack of knowledge about the pathogenesis of strabismus is a key factor in our inability to treat it effectively. Her career goal is to better understand this disease and to find effective treatments to help patients.

Joining her in this research project will be **Marianna Alperin, MD**, Associate Professor of Obstetrics, Gynecology, and Reproductive Sciences with the



Marianna Alperin, MD and Jolene Rudell, MD, PhD

UC San Diego School of Medicine, who specializes in skeletal muscle biology and is an expert in muscle physiology and biometrics, muscle stem cell biology, and muscle disease. Dr. Rudell will also be collaborating with Joel Miller, PhD, Director of Research and Senior Scientist at the Strabismus Research Foundation, and Linda McLoon, PhD, Professor, Department of Ophthalmology and Visual Neurosciences at the University of Minnesota Medical School.

Bridge 2AI

Assistant Professor **Sally L. Baxter, MD, MSc**, and Professor **Linda Zangwill, PhD**, are part of a UC San Diego School of Medicine group selected for the National Institutes of Health (NIH) Common Fund's Bridge to Artificial Intelligence (Bridge2AI) program. The team at the Shiley Eye Institute was selected to participate in the project due to a long-standing track record of innovation and excellence in eye imaging and conducting clinical research studies.

The NIH's Bridge2AI funding is intended to speed up the widespread use of AI in biomedical research and health care. It has been noted that AI has potential in helping understand and treat disease, but its clinical and research use remains limited because AI cannot be easily or appropriately applied to new datasets. Bridge2AI will create comprehensive AI-ready datasets to be the foundation for new, interpretable and trustworthy AI technologies to answer these issues.

Drs. Baxter and Zangwill are leaders in the modules associated with a

data generation project focused on salutogenesis or the origins of health called AI-READI (AI Ready and Equitable Atlas for Diabetes Insights), along with principal investigators from the University of Washington. Both investigators at SEI will lead the Skills and Workforce Development Module and the Data Acquisition module at UC San Diego. The Skills and Workforce development module also includes faculty from the UC San Diego Halicioğlu Data Science Institute and Herbert Wertheim School of Public Health and Human Longevity Science.

The AI-READI study will focus on diabetes—to learn how diabetes is influenced by patients' genes, lifestyle and environments by generating an ethically sourced data repository to develop machine learning models.

The AI-READI project will include eye imaging and eye exam findings as part of the data being collected in the study, alongside a wide range of other data, including laboratory tests, physical

measurements, surveys/questionnaires, electrocardiograms, genetic data, and statistics from digital health devices like activity trackers. The hope is that researchers can use this wide range of information to generate new insights about diabetes risk and progression, to help develop better treatments for diabetes and its manifestations in different areas of the body, including the eyes.

Focusing on recruiting people traditionally underrepresented in the biomedical sciences and data science/AI workforce, the Skills and Workforce Development team will create a mentored research training program to diversify the AI workforce. Trainees will go through a structured "bootcamp" to learn AI and programming skills along with longitudinal curriculum that incorporates principles of clinical research, AI/machine learning, ethics and the responsible conduct of research. Ultimately, training and educational materials will be developed for the broader community of researchers who will use the AI-READI dataset.



Congratulations Viterbi Family Endowed Chair

Eric N. Nudleman, MD, PhD

Upon the establishment of the Viterbi Family Department of Ophthalmology with a generous \$50 million donation by Andrew Viterbi, PhD, six endowed chairs were established as well as the soon to be constructed Viterbi Family Vision Research Center. Recently, **Robert N. Weinreb, MD**, Chair, Viterbi Department of Ophthalmology and Director, Shiley Eye Institute (SEI), announced the appointment of **Eric Nudleman, MD, PhD** as the inaugural Viterbi Family Chair for Retinal Vascular Diseases.

Eric D. Nudleman, MD, PhD, Associate Professor of Clinical Ophthalmology, joined the retina service at SEI eight years

ago. His clinical focus is on vitreoretinal diseases and surgery, with a special interest in pediatric vitreoretinopathies. His laboratory focuses on developmental angiogenesis and the role of the Wnt signaling pathway with a particular interest in identifying novel targets to treat vascular diseases.

The award of this chair allows Dr. Nudleman to continue his groundbreaking research to identify specific molecules that are required for maintaining the integrity of the blood-retina barrier that regulate vascular proliferation.

Dr. Nudleman graduated from Stanford University with his bachelors and doctoral degrees and then received his medical degree from Albert Einstein College of Medicine at Yeshiva University. He is also the recipient of many prestigious honors such as the Ronald G. Michels Fellowship, Heed Fellowship, the Doris P. and Harry I. Wexler Prize, Rosenbaum Research Award, and the Association of University Professors of Ophthalmology/Research to Prevent Blindness Resident and Fellow Research Forum Award.

The Viterbi Family Chair for Retinal Vascular Diseases was commemorated with an event at the UC San Diego Audrey Geisel University House on Monday, November 28, 2022. Hosted by Chancellor Pradeep K. Khosla and Associate of the Chancellor, Thespine Kavoulakis, the celebration was attended by family and friends of both Drs. Viterbi and Nudleman.

Chancellor Pradeep K. Khosla, Eric Nudleman, MD, PhD, Andrew Viterbi, PhD & Robert N. Weinreb, MD

Lindsay Nudleman and Eric Nudleman, MD, PhD

Andrew Viterbi, PhD and Chancellor Pradeep K. Khosla



Distinguished Alumnus 2022

Christopher Girkin, MD, MSPH

When Christopher Girkin, MD, MSPH trained as a glaucoma fellow here at the UC San Diego Shiley Eye Institute (SEI), he saw how translational research could impact patients' lives. With SEI's pioneering work in optic nerve and retinal imaging, Dr. Girkin learned methods of research and use of clinical imaging techniques that he would later deploy when he moved on to the University of Alabama at Birmingham (UAB).

At UAB, Dr. Girkin expanded their clinical studies to include the at-risk African American population as part of a National Institutes of Health (NIH) funded training grant with mentors from UAB and UC San Diego. His collaboration included **Robert N. Weinreb, MD, Linda Zangwill, PhD,** and Pamela Sample, PhD from SEI, as well as colleagues at UAB and Columbia University. This collaboration became the African Descent and Glaucoma Evaluation Study (ADAGES).

Growing up in the South, Dr. Girkin experienced what he called the "palpable deep racial divide in our culture." These experiences, along with the inequalities in care delivery seen during medical training, led him to focus his early career on developing a health disparities program.

"For me, working in broad scientific collaborations is the greatest pleasure in academia. We get to surround ourselves with brilliant but very different minds focused on finding solutions to the same problem," said Dr. Girkin.

Dr. Girkin recently stepped down as the Chair of the ophthalmology department at UAB after 10 years to devote his time to his research in imaging and the Living Eye Project. When he first arrived at UAB in 1999, he founded the glaucoma service and fellowship program. As chair, Dr. Girkin developed a partnership with the EyeSight Foundation of Alabama to



Christopher Girkin MD, MSPH

*Professor and Eyesight Foundation Endowed Chair
Founding Director, UAB Glaucoma Service
Department of Ophthalmology and Visual Sciences
Callahan Eye Hospital, University of Alabama
at Birmingham
President Past-Chair, American Glaucoma Society*

invest in vision research and grow the department.

The bulk of Dr. Girkin's work now focuses on developing and expanding the Living Eye Project. He began the program seven years ago to develop a platform for vision research with research-consented organ donors; it has supported several ongoing NIH-sponsored projects. With the remainder of his time, Dr. Girkin enjoys training clinical fellows and working on his collaborative research program that extends across imaging studies, adherence, ocular biomechanics, outcomes and health services research.

Outside of work, he spends time with his two boys and his wife, a child psychiatrist. They enjoy mountain biking, scuba diving, traveling with family and friends, and hiking.



Ophthalmology at the VA Medical Center



Andrew Camp, MD has been named the Acting Chief of the Ophthalmology Section at the Veterans Administration (VA) Medical Center in La Jolla as of October 2022. His duties include clinical oversight, development and expansion of the ophthalmology section. His goals are to raise patient satisfaction by improving clinical efficiency, increase patient volume and promote research within the VA ophthalmology section.



Dr. Camp is an assistant professor in the Viterbi Family Department of Ophthalmology teaching medical students, residents and fellows at the UC San Diego School of Medicine. He completed his glaucoma fellowship at SEI.

Dr. Camp's clinical focus is the medical and surgical management of adult and childhood glaucoma. His research focuses on the diagnostic testing and treatment options for glaucoma patients.

Distinguished International Alumnus 2022

Ningli Wang, MD, PhD



Ningli Wang, MD, PhD

Director, Beijing Tongren Eye Center

President, Asia-Pacific Academy of

Ophthalmology (APAO)

President, Chinese Ophthalmologist Association

*Head, National Committee for the Prevention of
Blindness (NCPB)*

Chair, APAO Prevention of Blindness

*Advisory Board, Asia Pacific Journal of
Ophthalmology (APJO)*

*Council Member, World Glaucoma Association
(WGA)*

*President, Chinese Society of Public Health
Ophthalmology*

*Member, Academy of Asia-Pacific Professors of
Ophthalmology*

*Advisory Board Member of Chinese Academy of
Medical Sciences*

Board Member, Asia-Pacific Glaucoma Society

*Senior Advisory Council Chair, Asia-Pacific
Glaucoma Society*

Patients rely heavily on and place a lot of trust in their doctors. Ningli Wang, MD, PhD, Director of the Beijing Tongren Eye Center, was reminded of this while realizing the importance of a physician's responsibility in his patient's treatment. This realization came years ago while treating a blind glaucoma patient who had one eye with high intraocular pressure and a shallow anterior chamber in the other eye. This patient lived in a remote area of China and Dr. Wang had been part of a team doing consultation in the area. Due to miscommunication, there was an error in treatment by a local doctor. The patient was transferred to the Beijing hospital for treatment under Dr. Wang's care and after multiple surgeries, the patient finally had his vision restored to 20/20 and the lens was preserved. To this day, this incident and patient has stayed with him, as he has devoted himself to promoting eye health in China.

Ophthalmology was not his first choice in fields of study during medical school at the Medical College of Qinghai University. But Dr. Wang considers it his “great cause” to help the blind see again. He is devoted to the clinical and scientific research of glaucoma and prevention of blindness. That is what led him to the UC San Diego Shiley Eye Institute (SEI) in 1998 as a post-doctoral international fellow following his studies and work at Zhongshan School of Medicine. When he studied for his PhD, Dr. Wang was involved with clinical applications more so than basic research. His time at SEI exposed him more to experimental research. The experimental techniques he learned helped lay the foundation for his scientific research.

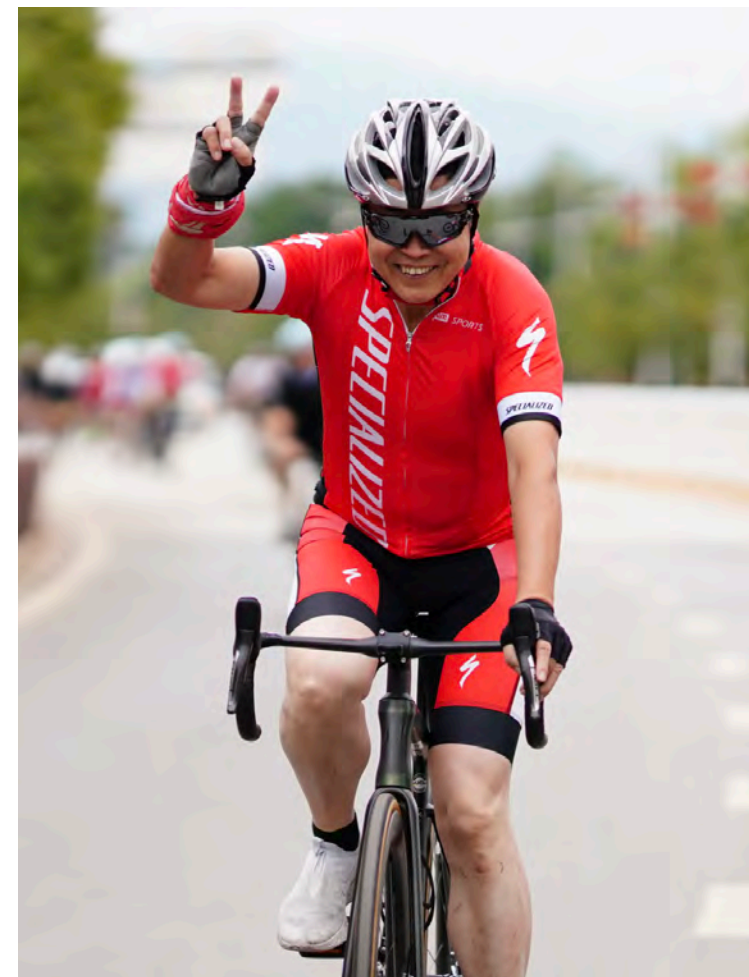
Dr. Wang credits **Robert N. Weinreb, MD**, Director of SEI and Chair of the Viterbi Family Department of Ophthalmology, whose “careful teaching and selfless sharing” showed him how to be an exceptional leader and manager.

After arriving at Tongren Hospital and founding the Beijing Tongren Eye Center, Dr. Wang orchestrated the growth of the eye center and its influence in clinical and scientific vision research in China. He was

president of the Tongren Hospital from 2016-2017 and is the current president of Asia-Pacific Ophthalmology Academy. His work in preventing trachoma and cataract blindness garnered him a Vision Excellence Award from the International Agency on the Prevention of Blindness (IAPB). Dr. Wang’s work to have primary eye care incorporated into primary health care—including adding cataract surgery to the national basic medical insurance—was also noted. Dr. Wang also leads a tele-ophthalmic center across 200 hospitals nationwide for remote consultation and collaborative treatment.

Dr. Wang considers his greatest contribution in ophthalmology to be his research on trans-lamina cribrosa pressure theory, which explains the optic nerve injury in normal tension glaucoma patients and showed that intracranial pressure was a risk factor. The next big advance in ophthalmology will be in visual augmented reality, Dr. Wang believes. Institutions and industries are increasingly allocating more resources into development of contact lenses that apply augmented reality technology to video recording, accessing information, diagnosing and treating diseases.

Currently, he spends the majority of time on research with one day of the week devoted to seeing patients in the clinic. During his free time, Dr. Wang enjoys cycling. He participated in the Tour of Qinghai Lake International Road Cycling Race and plans on completing 40,000 kilometers (approximately 24,850 miles) of cycling in the future. For him, cycling is more than a way to improve physical endurance; it’s also about perseverance and courage to rise to the occasion.



New Faculty

Nathan Scott, MD, MPP

The Viterbi Family Department of Ophthalmology and the Shiley Eye Institute (SEI) welcomes **Nathan L. Scott, MD, MPP** as Assistant Professor of Ophthalmology and the Inaugural Chief of the Ocular Oncology Division.

Dr. Scott is a physician-scientist with a clinical focus on vitreoretinal diseases and surgery, specializing in ocular oncology. His clinical research and interests include utilizing imaging and genomic/molecular technologies to better understand, diagnose and treat cancers of the eye. He treats general and complex vitreoretinal diseases as well as both surface and intraocular malignancies.

Dr. Scott earned his medical degree at Harvard Medical School and completed his residency in ophthalmology at the University of Miami Bascom Palmer Eye Institute, where he was also Chief Resident. Dr. Scott also holds a Master in Public Policy from the Kennedy School

at Harvard University. He completed fellowships in Vitreoretinal Surgery and Ocular Oncology at the Bascom Palmer Eye Institute. He received multiple awards during his training, including the Heed Ophthalmic Society Fellowship, the Mary August Trust Fellowship Award, the 2020 Vit Buckle Society Fellows Foray Award, and the American Academy of Ophthalmology Robert Copeland Fellowship Award.

Dr. Scott was appointed as a K12 Program Scholar from the National Eye Institute (NEI) Mentored Clinical Scientist Development Program Award at UC San Diego.

Dr. Scott is actively engaged with the American Academy of Ophthalmology, where he serves on the executive board of the minority ophthalmology mentoring (MOM) program and is a member of the young ophthalmology advocacy sub-committee.



New Division of Ocular Oncology

The Shiley Eye Institute's (SEI) new division of Ocular Oncology offers treatments for eye cancer which can affect the surface of the eye, areas surrounding the eye and structures within the eye. **Nathan L. Scott, MD, MPP**, who recently joined SEI, is the Inaugural Chief of the Ocular Oncology Division.

SEI's team of specialists includes oculoplastics, neurosurgery, adult and pediatric medical oncologists, as well as radiation oncologists at the world-renowned UC San Diego Health Moores Cancer Center. The team treats both adult and pediatric eye cancers. The team prides itself on their ability to promptly see patients in need with an emphasis on personalized treatment plans.

The SEI ocular oncology service offers comprehensive eye care that incorporates cutting edge diagnostic imaging, advanced treatment options, and a multi-disciplinary approach to individualized patient care. The ocular oncology service provides:

Cutting Edge Diagnostic Imaging

- Fundus Photography
- Fluoresceine Angiography
- ICG Angiography
- Optical Coherence Tomography (OCT)
- Ocular Ultrasound (B Scan)

Advanced Treatment Options

- Plaque Brachytherapy
- Radiation Therapy
- Systemic and Local Chemotherapy
- Tumor Resection

Related Conditions Treated

- Conjunctival Tumors (Ocular Surface Squamous Neoplasia, Melanoma, Carcinoma)
- Anterior Segment and Iris Tumors
- Lymphoma of the Eye and Orbit
- Uveal Tumors (Melanoma, Metastatic tumors, Vascular tumors)
- Vascular Tumors (Choroidal Hemangioma, Capillary Hemangioma)
- Eyelid and Orbital Tumors
- Retinoblastoma



New Faculty

Christopher Toomey, MD, PhD

The Viterbi Family Department of Ophthalmology and the Shiley Eye Institute (SEI) at UC San Diego welcomes **Christopher B. Toomey, MD, PhD**, as Assistant Professor of Ophthalmology. Dr. Toomey specializes in the diagnoses and treatment of adult vitreoretinal disease, macular degeneration, diabetic retinopathy, retinal detachment, macular holes, and other retinal diseases.

While completing his medical and doctoral degrees at Duke University School of Medicine, Dr. Toomey was part of the integrated National Institutes of Health (NIH) funded medical scientist training program. He received his residency training at SEI following medical school. Rounding out his medical training, Dr. Toomey did his two-year fellowship in vitreoretinal surgery at the Wilmer Eye Institute, John Hopkins Hospital in Baltimore. As a young clinician scientist, he already has received multiple prestigious awards including the Heed Ophthalmic Society Fellowship,

Vitreoretinal Surgery Foundation Research Award and has served on the editorial board of the Journal of Clinical Investigation (JCI), as a JCI scholar.

