Shiley Eye Institute

FOR SIGHT

The Viterbi Family Department of Ophthalmology

UC San Diego Health

UC San Diego School of Medicine

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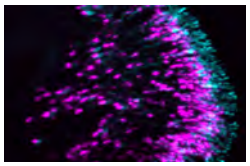
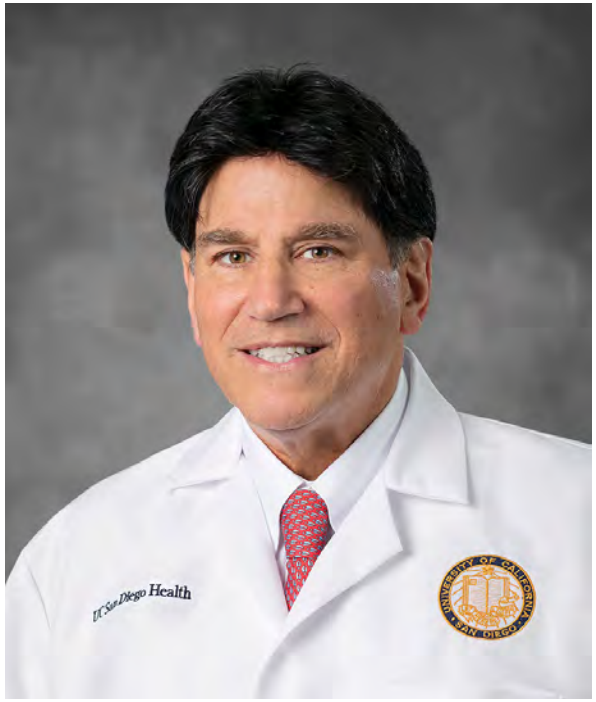


***Image on the Cover**: Living human retinal organoids with an emphasis on cone photoreceptors from Karl Wahlin, PhD and his laboratory team.*

Letter from the Chair



Dear Friends,

This past year was like no other. Although 2021 was filled with unprecedented challenges, Shiley Eye Institute staff, clinicians, residents and fellows were resilient and never wavered in providing outstanding clinical care to our patients. Moreover, the vision research in the Viterbi Family Department of Ophthalmology continued to grow as we translated our laboratory discoveries to our patients. There are so many exciting items to share with you!

2021 marked the 30th Anniversary of the Shiley Eye Center and there has been numerous notable accomplishments and activities during the past year that are described in the Annual Report including:

• Another transformative donation from Darlene Shiley, our partner from the very beginning, will enable the renovation of the second floor and expansion of our clinical space to better serve our patients.

• Two outstanding faculty were appointed to Viterbi Family Chairs.

• The Nixon family provided a generous gift for genetic research for a rare and disabling inherited retinal disease.

• The planning of the Viterbi Family Vision Research Center is nearing completion and ground should soon be broken on this 100,000 square foot structure.

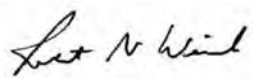
• Collaborative clinical partnerships throughout UCSD Health and vision research throughout the UCSD campus continued to grow.

• Service to the underserved children in San Diego, the most vulnerable inhabitants, continued despite pandemic hardships

While reflecting on the past 30 years, I am heartened to know that our entire team is excited by the upcoming changes and future of the Shiley Eye Institute and Viterbi Family Department of Ophthalmology. Now, more than ever, we are inspired by our patients and cognizant every day of the trust from our donors who have generously supported our vision research.

On behalf of the Shiley Eye Institute and Viterbi Family Department of Ophthalmology at UC San Diego, I thank you for your partnership and support.

Sincerely,



Robert N. Weinreb, MD
Chair and Distinguished Professor, Ophthalmology
Director, Shiley Eye Institute

Letter from the Chancellor

Dear Friends,

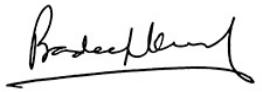
Year after year, the Shiley Eye Institute and Viterbi Family Department of Ophthalmology at UC San Diego Health exemplify excellence in education, collaborative research, and innovative clinical care. In 2021, we commemorated the 30th anniversary of the Shiley Eye Institute, celebrating its groundbreaking discoveries, recognizing generous community support, and planning exciting new research initiatives. The many inspiring stories highlighted in this annual report feature successful patient outcomes, innovative research, and groundbreaking discoveries to treat and cure eye diseases.

These successes are possible, in great part, because of the generous and ongoing support of our community partners. Recently, physician-scientists discovered enzymes that demonstrate potential to prevent optic nerve cell degeneration resulting from glaucoma or inherited retinal disease. We are grateful for generous support from the Nixon Vision Foundation that will fund genetic studies in pursuit of macular degeneration diagnosis and treatment.

And this year, a $10 million gift from Darlene Shiley to revitalize the institute's facilities will help move ongoing and new research to the next level of excellence. We are grateful for the opportunities that this transformational gift will create. The discoveries and innovations found through this important work will truly honor the enduring legacy of Darlene and Donald Shiley.

Thank you to all of our donors for their commitment and continued partnership with UC San Diego and the Shiley Eye Institute. Your support profoundly changes patients' lives and makes a meaningful, lasting impact at UC San Diego. Your gifts drive transformative research, treatments, and cures. With gratitude, I look forward to all we will continue to accomplish together.

With Kind Regards,



Pradeep K. Khosla, PhD
Chancellor, UC San Diego

Letter from the CEO

Dear Friends,

Amid one of the most challenging and historic public health crises, the Shiley Eye Institute and Viterbi Family Department of Ophthalmology have remained at the forefront of vision expertise and excellence in eye care. Our teams have been ready, responsive and focused on ensuring that patients receive the quality care they deserve in a safe environment. It is because of this that patients from Southern California to across the world continue to seek out the specialized care that exists only at UC San Diego Health. I am incredibly proud of the work being done by our staff, trainees, clinicians and faculty leadership.

In addition to clinical excellence, their vision research is growing and transformative. Among their many research activities, some SEI clinicians and scientists are studying the effects of the pandemic on eyesight. Others are exploring the progression of glaucoma through artificial intelligence, and still others are developing gene therapies to restore vision by investigating rare gene mutations that can lead to loss of vision.

We also have continued to increase our ophthalmology offerings thanks to your generous support and, in particular, the support of Darlene Shiley who recently gave a $10 million gift for the clinical space expansion of the Shiley Eye Institute. Her gift, along with the additional funds provided by UC San Diego Health, will enable increased patient access to our dedicated clinical team.

From treating potentially blinding eye diseases such as diabetic retinopathy, macular degeneration and glaucoma, to discovering pathways to improve patient health on a broader scale, the Shiley Eye Institute and the Viterbi Family Department of Ophthalmology are advancing clinical care and vision research every day.

Thank for you for your support.

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

Letter from the Interim Dean

Dear Friends,

Year after year, I am proud of the accomplishments of the faculty and staff of the Viterbi Family Department of Ophthalmology and Shiley Eye Institute. Despite the continuation of the global pandemic, this year is no different.

We are thrilled to celebrate another year of achievement by our distinguished faculty. From driving innovation through leading-edge translational research to training a diverse set of residents and fellows in the latest treatment options across all areas of eye care, the Viterbi Family Department of Ophthalmology and Shiley Eye Institute remain among the premier destinations for ophthalmology in the nation.

Thank you for your commitment to ensuring UC San Diego remains a leader in delivering outstanding patient care, pursuing diverse avenues of research through collaborative team science, and offering an exceptional academic environment for our students and trainees. Your support of the Viterbi Family Department of Ophthalmology and Shiley Eye Institute is vital to these efforts, and we remain deeply grateful for your partnership.

Sincerely,

Steven R. Garfin, MD
Interim Dean,
UC San Diego School of Medicine

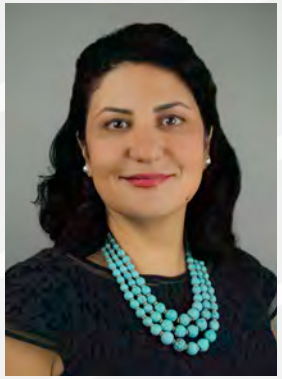
2021 BY THE NUMBERS

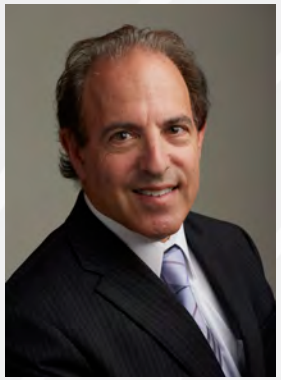
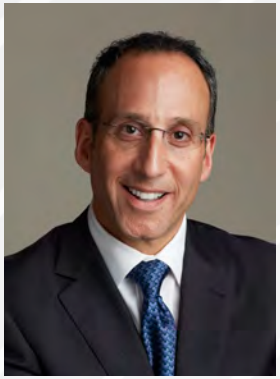
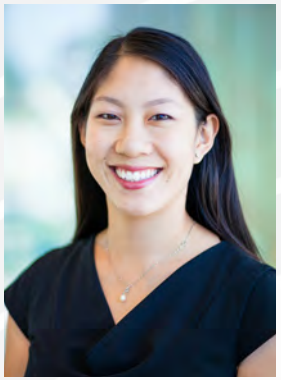
While the Shiley Eye Institute (SEI) maintained our rigorous Covid-19 protocols, the Viterbi Family Department of Ophthalmology had **125,532** patient visits in person and many others remotely. Surgical procedures increased to **7,879**.

With the continuing Covid-19 pandemic, there have been many challenges for the SEI in 2021. Nevertheless, our doctors and scientists published **197** peer reviewed manuscripts and delivered **129** lectures, many of them virtual. With **34** ongoing clinical trials and **50** grants, we are resolute in our dedication to cure blindness.

The SEI EyeMobile for Children provided **2,257** vision screenings, **644** dilated eye exams and distributed **421** eyeglasses to children all at no cost to their families. This was particularly difficult with school closures and general health concerns within the underserved community. **43** children were identified as high risk and referred for ongoing eye care that would not have otherwise been treated.

EXECUTIVE COMMITTEE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WITH $10 MILLION GIFT, DARLENE SHILEY BUILDS UPON HER HUSBAND'S LEGACY

Gift will target expansion of the clinical space at Shiley Eye Institute, which opened 30 years ago with foundational support from the couple; it is part of a $27 million renovation and improvement project being undertaken by UC San Diego

Marking its 30th anniversary and her enduring interest and support, philanthropist Darlene Shiley has given a $10 million gift for the clinical space expansion of the Shiley Eye Institute at UC San Diego Health.

The gift will finance the expansion of the clinical space and function of the Institute. Already an architectural landmark, the expansion will usher in a new era of vision care and research benefiting San Diego and beyond thanks to increased patient care capacity and expanded research infrastructure.

Donald Shiley

"Over the last three decades, Donald and I have supported the growth and excellence of the Shiley Eye Institute and her centers of care. It was one of our first philanthropic projects we supported and were loyal to for the "long haul" as Donald would say. I now continue that legacy with pride and the knowledge that we have and continue to believe in improving medical care and research that benefits all of us."

With her late husband Donald, who passed away in 2010, Darlene Shiley has been a longtime supporter of UC San Diego across multiple endeavors, including the Shiley-Marcos Alzheimer's Disease Research Center, named in part to honor Darlene's mother, Dee Marcos.

"I can't emphasize enough how far-reaching the influence of Darlene and Donald Shiley has been on UC San Diego and elsewhere. Vision care, Alzheimer's disease, and so many other important areas of research and care on our campus are sustained thanks to the Shileys' generosity. It is remarkable to see the legacy of transformation they have made here," said Chancellor Pradeep Khosla.

The latest gift will further burnish, in form and function, the Shileys' vision of their eponymous eye institute, which has grown dramatically over the last three decades.

In 1983, Department of Ophthalmology, part of UC San Diego Health, debuted in an 800-square-foot, three-room clinic, progressing to a 3,000-square-foot trailer in 1985 and then the 1991 opening of the original $8 million Donald P. and Darlene V. Shiley Eye Center, under the leadership of **Stuart I. Brown, MD**. Over the years, the Shiley family has donated more than $10 million for various clinical improvements, equipment, research and leadership chair funding. Additionally, other members of the family contributed to the Shiley Eye Institute as well.

From L to R: Robert N. Weinreb, MD, Darlene Shiley, Patty Maysent, Chancellor Pradeep Khosla

including support of the Low Vision Clinic and Shiley Eye Mobile clinic by granddaughter Patricia.

Today, the Shiley Eye Institute encompasses more than 91,000 square feet and three centers: the Anne F. and Abraham Ratner Children's Eye Center, the Joan and Irwin Jacobs Retina Center and the Hamilton Glaucoma Center, and the soon to be the Viterbi Vision Research Center. These facilities, with satellite operations at UC San Diego Medical Center in Hillcrest and the VA San Diego Healthcare System, handle more than 125,000 patient visits and perform more than 7,000 surgeries annually.

"Darlene Shiley's support, and that of her late husband Donald, of UC San Diego Health has been instrumental in so many key moments for our institution, particularly in the Shiley Eye Institute," said Patty Maysent, CEO of UC San Diego Health. "That first building really was the first major piece of our La Jolla medical campus, now a crown jewel in San Diego's health care community. We are thrilled to know that this expanded delivery of care and UC San Diego Health history can continue to serve our community and inspire our world thanks to Darlene's continued partnership."

Led by director **Robert N. Weinreb, MD**, who is also chair of the Viterbi Family Department of Ophthalmology at UC San Diego, Shiley Eye Institute boasts more than 40 physician-scientists, plus numerous visiting fellows and residents, with specialties ranging from cataract and corneal disorders to glaucoma to restorative vision therapies. The Department is consistently a leader in research funding from the National Institutes of Health and claims 21 faculty members ranked among the top experts in their field by Expertscape.

Recent research has included the discovery of specific enzymes that may help create new therapies to protect and regrow neurons, a key to perhaps preventing degeneration of optic nerve cells in glaucoma and other eye conditions such as inherited retinal disease.