As a physician-scientist, he is focusing on age-related macular degeneration (AMD) and other retina and vitreous eye diseases. Dr. Toomey is participating in a research program studying the early and intermediate stages of “dry” AMD. Approximately 50% of the attributable risk of developing AMD is due to common polymorphisms in complement regulatory genes. His research discovered the mechanism of complement factor H in regulating the formation of drusen in patients with AMD (published in *Proceedings of the National Academy of Sciences* and reviewed in *Progress in Retinal and Eye Research*). As a part of this discovery, Dr. Toomey explained an unexpected role of extracellular glycosaminoglycans (repeating disaccharide sugar chains) in regulating the formation of drusen.



Dr. Toomey was appointed as a K12 Program Scholar from the National Eye Institute (NEI) Mentored Clinical Scientist Development Program Award at UC San Diego.

His laboratory program is embedded within the Glycobiology Research and Training Center at UC San Diego, to determine the pharmacological potential of glycosaminoglycans in patients with early and intermediate stages of “dry” AMD. His long-term goal is to develop therapies capable of cleansing the eye of drusen prior to development of vision loss in AMD.



Prestigious Honors

As part of Dr. Christopher Toomey's research into AMD, he has been awarded a \$100,000 scholarship from the Robert Machemer, MD and International Retinal Research Foundation Fellowship. Robert Machemer is considered the father of modern vitreoretinal surgery—with discoveries such as the breakthrough technique, pars plana vitrectomy.

The Robert Machemer Foundation Fellowship Board, consisting of top leaders in the field of vitreoretinal surgery, chose one junior vitreoretinal clinician-scientist as the recipient for

this award in support promising early career research of the retina. Dr. Toomey's research project is called Ultrastructural Glycomics Analysis of Bruch's Membrane in Age-related Macular Degeneration (AMD).

In addition, Dr. Toomey recently presented his research on drusen formation in patients with AMD as part of the Alliance for Eye and Vision Research (AEVR) Emerging Vision Scientists (EVS) Day on Capitol Hill. As one of 21 EVSs in attendance, Dr. Toomey visited the San Diego US Representative congressional

office to advocate for the National Eye Institute's (NEI) budget.

The NEI is part of the National Institutes of Health (NIH). The program by AEVR occurred during the annual International AMD Awareness Week Congressional Briefing, with the 21 EVSs showing posters of their research at a Congressional reception. These educational and advocacy activities are part of an effort to spur breakthrough research to prevent, delay, and treat vision disorders.

New Faculty

Cristiana Vasile, MD, MAS

The Viterbi Family Department of Ophthalmology and the Shiley Eye Institute (SEI) welcomes **Cristiana Vasile, MD, MAS** as an Associate Clinical Professor of Ophthalmology. Dr. Vasile is a Board-Certified Ophthalmologist and fellowship trained Glaucoma specialist.

Dr. Vasile spent several years at the SEI Hamilton Glaucoma Center performing vision research. She served as the founding Director of the UC San Diego Optic Nerve Reading Center, a hub for collaborative research conducted by national and international glaucoma centers.

Following her internship in Internal Medicine at UC San Diego, she completed a residency in Ophthalmology at the UC San

Diego Shiley Eye Institute. During her residency, she received the Department of Ophthalmology Resident Research Award. She subsequently completed a Glaucoma Fellowship at UC San Diego. Dr. Vasile also was awarded a Masters in Advanced Studies (MAS) in Clinical Research at UC San Diego.

Dr. Vasile is dedicated to outstanding and compassionate care of her glaucoma patients.

She speaks several languages including English, Italian, French, Romanian and also is proficient in Spanish.





Grateful Patient

I retired from the high-tech industry last year and have been dabbling in photography for over eight years. Vision is extremely important to me.

Dr. Cristiana Vasile's greatest strength (after her glaucoma expertise!) is her exceptional communication skills. I think that the most important aspect of communication is listening, and she is a wonderful listener. She is the only ophthalmologist I have ever worked with who took the time to genuinely listen to my thoughts and concerns. She was patient and thoughtful in how she communicated with me and I am truly grateful for that. Not just high IQ but, just as importantly, high EQ.

Dr. Vasile always responds promptly to my queries online as well, and once she did so even when she was on vacation - totally unexpected. She is devoted to her patients!

When I recently moved to Colorado, Dr. Vasile was able to connect me with an exceptional ophthalmologist who normally does not take on any new patients. He only did so at her request, which also tells you something about the respect she enjoys in the extended ophthalmology community.

I am truly grateful for all she has done for me. Here is a photo I took recently.

-Joe

New Faculty

Manuel Puig-Llano, MD

The Viterbi Family Department of Ophthalmology and the Shiley Eye Institute (SEI) welcomes **Manuel Puig-Llano, MD, FACS, FASRS** as Clinical Professor of Ophthalmology.

Dr. Puig-Llano's completed an Ophthalmology Residency and Fellowships in Cornea and Retina Vitreous at the University of California, San Francisco and received his medical degree from the National Autonomous University of Mexico. His career in ophthalmology began as a teenager working with his father doing ophthalmology clinical research. His father, who studied ophthalmology in Vienna, inspired him to pursue this area of medicine.

After working at his father's ophthalmology practice for six years in Mexico, Dr. Puig-Llano opened a clinic in Chula Vista. He treated patients for nearly 40 years in this office before joining SEI.

Dr. Puig-Llano's devotion to treating the underserved populations in Southern



California extended to medical missions in the Philippines and Mexico to treat patients with diabetic retinopathy and glaucoma. On these missions, Dr. Puig-Llano brought equipment, supplies and assistance where he built community relations and learned to speak Tagalog.

He is fluent in English and Spanish.

Faculty Spotlight

Shira L. Robbins, MD, FAAO, FAAP



Shira L. Robbins, MD, FAAO, FAAP is a Clinical Professor who specializes in Pediatric Ophthalmology and Adult Eye Re-Alignment in the Anne F. and Abraham Ratner Children's Eye Center at the UC San Diego Shiley Eye Institute (SEI) and Viterbi Family Department of Ophthalmology. She currently serves as Vice President Medical Staff for UC San Diego Health, the Director of Neonatal Ophthalmology at the Jacobs Medical Center NICU and Educational Director for the Division of Pediatric Ophthalmology and Strabismus.

After receiving her medical degree from the Medical College of Pennsylvania Hospital and completing her residency in ophthalmology at Hahnemann University Hospital in Philadelphia, Dr. Robbins completed her fellowship training in pediatric ophthalmology at UC San Diego and the Naval Medical Center in San Diego. She is board certified by the American Board of Ophthalmology and is a Fellow of both the American Academy

of Ophthalmology and the American Academy of Pediatrics.

Dr. Robbins' practice focuses exclusively on pediatric ophthalmology and adult eye re-alignment. Her clinical interests encompass pediatric patients with vision and ocular complaints, amblyopia, strabismus (eye misalignment), retinopathy of prematurity, pediatric glaucoma and cataracts (including intraocular lens placement), congenital eye syndromes, craniofacial syndromes, nystagmus, learning disabilities, nasolacrimal tear duct disorders, genetic ocular disorders, and systemic diseases affecting the eyes. Her adult practice includes patients with double vision, strabismus, and visual strain complaints.

Dr. Robbins performs research to preserve and protect the vision of premature children. Her research targets improving how doctors diagnose, prevent and treat blinding diseases in the smallest most vulnerable of infants.

WHY DID YOU GO INTO MEDICINE?

During my first career as a genetic researcher, I found that I was drawn to working in a more direct and immediate way to help people. My initial desire to be a primary care doctor changed when I realized I could create such rapid impact in a person's life through the elegance of eye surgery.

HAVE ANY OF YOUR PATIENTS AFFECTED YOU SIGNIFICANTLY?

The courage of so many of my patients remains a lasting impression. One early example was a young boy who was hospitalized after a stroke related to sickle cell anemia. Upon admission this child could not walk or talk. Within days, I witnessed him run next to his IV pole then jump onto the metal wheeled base taking it for a ride down the hallway of the hospital. The absolute will to live and play after such a serious health crisis gave me much admiration for this little boy. Unfortunately, the unit nurse was not so amused and asked me to stop my patient from "disrupting the ward." To the nurse's dismay, I told my patient that he could have one more ride before he needed to get back in bed; after all, it was 2 am. I will remember his smile forever.

HOW DO COLLABORATIONS AND PARTNERSHIPS FIT INTO YOUR ROLE AS A RESEARCHER?

Being a team player is one of the main reasons that drew me to academics. The opportunity to work as a team allows me to do broader and deeper research. My collaborations with the Neonatal ICU have allowed me to study potential treatments to avoid blindness in these infants as well as care for them in the hospital every week. My most important partnership would be with my husband who takes care of the home front allowing me the opportunity to be a productive academic surgeon.

WHAT ARE YOUR MOST IMPORTANT/ SIGNIFICANT TEACHING OR RESEARCH CONTRIBUTIONS?

From a research perspective, some of my most impactful work as an academic surgeon has been to help create the national guidelines for diagnosis and treatment of the blinding disease retinopathy of prematurity. Guidelines across the globe are based on this paper.

From a teaching perspective, my training of American and International fellows who go on to care for many patients worldwide expands my influence. Additionally, I created the first teaching

program to train ophthalmology residents to break bad news to patients and their families in a respectful and effective way.

WHAT DO YOU DO IN YOUR FREE TIME?

My most significant life contribution are my children. In our free time, my husband and I spend time with them as they pursue their interests. For my little one that means lots of time on the soccer field sidelines. For my older one, that means reading their creative writing and other academic pursuits. Together we love to hike, swim, watch British mystery shows, and play with our ridiculously spoiled dog. I am an avid tennis fan and a forever Philadelphia Eagles fan wearing a championship cap for a week straight when they won the Super Bowl. You have to bask in the glory when you can!



Faculty Spotlight

Chris W. Heichel, MD



Chris W. Heichel, MD is a Professor of Clinical Ophthalmology in the Division of Cornea, Cataract and Refractive Surgery at the UC San Diego Shiley Eye Institute (SEI) and Viterbi Family Department of Ophthalmology.

After completing his medical degree with honors from Chicago Medical School in 1999, Dr. Heichel became chief resident in ophthalmology at UC San Diego in 2000 and completed a cornea fellowship at SEI in 2004. He joined the SEI faculty in 2004 and has been consistently named a top doctor by *U.S. News & World Report*.

In his clinical practice, Dr. Heichel enjoys challenging cataract and anterior segment cases including traumatic cataracts, pediatric cataracts, subluxed lenses, dislocated intraocular lenses, and iris reconstruction cases. He is well versed in a breadth of keratoplasty techniques including endothelial (DMEK, DSAEK, DWEK), penetrating (PKP), lamellar (DALK), artificial (KPRO), and limbal stem

cell transplantation. He takes a special interest in treating congenital corneal opacities and has extensive experience in pediatric corneal transplantation. He practices the most advanced laser refractive surgery techniques for LASIK and PRK, as well as phakic intraocular lenses like the Visian ICL, INTACS and corneal cross-linking.

As a physician, Dr. Heichel's patients are his priority, but he is very dedicated in teaching and training fellows and residents. This is evidenced by the numerous awards he has received for Teacher of the Year.

WHY DID YOU GO INTO MEDICINE?

Witnessing a tragic accident during college convinced me to go into medicine. After desperately attempting to save a good friend's life, I distinctly remember feeling helpless. That moment stuck with me and from that point on I have dedicated my life to helping others and never feeling that way again.

HAVE ANY OF YOUR PATIENTS AFFECTED YOU SIGNIFICANTLY?

I remember a young single mother who developed traumatic cataracts from a domestic violence incident, which made it difficult for her to hold down her job and feed her children. She did not have money or insurance to pay for the surgery, so I performed it pro bono. Her successful outcome enabled her to continue working and to care for her family. Seeing her tears of joy will stay with me forever.

Another patient was a 12-year-old who was diagnosed with keratoconus (the cornea thins and gradually bulges out into a cone shape causing blurred vision). She struggled to see and as a result fell behind in school. I performed bilateral corneal transplantation on her many years ago, and last year I received an announcement for her graduation from medical school.

Also, I was asked to perform the first pediatric cataract surgery in the U.S. on a 3-year-old lowland gorilla at the San Diego Zoo Safari Park. Working collaboratively with veterinarians, keepers and surgical staff in order to successfully plan, organize, and perform surgery was one of the most rewarding moments of my career... and quite possibly the most unique.

HOW DO COLLABORATIONS AND PARTNERSHIPS FIT INTO YOUR FIELD?

Collaboration is critical in our research. Fortunately, some of the brightest minds in ophthalmology are here at UC San Diego. My research is primarily focused on corneal transplantation with an emphasis on pediatric patients. There are only a handful of trained pediatric cornea specialists in the world that can successfully perform transplants in these patients, and I was fortunate to be trained by Shiley's own **Stuart I. Brown, MD**. Families frequently travel across the globe to find one of us to help their children and it brings me great joy to be able to provide these families hope. Developing new techniques and protocols to increase the success of these procedures in my patients and patients worldwide will always drive me. I am grateful for the continued funding and support that makes this possible.

WHAT DO YOU SEE AS THE NEXT BIG ADVANCES IN YOUR FIELD?

Stem cells will be very important. Corneal and cataract surgery will change dramatically when we advance stem cell technology and transplantation to become predictable, repeatable and successful enough for routine use. While both corneal transplantation and cataract surgery are already widely successful, the

ability to restore and improve sight with a less invasive procedure and a faster recovery will propel ophthalmology to the next level.

WHAT DO YOU DO IN YOUR FREE TIME?

Outside of medicine, my two greatest passions are my family and traveling. I love the time I have with my amazing wife and daughters. Like many parents, I enjoy the simplicity of being on the sidelines at my daughters' soccer games, and I cherish our times together at the beach or on the slopes. I love exploring other parts of this world: how others eat, think, and live. Travel is inspiring and illuminating, and I love getting to experience new places through my children's eyes. Likewise, traveling to perform medical mission work abroad has been beyond rewarding, and I look forward to more of this in the future.



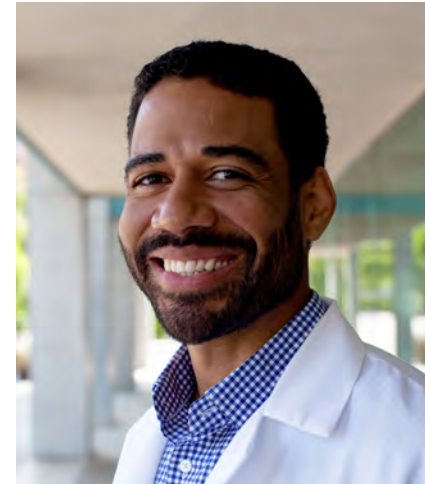
Advancing Diversity & Inclusion at SEI

We are committed to cultivating a welcoming, inclusive environment for all patients, employees, faculty and trainees.

The UC San Diego Viterbi Family Department of Ophthalmology and Shiley Eye Institute (SEI) continues to promote diversity and inclusion in clinical activities, research, education and community service. A key addition to our Diversity, Equality, and Inclusion (DEI) Committee in 2022 was the appointment of **Nathan Scott, MD, MPP** as Co-Chair of the DEI Committee. He joins **Sally Baxter, MD, MSc** in leading diversity and inclusion initiatives at Shiley. Dr. Scott has long been an advocate for diversity and has served on the Executive Committee of Minority Ophthalmology Mentoring (MOM) Program, a program of the American Academy of Ophthalmology (AAO) in partnership with the

Association of University Professors in Ophthalmology (AUPO), which provides one-on-one mentorship, guidance in medical career planning, networking opportunities, and access to educational resources to students who come from backgrounds that are underrepresented in medicine. Drs. Scott and Baxter have both served as MOM mentors to medical students across the country through this program. Dr. Scott will bring new perspectives and leadership to Shiley's DEI efforts, positioning our department as a leading entity in this domain.

In 2022, the department also received two major educational training grants from the National Institutes of Health





These flags reflect a number of the countries and nationalities represented by SEI staff members.



*SEI Clinic Supervisors (Left to Right): Kelly Kemp, Juan Arias, Aida Haile
SEI Director of Ophthalmology Services (Third from the Left): Cathi Lyons*

(NIH) to provide funding support and mentored research training opportunities to a diverse range of students. One grant, awarded by the National Eye Institute (NEI), provides support for medical students to complete short-term summer research projects to supplement their classroom and clinical training. Another grant is through the trans-NIH Bridge2AI initiative, which is funding a yearlong internship program to train interns from a wide range of backgrounds to learn about artificial intelligence, machine

learning, and biomedical research principles, scheduled to start in summer 2023. Both programs will also offer networking and career development opportunities and are directed by Dr. Baxter and **Linda Zangwill, PhD**. Our department is one of the few nationwide to have NIH-funded training grants across multiple training stages, including training programs for medical students, graduate students, postdoctoral fellows, and early career faculty.

In addition, Shiley faculty, staff, and trainees continue to engage in local outreach activities, including hosting seminars with students regarding career paths in ophthalmology, providing care to underserved individuals through the UC San Diego Free Clinic and the Shiley EyeMobile for Children, and engaging in broader diversity-related initiatives at UC San Diego Health Sciences and the general campus.

From the Eyes of a Patient

Another Success from Team Shiley

By Diane M. Martin



When I was younger, I used to ride my bicycle 100 miles per week, but now at 84-years-old I'm happy to be walking five miles a week. My philosophy is to think about what you can do, don't lament about what you can't do—just open your front door.

I was diagnosed with glaucoma in 2008 and began treatment shortly after the diagnosis. A few years later, I had the first surgery for my left eye. I felt that my second ophthalmologist in San Diego did not know how to help with my vision loss. A friend thought I should find a clinic in San Diego that conducts clinical trials because my glaucoma was not responding to normal eye drops.

In the fall of 2018, I was teaching my last semester of a 20-year career as an adjunct English professor at Palomar College. I could not read my textbook,

so my friend came to my house every Sunday to read it to me. Another friend helped record the student grades. I also relied heavily on my father's 3x5-inch magnifying glass to read recipes and newspapers. By December, I had to stop driving and a friend took me grocery shopping.

I started seeing **Robert N. Weinreb, MD**, who treated me with lasers, different eye drops, and surgery on my left eye. I then had an edema on my macula which **Eric Nudleman, MD, PhD** treated me for. In 2020, I was next referred to **Natalie Afshari, MD** for a corneal transplant in my right eye.

I was overjoyed by the corneal transplant, which required my daughter to fly in from Houston. This cornea surgery required me to lie flat for 24 hours with short breaks for food and bathroom. As the dutiful daughter she is, I was given meatloaf, an old family recipe, fresh vegetables, and salad. I am a slow eater and wanted to finish each meal, so she would say, "Mother, your time is up! You must lie flat now!" My daughter was worried that it would be her fault if the surgery was not successful because I was not flat on my back long enough.

After careful maneuvering, we were pleased to learn the surgery was a success! I could see immediately and seven days later my vision was crisp and clear.