"I know I speak for every one of our faculty and staff when I say that the support of Darlene and Donald P. Shiley has been sustained, unwavering and key to our successes and leadership in ophthalmology and eye care," said Weinreb. "Moreover, we are making discoveries here every day that translate into vision saving therapies that we hope will cure blindness; Darlene has been a central reason for this, too."

2021 MARKS 30 YEARS OF THE SHILEY EYE INSTITUTE

The Shiley Eye Center opened in 1991 with a dazzling gala as the first structure on UC San Diego's medical complex east of Interstate 5.

Donald P. and Darlene V. Shiley made a significant donation to house the Department of Ophthalmology and create the first dedicated eye center in San Diego.

The Shiley Eye Center subsequently would become the Shiley Eye Institute achieving worldwide recognition for its excellent clinic care, vision research, education of future leaders and service to the underserved community.

For over 30 years, patients aged 1 to 108 from San Diego and across the globe have entrusted SEI with their vision care.

ANNIVERSARY MILESTONES

The Shiley Eye Center began by providing care for 13,000 patients in 1991 to **125,532** in 2021!

During this time, the Shiley EyeMobile for Children screened over **250,803** underserved youngsters from all corners of San Diego County, as well as providing them no cost dilated eye exams and free pairs of glasses.

SEI staff and faculty are proud to have played a role in training **549** residents and fellows from the United States and **39** countries.

We would like to thank the **5,232** generous donors giving **16,897** donations for believing in us over these past 30 years! Your unwavering support and confidence in us has been invaluable and is greatly appreciated!

MAJOR GIFT FOCUSES EFFORTS ON A RARE, BUT DEVASTATING, GENETIC EYE DISEASE

Funding from the Nixon Visions Foundation will support studies of the PRPH2 gene linked to macular dystrophy and boost stem cell research aimed at developing early diagnosis and a cure

In healthy vision, a gene called PRPH2 provides instructions to make a protein called peripherin 2 (PRPH2), which plays a key role in the normal functioning of photoreceptors that detect light and color and which line the back of the eye.

When there are mutations in the PRPH2 gene, the result can be macular dystrophy, an impairment of the retina that progressively diminishes the ability to see clearly and may eventually result in vision loss. Currently, there are no effective treatments to slow or prevent the condition.

The Nixon Visions Foundation, led by philanthropists Brandon and Janine Nixon, has given a significant gift to the Viterbi Family Department of Ophthalmology and Shiley Eye Institute, both part of UC San Diego Health, to launch the Nixon Visions Foundation Macular Dystrophy-PRPH2 Research Fund, which will focus studies of the PRPH2 gene and related mutations and help upgrade stem cell technologies that may eventually provide a proven therapeutic remedy. Nixon Visions Foundation is also building capacity with the Foundation Fighting Blindness to further advance national and global research in this space as part of this effort.

"We are impressed with the impactful work at UC San Diego and specifically in the Department of Ophthalmology and at Shiley Eye Institute," said the Nixons. "We believe this gift can accelerate efforts to make a tremendous impact for people with this inherited eye disease and will improve the lives of others for generations to come."

"Macular dystrophy is such a challenging disease for people who have it, but UC San Diego Health has the expertise to discover new ways of treating this illness and creating a healthier world," said UC San Diego Chancellor Pradeep Khosla. "Thanks to the generosity of the Nixon Visions Foundation, we can pursue the most promising leads and follow the science wherever it takes us."

Macular dystrophy is a relatively rare eye condition. It affects the central retina or macula, which has the highest concentration of light-sensitive cells or photoreceptors. It is different from the more common eye disease known as macular degeneration, which is often caused by age-related deterioration of the retina and macula. Macular dystrophy is associated with genetic mutations that — for no known reason — trigger degradation of retinal cells. Some forms of the disease appear in childhood; some in adulthood.

"There really aren't viable therapies for macular dystrophy and even fewer

promising leads to develop them, but in our work we believe we've found one. But that work is still in its fairly early phases so for myself and my colleagues, such as **Dr. Radha Ayyagari**, funding like this from the Nixon Visions Foundation is crucial to understanding causes and treating the disease," said **Shyamanga Borooah, PhD**, assistant professor of ophthalmology at Shiley Eye Institute and one of the investigators on the PRPH2 research project.

Faculty in the Viterbi Family Department of Ophthalmology and at Shiley Eye Institute are among the leaders in basic research investigating the causes of eye disease and finding remedies. The institute is home to the Joan and Irwin Jacobs Retina Center.

"Shiley Eye Institute is at the leading edge of vision research and eyecare, and we know that macular dystrophy is a devastating diagnosis," said **Robert Weinreb, MD**, director of Shiley Eye Institute and chair of the Viterbi Family Department of Ophthalmology. "We are confident that there is no place better to understand this illness and innovate therapies for it than UC San Diego Health."

From L to R: Radha Ayyagari, PhD, Robert N. Weinreb, MD, Chancellor Pradeep Khosla, Janine Marks Nixon, Brandon L. Nixon, and Shyamanga Borooah, MD, PhD

Patty Maysent, CEO of UC San Diego Health agreed: "Shiley Eye Institute represents some of the finest ophthalmological research and care in the world. We are honored to have the support of the Nixon Visions Foundation in such a tangible, meaningful way."

Nixon Visions Foundation is dedicated to the support of organizations and individuals who are striving to reach their potential. Based in San Diego, the foundation provides scholarships and other funding for education, training, social welfare, public information, and research. Its newest initiative is to provide meaningful support for scientific research leading to critical treatments and, ultimately, cures for rare inherited retinal degenerative diseases through partnerships with UC San Diego Health's Shiley Eye Institute and the Foundation Fighting Blindness, each targeting rare gene mutations such as those of the PRPH2 gene.

Visit www.nixonvisionsfoundation.org or scan this barcode to go to the website:

CONGRATULATIONS
NEW ENDOWED CHAIRS

Endowed chairs are highly honored academic positions that attract and support distinguished faculty. Chairs recognize the faculty members' excellence in research and clinical practice. They provide an enduring source of support for faculty research, scholarly activities and teaching.

In 2018, as part of a transformative gift to UC San Diego, Andrew Viterbi, PhD established six endowed chairs in Ophthalmology. In part, he made the donation to honor the legacy of his late father, ophthalmologist Achille Viterbi. The gift also includes a new Viterbi Family Vision Research Center and the naming of the Department.

Robert N. Weinreb, MD, Chair, Viterbi Family Department of Ophthalmology and Director, Shiley Eye Institute, stated, "Endowed Chairs enable our faculty to deeper and accelerate their scholarship, vision care and research. We deeply thank Dr. Viterbi for ensuring the future success of the Department with his generosity."

Alex A. Huang, MD, PhD, new Associate Professor of Ophthalmology, has been appointed the inaugural holder of the Alfred Vogt Chair in Ophthalmology in the Viterbi Family Department of Ophthalmology, Shiley Eye Institute at UC San Diego.

Dr. Viterbi included The Alfred Vogt Chair in Ophthalmology in his gift to UC San Diego. This chair is named after internationally recognized Swiss ophthalmologist Professor Alfred Vogt, who not only served as Dr. Achille Viterbi's mentor but he helped the Viterbi family flee Italy in 1939 by securing them visas to Switzerland and then on to the United States.

Dr. Huang notes, "I am honored as a new faculty member to be the inaugural chairholder of the prestigious Vogt Chair. This distinction will help to propel my research forward and create more opportunities to collaborate with colleagues worldwide in treating and curing optic nerve and glaucoma related eye diseases."

Through his research, Dr. Huang hopes to better understand how glaucoma therapies work, identify their stengths and weaknesses, as well as develop better drug treatments or surgical techniques for the best possible patient outcomes.

Radha Ayyagari, PhD, Professor of Ophthalmology and Pathology, has been appointed as the Viterbi Family Chair of Ophthalmic Genetics in the Viterbi Family Department of Ophthalmology, Shiley Eye Institute at UC San Diego.

Dr. Ayyagari is Chief of the Ophthalmic Molecular Genetics Laboratory and Director of the Downtown San Diego Lions Biobank for Vision. She completed her undergraduate studies at Andhra University in Vizag, India, her graduate studies at Osmania University in Hyderabad, India and fellowship in Ophthalmic Molecular Genetics at the National Eye Institute, National Institute of Health, Bethesda, Maryland.
"The research and teaching support from endowed chairs like the Viterbi Family Chair III enables the bold pursuit of new solutions to debilitating eye diseases that may cause blindness – thus preserving sight and improving lives", stated Dr. Ayyagari.

Her research interests include molecular genetics of macular and retinal dystrophy and glaucoma, biological mechanisms underlying retinal diseases, age-related macular degeneration and diabetic retinopathy. She has been honored with the Frank A. Bennack, Jr. Research Fellowship, Sybil B. Barrington Scholar Award, University of Michigan Research Faculty Recognition Award and the Lew Wassermen Award.

FACULTY SPOTLIGHT
ERIC D. NUDLEMAN, MD, PHD

Eric D. Nudleman, MD, PhD is an Associate Professor of Ophthalmology at UC San Diego Shiley Eye Institute (SEI) and the Viterbi Family Department of Ophthalmology. He joined SEI in 2014 after completing his fellowship in vitreoretinal surgery with the renowned Associated Retinal Consultants at the renowned William Beaumont Hospital in Michigan. This included a special focus on pediatric vitreoretinal surgery, which remains his major clinical focus. Prior to his fellowship, Dr. Nudleman graduated from Stanford University with a bachelors in Human Biology and PhD in Developmental Biology. He earned his medical degree at Albert Einstein College of Medicine of Yeshiva University in New York. He interned at Lenox Hill Hospital and then went on to Washington University School of Medicine in St. Louis, Missouri for his ophthalmology residency.

Dr. Nudleman is 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. He has participated in multiple National Eye Institute and industry-sponsored clinical trials. At SEI, Dr. Nudleman's 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.

WHY DID YOU GO INTO MEDICINE?

I was exposed to academic medicine from an early age. My father is a neurologist and spent most of his career at UC Irvine. As a child, if my mother was busy on the weekends he would take me to work with him to round on a sick patient, finish paperwork in the office, or meet with his research team. It was easy to recognize his passion for the work and the intense appreciation he felt for the privilege to provide healthcare.

As a student, I was always interested in science. After my undergraduate studies, I entered a PhD program in Developmental Biology at Stanford. I loved doing basic science research, but the human connection to the work that I saw my father experience was missing for me. I went to medical school so that I could combine those interests. The opportunity to both practice medicine and help individual patients, as well as do basic science work to discover new therapies, has been tremendously rewarding.

HAVE ANY OF YOUR PATIENTS AFFECTED YOU SIGNIFICANTLY?

Without question, every patient affects me. As a retina surgeon, some of the common diseases we see (such as diabetic retinopathy and macular degeneration) require frequent visits. This allows me to form very close relationships, often over many years. I also focus on pediatric retinal diseases, which allows me to take care of some patients from infancy. It is a unique and privileged role to play in their lives. When I see patients do well with existing therapies, it is a tremendous joy. However, when they do poorly, it is a deep disappointment. Seeing the challenges in people who I have gotten to know well is the frustration that motivates the research that I do in the lab.

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

Collaborations are a critical component of any research endeavors. We are very fortunate at UC San Diego (UCSD) to be surrounded by tremendous expertise in virtually every discipline.

Dr. Nudleman and family

My research is primarily focused on diseases of the blood vessels in the retina. Since coming to UCSD, I have worked closely with fellow faculty member Napoleone Ferrara, MD, Distinguished Professor of Ophthalmology and Pathology at UC San Diego Health. He is an expert in vascular biology and discovered Vascular Endothelial Growth Factor (VEGF), the target of the most common drugs we use as retina specialists. In addition, we collaborate with Richard Daneman, PhD, Professor of Neurosciences and Pharmacology at UC San Diego, an expert in the blood-brain barrier, which is similar to the blood-retinal barrier. The key to these collaborations is to identify the molecular abnormalities that occur in diseases of the retinal blood vessels in order to target new therapies. Each part of the team provides unique and highly valuable skills.

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

Possibly the biggest advance ever in our field was the discovery of VEGF by Dr. Ferrara, and the subsequent development of inhibitor therapies. These drugs have prevented blindness in many millions of people worldwide. However, despite their incredible efficacy, they have to be injected frequently, which is a major burden for patients, providers and the healthcare system. A great deal of effort right now is being directed towards therapies that will be longer lasting. In addition, some patients fail to improve. Often that is due to scarring, which has no effective treatment. Therapies that would prevent scarring in the retina would have a tremendous impact on saving vision.

WHAT DO YOU DO IN YOUR FREE TIME?

Outside of science and medicine, my family and surfing are my two passions. I have three amazing kids and cherish the time I get to spend with them. Surfing has been an obsession since grade school growing up in Orange County. I try to surf a handful of days a week, and have recently been developing skills in building surfboards. I find the combination of creativity and precision to be much like retina surgery.

UN ADOPTS RESOLUTION ON VISION

"Global eye care needs are projected to increase substantially with half the global population expected to be living with a vision impairment by 2050."

The United Nations General Assembly unanimously adopted the first ever resolution on vision, designating its 193 member nations to ensure community access to eye health for the 1.1 billion people worldwide living with preventable sight loss by 2030. The resolution was introduced by Bangladesh's U.N. Ambassador and sponsored by Antigua and Ireland as well as being co-sponsored by 100 other countries.

The resolution titled, "Vision for Everyone", is designed to encourage countries to increase access for vision care services for their populations and make eye health part of their nation's governmental health agenda. The resolution says, "Global eye care needs are projected to increase substantially with half the global population expected to be living with a vision impairment by 2050." It also calls on international financial institutions and philanthropies to focus on the increasing impact of vision loss on economic and social development.

Robert N. Weinreb, MD, Chair and Professor, Viterbi Family Department of Ophthalmology and Director, Shiley Eye Institute, states, "This announcement is a welcome and important milestone in worldwide efforts to treat and prevent blinding eye diseases."

This resolution gives the global ophthalmology community opportunity to improve access to eye care for millions of people living with impaired vision and blindness around the world. These General Assembly resolutions are not legally binding, but they do indicate worldwide outlook.

For more information, go to:

EYEMOBILE CELEBRATES 20 YEARS & 100,000 MILES!