That summer of COVID 2020 was a magical one with weekly trips with friends to Moonlight Beach where we walked, boogie boarded, and collected rocks.

In July 2021, I had surgery number 15 in the left eye to repair it. This was a collaborative effort by Team Shiley with Drs. Nudleman, Weinreb, and Afshari. Meanwhile, I passed my behind the wheel driving test (twice now) and the examiner said I was a very good driver!

Recently, I've had treatment for the retinal edema in my right eye with different drops and it's getting better. My eyes are now stable and my newest challenge has been with other health issues—I had major back surgery in 2022.

Luckily, to this day, I continue with my normal activities of walking, swimming an hour each day, and golf. I'm hoping to do some traveling in the future! I am grateful to all the doctors and Team Shiley for helping me see!



Eric Nudleman, MD, PhD and Diane M. Martin

Underserved Children Will See Better

New Shiley EyeMobile for Children Hits the Road

The Shiley EyeMobile for Children at UC San Diego —a program in the Division of Community Ophthalmology at the Shiley Eye Institute (SEI)— provides free services to underserved, low-income students and it meets them in the neighborhoods where they live. The new EyeMobile replaces one that had been in service since 2008.

The EyeMobile services include eye exams by an optometrist, follow-up monitoring with teachers and parents, referral for subspecialist care as needed to the Anne F. and Abraham Ratner Children's Eye Center at SEI and eyeglasses (if needed) – all at no cost to families. There is also bilingual parent and teacher information to teach families about the importance of eye/brain development and how eye care plays a crucial role in preparing children to learn.

"It's estimated that 1 in 4 children have vision problems, making early detection

and treatment very important," said **Robert N. Weinreb, MD**, Director of the Shiley Eye Institute and Chair of the Viterbi Family Department of Ophthalmology. "This community service we have provided for over 20 years has proven to reduce the negative impact vision problems have on a child's learning ability and development."

The new EyeMobile is bigger and more efficient and was funded by an estate gift from a former patient of the SEI. It is a 33-foot-long recreational vehicle with two exam rooms and includes a TV in the waiting room to keep children occupied as they wait for their exams.

The program's long-term goal is to provide eye care services to 20,000 low-income children each year. About 250 preschools are slated for visits from the EyeMobile this year in underserved areas all across San Diego County.

*Our program reached over
122 locations throughout
San Diego County*

2021 - 2022

2000 - 2022

Children screened by autorefractor

8,277

221,445

Children received full dilated eye exams

1,020

33,639

Prescription glasses provided

895

14,937

*High risk of vision conditions
for subspecialty referrals*

122

1,491



New Shiley EyeMobile for Children

"The families we serve do not have another way to access eye exams. Some don't even have transportation and others must decide between getting milk or getting eyeglasses for their kids," said Iliana Molina, DHA, MBA, director of the UC San Diego Shiley EyeMobile for Children. Dr. Molina has been director of the EyeMobile for 15 years. She started out with the program as a student at UC San Diego in 2003 when the EyeMobile only had one exam room.

"My favorite part of the experience is delivering the eyeglasses to the students at school and watching their reaction when they can see clearly for the first time," said Dr. Molina.

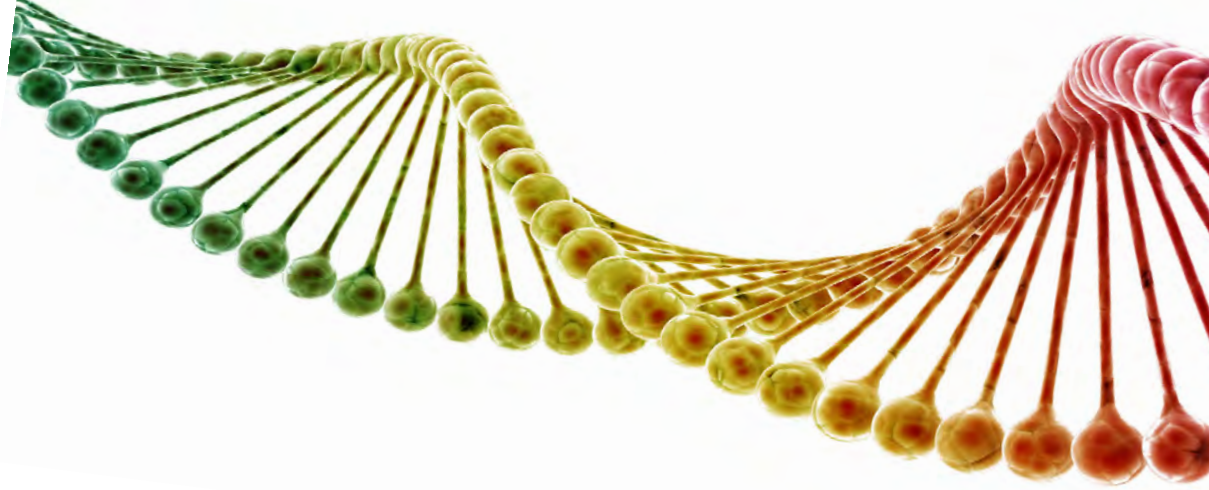
Since the program launched in 2001, the Shiley EyeMobile has screened more than 250,000 children across San Diego County—with close to 15,000 pairs of glasses provided in the last 20 years. Since the program began, more than 13,000 students' vision has been screened



Top Left to Right: Jovane Recendez, Rachel Lee, OD, Dr. Iliana Molina, Eric Hernandez, Jon Chavis | Bottom Left to Right: Alberto Enriquez and Leslie Espinoza

annually. Before COVID-19, the Shiley EyeMobile traveled to 225 locations across San Diego County. In 2021-2022, the EyeMobile traveled 8,226 miles and delivered 895 pairs of prescription glasses to students.

The EyeMobile program is funded solely by foundations, corporations and individual donations. When funds have been raised, the former EyeMobile will be retrofitted to provide senior vision care services throughout San Diego County.



Nixon Visions Foundation Update

The PRPH2 Mutation Research Project was initiated during the past year under the scientific leadership of **Radha Ayyagari, PhD** and **Shyamanga Borooah, MD, PhD**. Funded by the Nixon Visions Foundation, led by philanthropists Janine and Brandon Nixon, the project studies the PRPH2 gene linked to macular dystrophy and boosts stem cell research, aimed at developing an early diagnosis and a cure. The Nixon Visions Foundation is also partnering with the Foundation Fighting Blindness to build momentum and increase global research in this area.

Macular dystrophy is a relatively rare eye condition affecting the central retina; it is not the same as macular degeneration which is more common. Macular

dystrophy happens when mutations occur in the PRPH2 gene which damages the retina causing progressive sight loss and possibly blindness. Currently, there are no effective treatments to slow or stop the condition.

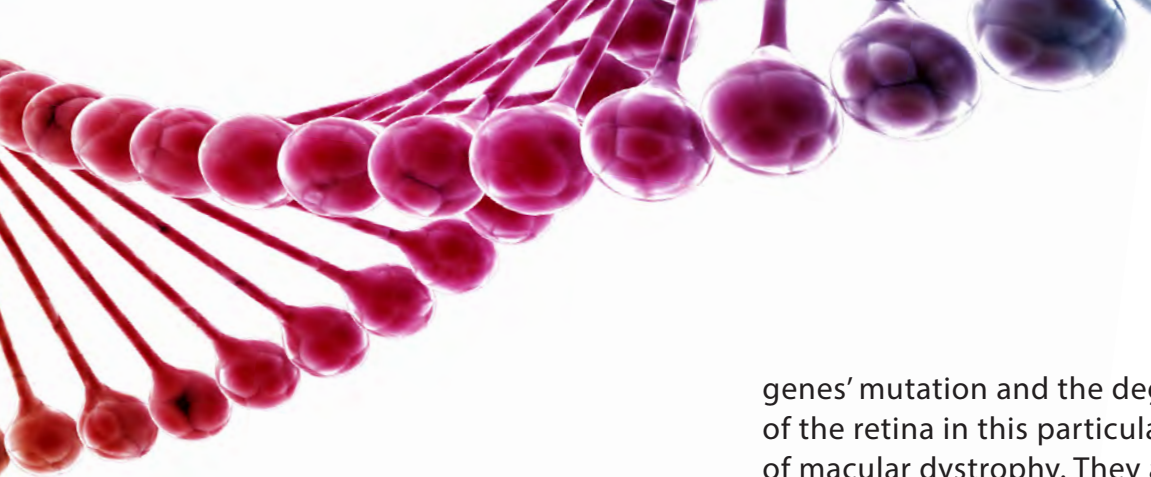
PRPH2 is a gene which provides instructions for making a protein (peripherin 2) in the retina that plays a role in normal vision. The retina is the light sensitive part of the back of the eye. This protein is necessary for full function of specialized cells within the retina called photoreceptors that detect light and color.

Drs. Ayyagari and Borooah are identifying patients with the PRPH2 mutation for genetic evaluation, imaging and assessment for changes over time as

well as testing novel treatments for the mutation using stem cell models.

There already have been several developments including:

- Assembling a worldwide team of investigators each with a significant collection (50-200) of patients carrying a spectrum of PRPH2 mutations.
- Identifying a set of clinically relevant PRPH2 mutations for phenotype-genotype association analysis.
- Generating stem cells that carry the c.623G>A mutation.
- Coming close to completion of the differentiation to retinal pigment epithelial cells as well as starting differentiation of retinal organoids (mini-retina).



- Introduction of the c.623G>A mutation into a lab animal genome with plans for offspring to have their DNA analyzed.

Working with a global team of investigators and a cohort of patients from the United States, the United Kingdom, Southeast Asia and Europe, research is being conducted to analyze phenotype-genotype association.

Genotype is a person's unique DNA sequence; phenotype is a person's genes combined with environmental factors. The research team is attempting to elucidate how an individual's genetics (genotype) and their characteristics from the interaction of genetics and environment (phenotype) cause the

genes' mutation and the degeneration of the retina in this particular type of macular dystrophy. They also are evaluating if machine learning tools can be used for the classification of PRPH2 gene and studying the phenotype-genotype association using artificial intelligence (AI).

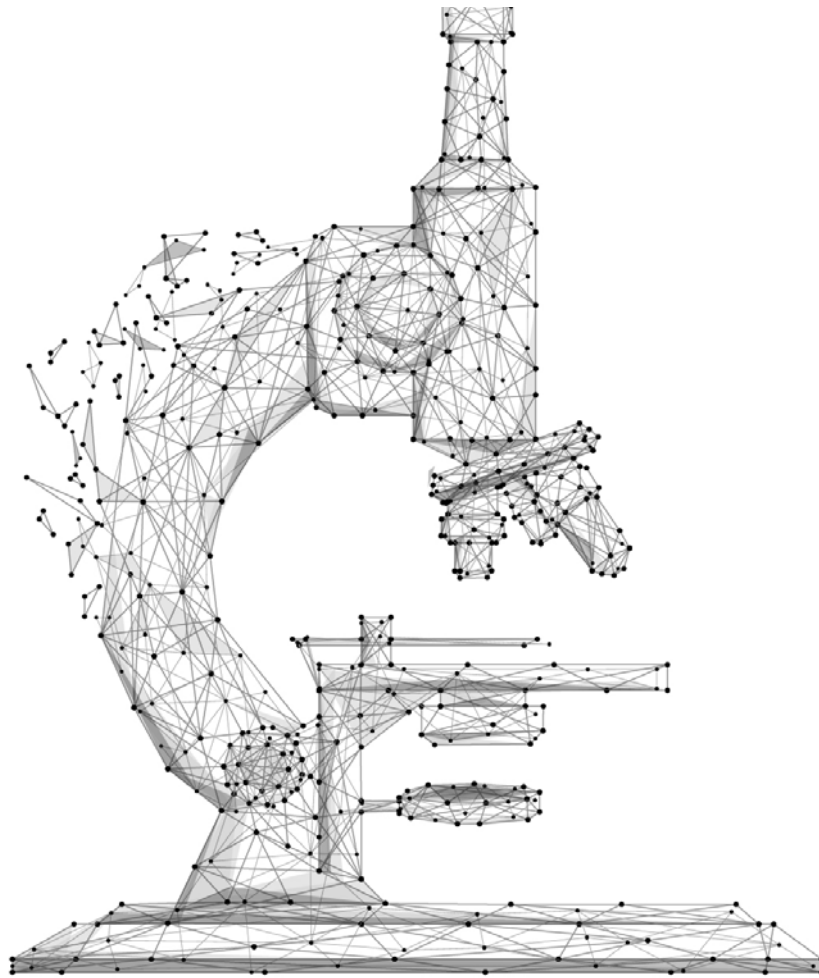
Cell differentiation happens when a cell undergoes changes to become a more specific type of cell. For this research, differentiation to retinal organoids—the three-dimensional cell cultures created by stem cells—has begun. Tests will be run on the cell cultures created specifically aimed at the c.623 G>A *PRPH2* mutation.

Dr. Borooah's team has designed a CRISPR-Cas9 gene editing treatment for the c.623 G>A *PRPH2* mutation which has been tested; it will be used to target and cut the mutation in the DNA. The next step is to test the CRISPR gene editing on the stem cell produced genes if the cutting strategy on the normal DNA is safe.

Research also is being done to evaluate personalized treatments by using cell cultures and the animal models with *PRPH2* mutations.



Richard C. Atkinson Laboratory for Regenerative Ophthalmology



Stem Cell Regeneration & Transplantation

Using stem cell technologies, **Jiun Do, MD, PhD**, Assistant Professor, is investigating potential treatments for **glaucoma** that regenerates the optic nerve and restore the connections between the eye and the brain. These connections are lost in glaucoma and many other eye diseases, resulting in permanent vision loss. He is developing methods to directly replace the cells that are lost from eye diseases. The process starts by genetically manipulating and optimizing stem cells for transplantation then transferring the modified stem cells into the appropriate location within the eye using novel intraocular techniques.

Additionally, Dr. Do is pioneering the development of “neuronal relays” to reconnect the injured optic nerve to the brain. By adapting this stem cell strategy to the optic nerve, it may be possible to successfully transplant a whole eye. Ultimately, these research directions aim to provide new directions for vision restorative therapies.

Developing Treatments for Inherited Retinal Disease

Shyamanga Borooah, MD, PhD, Assistant Professor, and his team are developing novel therapies for a number of inherited retinal diseases using a variety of disease specific treatment approaches. The treatment approaches include gene therapy and CRISPR based gene editing. The lab's main focus is **macular degeneration** including late-onset retinal degeneration, Sorsby fundus dystrophy, dominant drusen and more recently pattern dystrophy, one of the most common inherited retinal diseases. These are all sight threatening diseases.

His team has generated patient stem cells carrying the disease-causing mutations and are converting these cells to either retinal cells or organoids (mini-eyes) to enable 'disease in a dish' modeling of eye disease. They will then use these human eye models to test their various treatment strategies. The ultimate aim is to develop innovative cures for currently untreatable sight threatening eye disease.

New Strategies For Eye Regeneration

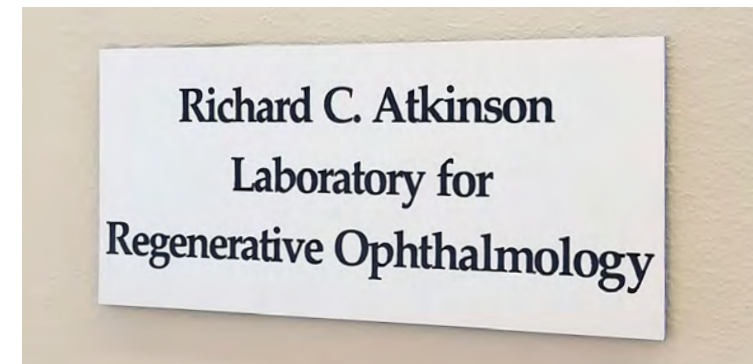
Researchers under the supervision of **Karl Wahlin, PhD**, Assistant Professor and Director of the Richard C. Atkinson Laboratory for Regenerative Ophthalmology, are developing novel strategies to regenerate new optic nerve and photoreceptor cells within the eye. Many species, including fish, can regrow damaged cells within the eye after injury. While humans seem to have lost this capability, Dr. Wahlin and his team believe that this process is merely dormant and can be activated in the human eye too.

A main limitation to restoring vision in humans is our inability to grow new cells that are lost during disease. One approach that might solve this is to regenerate new cells by activating genes that control normal eye development, as well as what is active during eye regeneration in other species. In several publications this year, the Wahlin lab demonstrated that human retinas express many of the same genes expressed in other species, particularly with respect to regulatory genes controlling cell type formation. Some of these control vast gene programs

and regulate how and when a cell type forms.

To prove that these genes were important, their team devised a series of experiments which demonstrated that by controlling the levels of 'regulator genes', they could make new human optic nerve cells in record time. The ability to generate new optic nerve cells could lead to exciting new ways to study and reverse permanent vision loss from **glaucoma**. In fact, these new cellular tools have already been used to explore and identify neuroprotective drugs that help optic nerve cells survive injury. A similar approach is under development for creating new light-sensing photoreceptor cells that die in other forms of **retinal disease**.

These technological innovations bring the team one step closer to reversing a variety of retinal degenerations spanning from glaucoma, which destroys the optic nerve, to retinitis pigmentosa and age-related macular degeneration that destroy light-sensing photoreceptors.



Lions Biobank Fast-Tracks SEI Genetic Research

The Shiley Eye Institute (SEI) received an innovative donation to establish the Downtown San Diego Lions Club BioBank for Vision in 2017. Conceived in 2006 by **Robert N. Weinreb, MD**, the BioBank was launched in 2012. The BioBank stores a library of biological samples with personal history that scientists can use to investigate predictors for diseases and effectiveness of therapies. Under the direction of **Radha Ayyagari, PhD**, and **Linda Zangwill, PhD**, these biological samples have been utilized to (1) learn about predictors of diseases (biomarkers); (2) determine effectiveness

or lack of effectiveness of therapies; (3) understand disease pathologies; and (4) develop successful cures for blinding eye diseases.

Demographic, ethnic, medical and risk factor history data are collected from qualified patients in the SEI clinic. The details of sample collection, processing, analysis and exact freezer storage location of samples are recorded in the BioBank database system. Each step of the process ensures that all patient data and samples are stored, tracked and readily available to share with investigators, along with all linked clinical, demographic, genotype, and phenotype information while maintaining strict confidentiality. This process has been approved by the UCSD Institutional Review Board Committee and involves all activities including the sample collection, sample processing and intended use and handling protocol.

Patients with inherited eye diseases who participate in this research have provided blood samples that are processed into DNA, RNA and other important components of blood. These samples are

isolated, quantified and standardized in preparation for future genetic analysis. Moreover, induced pluripotent stem cells from specific individuals also are stored in the BioBank.