The UC San Diego Shiley EyeMobile for Children is a program of Community Ophthalmology at the Shiley Eye Institute (SEI) and Viterbi Family Department of Ophthalmology.

In 1998, the goal of Stuart I. Brown, MD, founder of the EyeMobile, was to partner with the community to develop a model that would deliver free eye care to the low-income children in San Diego who were needlessly losing sight, struggling to fulfill their potential to learn and contribute to society. Community leaders and philanthropists shared this vision to establish a mobile pediatric eye care program that would overcome barriers and bring vision care to underserved sectors of San Diego County. In addition to benefiting the underserved youngsters, this innovative program would provide a viable model for other communities and a platform for research studies.

Funded by several foundations, corporations and individuals, the dream was realized with the launching of our first UC San Diego Shiley EyeMobile for Children in April 2001. It was a specially furnished recreational vehicle with an optometric exam room and waiting area for children and families. In 2008, the program was able to expand with a new EyeMobile equipped with two exam rooms.

Before COVID-19 struck, the vision of 13,000 students' was screened at over 225 locations across San Diego County. The EyeMobile program, provided at no cost to the family, includes: vision screening, dilated eye examinations by an optometrist, if needed - a free pair of glasses, 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. There is also bilingual parent and teacher information informing them on the importance of eye/brain development, the need for eye care and its crucial role in preparing children to learn, as well as program evaluation.

Since the first EyeMobile went out, the program has screened over 250,000 youngsters across San Diego County. Keys to the EyeMobile's success include a dedicated multilingual staff, as well as students and community volunteers. With the medical unit's mobility, the program overcomes the transportation, language, cultural and financial barriers that low-income families with children face. We have created community partnerships with the San Diego County Office of Education, Chula Vista, San Ysidro, La Mesa, Lemon Grove, and Cajon Valley School Districts, Head Start, San Diego-Imperial Counties Developmental Services, and others responsible for the education and health of young children.

Early detection and treatment have proven to reduce the negative impact vision problems may have on a child's learning ability and development. If left untreated, conditions such as amblyopia, could lead to irreversible vision loss and psychosocial effects. The EyeMobile program provides children with the best sight to allow them to be "school ready" so they can learn at their maximum potential.

COVID-19 severely impacted the ability for the EyeMobile to travel in the community to see youngsters around San Diego in the school locations. We are happy to report that COVID-19 didn't completely close down the EyeMobile entirely. Although a different model, the EyeMobile is safely continuing to provide no cost exams and glasses to children ages 3-14 in community locations around San Diego County.

This unique program has been embraced throughout the community and is giving underserved young children the vision, they need to succeed in school and life. When children can see, they are able to learn which then expands the educational opportunities for under-represented students.

The long-term goal is to expand with a more efficient and larger EyeMobile in order to provide eye care services for 20,000 low-income young children annually. In addition, the expansion of vision care services for underserved seniors throughout San Diego County is being planned.

SEI@UCSD

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 but more importantly are translating our research into real world discoveries and treatments for patients with eye diseases and vision disorders.

Natalie Afshari, MD, Professor and Vice Chair, is collaborating with **Gene Yeo, PhD** (Professor of Cellular and Molecular Medicine) and scientists at Case Western Reserve University to investigate the genetic basis of Fuchs Endothelial Dystrophy. They are searching for novel targets to develop gene therapies. R01EY029166 (Yeo and Afshari)

Radha Ayyagari, PhD, Professor of Ophthalmology and Pathology, is collaborating with **Bing Ren, PhD** (Professor of Cellular and Molecular Medicine, and Director, Center for Epigenomics) and **Kelly A. Frazier, PhD** (Professor of Pediatrics and Director of the Institute of Genomic Medicine) using genetics and epitranscriptomics to study the contribution of individual retinal cell type specific epigenomic changes on retinal aging, early and late-onset retinal/macular degeneration pathology. RO1EY031663 (Ayyagari, Frazer and Ren).

Sally Baxter, MD, MSc, Assistant Professor, is a member of a team of clinical informaticists led by **Lucila Ohno-Machado, MD, PhD**, (Professor of Medicine/Division of Biomedical Informatics) to develop and deploy queries related to COVID-19 across multiple electronic health record (EHR) systems. This is supported by the Gordon and Betty Moore Foundation.

Sally Baxter, MD, MSc is collaborating with **Ming Tai-Seale, PhD**, (Professor of Family Medicine) to analyze associations between EHR use and physician burnout with support from the American Medical Association (AMA) Practice Transformation Initiative.

Shyamanga Borooah MD, PhD, Assistant Professor, is collaborating with **Eric Adler MD**, (Professor of Medicine and Medical Director of the Heart Transplant Program at UCSD Health) to develop a gene therapy for children with a rare inherited sight threatening and heart disease. This work is supported by the Knights Templar Eye Foundation (PI: Borooah).

Andrew Camp, MD, Assistant Professor, and R**obert N. Weinreb, MD**, Distinguished Professor and Chair, are collaborating with **James Friend, PhD** (Professor of Mechanical and Aerospace Engineering and Director, Medically Advanced Devices Lab) to develop a novel eye pressure measurement device to provide a gold standard that can be used in any patient, including those with corneal disease or injury in whom current methods are inaccurate.

In collaboration with **Mark Tuszynski, MD, PhD**, (Distinguished Professor of Neurosciences and Director, UCSD Translational Neuroscience Institute), **Jiun Do, MD, PhD**, Assistant Professor, is focusing on regenerating the optic nerve by adapting stem cells strategies used in spinal cord injury research to regenerate the optic nerve and enable whole eye transplants. K08EY033032 (Do).

William Freeman, MD, Distinguished Professor and Vice Chair, is collaborating with Truong Q. Nguyen, PhD (Professor of

Electrical and Computer Engineering) to use Artificial Intelligence to enhance our analysis of retinal imaging scans to better understand retinal disease, treatments and help guide clinical trials. The work is funded by R01EY033847 (Nguyen, Freeman).

Catherine Liu, MD, PhD, Assistant Professor, is collaborating with **David Peterson, PhD** (UCSD Institute for Neural Computation and Salk Institute for Biological Studies) to study blepharospasm, a movement disorder involving the periocular region that can be functionally blinding. They are using computer vision and machine learning to model and understand the pathologic, dynamic features of blepharospasm and hemifacial spasm.

Sasan Moghimi, MD, Associate Professor, is collaborating with **Tara Javidi, PhD**, (Professor of Electrical and Computer Engineering and the Halicioglu Data Science Institute), to investigate the structure, function and microvasculature of the optic nerve and retina with artificial intelligence to improve monitoring of advanced glaucoma. The work is funded by R01EY029058 (Weinreb).

Eric Nudleman, MD, PhD, Associate Professor and **Napoleone Ferrara, MD**, Distinguished Professor of Pathology and Ophthalmology and Senior Deputy Director for Basic Sciences at the UCSD Moores Cancer Center, are collaborating on a novel long-acting VEGF inhibitor. The research is funded in part by R01 EY031345-01 (Ferrara).

Eric Nudleman, MD, PhD, Associate Professor is collaborating with **Richard Daneman, PhD** (Associate Professor of Pharmacology and Neurosciences) to study the mechanism of blood-retinal barrier dysfunction, including the development of scarring (fibrosis) in response to abnormal vascular function. Dr. Daneman recently received the prestigious Research to Prevent Blindness Stein Innovation Award.

Jolene Rudell MD, PhD, Assistant Professor, is collaborating with **Marianna Alperin, PhD** (Associate Professor of Obstetrics, Gynecology, and Reproductive Sciences) studying the biology of extraocular muscles in eye movement disorders such as strabismus and its effects on visual development. Her work was supported by K12EY024225 (Weinreb).

Using stem cell-based models of human retinal development and disease, **Karl Wahlin, PhD**, Assistant Professor, and **Stuart Lipton, MD, PhD** (Adjunct Professor of Neurosciences) are collaborating to investigate a link between microglia in human Alzheimer's disease and inherited retinal degenerations. It is hoped that these studies will uncover new therapeutic drug targets for treating retinal degenerations that might otherwise lead to vision loss.

In collaboration with **Todd Coleman, PhD** (Professor, Bioengineering UCSD and Stanford University) and **Camille Nebeker, PhD** (Associate Professor, Family Medicine and Wertheim School of Public Health), **Robert N. Weinreb, MD**, Distinguished Professor and Chair, and **Sally Baxter MD, MSc**, Assistant Professor, are evaluating and seeking to improve medication adherence of underrepresented minorities with glaucoma, a leading cause of blindness. The work is funded by R01MD014850 (Weinreb).

In collaboration with **Michael Pazzani, PhD**, (Distinguished Scientist at UC San Diego's Halıcıoğlu Data Science Institute), **Linda Zangwill, PhD**, Professor and interim Research Director and colleagues are employing deep learning models to determine whether a patient has glaucoma and how clinicians can use these results to manage glaucoma. In part, this work was funded through Dr. Pazzani's Defense Advanced Research Projects Agency (DARPA) grant "Explainable Machine Learning."

SEI IN THE COMMUNITY

Faculty, staff and trainees, at the Shiley Eye Institute and Viterbi Family Department of Ophthalmology, not only worked tirelessly in the clinic but many also volunteered with the underserved around San Diego County as well as in Mexico.

Bobby Korn, MD, PhD, **Henry Ferreyra, MD**, **Sally Baxter, MD, MSc** and **Jiun Do, MD, PhD** along with some staff and trainees volunteered at the Petco Park UC San Diego Health Vaccination Station.

Andrew Camp, MD and **Jiun Do, MD, PhD** volunteered with SEI trainees and UC San Diego medical students at the UC San Diego School of Medicine Student Run Free Clinic in downtown San Diego.

Gustavo Wanderer, certified ophthalmic technician, volunteered for the Mercy Outreach Surgical Team in central Mexico with other San Diego physicians and nurses.

Sally Baxter, MD, MSc volunteered to screen and perform ophthalmic examinations on low income parents and grandparents who accompanied children being seen on the Shiley EyeMobile for Children as it traveled throughout San Diego County.

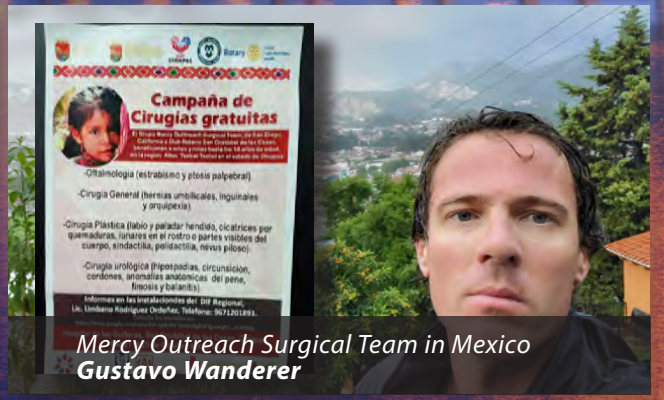
UC San Diego Health Vaccination Station
Henry Ferreyra, MD and Sally Baxter, MD, MSc

UC San Diego Health Vaccination Station
Bobby Korn, MD, PhD and volunteers

UC San Diego Health Vaccination Station
Bobby Korn, MD, PhD

Student Run Free Clinic in downtown San Diego
Andrew Camp, MD and volunteer

UC San Diego Health Vaccination Station
Jiun Do, MD, PhD, Sally Baxter, MD, MSc and Volunteer



Mercy Outreach Surgical Team in Mexico
Gustavo Wanderer

Student Run Free Clinic in downtown San Diego
Jiun Do, MD, PhD with Volunteers

THREE GENERATIONS OF CARING AT SEI

Veronica Rubio began her career at the Shiley Eye Institute (SEI) as a front desk receptionist 17 years ago and is now a Clinical Research Supervisor at the Hamilton Glaucoma Center (HGC). She was trained extensively in research protocols by UC San Diego. She oversees 30 research studies conducted by SEI investigators **Robert N. Weinreb, MD**, **Linda Zangwill, PhD**, **Andrew Camp, MD**, **Jiun Do, MD, PhD**, and **Sasan Moghimi, MD**.

Veronica manages the FDA regulated clinical trials with several pharmaceutical and medical device companies. She also administers the Institute Review Board (IRB) funding and investigator-initiated studies by assisting with patient recruitment and follow up on the studies' protocols.

Over two years ago, Veronica's mother, Marta Haight became a Clinical Research Coordinator at SEI for **Sally Baxter, MD, MSc**. She oversees the IRB studies, financial and administrative requirements for each project and recruits patients.

Most recently, Veronica's daughter, Janelle Rubio Nuno became a UC San Diego Volunteer at the HGC where she assists with checking in research patients, making reminder calls, conducting COVID screenings, data entry and various administrative tasks.

"We are fortunate to have such an amazing and service-oriented family as part of Team Shiley", stated Dr. Weinreb.

THE SECRET OF NURIA

Ten years ago on March 10, 2011, UC San Diego Shiley Eye Institute (SEI) faculty, **Don O. Kikkawa, MD**, and **David B. Granet, MD**, were reading the San Diego Union Tribune (SDUT) and came across a picture of a young girl, Nuria, from the war in Afghanistan with an eye injury. They contacted Karen Anisko Ryan, MS, Director of Business Development and Communications at SEI, and said, "We can help this girl – try to bring her to Shiley."

By March 30, 2011, the collective effort began to contact the family and transport the little girl to SEI for surgery to treat her damaged eye. Karen got in touch with Debra Kain, UC San Diego Health Sciences Communications, who in turn contacted the SDUT photographer and the reporter, who were both imbedded with the Marines in Afghanistan for assistance in locating the child. Next contacted was the Marine Captain in charge, before the unit returned to the United States.

Fortunately, the Marine Captain took a deep personal interest in the situation and was in close contact to the family. He was actively seeking help for the little girl through other channels but they would not allow a parent to accompany the child. Another Marine's family in Chicago got involved raising money and awareness. Time was of the essence – Nuria, which means light, needed to be treated right away due to the damaged eye socket possibly "settling" making reconstruction surgery more difficult. The Marines were adamant about bringing "light" to a very dark part of the world for the Afghan people and US soldiers.