This year Biobank initiated partnership with one of only 4 National Institutes of Health (NIH) Bridge to Artificial Intelligence (Bridge2AI) data generation projects. The NIH's Bridge2AI project is intended to speed up the widespread use of AI in biomedical research and health care by providing public access to ethically sourced data repositories. The UCSD data generation project called AI-READI (AI Ready and Equitable Atlas for Diabetes Insights), will provide public data sets to learn how diabetes is influenced by patients' genes, lifestyle and environment. The Downtown San Diego Lions Club biobank will provide the infrastructure for the AI-READI biospecimen repository at UCSD. The Downtown San Diego Lions Club BioBank for Vision is an invaluable resource for SEI investigators that contributes towards the future of finding cures for blinding eye diseases helping patients globally.



SEI & NASA

How can we conceive of going to the moon, traveling to Mars, or undertaking long-haul space travel if we can't see? These are the challenges facing humans with the goal of exploring the next frontier of space. Spaceflight Associated Neuro-ocular Syndrome (SANS) is an eye problem where the nerve of the eye (optic nerve) swells and bleeding occurs in the retina because many of the cells in the eye die. Today, SANS is a leading healthcare priority for astronauts and is under intense study.

The Shiley Eye Institute has contributed to this research for nearly a decade. In the last few years, lead investigator, **Alex Huang, MD, PhD**, Associate Professor and Alfred Vogt Chair in Ophthalmology, has worked with NASA to study changes to the eyes that can occur on the International Space Station (ISS). Today, results from astronaut eye exams on the ISS are sent to SEI and studied to uncover the cause of SANS. Attempts to develop countermeasures are underway in a unique international collaboration.

In a multinational study, NASA and Deutsches Zentrum für Luft- und

Raumfahrt (DLR – the German Aerospace Center) developed a special model to mimic what happens to astronauts in space. Human subjects lay down in a bedrest study with their heads lower than their feet by 6 degrees. This mimics the lack of gravity on the ISS where total body fluid in our lower extremities redistribute to our heads. This fluid shift is believed to be the cause of SANS.

Potential countermeasures to this fluid shift, such as exercise or lower body chambers that use negative pressure to hold the fluid in the legs, are being studied in this bedrest model. The challenge becomes: how to study the eye in such a unique position where subjects are lying down! Eye exams on earth are performed with patients sitting upright in a diagnostic device in a clinic.

Dr. Huang is leading an international team at the :envihab in Cologne, Germany, to understand the effects of bedrest positioning on the eye and the potential of SANS countermeasures. Dr. Huang and NASA investigators worked with German aerospace scientific collaborators on how best to study the

eye in the unique bedrest model. This included functional electrophysiological tests of the retina and optic nerve. Diagnostic equipment was re-engineered followed by testing and validation by team members.

Now, with these tools in place, if any countermeasure proves effective in protecting vision in the bedrest studies, imminent deployment to the ISS can occur. Ultimately, protecting the eye will allow humans to safely explore, experience, and travel to space for longer periods of time. Dr. Huang's SANS investigations may also illuminate the causes and treatments for earthly eye diseases such as glaucoma optic neuropathy.





New Findings in ADAGES

The African Descent and Glaucoma Evaluation Study (ADAGES) began over 20 years ago with researchers from the Hamilton Glaucoma Center at the Viterbi Family Department of Ophthalmology at UC San Diego, the Edward S. Harkness Eye Institute at Columbia University Irving Medical Center, and the Department of Ophthalmology at University of Alabama-Birmingham. The latest findings from the team show that the Black race group and the White race group had similar rates of visual field progression (loss of two or more lines of vision) despite the disease being more aggressive in the Black race group.

Robert N. Weinreb, MD, Director of the Shiley Eye Institute (SEI) and Chair of the Viterbi Family Department of Ophthalmology, and **Linda Zangwill, PhD**, Professor of Ophthalmology, led the team of researchers. The Hamilton Glaucoma Center, under Dr. Zangwill's direction, was the data coordinating center for the research. The average follow-up time with participants was 11 years.

"We know African Americans over the age of 40 are at a higher risk for

glaucoma," said Dr. Weinreb. "This makes it important for us to investigate whether there are any differences between African Americans with glaucoma versus their white counterparts from diagnosis to progression."

Dr. Zangwill, as Director of the Imaging Data Evaluation and Analysis (IDEA) Center at the Hamilton Glaucoma Center said, "Gathering and analyzing this data over time has had some surprising revelations. Our data showed that when African American patients have equal access to care, the progression of glaucoma between them and white patients are not as significant as they were in past studies."

The research was begun in order to find what may cause differences in glaucoma onset and rate of progression between Black and White race participants. Participants had to have primary open angle glaucoma (POAG).

The researchers believe the age difference in this study has significant clinical implications, because a larger number of the Black race participants were diagnosed with glaucoma at a younger age and may develop visual impairment in their lifetimes.

Christopher Girkin, MD, MSPH, Professor of Ophthalmology at the University of Alabama-Birmingham, who was a glaucoma fellow at UC San Diego when the study began, stated “It’s been a rewarding 20-year collaboration with Drs. Weinreb and Zangwill working on this research. Much of my career has been focused on studying the mechanism behind the racial disparity in glaucoma and methods to reduce this disparate burden.”

Previous population-based studies showed that Black race participants had higher prevalence and more rapid progression of glaucoma. Researchers surmise that their findings in this study are different from the prior studies because previously Black participants were adversely affected due to socioeconomic disparities and differences in access to treatment. In this current research, the findings show the rates of visual field progression were similar. This means that with improved access to medication, more frequent visual field testing, and better adherence to office visits through phone calls, patients will have better health outcomes.

Corneal Research To Improve Ocular Surface



Natalie A. Afshari, MD, Professor of Ophthalmology, and her team have been investigating how to improve the ocular surface of the cornea to treat dry eye and other conditions. In collaboration with Helen Makarenkova, PhD (Scripps Research) they studied how fibroblast growth factor 10 (FGF10) could help maintain and regenerate the eye’s corneal epithelium and ocular surface. FGF10 is a protein made by white blood cells and is critical to normal cellular development.

Role of FGF10/FGFR2b Signaling in Homeostasis and Regeneration of Adult Lacrimal Gland and Cornea Epithelium Proliferation. Finburgh EN, Mauduit O, Noguchi T, Bu JJ, Abbas AA, Hakim DF, Bellusci S, Meech R, Markarenkova HP, Afshari NA. Invest Ophthalmol Vis Sci. 2023 Jan 3;64(1):21. Doi:10.1167/iovs.64.1.21.

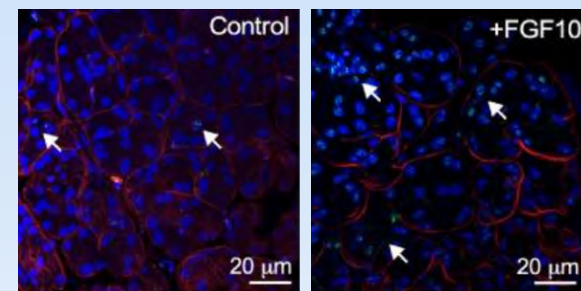
Those mouse models and human tissue showed that FGF10 promoted cellular regeneration in adult lacrimal glands. The team believes the findings have future therapeutic utility for dry eye

diseases by harnessing the regenerative potential of the cornea and lacrimal gland.

In her ocular surface investigations, Dr. Afshari also characterized the effects of three anti-inflammatory eye drops on the ocular surface corneal epithelial cells in-vitro to better understand and treat dry eye syndrome (DES).

The Effect of Anti-Inflammatory Topical Ophthalmic Treatments on In Vitro Cornea Epithelial Cells. Sella R, Tayar YC, Noguchi T, Finburgh EN, Lian RR, Abbas AA, Hakim DF, Bu JJ, Zhao J, Shaw P, Bahar I, Afshari AA. Transl Vis Sci Technol. 2022 Sep 1;11(9):16. Doi:10.1167/tvst.11.9.16.

These experiments demonstrated that of the eye drops tested, tacrolimus enhanced cell survival while cyclosporine (Restasis) offered a protective effect against cell death.



Immunostaining of lacrimal gland cells showing that FGF 10 treatment increased proliferation rates compared to controls

Smoking Effects in Glaucoma

“Healthy life, healthy body, healthy optic nerve”



According to the Centers for Disease Control and Prevention (CDC), smoking cigarettes increases one's risk for coronary heart disease by 2 to 4 times; for stroke by 2 to 4 times; for men developing lung cancer by 25 times; and for women developing lung cancer by almost 26 times.

Those effects of smoking may be well known and understood. What has not been explored in as much depth until recently is how smoking affects a person's eyes and vision. Researchers at medical schools across the country have been investigating the effects of smoking on eyes and their findings show that smoking does adversely affect one's eyesight.

Sasan Moghimi, MD, Associate Professor of Ophthalmology at UC San Diego's Shiley Eye Institute and Viterbi Family Department of Ophthalmology, has been working on this research along with **Robert N. Weinreb, MD**, **Sally Baxter, MD, MSc**, and **Linda Zangwill, PhD**.

The research spanned a couple of glaucoma studies conducted by the Hamilton Glaucoma Center at SEI with the Edward S. Harkness Eye Institute at Columbia University Medical Center and the Bernard School of Medicine at the University of Alabama-Birmingham.

In one of their reports, started in 2020 and published in the Academy of Ophthalmology's (AAO) Ophthalmology magazine, patients with primary open angle glaucoma (POAG) were followed for over three years with at least 5 visual field (VF) tests and 5 visits of optical coherence tomography (OCT). OCT is an imaging test of the eye using light waves to take cross-section pictures of the retina. The findings showed that smokers' eyes had VF progression 2.2 times more than non-smokers'—meaning the smokers' glaucoma worsened.

It was also discovered that the more someone smoked, there was reduced optic nerve vessel density in glaucoma and more susceptible to glaucoma

Aging Effects on the Eyes

progression. In addition, their other reports showed that heavy smokers had faster rates of thinning of their retinal nerve fiber layer (RNFL). The RNFL is made primarily of ganglion cells, which are the retinal neurons that communicate directly with the brain.

“The research clearly shows that smoking damages a person’s vision. When someone stops smoking, they help their overall health and may help their sight,” stated Dr. Moghimi.

Interestingly, they demonstrated that after ≥ 25 years of smoking cessation, the risk of VF progression in former heavy smokers becomes similar to never smokers. This is in line with previous studies that demonstrated the risk of age-related macular degeneration (AMD) reduces to a baseline 20 years after smoking cessation

Further studies are needed to see if the smoker stops smoking whether this will decrease the glaucoma progression.

Robert N. Weinreb, MD, Chair and Distinguished Professor of Ophthalmology and **Won-Kyu Ju, PhD**, Professor of Ophthalmology, at the Shiley Eye Institute and Viterbi Family Department of Ophthalmology collaborated on research which shows that repetitive stress in retinal tissue accelerates aging of the eye. The study was first authored by Dorota Skowronska-Krawczyk, MSc, PhD, Assistant Professor, Physiology & Biophysics and Ophthalmology and faculty of the Center for Translational Vision Research at the UC Irvine School of Medicine. Dr. Skowronska-Krawczyk completed her post-doctoral fellowship at UC San Diego’s Shiley Eye Institute from 2006-2010 and then was on the SEI staff.

“In collaboration with Dr. Skowronska-Krawczyk, our research was initiated at SEI and shows that the aging factor can accelerate progressive retinal ganglion cell (RGC) death and its axon loss, as well as the visual dysfunction in acute model of aged glaucoma,” said Dr. Ju.

The team’s research shows how fluctuations in eye pressure affects retinal tissue, creating epigenetic (how cells control gene activity without changing DNA) changes such as one would find with natural aging.

“Compared with young mice, our histological data clearly showed the evidence of a significant sectorial loss of axons in the optic nerve head and epigenetic changes in the retina of elevated IOP-induced aged mice, guiding us to develop potential therapeutic strategies to prevent progressive loss of RGCs, axons and vision in aging and glaucomatous neurodegeneration,” stated Dr. Ju.

Qianlan Xu, Cezary Rydz, Viet Anh Nguyen Huu, Lorena Rocha, Claudia Palomino La Torre, Irene Lee, William Cho, Mary Jabari, John Donello, David C Lyon, Robert T Brooke, Steve Horvath, Robert N. Weinreb, Won-Kyu Ju, Andrzej Foik, Dorota Skowronska-Krawczyk. Stress Induced Aging in Mouse Eye. Aging Cell. 2022 Dec;21(12):e13737. Epub 2022 Nov 17.



Team Shiley Wellness

SEI is committed to supporting the well-being of our clinical and research faculty, residents, fellows and staff. They work long hours spending most of their time on their feet attending to patients, operating in surgery or researching in the laboratories.

Spearheading this initiative at SEI are Wellness Program Directors **Catherine Y. Liu, MD, PhD** and **David Granet, MD**, who are collaborating with the UC San Diego Health Physician Wellness Office, the UC San Diego Health Employee Well-being Program and Integrative Medicine.

Drs. Granet and Liu are implementing UC San Diego initiatives supporting the faculty and staff's overall wellbeing. The faculty part of the initiative will focus on physician's mental health, practice efficiency, family care, academic engagements, and personal finances. Additionally, they have tasked the IT division to find a systems-based offering which may help improve clinic efficiency for our providers.

"We are very interested in ways to optimize the professional fulfillment of our extraordinary faculty," said Dr. Liu, who pointed out that the faculty's

wellness is key to SEI providing effective health care to our community.

With this goal in mind, there are plans for more sporting events like the recent table tennis tournament. Plans are underway for Healthy Lunch and Learn workshops focusing on nutrition, workplace movement, and mindfulness for all faculty and staff. SEI's Wellness Directors are focused on activities which will foster personal resilience and health and contribute to positive team building. They had help from **Robert N. Weinreb, MD**, **Don Kikkawa, MD**, Craig Kishaba, MBA and Karen Anisko Ryan's team.

Creating Connections at SEI

The promotion of mental health and creating connection between our diverse staff and faculty have always been key priorities for the UC San Diego Shiley Eye Institute and Viterbi Family Department of Ophthalmology.

This year we combined these efforts in a department ping pong tournament. Participants included the faculty, residents, fellows, researchers, nurses, and staff, across all departmental specialty sub-divisions such as glaucoma, cornea, retina, optometry, administration, and the operating room.

The laughs, cheering, and even competitiveness that were present during the tournament created a unique opportunity for department staff and faculty who would normally not interact with one another, a space to form connection, camaraderie, and boost morale.



Congratulations

Sally L. Baxter, MD, MSc, Assistant Professor of Ophthalmology, was voted to the periodical Ophthalmology Management's inaugural "40 Under 40" list for achieving excellence in ophthalmology as the next generation.

Napoleone Ferrara, MD, Distinguished Professor of Ophthalmology and Pathology, received the Pair Prize for American-Italian Relations from the Centro Studi Americani in Rome, Italy, October 2021. He was also awarded the XIII Weinman Award from the Barry and Virginia Weinman Innovation Fund in Honolulu, HI, January 2022.

Alex A. Huang, MD, PhD, Associate Professor of Ophthalmology, received the Roche Collaborative Research Fellowship Award with Dr. Shikha Gupta as mentee. He was also awarded the Top Poster Designation at the 2022 American Glaucoma Society.

Don O. Kikkawa, MD, Distinguished Professor of Clinical Ophthalmology and Plastic Surgery, received the 2022 UW-Madison Ophthalmology Alumni Association's Distinguished Alumni Award.

Jeffrey Lee, MD, Associate Professor, and **Robert N. Weinreb, MD**, Distinguished Professor of Ophthalmology and Bioengineering, were named to Newsweek's "America's Best Doctors 2022".

Shira L. Robbins, MD, Professor of Ophthalmology, was elected Vice President Medical Staff UC San Diego Health System and is now Vice Chair, Medical Staff Professionalism Committee.

Robert N. Weinreb, MD, Distinguished Professor of Ophthalmology and Bioengineering, was recognized as one of the "Top 10 in the World" as Most Influential in Ophthalmology on the THE POWER LIST 2022 by *The Ophthalmologist* international periodical. He was also nominated as a GLAUCOMA VISIONARY by the periodical *Glaucoma Today*.

TRAINEES

Richard L. Scawn, MBBS (Oculoplastics Visiting Scholar, 2014) received the 2022 American Academy of Ophthalmology Achievement Award for his contributions made to the Academy, its scientific and educational programs and to ophthalmology.

Michele Ting, MD (Oculoplastics Fellow, 2022) received the American Society of Ophthalmic Plastic and Reconstructive Surgery Research award 2022 for her paper titled, "A Comparison of Proptosis Reduction with Teprotumumab vs Surgical Decompression Based on Fat-to-Muscle Ratio in Thyroid Eye Disease"

Ben Xu, MD, PhD (Glaucoma Fellow, 2017) was named to Newsweek's "America's Best Doctors 2022".

Every year, Shiley Eye Institute specialists are honored to be named as being "the best" by major national and local organizations.

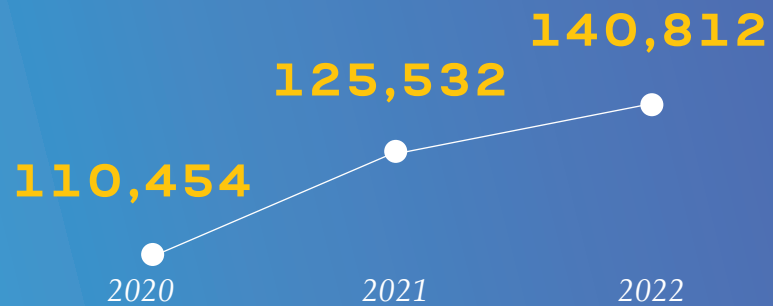
The Ophthalmologist
Expertscape
Castle Connolly

San Diego Magazine
TOP Doctors
U.S. News & World Report

Best Doctors
SuperDoctors
Newsweek

SEI BY THE NUMBERS 2022

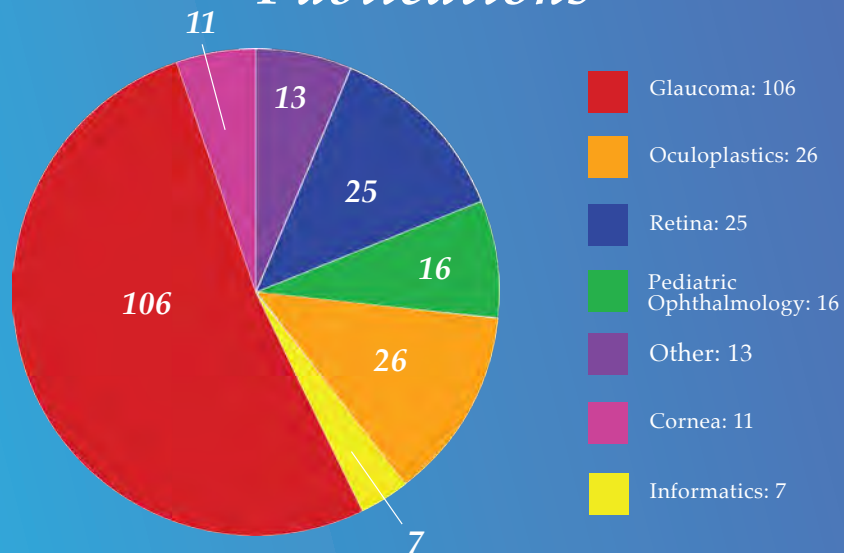
Patient Visits



Surgical Procedures



Publications



204,723 Phone Calls

5,432 Same Day Appointments

204 Publications

65 Grants

35 Clinical Trials



Robert N. Weinreb, MD

Chair & Distinguished Professor,
Department of Ophthalmology

Director, Shiley Eye Institute

Director, Hamilton Glaucoma
Center

Distinguished Professor of
Bioengineering

Morris Gleich, MD Chair
in Glaucoma

GLAUCOMA

Dr. Weinreb specializes in glaucoma surgery (conventional and minimally invasive), medical management of glaucoma; cell and molecular biology of aqueous outflow; mechanisms of optic nerve damage in glaucoma; visual function; neuroprotection in glaucoma; drug delivery to eye; cataract surgery.