The Captain decided to utilize the UC San Diego option allowing a parent to accompany Nuria. He then mobilized all the entities in support of getting Nuria help. The combined wheels of the US government, Marines, UC San Diego and SDUT were put into motion. The roadblocks encountered included

securing identity cards and passports, the long wait for embassy visa applications, medical/travel/lodging costs, finding a San Diego interpreter that spoke not only Pashtu but their dialect, and most importantly concerns for the safety of the child and her father.

Thankfully Nuria and her father successfully traveled from Afghanistan to San Diego through a patchwork of planes, trains and automobiles. The difference between Afghanistan and California could not be greater! They went from a mud home with no electricity or running water to the UC San Diego Health Bannister House in Hillcrest. Three interpreters where found locally that spoke their dialect, they included a kind man from East County, a UC San Diego student and a UC San Diego doctor from Hillcrest. Nuria arrived a quiet scared child so connecting with her father was vital to the success of the trip.

Through gifts to the 4sight4children Fund at the SEI, the Department of Ophthalmology was able to fund the travel, food and lodging as well as the medical costs. UC San Diego Health donated hospital fees, doctors donated their services and Dr. Kikkawa was able to secure a donation of a prosthetic eye and safety glasses. Local attractions donated tickets for her to see how children have fun in the USA.

Dr. Kikkawa successfully performed the difficult surgery. Post-surgery, you could not get the smile off Nuria's face – she lit up like a bright light and was laughing playfully nonstop. Nuria and her father stayed for a month in San Diego for all of the medical treatment and follow up. She was able to see the Pacific Ocean for the first time. She was able to go on amusement rides at local parks. She was able to play with American children.

Before they returned to Afghanistan, Nuria's father said through an interpreter repeatedly ***"Thank you! The kindness we received and the way we were treated by everyone in the United States was beyond our dreams."***

Without the collective help from UC San Diego Health, Debra Kain, the SDUT reporter, the Marine Captain, the interpreters along with Dr. Kikkawa and his Shiley Eye Institute team – this would not have been so incredibly successful.

****We have limited the pictures and names of people who helped from the article for safety reasons. This story has not been made public before and has been a SEI "secret" for 10 years!*

MY RECENT, MINIMALLY INVASIVE GLAUCOMA SURGERY A NEW PROCEDURE

By Natasha Josefowitz

"Your eye pressure is 50," says **Robert N. Weinreb, MD**, Director of the Shiley Eye Institute and my ophthalmologist, whose expertise is glaucoma. "We have been unable to control your eye pressure with drops; I am recommending eye surgery."

I, of course, am immediately reluctant and ask, "What happens if we don't operate?"

"You may lose the sight of your eye or have a blocked blood vessel in the eye — something like a stroke," is his response. "There really is no choice."

At that glum prediction, I acquiesce.
"When I ask?"
"Today is Friday," he replies. "We'll do it Monday."

I also have macular degeneration and receive regular shots in that eye from retina specialist **Eric Nudleman, MD, PhD**; that disease has been improving.

"What are you going to do?" I ask with anxiety rising as the inevitability of the looming operation becomes reality.

Dr. Weinreb explains that it is one of several new procedures classified as minimally invasive glaucoma surgery (MIGS). A tiny gel implant is placed inside the outer part of the eye. The implant is actually a tiny tube with an inner diameter of 45 microns that allows the fluid in the eye to drain slowly and lower the eye pressure. It is called MIGS as there is minimal tissue disruption, short surgical time, simple instrumentation, and fast post-operative recovery. This procedure should take about 15 minutes. I have to stay in the recovery room on the third floor for a while in order for the anesthetic to wear off.

I am now free of the fear of losing my sight.

"Oh my goodness," I say. I had read that for people my age, anesthesia can impact cognition. I am reassured that it won't be general, just enough to relax me. I will not be allowed to bend down or lift heavy objects for two weeks following the surgery, so I have two days to arrange my apartment. I have restless nights.

Monday does eventually come. Sheri, one of our White Sands drivers, takes me at 8:15 in the morning. Upon arrival, after registering, I am taken to a pre-op room to change into the proverbial hospital gown that ties in the back. I lie down on a gurney with an IV, a blood pressure monitor (that inflates itself every few minutes throughout the operation), and a pulse oximeter on my finger. Mark Schwartz, MD the anesthesiologist, comes over. I tell him of my concern about the pending loss of brain cells from the anesthesia for people my age (I am 94). He agrees to give me very little Versed, the usual culprit, and some Fentanyl. After just a couple of minutes of conversation, Dr. Schwartz says: "Don't micro-manage during the operation." How did he get my number so quickly?

Dr. Weinreb comes over to reassure me and tells me everything is ready. I am wheeled into the operating room and a sheet is placed over my face with an opening over my eye. After some numbing eye drops, I feel no pain during the operation, only some pressure over the eye. I know how to relax from my meditation class. Before I know it, Dr. Weinreb says that the operation is over. He is pleased; the procedure was successful. The entire staff was impressed as he performed it in a mere four minutes.

I rest on my gurney for half an hour, and I'm off in a wheelchair to the waiting car. Sheri had already called ahead to White Sands so that upon my arrival a wheelchair was waiting to take me to my room. My wonderful caregiver, Melissa, puts a drop in my eye; thereafter, I could do the drops on my own — every two hours while I'm awake. I sleep well; I am surprised that I have no aftereffects from the anesthesia. My eye is barely sore.

The next morning I return to the hospital for a post-op follow-up appointment. While Dr. Weinreb examines me, he invites a resident and two fellows to come and take a look at the results of a successful operation. (The institute as part of UC San Diego Health is a teaching hospital.) My eye pressure went from 50 to nine.

MIGS, the type of surgery performed by Dr. Weinreb, has been available for only a few years and is replacing much riskier procedures for many patients with glaucoma. I feel fortunate to be able benefit from this miracle of modern surgery and very grateful to Dr. Weinreb, Dr. Nudleman, and their entire team at the Shiley Eye Institute. I am now free of the fear of losing my sight.

Natasha Josefowitz is the author of 21 books. She currently resides at White Sands Retirement Community in La Jolla.

INFANTILE CATARACTS ARE A BLIND SPOT

The condition is more common — and problematic — than thought

Three days after Canyon Brown was born, the attending pediatrician discovered a problem.

During a standard red reflex test, in which a red dot of light is shined from an ophthalmoscope into the pupil, the boy's right eye, unlike his left, reflected no light back.

People can be born with cataracts. They can form them at any point in life. The clouding of the lens is not just an artifact of advancing age. According to the American Academy of Ophthalmology, the incidence of infantile cataracts is 3 to 4 per 10,000 live births per year. They account for 5 to 20 percent of childhood blindness worldwide.

An even lesser known fact is that cataracts are much more serious in an infant than in an adult.

"People always think, 'Oh my grandpa had his cataracts removed and it was in and out of surgery in 20 minutes and he never saw a surgeon again, no big deal,' but with kids, it's the opposite," said **Jolene Rudell, MD, PhD**, Assistant Professor and pediatric ophthalmologist at Shiley Eye Institute at UC San Diego Health.