Natalie A. Afshari, MD, FACS

Professor of Ophthalmology

Vice Chair for Education,
Department of Ophthalmology

Chief, Division of Cornea and
Refractive Surgery

Stuart I. Brown MD Chair in
Ophthalmology in Memory of
Donald P. Shiley

CORNEA & REFRACTIVE

Dr. Afshari specializes in Fuchs dystrophy; cataract surgery; corneal transplantation; endothelial keratoplasty (DSAEK & DMEK); Intacs and collagen crosslinking for keratoconus; laser refractive surgery, including LASIK and PRK; surgical and medical diseases of cornea.



Radha Ayyagari, PhD

Professor of Ophthalmology &
Pathology

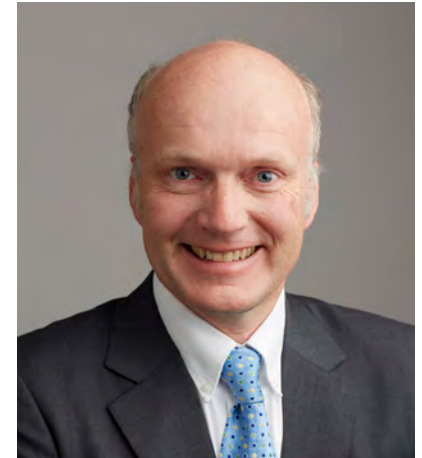
Chief of Ophthalmic Molecular
Diagnostic Laboratory

Director of Downtown San
Diego Lions Club BioBank for
Vision

Viterbi Family Chair of
Ophthalmic Genetics

GENETICS

Dr. Ayyagari specializes in molecular genetics of macular and retinal dystrophy; biological mechanisms underlying retinal diseases; age-related macular degeneration; diabetic retinopathy; and glaucoma.



Dirk-Uwe Bartsch, PhD

Adjunct Professor of
Ophthalmology

RETINA & VITREOUS

Dr. Bartsch specializes in retinal imaging; scanning laser imaging-confocal/non-confocal; optical coherence tomography (OCT); indocyanine green and fluorescein angiography; tomographic reconstruction of the posterior pole.



Sally L. Baxter, MD, MSc

Assistant Professor of
Ophthalmology

Chief, Division of
Ophthalmology Informatics
and Data Science

**COMPREHENSIVE
OPHTHALMOLOGY**

Dr. Baxter specializes in comprehensive ophthalmology; cataract surgery; diabetic retinopathy screening; caring for underserved populations; digital health and informatics and data science.



Akram Belghith, PhD

Assistant Project Scientist of
Ophthalmology

GLAUCOMA

Dr. Belghith specializes in change detection and monitoring of glaucoma; image processing and machine learning classifier analyses.



**Shyamanga Borooah,
MBBS, MRCP (UK),
MRCSEd, FRCOphth, PhD**

Assistant Professor of Clinical
Ophthalmology

RETINA & VITREOUS

Dr. Borooah specializes in adult and childhood inherited retinal degenerations; age-related macular degeneration; retinal vein occlusion; central serous retinopathy and diabetic eye disease.



Christopher Bowd, PhD

Research Scientist of
Ophthalmology

Director of the Hamilton
Glaucoma Center-based Visual
Field Assessment Center

Co-Director of the Hamilton
Glaucoma Center-based
Imaging Data Evaluation and
Analysis (IDEA) Center

GLAUCOMA

Dr. Bowd specializes in early detection and monitoring of glaucoma; machine learning classifier analyses of imaging and visual function measurements.



Stuart I. Brown, MD

Professor of Ophthalmology,
Emeritus

CORNEA & REFRACTIVE

Dr. Brown specializes in corneal transplantations and cataract surgeries.



Andrew S. Camp, MD

Assistant Professor of
Ophthalmology

Acting Chief of the
Ophthalmology Section at the
Veterans Administration
Medical Center

GLAUCOMA

Dr. Camp specializes in adult
and pediatric glaucoma.

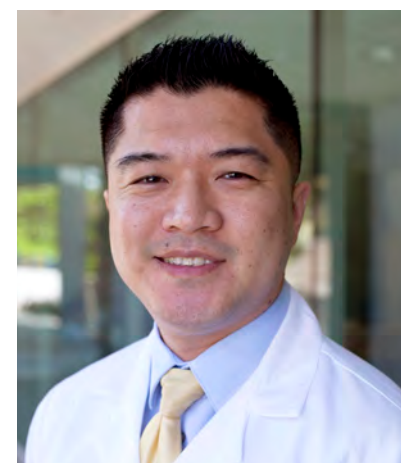


Mark Christopher, PhD

Assistant Project Scientist of
Ophthalmology

GLAUCOMA

Dr. Christopher specializes in
deep learning applications in
imaging and visual function in
glaucoma.



Jiun Do, MD, PhD

Assistant Professor of
Ophthalmology

GLAUCOMA

Dr. Do specializes in
translational research; retinal
and optic nerve regeneration;
retinal ganglion cell replace-
ment for glaucoma and other
optic neuropathies; optic nerve
relays; patient measured
intraocular pressures and
glaucoma progression.



Napoleone Ferrara, MD

Distinguished Professor of
Ophthalmology and Pathology

Senior Deputy Director for Basic
Sciences, UC San Diego Moores
Cancer Center

Ben and Wanda Hildyard Chair
for Diseases of the Eye

RETINAL VASCULAR

Dr. Ferrara specializes in
regulation of angiogenesis (the
formation of new blood vessels)
and the role of VEGF (vascular
endothelial growth factor);
continues to develop new
therapies to treat age related
macular degeneration building
upon past development of
Avastin® and Lucentis®.



Henry A. Ferreyra, MD

Clinical Professor of
Ophthalmology

RETINA & VITREOUS

Dr. Ferreyra specializes in
electrophysiology inherited
disorders of the retina; age-
related macular degeneration;
diabetic retinopathy;
retinopathy of prematurity.



William R. Freeman, MD

Distinguished Professor of
Ophthalmology

Vice Chair, Department of
Ophthalmology

Director, Jacobs Retina Center

Co-Director, Retina Division

RETINA & VITREOUS

Dr. Freeman specializes in retinal
detachment; diabetic retinopa-
thy; macular holes & age-related
macular degeneration.



Michael H. Goldbaum, MD

Professor of Ophthalmology in
Residence, Emeritus

RETINA & VITREOUS

Dr. Goldbaum specializes in
surgical and medical treatment
of the retina and vitreous;
macular degeneration; pediatric
retina; ocular tumors; glaucoma
informatics.



**David B. Granet, MD,
MHCM, FACS, FAAO, FAAP**

Professor of Clinical
Ophthalmology and Pediatrics

Vice Chair, Department of
Ophthalmology

Anne Ratner Chair of Pediatric
Ophthalmology

Director, Anne F. & Abraham
Ratner Children's Eye Center

Director, Division of Pediatric
Ophthalmology & Eye
Alignment

**PEDIATRIC OPHTHALMOLOGY &
ADULT EYE REALIGNMENT**

Dr. Granet specializes in
pediatric ophthalmology and
strabismus, adult eye movement
problems, strabismus surgery,
childhood eye misalignments &
disorders, and nystagmus.



Weldon W. Haw, MD

Clinical Professor of
Ophthalmology

CORNEA & REFRACTIVE

Dr. Haw specializes in cataract
surgery; dry eye/pterygium;
cornea transplantation;
refractive surgery/LASIK.



Chris W. Heichel, MD, FACS

Clinical Professor of
Ophthalmology

CORNEA & REFRACTIVE

Dr. Heichel specializes in corneal
transplantations and kerato-
prostheses; challenging cataract
and IOL surgeries; LASIK, Intacs,
and Visian ICL advanced tech-
niques in laser and refractive
surgery; keratoconus ocular
surface tumors; limbal stem cell
transplantation.



Alex A. Huang, MD, PhD

Associate Professor of
Ophthalmology

Alfred Vogt Chair in
Ophthalmology

GLAUCOMA

Dr. Huang specializes in
glaucoma, cataracts, and ocular
changes during space flight.



Won-Kyu "Daniel" Ju, PhD

Professor of Ophthalmology and Bioengineering

GLAUCOMA

Dr. Ju specializes in cellular and molecular mechanisms for neurodegeneration; neuro-inflammation, and neuro-protection in glaucoma and Alzheimer's disease; characterization of melanopsin-expressing retinal ganglion cell-mediated multiscale connectome in Alzheimer's disease.



Don O. Kikkawa, MD, FACS

Distinguished Professor of Clinical Ophthalmology and Plastic Surgery

Vice Chair for Clinical Services, Department of Ophthalmology

Chief, Division of Oculofacial Plastic and Reconstructive Surgery

Dr. Trude Kahn Hollander Chair in Ophthalmology

OPHTHALMIC PLASTIC & RECONSTRUCTIVE SURGERY

Dr. Kikkawa specializes in oculofacial surgery; eyelid, lacrimal & orbital surgery; thyroid eye disease (orbital decompression & eyelid surgery); craniofacial disorders involving the eyelids & orbits; orbital & eyelid tumors; facial aesthetics - soft tissue fillers & injectables.



Lanning Kline, MD

Clinical Professor of Ophthalmology

NEURO-OPHTHALMOLOGY

Dr. Kline specializes in optic nerve disease; double vision; pupillary disorders; demyelinating diseases; visual abnormalities accompanying stroke.



Bobby S. Korn, MD, PhD, FACS

Professor of Clinical Ophthalmology and Plastic Surgery

OPHTHALMIC PLASTIC & RECONSTRUCTIVE SURGERY

Dr. Korn specializes in cosmetic and reconstructive surgery; blepharoplasty; ptosis surgery; congenital birth defects; endoscopic forehead lifting; thyroid eye disease management; optic nerve sheath fenestration/decompression; eyelid and orbital tumors and cancers; lacrimal/tear outflow system disorders; bulging or proptosis of eyes; reconstruction of eyelids post cancer removal; reconstruction after trauma/eye injuries; facial fillers and skin rejuvenation.



Jeffrey E. Lee, MD

Associate Clinical Professor of Ophthalmology

Program Director,
Ophthalmology Residency

COMPREHENSIVE OPHTHALMOLOGY

Dr. Lee specializes in facial burns; orbital trauma; ocular manifestations of HIV.



John H. K. Liu, PhD

Professor of Ophthalmology

Director, Glaucoma Sleep
Laboratory

GLAUCOMA

Dr. Liu specializes in regulation of intraocular pressure and ocular blood flow 24-hour sleep laboratory for glaucoma and other eye diseases.



Catherine Y. Liu, MD, PhD

Assistant Professor of Clinical Ophthalmology

OPHTHALMIC PLASTIC & RECONSTRUCTIVE SURGERY

Dr. Liu specializes in ptosis surgery; blepharoplasty; lacrimal disease and surgery; eyelid and orbital oncology; blepharospasm and hemifacial spasm; orbital fractures; cranio-facial disorders involving the eyelid and orbit; pediatric oculoplastics; surgical and non-surgical facial rejuvenation.

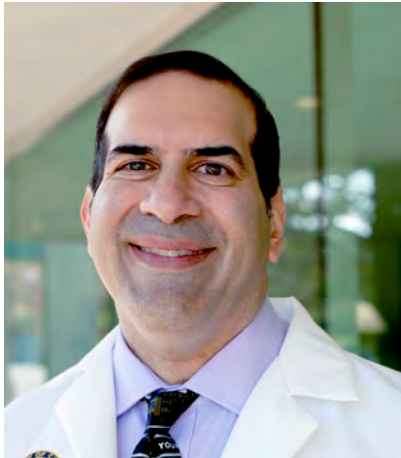


Sasan Moghimi, MD

Associate Professor of Ophthalmology

GLAUCOMA

Dr. Moghimi specializes in imaging in early detection and monitoring of the disease; angle-closure glaucoma diagnosis and treatment.



Mansoor Movaghar, MD

Associate Clinical Professor of Ophthalmology

PEDIATRIC OPHTHALMOLOGY & ADULT EYE REALIGNMENT

Dr. Movaghar specializes in strabismus/eye misalignment/double vision; adult eye movement problems; amblyopia; pediatric cataracts; nasolacrimal duct disorders; congenital eye syndromes; systemic diseases affecting the eyes.



Thao P. Nguyen, MD

Assistant Clinical Professor of Ophthalmology

COMPREHENSIVE OPHTHALMOLOGY

Dr. Nguyen specializes in cornea; anterior segment and cataract surgery.



Eric Nudleman, MD, PhD

Associate Professor of Clinical Ophthalmology

Co-Director, Retina Division

Viterbi Family Chair for Retinal Vascular Diseases

RETINA & VITREOUS

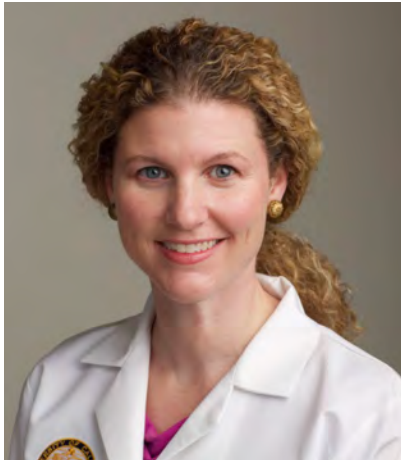
Dr. Nudleman specializes in adult & pediatric vitreoretinal diseases, including AMD, diabetic eye disease; retinal vein occlusions; retinal detachments; proliferative vitreoretinopathy, macular holes & epiretinal membranes; pediatric vitreoretinal diseases, retinopathy of prematurity, familial exudative vitreoretinopathy, Coats disease, fetal vascular syndrome, & intraocular trauma. developmental angiogenesis.



Manuel Puig-Llano, MD, FACS, FASRS

Clinical Professor of Ophthalmology

COMPREHENSIVE OPHTHALMOLOGY



**Shira L. Robbins,
MD, FAAO, FAAP**

Professor of Clinical
Ophthalmology

Educational Director of Pediatric
Ophthalmology/Strabismus
Division

Vice President Medical Staff for
UC San Diego Health

**PEDIATRIC OPHTHALMOLOGY &
ADULT EYE REALIGNMENT**

Dr. Robbins specializes in strabismus/eye misalignment/double vision; amblyopia; retinopathy of prematurity; pediatric glaucoma and cataracts; including intraocular lens placement; nasolacrimal duct disorders; congenital eye syndromes; craniofacial syndromes; systemic diseases affecting the eyes; nystagmus.



Jolene Rudell, MD, PhD

Assistant Professor of Clinical
Ophthalmology

**PEDIATRIC OPHTHALMOLOGY &
ADULT EYE REALIGNMENT**

Dr. Rudell specializes in strabismus/eye misalignment/double vision; amblyopia; pediatric cataracts; nasolacrimal duct disorders; congenital eye syndromes; systemic diseases affecting the eyes.



Peter J. Savino, MD

Professor of Ophthalmology &
Neurosciences

NEURO-OPHTHALMOLOGY

Dr. Savino specializes in myasthenia gravis optic neuritis; atrophy and neuropathy brain and nervous system; tumors; visual field defects; degenerative, metabolic, inflammatory and demyelinating diseases; vascular disorders.



Nathan L. Scott, MD, MPP

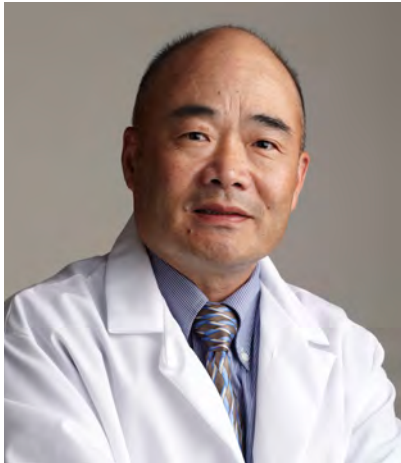
Assistant Professor of Clinical
Ophthalmology

Division Chief, Ocular Oncology
Associate Member, Solid Tumor
Therapeutics

UC San Diego Health Moores
Cancer Center

OCULAR ONCOLOGY

Dr. Scott specializes in ocular oncology; uveal melanoma; retinoblastoma; choroidal hemangioma; ocular surface tumors (OSSN, conjunctival melanoma, lymphoma, etc.); ocular trauma; complicated retinal detachment; proliferative vitreoretinopathy; diabetic retinopathy; macular hole; age-related macular degeneration; retinal vascular occlusive disease; epiretinal membranes.



Peter Shaw, PhD

Associate Adjunct Professor of Ophthalmology

RETINA & VITREOUS

Dr. Shaw investigates how genetic and oxidative stress risk factors impact ocular disease; development of molecular and gene therapy methods to treat eye diseases.



Doran B. Spencer, MD, PhD

Assistant Clinical Professor of Ophthalmology

UVEITIS

Dr. Spencer specializes in uveitis and ocular inflammation.



Christopher B. Toomey, MD, PhD

Assistant Professor of Clinical Ophthalmology

RETINA & VITREOUS

Dr. Toomey specializes in retina and vitreous; adult vitreoretinal disease, with specialization in age-related macular degeneration (AMD); diabetic retinopathy; retinal vein occlusions; retinal detachments; proliferative vitreoretinopathy; macular holes; and epiretinal membranes. Scientific interest in age-related macular degeneration with a focus on the early and intermediate “dry” stages of AMD.



Cristiana Vasile, MD, MAS

Associate Clinical Professor of Ophthalmology

GLAUCOMA

Dr. Vasile specializes in glaucoma management, and clinical research in glaucoma and optic nerve assessment.



Karl Wahlin, PhD

Assistant Professor of
Ophthalmology

Director, Richard C. Atkinson
Laboratory for Regenerative
Ophthalmology

REGENERATIVE OPHTHALMOLOGY

Dr. Wahlin specializes in directed differentiation of pluripotent stem cells and their application towards the study of retinal development and eye disease; photoreceptor cell development and retinal connectivity; retinal and optic nerve regeneration.



Derek S. Welsbie, MD, PhD

Associate Professor of
Ophthalmology

GLAUCOMA

Dr. Welsbie specializes in neuroprotection in glaucoma and other optic neuropathies; use of functional genomic technologies to identify novel mediators of axon injury signaling in neurons; development of dual leucine zipper kinase inhibitors; role of dual leucine zipper kinase in traumatic brain injury.



Linda M. Zangwill, PhD

Professor of Ophthalmology

Interim Director, Research

Director, Hamilton Glaucoma
Center, Data Coordinating
Center

Richard K. Lansche, MD &
Tatiana A. Lansche Chair in
Ophthalmology

GLAUCOMA

Dr. Zangwill specializes in the relationship between structural & functional change in the aging & glaucoma eye; developing computational & statistical techniques to improve glaucomatous change detection, reduce the number of visits & optimize the type of testing required; identify risk factors that can predict glaucomatous progression & rapidly progressing glaucoma.

Optometry & Low Vision



John F. Kulischak, OD
OPTOMETRY SUPERVISOR

OPTOMETRY SCHOOL
University of California
Berkeley

RESIDENCY
Palo Alto VA Medical Center



Maria Laura
Gomez, MD, OD

**MEDICAL SCHOOL
& RESIDENCY**
Rosario University & Barraquer
Institute of America, Bogota,
Colombia

FELLOWSHIP
Moorfield Eye Hospital,
London
University of California San
Diego

SPECIALTY
Cornea and Dry Eye



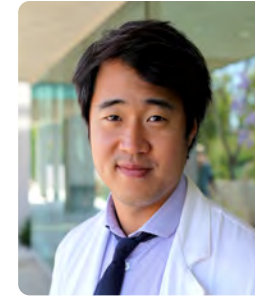
Pamela A. Hoo, OD

OPTOMETRY SCHOOL
Southern California College
of Optometry at Marshall B.
Ketchum University



Caitlin Jomoc, OD

OPTOMETRY SCHOOL
Midwestern University Arizona
College of Optometry



Philip Kim, OD

OPTOMETRY SCHOOL
Nova Southeastern University



Anne B. Lam, OD

OPTOMETRY SCHOOL
Southern California College
of Optometry at Marshall B.
Ketchum University



Esmeralda
McClean, OD

OPTOMETRY SCHOOL
University of California Berkeley

SPECIALTY
Ocular Disease



Lianne Mizoguchi, OD

OPTOMETRY SCHOOL
New England College of
Optometry



Tracy Moor, OD

OPTOMETRY SCHOOL
The Ohio State University

RESIDENCY
Columbus and Chillicothe VA
Medical Centers

SPECIALTY
Ocular Disease

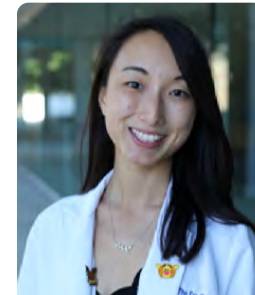


Andrew Vo, OD

OPTOMETRY SCHOOL
University of California Berkeley

RESIDENCY
Southern California College
of Optometry at Marshall B.
Ketchum University

SPECIALTY
Specialty Contact Lens



Carol Yu, OD

OPTOMETRY SCHOOL
University of California Berkeley

RESIDENCY
Nova Southeastern University

SPECIALTY
Specialty Contact Lens and Ocular
Disease

NOT PICTURED:
Lara D. Hustana, OD

Residents

The UC San Diego ophthalmology residency training is a three-year program with 12 resident physicians (four per year of training).

Our highly selective residency program receives over 400 applications per year from throughout the country to fill four positions. The program is known for its outstanding clinical and surgical training, as well as the value placed on scholarships and compassionate patient care. Our residents are among the brightest and most motivated, and continue to be high achievers during and after their training.

As a result, graduating residents are regularly chosen for competitive post-residency

Fellowship training in various subspecialties of Ophthalmology, such as Cornea, Glaucoma, Ophthalmic Plastic and Reconstructive Surgery and Retina at the Shiley Eye Institute. Under the supervision of the renowned Shiley faculty, residents learn to care for patients, from common to very rare eye conditions.

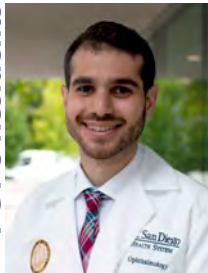
With departmental support, residents also participate in the many cutting-edge research opportunities available in the UC San Diego Viterbi Family Department of

Ophthalmology and present their work at national meetings such as the American Academy of Ophthalmology and the Association for Research in Vision and Ophthalmology. The UC San Diego Ophthalmology Residency Training Program was recently recognized by the national accrediting body, the Accreditation Council for Graduate Medical Education, with a commendation on the excellence of the Residency Program and its faculty.

PGY-4 Residents



PGY-3 Residents



PGY-2 Residents



PGY-4 Residents

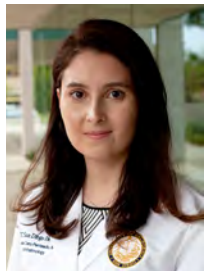
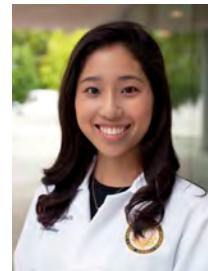
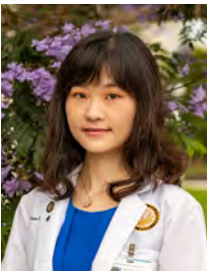
Aimee Chang, MD
Liane Dallalzadeh, MD
Lingling Huang, MD, PhD
Mark C. C. Lin, MD

PGY-3 Residents

Justin Arnett, MD
Medi Eslani, MD
Jenny Q. Hu, MD
Maya Yamane, MD

PGY-2 Residents

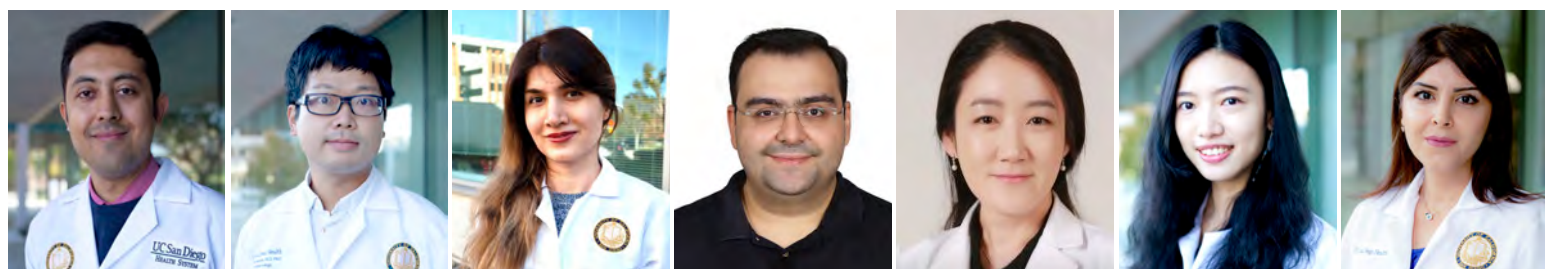
Helena Gali, MD
Andrew Lin, MD
Rafaella Pentead, MD
George Villatoro, MD



Fellows

Shiley Eye Institute offers world-class fellowships in cornea, glaucoma, ophthalmic plastic and reconstructive surgery, pediatric ophthalmology, and retina. Fellows are exposed to expert training in both the clinical and research settings. Many assume prominent academic positions around the world as well as practicing as outstanding clinicians in the global ophthalmic community.

GLAUCOMA



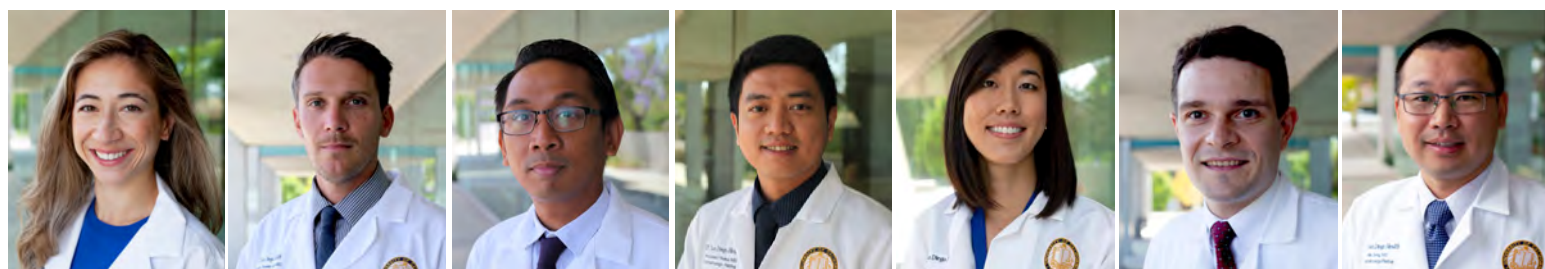
Glaucoma

Alireza Kamalipour, MD
Takashi Nishida, MD, PhD
Golnoush Mahmoudi Nezhad, MD, MPH
Vahid Mohammad Zadeh, MD
Joo Youn Shin, MD, PhD
Jo-Hsuan (Sandy) Wu, MD
Adeleh Yarmohammadi, MD
Andrea Yonge, MD

Retina

Daniel Deussen, MD, MSc
Carlo Galang, MD
Fritz Kalaw, MD
Alexa Li, MD
Etienne Schonbach, MD
Delu Song, MD
Alexandra Warter, MD
Shaden Handy Fathy Yassin, PhD

GLAUCOMA RETINA



Cornea

James Bailey, MD
Samuel Burke, MD

Oculoplastics

Michelle Ting, MD
Nicole Topilow, MD

Pediatrics

Aaron Winter, MD

RETINA



CORNEA



OCULOPLASTICS



PEDIATRICS



NOT PICTURED

Glaucoma

Seyed Pourya Hoseini Alinodehi, PhD
Na Young Lee, MD, PhD
Gabriela Avila Mendoza, MD

Retina

Hailey Robles-Holmes, MD
Shikha Pachauri, PhD

Oculoplastics:

Jin Sook Yoon, MD, PhD

Graduation

GRADUATION OF RESIDENTS & FELLOWS

On June 21, 2022, the Viterbi Family Department of Ophthalmology and Shiley Eye Institute graduated outstanding residents and fellows with a virtual and socially distanced ceremony in the Shiley Conference Room.

Graduating Residents

Aimee Chang, MD (Co-Chief, Quality Assurance)
Liane Dallalzadeh, MD (Co-Chief, Academics)
Lingling Huang, MD, PhD (Co-Chief, Research)
Mark Lin, MD (Co-Chief, Administration)

Graduating Fellows

Michelle Ting, MD (Oculoplastics)

Aaron Winter, MD (Pediatric Ophthalmology)

James Bailey, MD (Cornea)
Samuel Burke, MD (Cornea)

Alexandria Li, MD (Retina)

Adeleh Yarmohammadi, MD (Glaucoma)
Andrea Yonge, MD (Glaucoma)

Vahid Mohammadzadeh, MD (Glaucoma Research)
Eleonora Micheletti, PhD, OD (Glaucoma Research)

GRADUATION AWARDS

The ninth annual **Lamont Ericson, MD Award for Outstanding Patient Care by a Resident** was awarded to Mark Lin, MD by Residency Director, **Jeffrey Lee, MD**. Dr. Ericson was an outstanding former resident in the department who passed away in 2007 at a young age. The department is grateful that Dr. Ericson's family has supported his memory in this special way.

The inaugural **Lanna Cheng Ophthalmology Innovation Award** in recognition of outstanding Innovation in Research in the Retina was given to **Shyamanga Borooah, MD, PhD**.

The inaugural **Lanna Cheng Ophthalmology Innovation Award** in recognition of outstanding Innovation in Research in Ophthalmic Reconstructive and Oculofacial Plastic Surgery was given to Nicole Topilow, MD.

The **Whitehill Teaching Award** from the UC San Diego Health Sciences Academy of Clinical Scholars was given to **Doran Spencer, MD, PhD**. The recipient is chosen by the Chief Residents and given to an Assistant or Associate level faculty member who best exemplifies compassionate bedside manners for learners to emulate, serves as an advocate for trainees, and encourages and facilitates clinical, translation or basic science research projects.

Award for Teaching by a Resident Rounds & Didactics

Liane Dallalzadeh, MD

OKAP Teaching Award

Liane Dallalzadeh, MD

Outstanding Academic Achievement Award (OKAP)

Lingling Huang, MD, PhD
Justin Arnett, MD

Outstanding Surgical Teaching

David Granet, MD
Bobby Korn, MD, PhD

Outstanding Clinical Teaching

Sasan Moghimi, MD

Award for Teaching by a Fellow

Alexa Li, MD

Teaching Excellence Award

Cole Ferguson, MD

Education: Physicians

2022 OPHTHALMOLOGY UPDATE

The 2022 Ophthalmology Update, sponsored by the Viterbi Family Department of Ophthalmology and the Shiley Eye Institute at UC San Diego, was held virtually on February 26, 2022. **Natalie Afshari, MD, David Granet, MD, Eric Nudleman, MD, PhD, Don Kikkawa, MD and Robert N. Weinreb, MD** served as Program Moderators. The interdisciplinary faculty of ophthalmic subspecialists reviewed the continuing progress, latest surgical techniques, innovative ideas and cutting-edge translational research in ophthalmology.



SHILEY EYE INSTITUTE
UC SAN DIEGO

The Viterbi Family
Department of Ophthalmology

OPHTHALMOLOGY UPDATE 2022

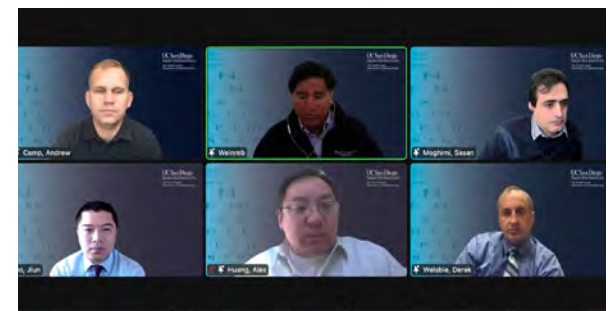
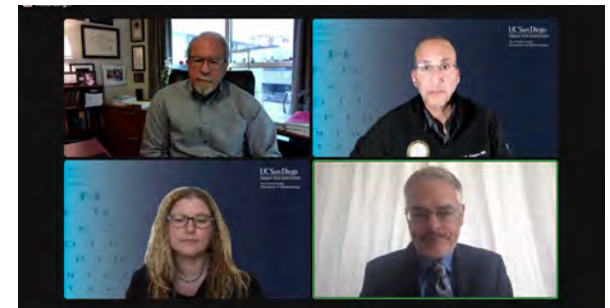
**Saturday,
February 26, 2022
8:00 AM - 3:00 PM PST**

Program Chairs


Robert N. Weinreb, MD


Don O. Kikkawa, MD

An interdisciplinary faculty of ophthalmic subspecialists will review the continuing progress in Cataract and Refractive Surgery, Glaucoma, Retina, Neuro-Ophthalmology, Pediatric Ophthalmology, Ocular Surface Disease, Cornea and Oculoplastics.



Education: Physicians

VIRTUAL GRAND ROUNDS

The community and SEI alumni are also invited to the departmental weekly Grand Rounds on Monday afternoon. The Grand Rounds consist of a special lecture from a prominent physician scientist from around the world and case presentations with moderated discussion. Interesting eye diseases, treatment dilemmas and surgical challenges are often the theme. Due to the COVID-19 pandemic, the Grand Rounds became virtual to follow safety guidelines. CME credits are given for this event as well.

January 10, 2022

Moderated by Robert N. Weinreb, MD
Guest Lecturer: James Tsai, MD
President - New York Eye and Ear Infirmary of Mount Sinai, Delafield-Rodgers Professor and Chair Department of Ophthalmology, Icahn School of Medicine at Mount Sinai
TITLE: "New Innovative Directions in Glaucoma Detection and Management"

January 24, 2022

Moderated by Don O. Kikkawa, MD
Guest Commentator: Samuel Lance, MD
Associate Clinical Professor, Director, Adult Craniomaxillofacial Surgery, Director, Plastic Surgery Residency Program, UCSD Division of Plastic Surgery

January 31, 2022

Moderated by Natalie Afshari, MD
Guest Commentator: Gabriel Valerio, MD
LCDR, MC, USN, Refractive Surgery Advisor for Navy Ophthalmology, Program Director, Navy Refractive Surgery San Diego, Assistant Professor of Surgery, USUHS, Cornea, External Disease & Refractive Surgery, Naval Medical Center San Diego

February 7, 2022

Moderated by Robert N. Weinreb, MD
Guest Lecturer: Peter Savino, MD
Professor of Ophthalmology & Neurosciences, Viterbi Family Department of Ophthalmology, Shiley Eye Institute, UC San Diego
Title: "Things That Could Bite You"

March 7, 2022

Moderated by William Freeman, MD

March 14, 2022

Moderated by Robert N. Weinreb, MD

March 21, 2022

Moderated by Natalie Afshari, MD
Guest Lecturer: Mark J. Mannis, MD
Fosse Endowed Chair in Vision Science Research, Professor and Chair, Department of Ophthalmology & Vision Science, University

of California Davis Eye Center
Title: "Keratoplasty: Past, Present, and "Back to the Future"

March 28, 2022

Moderated by Doran Spencer, MD, PhD

April 11, 2022

Moderated by Don O. Kikkawa, MD
Guest Lecturer: Parag Sanghvi, MD, MSPH
Vice Chair and Professor, Department of Radiation Medicine and Applied Sciences, UC San Diego Health
"The Role of Radiotherapy in Orbital and Ocular Tumors"

April 18, 2022

Moderated by William Freeman, MD

May 9, 2022

Moderated by David Granet, MD
Guest Lecturer: Ben Wiggins, MD, MHA
President, American Academy of Ophthalmology
Title: "The Changing Demography of Ophthalmology Practice"

September 12, 2022

Moderated by Doran Spencer, MD, PhD

September 19, 2022

Moderated by William Freeman, MD
Guest Lecturer: Amani Fawzi, MD, FARVO
Cyrus Tang and Lee Jampol Professor of
Ophthalmology
Professor, Department of Ophthalmology,
Feinberg School of Medicine, Northwestern
University
Title: "Vascular Imaging In Diabetic
Retinopathy: What Have We Learned"

October 10, 2022

Moderated by Doran Spencer, MD, PhD
Guest Lecturer: James Walsh, MD, PhD
Instructor, Ophthalmology and Visual
Sciences
Washington University
Title: "Posterior Uveitis: The Contribution of
Local Immunity"

November 7, 2022

Moderated by Peter Savino, MD

November 14, 2022

Moderated by Nathan Scott, MD
Guest Lecturer: J. William Harbour, MD
Professor and Chairman
The David Bruton, Jr. Chair in
Ophthalmology
Department of Ophthalmology
UT Southwestern Medical Center
Title: "Recent Breakthroughs in the
Management of Uveal Melanoma"

VISION RESEARCH LECTURES

The Vision Research Lecture Series addresses the latest advances in vision science and clinical ophthalmology. Each presentation features UC San Diego Department of Ophthalmology's faculty, as well as a selection of leading vision scientists from around the globe. These lectures are held in the Shiley Eye Institute Education Center.

January 4, 2022

Hosted by Derek Welsbie, MD, PhD
Guest Lecturer: Pradeep Ramulu, MD, PhD
Professor of Ophthalmology
Wilmer Eye Institute, Johns Hopkins
Hospital
Title: The Complexity of Addressing
Glaucoma Disability

January 12, 2022

Hosted by Robert N. Weinreb, MD
Guest Lecturer: Randy Craven, MD, PhD
Medical Director, AbbVie
Title: Tenon's Tissue and Glaucoma Surgery

January 13, 2022

Hosted by Radha Ayyagari, PhD
Guest Lecturer: Monica M. Jablonski, PhD,
FARVO

Professor, Department of Ophthalmology
Department of Anatomy and Neurobiology
The University of Tennessee Health Science
Center

Title: Bidirectional Translation: Novel
Preclinical Models of Glaucoma and New
Therapeutics

January 19, 2022

Hosted by Linda M. Zangwill, PhD

Guest Lecturer: Mae Gordon

Professor, Ophthalmology and Visual
Sciences

Washington University School of Medicine

Title: The Ocular Hypertension Treatment
Study: A 20 Year Update

January 20, 2022

Hosted by Sally L. Baxter, MD, MSc

Guest Lecturer: Adam Rule, PhD

Assistant Professor in the Information
School

University of Wisconsin-Madison

Title: The Composition of Clinical Notes

January 27, 2022

Hosted by Radha Ayyagari, PhD and
Shyamanga Borooah, MBBS, MRCP (UK),
MRCSEd, FRCOphth, PhD

Guest Lecturer: Patrick Yu-Wai-Man, PhD,
FRCPath, FRCOphth

Professor, Department of Clinical
Neurosciences

University of Cambridge

Title: Inherited Optic Neuropathies –
An Update

February 28, 2022

Guest Lecturer: Kaweh Mansouri, MD MPH

Consultant Ophthalmologist

Montchoisi Eye Clinic, Lausanne,
Switzerland

Title: Does MIGS Work? Where Are The Data?

March 9, 2022

Hosted by Sally L. Baxter, MD, MSc

Guest Lecturer: Michelle Hribar, PhD, MS

Assistant Professor of Medical Informatics
and Clinical Epidemiology,

School of Medicine

Oregon Health and Science University

Title: Using EHR Data to Improve Patient

Compliance: A Case Study for Amblyopia
Patients

March 16, 2022

Hosted by Jiun Do, MD, PhD

Guest Lecturer: Benjamin Xu, MD, PhD

Assistant Professor of Ophthalmology
University of Southern California Roski Eye
Institute

Title: Treating Primary Angle Closure
Disease: What's the Evidence?

March 31, 2022

Hosted by Robert N. Weinreb, MD

Guest Lecturer: Xin Duan, PhD

Assistant Professor, Department of
Ophthalmology

University of California San Francisco

Title: Selective Retinal Neurons and Circuits
in Neuroprotection and Axon Regeneration

April 6, 2022

Hosted by Sasan Moghimi, MD

Guest Lecturer: Kouros Nouri-Mahdavi, MD

Professor-in-Residence, Ophthalmology

University of California Los Angeles

Title: Challenges of OCT Imaging in Myopia
and Diagnostic Implications in Glaucoma

April 13, 2022

Hosted by Sally L. Baxter, MD, MSc

Guest Lecturer: Cecilia S. Lee, MD, MS

Associate Professor, Director of Clinical
Research

University of Washington

Title: Understanding the Connection
Between the Aging Eyes and the Aging
Brain

May 4, 2022

Hosted by Derek Welsbie, MD, PhD

Guest Lecturer: David S. Friedman, MD, PhD,
MPH

Professor of Ophthalmology

Harvard Medical School

Director, Glaucoma Service

Massachusetts Eye and Ear

May 11, 2022

Hosted by Robert N. Weinreb, MD

Guest Lecturer: Tomas Grippo, MD

Hospital Aleman
Buenos Aires, Argentina
Title: Micropulse Laser Cyclophoto-coagulation

Guest Lecturer: Gulab Zode, PhD
Associate Professor, Pharmacology & Neuroscience
North Texas Eye Research Institute
Title: Targeting Trabecular Meshwork Pathology for the Treatment of Glaucoma

May 18, 2022

Hosted by Sasan Moghimi, MD
Guest Lecturer: Arsham Sheybani, MD
Associate Professor of Ophthalmology and Visual Sciences
Washington University, School of Medicine
Title: Malignant Glaucoma, Rational for Modern Day Management

Hosted by Sally L. Baxter, MD, MSc
Guest Lecturer: Kerry Goetz, MS
Associate Director, NEI Office of Data Science & Health Informatics
National Eye Institute
Title: National Eye Institute Office of Data Science & Informatics

June 9, 2022

Hosted by Radha Ayyagari, PhD
Guest Lecturer: Thanh V. Hoang, PhD
Postdoctoral Fellow
Johns Hopkins University School of Medicine

Title: Reprogramming Mammalian Glial Cells to Regenerate Neurons

September 9, 2022

Hosted by Radha Ayyagari, PhD
Guest Lecturer: Patricia Becerra, PhD
Senior Investigator
National Institutes of Health
Title: PEDF Deficiency Increases the Susceptibility to Retinal Degeneration and Induces Senescence in the RPE

October 6, 2022

Hosted by Sasan Moghimi, MD
Guest Lecturer: Arsham Sheybani, MD
Associate Professor of Ophthalmology and Visual Sciences
Washington University, School of Medicine
Title: UC San Diego and Washington U Joint Glaucoma Rounds

November 10, 2022

Hosted by Sally L. Baxter, MD, MSc
Guest Lecturer: Michael V. Boland, MD, PhD
Associate Professor of Ophthalmology
Harvard Medical School
Site Director, Mass Eye and Ear, Lexington
Medical Director, Practice Innovation for Ophthalmology
Massachusetts Eye and Ear
Title: Advancing Academic Ophthalmology with Information Technology

November 17, 2022

Hosted by Radha Ayyagari, PhD
Guest Lecturer: Nawajes Mandal, PhD
Associate Professor
Department of Ophthalmology
Department of Anatomy and Neurobiology
Hamilton Eye Institute
University of Tennessee Health Science Center
Title: Sphingolipids in the Pathobiology of Eye Diseases and their Translational Relevance

December 8, 2022

Hosted by Radha Ayyagari, PhD
Guest Lecturer: Sheikh Amer Riazuddin, PhD, MS
Associate Professor of Ophthalmology
Wilmer Eye Institute, Johns Hopkins University School of Medicine
Title: The Promise of Molecular Genetics: Structure, Function, and Personalized Medicine

December 13, 2022

Hosted by Sally L. Baxter, MD, MSc
Guest Lecturer: Alvin Liu, MD
Assistant Professor of Ophthalmology
Johns Hopkins University
Title: Artificial Intelligence Initiatives at Johns Hopkins Medicine and the Wilmer Eye Institute

Grants 2022

| Division | Principal Investigator | Title | Funding Agency |
|----------|------------------------|---|-----------------------------------|
| Cornea | Natalie A. Afshari, MD | Whole Exome Sequencing for Variant Discovery in Fuchs Endothelial Corneal Dystrophy | NIH/NEI |
| Glaucoma | Sally Baxter, MD | Multi-Modal Health Information Technology Innovations for Precision Management of Glaucoma | NIH/NEI |
| Glaucoma | Sally Baxter, MD | Supplemental Graduate Student Support for Multi-modal Health Information Technology Innovations Project | NIH/NEI |
| Glaucoma | Sally Baxter, MD | OT2 NIH Bridge to Artificial Intelligence (Bridge2AI) Program - Skills Development | NIH/NEI |
| Glaucoma | Mark Christopher, PhD | Deep Learning Approaches to Detect Glaucoma and Predict Progression from Spectral Domain Optical Coherence Tomography | NIH/NEI |
| Glaucoma | Jiun Do, MD, PhD | Development of Optic Nerve Relays to Restore Retinofugal Connections | NIH/NEI |
| Glaucoma | Jiun Do, MD, PhD | Optic Nerve Relays for the Restoration of Visual Function | Glaucoma Research Foundation |
| Glaucoma | Jiun Do, MD, PhD | Stem Cell-Derived Optic Nerve Relays to Restore Vision | America Glaucoma Foundation |
| Glaucoma | Alex Huang, MD, PhD | Dynamic Variable Aqueous Humor Outflow and Glaucoma Therapies in the Human Eye | NIH/NEI |
| Glaucoma | Alex Huang, MD, PhD | Exercise Countermeasure to Prevent Ocular Structural and Functional Changes in a Terrestrial Model of SANS | NASA |
| Glaucoma | Alex Huang, MD, PhD | iSAFE (Investigating Structure and Function of the Eye) | NASA |
| Glaucoma | Wonkyu Ju, PhD | Mitochondrial Protection in Glaucomatous Optic Neuropathy | NIH/NEI |
| Glaucoma | Wonkyu Ju, PhD | Mitochondrial Protection in Glaucomatous Optic Neuropathy (Seahorse Analyzer) | NIH/NEI |
| Glaucoma | Wonkyu Ju, PhD | AAV-AIBP Therapy for Alzheimer's Disease | NIH/NEI |
| Glaucoma | Wonkyu Ju, PhD | Neuroprotective Role of Sirt6 in Glaucoma | NIH/NEI |
| Glaucoma | Wonkyu Ju, PhD | CXCR3-mediated Cell-cell Communication during Glaucoma | NIH/NEI |
| Glaucoma | Wonkyu Ju, PhD | Reversing Microglial Inflammarafts and Mitochondrial Dysfunction in Alzheimer's | NIH/NEI |
| Glaucoma | Sasan Moghimi, MD | Racial Differences in Smoking-related Glaucoma Progression: Effect on Neural and Vascular Tissue | TDRP |
| Glaucoma | Sasan Moghimi, MD | Monitoring of Glaucoma Patients in Advanced Disease | NIH/NEI |
| Glaucoma | Robert N. Weinreb, MD | Diagnosis and Monitoring of Glaucoma with Optical Coherence Tomography | National Institutes of Health |
| Glaucoma | Robert N. Weinreb, MD | iGLAMOUR Study: Innovations in Glaucoma Adherence and monitoring of Under-Represented minorities | National Institutes of Health |
| Glaucoma | Robert N. Weinreb, MD | Ophthalmology and Visual Sciences Career Development K12 program | National Institutes of Health |
| Glaucoma | Robert N. Weinreb, MD | Diagnosis and Monitoring of Glaucoma with Optical Coherence Tomography Angiography. May 2018 - April 2022 | National Institutes of Health/NEI |
| Glaucoma | Robert N. Weinreb, MD | Unrestricted and Challenge Grant - Research to Prevent Blindness. January 2018 - December 2023 | Research to Prevent Blindness |

Grants 2022

| Division | Principal Investigator | Title | Funding Agency |
|---------------|---------------------------|---|-----------------------------------|
| Glaucoma | Derek S. Welsbie, MD, PhD | Kinase Multitargeting for Glaucoma Neuroprotection | NIH/NEI |
| Glaucoma | Derek S. Welsbie, MD, PhD | High-Throughput Functional Genomic Screening in Retinal Ganglion Cells | Glaucoma Research Foundation |
| Glaucoma | Derek S. Welsbie, MD, PhD | Developing an Optic Nerve Relay for Vision Restoration | Research to Prevent Blindness |
| Glaucoma | Derek S. Welsbie, MD, PhD | Development of Small Molecule and Gene Therapy Approaches to Inhibit Dual Leucine Zipper Kinase and Accessory Pathways for Retinal Ganglion Cell Neuroprotection | Oriole Therapeutics, Inc. |
| Glaucoma | Derek S. Welsbie, MD, PhD | Kinase Multitargeting for Glaucoma Neuroprotection (Administrative) | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | OT2 NIH Bridge to Artificial Intelligence (Bridge2AI) Program - Data Generation | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | Multimodal Artificial Intelligence to Predict Glaucomatous Progression and Surgical Intervention | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | Diagnostic Innovations in Glaucoma Study (DIGS): High Myopia and Advanced Diseases PI: Linda Zangwill, PhD, Co-I: Robert N. Weinreb, MD, Co-I: Christopher Bowd, PhD, NIH, March 2017 – February 2022 | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | Translational Vision Research Training at UCSD PI: Linda Zangwill, PhD, Co-I: Radha Ayyagari | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | Personalized Forecasting of Disease Trajectory for Patients with Open Angle Glaucoma | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | Dietary Interventions to Improve Vision | Krupp Endowment |
| Glaucoma | Linda Zangwill, PhD | P30-Center Core Grant for Vision Research PI: Linda Zangwill, PhD, PI: William R. Freeman, MD, Co-I: Dirk-Uwe G. Bartsch, PhD, Co-I: Lingyun Cheng, MD, NIH, September 2018 – August 2022 | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | A Randomized Clinical Trial Evaluating Fenofibrate for Prevention of Diabetic Retinopathy Worsening | NIH/DRCR |
| Glaucoma | Linda Zangwill, PhD | AI-Based Identification of Rapid Glaucoma Progression to Guide Clinical management and Accelerate Clinical Trials | NIH/NEI |
| Glaucoma | Linda Zangwill, PhD | Forecasting Disease Progression using Artificial Intelligence | Glaucoma Research Foundation |
| Glaucoma | Linda Zangwill, PhD | Improve OCT Detection of Optic Nerve Head (ONH) | GMOPC |
| Oculo-plastic | Don O. Kikkawa, MD | Gene Expression in Nonspecific Orbital Inflammation Disease | NIH/NEI |
| Pediatric | Iliana Molina, MS | Co-I: Don O. Kikkawa, MD NIH, September 2016 - August 2021 | Price Foundation |
| Pediatric | Jolene Rudell, MD, PhD | UC San Diego Shiley EyeMobile | Strabismus Research Foundation |
| Pediatric | Jolene Rudell, MD, PhD | The Effects of Bupivacaine on Extraocular Muscles as a Treatment for Strabismus | UCSD/ACTRI |
| Pediatric | Jolene Rudell, MD, PhD | Role of Fibroblast Growth Factor Signaling in a Genetic Model of Strabismus | UCSD/ACTRI |
| Retina | Radha Ayyagari, PhD | Identification of the Elusive Genetic Causality of Inherited Retinal Degenerations (IRDs) | The Foundation Fighting Blindness |

Grants 2022

| Division | Principal Investigator | Title | Funding Agency |
|-----------|-----------------------------|--|--|
| Retina | Radha Ayyagari, PhD | Molecular Basis of Hereditary Retinal Degenerations | NIH/NEI |
| Retina | Radha Ayyagari, PhD | Molecular Mechanism Underlying Late-onset Retinal/Macular Degeneration | NIH/NEI |
| Retina | Radha Ayyagari, PhD | Unraveling the Molecular Pathology of Retinal Degeneration through Single Cell Genomics | NIH/NEI |
| Retina | Dirk-Uwe Bartsch, PhD | Mechanistic-Based Non-Invasive Assessment of Retinal Damage in HAART Era | NIH/NEI |
| Retina | Shyamanga Borooah, MD, PhD | Combining the Utility of Human Induced Pluripotent Stem Cell Modeling and CRISPR-Cas9 Gene Editing with Adenoassociated Virus Vector Gene Delivery to Develop and Optimize Novel Gene Editing in Inherited RPE Disease | The Foundation Fighting Blindness |
| Retina | Napoleone Ferrara, MD | Long Novel-Acting Inhibitors of Vascular Endothelial Growth Factor (VEGF) for Treatment of Intraocular Vascular Disorders; Co-I: Eric Nudleman, MD, PhD | NIH/NEI |
| Retina | Eric D. Nudleman, MD, PhD | Role of PDLIM1 in Retinal Vascular Leakage and Proliferation | NIH/NEI |
| Retina | Eric D. Nudleman, MD, PhD | Novel Long-Acting Inhibitors of Vascular Endothelial Growth Factor (VEGF) for Treatment of Intraocular Vascular Disorders | NIH/NEI |
| Retina | Eric D. Nudleman, MD, PhD | Stein Innovation Award | RPB |
| Retina | Nicholas Oesch, PhD | Computing Luminance and Contrast in Prosthetically Driven Retina | NIH/NEI |
| Retina | Christopher Toomey, MD, PhD | Robert Machemer MD and International Retinal Research Foundation Fellowship | Robert Machemer Foundation |
| Stem Cell | Karl Wahlin, PhD | Endogenous Generation of Cone Photoreceptors to Increase Light Responses in Foveal Hypoplasia | Vision of Children |
| Stem Cell | Karl Wahlin, PhD | Pluripotent Stem Cell Derived 3D Retinas for Studies of Early Onset Retinal Degeneration | NIH/NEI |
| Stem Cell | Karl Wahlin, PhD | Dissecting the Biochemical Role of Epigenetically Modified Regulatory Sequences within the Genomes of Retinal Neurons (A1) | James Madison University; NIH/NEI as Prime |
| Stem Cell | Karl Wahlin, PhD | Correlating Genomic AMD Risk Variants with Lipid Composition and Phagocytic Function of Patient-Derived Induced Pluripotent Stem Cell (iP-SC)-derived Retinal Pigment Epithelium (RPE) | NIH/NEI |
| Stem Cell | Karl Wahlin, PhD | Endogenous Repair in a Human 3D Retinal Organoid Model of Leber Congenital Amaurosis | NIH/NEI |

Clinical Trials 2022

| Division | Principal Investigator | Title | Funding Agency |
|----------|--------------------------|--|---------------------------------|
| Cornea | Natalie A. Afshari, MD | Phase 1/2 Study for Autologous Human CD34+ Hematopoietic Stem Cells Ex Vivo Transduced 67with pCCL-CTNS Lentiviral Vector for Treatment of Cystinosis | CIRM |
| Cornea | Natalie A. Afshari, MD | A Phase I/IIa Study of BMS 986148, a Mesothelin Directed Antibody Drug Conjugate, in Subjects with Select Advanced Solid Tumors | Bristol-Myers Squibb |
| Cornea | Natalie A. Afshari, MD | Phase I/II, Open-Label, Multicenter Study to Assess the Safety, Tolerability, Pharmacokinetics and Anti-tumor Efficacy of DZD9008 in Patients with Advanced Non-Small Cell Lung Cancer (NSCLC) With EGFR or HER2 Mutation | Dizal Pharmaceuticals |
| Cornea | Natalie A. Afshari, MD | Phase 1 Safety Run-In and Phase 2 Randomized Clinical Trial of Anetumab Ravtansine and MK-3475 (Pembrolizumab) Compared to MK-3475 (Pembrolizumab) Alone for Mesothelin-Positive Malignant Pleural Mesothelioma | National Cancer Institute (NCI) |
| Cornea | Christopher Heichel, MD | A Thirteen-year Study of the Indications and Visual Outcomes of Capsular Tension Ring Implantation in Cataract Surgery 2016 | |
| Glaucoma | Christopher J. Bowd, PhD | A0081096 Prospective Randomized 12 233k Controlled Study of Visual Field Change in Subjects with Partial seizures Receiving Pregabalin or Placebo - Pfizer Inc | Pfizer |
| Glaucoma | Andrew Camp, MD | The Efficacy and Safety of Bimatoprost SR in Patients With Open-angle Glaucoma or Ocular Hypertension PI: Andrew S. Camp MD | |
| Glaucoma | Andrew Camp, MD | Efficacy and Safety of AbGn-168H in Patients with Active Psoriatic Arthritis: a 24-week, Open-label, Multi-center, Phase II Proof of Principle Trial | |
| Glaucoma | Andrew Camp, MD | Effects of the Body Position on Episcleral Venous Pressure and Intraocular Pressure in Glaucoma. | Allergan |
| Glaucoma | Andrew Camp, MD | XEN-45 Gel Stent Versus Trabeculectomy in Glaucoma: Gold Standard Pathway Study (GPS) | Allergan |
| Glaucoma | Andrew Camp, MD | An Extension Trial to Evaluate the Long-term Safety and Efficacy of Bimatoprost SR in Patients with open Angle Glaucoma or Ocular Hypertension | Allergan |
| Glaucoma | Andrew Camp, MD | A Prospective, Double-masked, Randomized, Multicenter, Placebo Controlled, Parallel-group Study Assessing the Safety and Ocular Hypotensive Efficacy and Optimum Concentration to be Used Clinically of Netarsudil Ophthalmic Solution in Japanese/Japanese American Subjects With Open-angle Glaucoma or Ocular Hypertension in the United States | Aerie |
| Glaucoma | Alex A. Huang, MD, PhD | A Phase IIb, Randomized, Double-Masked, Active-Controlled, Parallel-Group, Multicenter Study Assessing the Efficacy and Safety of DE-126 Ophthalmic Solution 0.002% Compared with Timolol Maleate Ophthalmic Solution 0.5% in Subjects with Primary Open Angle Glaucoma or Ocular Hypertension | Santen Pharmaceutical |

Clinical Trials 2022

| Division | Principal Investigator | Title | Funding Agency |
|-------------------------|---|--|--------------------------------|
| Glaucoma | Robert Weinreb, MD | A Randomized, Single Center, Masked, Crossover Study Comparing the Effects of Latanoprostene Bunod and Timolol on Intraocular Pressure and retinal Blood Vessel Density in Patients with Ocular Hypertension or Primary Open Angle Glaucoma | Bausch & Lomb |
| Oculo-plastics | Catherine Liu, MD and Sally Baxter, MD, MSc, Sub-Investigator | A Phase 4, Randomized, Double-masked, Placebo-controlled, Multicenter Trial to Evaluate the Efficacy and Safety of TEPEZZA in Treating Patients with Chronic (Inactive) Thyroid Eye Disease | Horizon Therapeutics USA, Inc. |
| Pediatric Ophthalmology | Shira Robbins, MD | A Multi-Center, Double-Masked, Randomized, Placebo-Controlled Phase 3 Study of the Safety and Efficacy of Atropine 0.1% and 0.01% Ophthalmic Solutions Administered with a Microdose Dispenser for the Reduction of Pediatric Myopia Progression (The CHAPERONE Study) | Eyenovia, Inc./Bausch & Lomb |
| Retina | Shyamanga Borooah, PhD | Natural History Study of Patients with X-linked Retinal Dystrophy Associated with Mutations in Retinitis Pigmentosa GTPase Regulator (RPGR) | MeiraGTx UK II Ltd |
| Retina | Shyamanga Borooah, PhD | Phenotyping and Genotyping Patients with Achromatopsia in Preparation for Gene Therapy Trials | MeiraGTx UK II Ltd |
| Retina | Shyamanga Borooah, PhD | A Phase 2 Randomized Placebo-Controlled Double-Masked Study to Assess Safety & Efficacy of Multiple Doses of IONIS-FB-LRX an Antisense Inhibitor of Complement FactorB in Patients w/GA 2nd to AMD | Syneos Health Inc. |
| Retina | Shyamanga Borooah, PhD | Open-Label, Single Ascending Dose Study to Evaluate the Safety, Tolerability, and Efficacy of EDIT-101 in Adult and Pediatric Participants with Leber Congenital Amaurosis Type 10 (LCA10), with Centrosomal Protein 290 (CEP290)-Related Retinal Degeneration Caused by a Compound Heterozygous or Homozygous Mutation Involving c.2991+1655A>G in Intron 26 (IVS26) of the CEP290 Gene ("LCA10-IVS26") | Editas Medicine |
| Retina | William Freeman, MD | A Multicenter, Open-Label, Extension Study to Evaluate the Long-Term Safety and Tolerability of the Port Delivery System with Ranibizumab in Patients with Neovascular AMD [PORTAL] | Genentech, Inc. |
| Retina | William Freeman, MD | A Phase 2, Prospective, Randomized, Double-masked, Active Comparator-controlled, Multi-center Study to Investigate the Efficacy and Safety of Repeated Intravitreal Administration of KSI-301 in Subjects with Neovascular (Wet) Age-related Macular Degeneration | Kodiak Sciences, Inc. |
| Retina | William Freeman, MD | A Phase 3 Multicenter, Randomized, Double-Masked, Sham-Controlled Clinical Trial to assess the Safety and Efficacy of Intravitreal Administration of ZIMURA™ (Complement C5 Inhibitor) in patients with Geographic Atrophy Secondary to Dry Age-Related Macular Degeneration (GATHER2) | IVERIC Biosciences |
| Retina | William Freeman, MD | A Randomized, Double-masked, Phase 3 Study of ABP 938 Efficacy and Safety Compared to Aflibercept (Eylea®) in Subjects with Neovascular Age-related Macular Degeneration | AMGEN Pharmaceuticals |

Clinical Trials 2022

| Division | Principal Investigator | Title | Funding Agency |
|------------------|--|--|---|
| Retina | William Freeman, MD | 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 [PULSAR] | BAYER AG |
| Retina | William Freeman, MD | A Phase 2, Double-Masked, Placebo-Controlled, Dose Range Finding Study of Danicopan (ALXN2040) in Patients with Geographic Atrophy (GA) Secondary to Age-Related Macular Degeneration (AMD) | Alexion Pharma |
| Retina | William Freeman, MD | A Prospective, Randomized, Double-masked, Active Comparator-controlled, Multi-center, Two-arm, Phase 3 Study to Evaluate the Efficacy and Safety of Intravitreal KSI-301 Compared with Intravitreal Aflibercept in Participants with Visual Impairment Due to Treatment-naïve Macular Edema Secondary to Retinal Vein Occlusion [BEACON] | Kodiak Sciences, Inc. |
| Retina | William Freeman, MD | A Prospective, Randomized, Double-masked, Active Comparator-controlled, Multi-center, Two-arm, Phase 3 Study to Evaluate the Efficacy and Safety of Intravitreal KSI-301 Compared with Intravitreal Aflibercept in Participants with Visual Impairment Secondary to Treatment-naïve Diabetic Macular Edema [GLEAM] | Kodiak Sciences, Inc. |
| Retina | William Freeman, MD | A Phase 3, Open-Label, Multicenter, Extension Study to Evaluate the Long-Term Safety and Efficacy of PEGCETACOPLAN in subjects with Geographic Atrophy 2nd to AMD [GALE] | Apellis Pharmaceuticals |
| Retina | Eric Nudleman, MD, PhD | A 2-year, Three-Arm, Multicenter, Randomized, Double-Masked, Multicenter, Phase III Study assessing the Efficacy and Safety of Brolucizumab vs Aflibercept in Adult Patients with Visual Impairment due to Diabetic Macular Edema (KESTREL) | Novartis Pharmaceuticals |
| Retina | Eric Nudleman, MD, PhD | A Randomized, Controlled, Multi-Center Study to Assess the Efficacy, Safety, and Tolerability of Intravitreal Aflibercept Compared to Laser Photocoagulation in Patients with Retinopathy of Prematurity (ROP) | Regeneron Pharmaceuticals |
| Retina | Eric Nudleman, MD, PhD | An Extension Study to Evaluate the Long-Term Outcomes of Patients Who Received Treatment for Retinopathy of Prematurity in the VGFTE-ROP-1920 Study" [BUTTERFLYEY] | Regeneron Pharmaceuticals |
| Retina Retina | Eric Nudleman, MD, PhD Doran Spencer, MD, PhD | Testing Collagen Probes and Bispecific VEGF/Ang-2 Suppression A Phase III, Multicenter, Randomized, Double-Masked, Active Comparator-controlled Study to Evaluate the Efficacy and Safety of Faricimab in Patients with Neovascular Age-related Macular Degeneration [TENAYA] | F. Hoffmann-La Roche LTD Genentech, Inc. |
| Retina | Doran Spencer, MD, PhD | A Phase 3 Randomized, Active-Controlled, Double-Masked Study to Evaluate the Safety and Efficacy of TRS01 Eye Drops in the Treatment of Subjects with Active Non-infectious Anterior Uveitis including Subjects with Uveitic Glaucoma | Tarsier Pharma |

Giving Opportunities

For over 30 years, the philanthropic support from generous individuals, foundations and corporations has provided the Shiley Eye Institute and Viterbi Family Department of Ophthalmology with valuable resources for patient care, research, education and community service. As a friend of the Department of Ophthalmology, there are several giving options for those who wish to contribute to our tradition of excellence.

Outright Gifts – *Immediate Impact*

Outright gifts of all sizes made with cash, check, credit cards, savings bonds, stocks, marketable securities or property provide immediate impact to our faculty and facility. If writing a check, please make payable to the "UC San Diego Foundation" and put the Shiley Eye Institute in the memo section. The check should be accompanied with a letter stating the focus of your donation and mail to

The Shiley Eye Institute, Mail Code
0946, 9415 Campus Point Drive, Room
241B, La Jolla, CA, 92093-0946
(Attention: Karen Anisko Ryan)

Annual Gifts – *Circle of Sight*

Started in 1996, the Circle of Sight is the Shiley Eye Institute's recognition program that acknowledges donors who make annual gifts of \$250 or more to support the greatest needs of the Department. Several times a year, the Shiley Eye Institute's Circle of Sight members are invited to attend Vision Research Lectures and receptions where members get to personally know our faculty. The members are also ambassadors for the Shiley Eye Institute within the San Diego community. The Circle of Sight group is the backbone of many of our successful initiatives.

Planned Gifts – *Your Vision for Tomorrow*

Please consider a charitable bequest in your estate plan that will benefit the future of the Shiley Eye Institute and directly support the Viterbi Family Department of Ophthalmology. We would be pleased to provide you, your attorney, accountant or tax advisor with specific bequest language for inclusion in your will, trust or as a beneficiary of your retirement account – all of which can lessen the impact of taxes on your heirs or give you comfort of knowing that your assets will benefit those you leave behind.

Tribute Gifts – *Acknowledge Someone Special*

Contributions can be made in memory, honor or in celebration of a loved one or to commemorate a special occasion. Gifts can be made to honor a special physician, for ex-

ample, who has played a significant role in your eye health. Such a gift creates a legacy and memorializes the person by providing direct support to the Department.

Matching Gifts – *Double or Triple your Gift*

Many employers offer a matching gift program to their employees meaning that your donations are worth even more. All you need is a Matching Gift Form from your employer.

Endowments – *Gifts in Perpetuity*

A gift of endowment demonstrates your long-term commitment to the Viterbi Family Department of Ophthalmology since the fund is maintained in perpetuity. Your gift can support programs, lectures, awards, fellowships and Chairs. An endowment serves as an enduring legacy since it often bears the name of a donor or loved one.

For more information about any of these gifting ideas, or for help in finding the best gift options for achieving your charitable goals, please contact Karen Anisko Ryan at kanisko@health.ucsd.edu or 858-534-8017. To learn how these giving options might affect your specific financial situation, please consult with your tax, legal or financial advisors.

Gifts of Real Estate

Making a gift of real estate is a generous and financially advantageous way to support Shiley Eye Institute. Many people have residential rental units or vacation homes that no longer serve their needs or have become too burdensome to maintain. Even commercial property and vacant land can be used as gifts to support Shiley's programs. Real estate can be given as an outright gift or in a bargain sale; it can be used to create a retained life estate, a charitable gift annuity or a charitable remainder trust. There are many creative ways that your real estate can unlock financial security and provide tax benefits for you now while supporting Shiley Eye Institute and the programs that mean the most to you.

Every donation makes a direct impact on our patients, faculty, researchers, residents, fellows and staff, as well as the field of Ophthalmology. We cherish the partnership that we have developed with those generous members of the community who invest in us. There are also naming opportunities for gifts including: endowed chairs, laboratories, specialized ophthalmic clinics and research initiatives. We would welcome the opportunity to have a confidential conversation with you, so we clearly understand how you want your gift to be used.

Achieve Your Philanthropic Goals & Provide Financial Benefits

NEW INFORMATION

Stocks and Securities: A gift to the Shiley Eye Institute (SEI) of appreciated securities owned longer than one year can be deducted at fair market value and you will avoid paying capital gains tax on the appreciation.

Qualified Charitable Distributions (QCD): Whether or not you itemize, if you are at least 70½, you can make a QCD from your IRA to support SEI. A QCD is not included in your reportable taxable income and, if you take required minimum distributions, a QCD will count toward some or all of that amount. Remember that a QCD in 2023 can help you manage your financial situation in 2024, including your annual Medicare contributions and your overall tax picture.

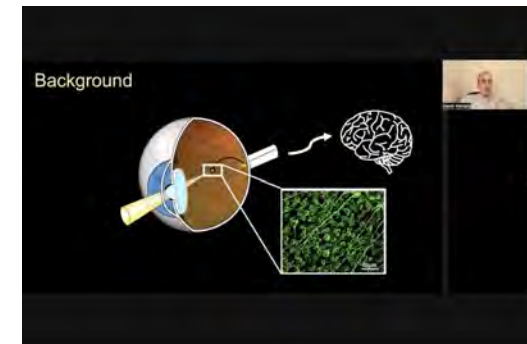
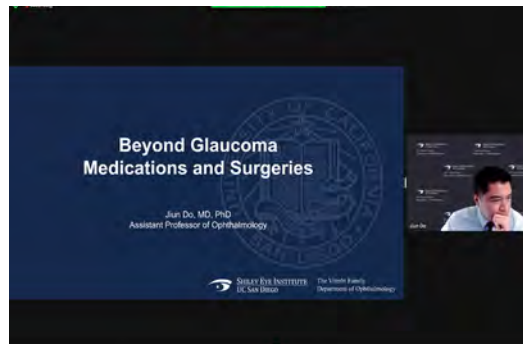
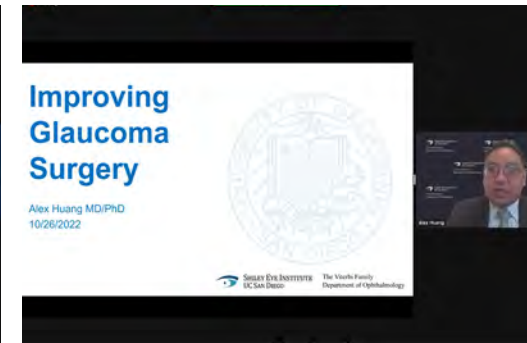
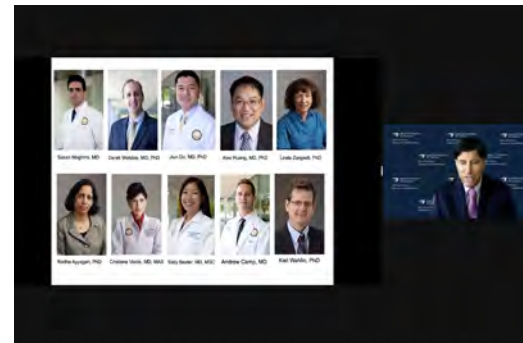
Charitable Gift Annuity (CGA): With higher interest rates and inflation eroding your buying power, consider creating a CGA to provide a guaranteed lifetime income stream and immediate tax benefits. In fact, CGA annuity rates have just increased as of January 1, 2022 to their highest level in a decade. In addition, Congress passed SECURE Act 2.0 which allows for a one-time transfer of up to \$50,000 from an IRA to a CGA (with certain restrictions).

Donor Advised Fund: Contribute to an existing fund and enjoy a tax savings when you itemize. You can then recommend a grant (or recurring grant) to the Shiley Eye Institute.

2022 Glaucoma Update



The thirty-ninth annual Glaucoma Update was held virtually on October 26, 2022. **Robert N. Weinreb, MD** presented the latest trends in glaucoma treatments and research from the Shiley Eye Institute, Hamilton Glaucoma Center and around the world. Additional presenters included Glaucoma faculty: **Jiun Do, MD, PhD**, **Alex Huang, MD, PhD** and **Derek Welsbie, MD, PhD**.





The Viterbi Family Department of Ophthalmology

9415 Campus Point Drive, MC 0946
La Jolla, CA 92093-0946

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Contributors

Ivy Andrade
Michelle Brubaker
Lilian Gischler
Jade Griffin
Craig Kishaba, MBA
Scott LaFee
Bob Lee
Diane Martin
Nicole Mlynaryk
Karen Anisko Ryan, MS
Riley Thomas, MBA
Kim Perkins Wenrick, MA, CSPG

Editors

Karen Anisko Ryan, MS
Robert N. Weinreb, MD

Creative

Grace Chang

Photography

Robyn Austin
Grace Chang
Lilian Gischler
Melissa Jacobs
Chris Park

Printing

Tu's Printing & Graphics

CHANCELLOR, UC SAN DIEGO

Pradeep K. Khosla, PhD

VICE CHANCELLOR, UC SAN DIEGO HEALTH SCIENCES

John M. Carethers, MD

INTERIM DEAN, SCHOOL OF MEDICINE

Steven Garfin, MD

CEO, UC SAN DIEGO HEALTH

Patty Maysent, MPH, MBA

DIRECTOR, SHILEY EYE INSTITUTE

Robert N. Weinreb, MD

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