Rudell removed Canyon's clouded lens at 6 weeks old. This was considered an emergency surgery for several reasons, each of which distinguishes infantile cataracts from the adult kind.

"One of the things we always worry about is cancer," said Rudell, explaining that retinoblastoma can sometimes look like a congenital cataract but, if discovered, could require "radiation, chemotherapy and possibly even removing the eye" to treat.

"That was terrifying to us," said Rochelle Gaudette, Canyon's mother. "We have a newborn that could possibly have this life-threatening disease?"

In Canyon's case, no tumor was detected. His cataract was due to an unexplained underdevelopment of the eye in utero. (If Canyon had developed cataracts in both eyes that might have been a sign of a more serious problem, such as an infection or genetic syndrome that can affect a child's development and health.)

No matter their cause, treating cataracts is also much more urgent for infants than adults because the brain starts shutting off vision from an underperforming eye immediately after birth. That's why, like most people who develop cataracts in infancy, Canyon also has amblyopia (more commonly called lazy eye).

"There is a very small window of time when we can operate, which is four to six weeks, to have a chance at saving any vision in the eye," said Rudell, who regularly performs these operations, "because, from day one, the brain favors the eye without the cataract."

Finally, treating cataracts is much more complicated in infants because clouded lenses cannot immediately be replaced with artificial ones. Eyes keep growing, and changing shape, according to Rudell. So Canyon must wear a contact lens, or very thick glasses, to have any focusing power in his problem eye until he is a little older, when his parents have the option of getting him an intraocular transplant or continuing with the contact lens indefinitely.

"When he wakes up, you have to clean the contact lens and then try to pry his eyeball open and pop it in without him swatting your hand away or screaming or squirming," Gaudette said. "And the glasses don't work because he won't wear his glasses anymore. He pulls them off."

Because of his amblyopia, Canyon must also wear a patch over his unaffected eye for three to six hours per day to strengthen his problem eye.

"It really changed the routine of our whole family," Gaudette said, "and every step of the way, there's things that come up."

Rudell calls correcting infant cataracts "a lifelong process."

"At any moment after surgery, from days to decades later, there are many potential problems that can arise, and likely additional surgeries to correct them," she said. "Even if their surgeries go perfectly and the right things are done at the right time, kids born with underdeveloped eyes are more at risk for glaucoma and other forms of blindness. Some of them may end up losing their vision anyway."

And the expense of this treatment can break the average family's bank. Canyon's lensectomy alone was prohibitively expensive and was billed to his insurance, which denied the claim. Fortunately, a "cash pay" arrangement for Gaudette and her husband reduced the cost and this was footed in its entirety by generous friends and family through a GoFundMe campaign.

Many families end up deciding it's not worth all the trouble just to save the vision in one eye, according to Rudell.

"It can be a difficult decision to put a six-week-old child under anesthesia for something that won't kill them," Rudell said. "After all, you can still legally drive with only one eye, and Canyon will still be able to do things other kids can do."

The problem, Rudell said, is if something ever happens to the unaffected eye.

"When a child grows up and they develop macular degeneration that happens to get worse in their good eye, they essentially become blind," she said. "That's why we always try to maximize whatever vision we're able to, when we can."

Rudell says more research is needed in the field of congenital cataracts.

"We have options to treat patients like Canyon, but we still don't have great solutions, and so many questions still remain on what is the best way to manage congenital cataracts," she said. "It is unfortunately not well-studied. But I'm hoping more research can only help improve visual outcomes for children with eye diseases, including cataracts."

For now, Canyon is healthy and developing normally at 18 months old, which is what his parents focus on.

"He interacts well with others and his language is developing nicely," Gaudette said. "I almost think that he might be ahead of the curve in some ways." She paused and added "It's not like this is a walk in the park, but just the fact that you can treat it makes us just want to go for it and hope for the best."

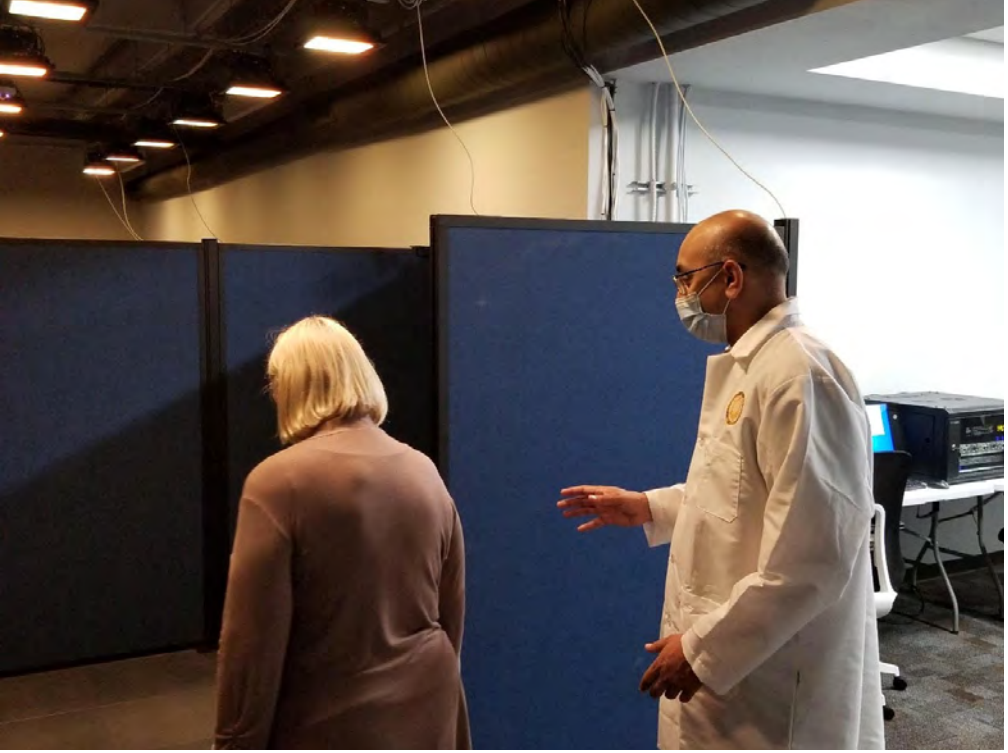
A MAZE FOR INVESTIGATIONS OF RETINA DEGENERATIONS

The Shiley Eye Institute (SEI) and the Viterbi Family Department of Ophthalmology at UC San Diego Health have recently constructed two new visual mobility courses (or mazes) near the La Jolla campus. These full size, human visual mobility courses are designed to test visual function in retinal degeneration patients. Research patients are tested to learn how they navigate through the mazes under different lighting conditions and are asked to negotiate obstacles just as they would in the real word.

The new mazes are being utilized under the leadership of **Shyamanga Borooah, MBBS, PhD**, Director of the Retinal Degeneration Clinic at SEI. He plans to apply these mazes to test the effectiveness of novel trial therapies for retinal degeneration as part of the new Retinal Degeneration Clinic.

Dr. Borooah states, "These mazes are an exciting new addition to our department. We are fortunate to have been selected as one of only a handful of sites around the world participating in a number of landmark clinical trials targeting retinal degeneration which will utilize our mobility courses. They give us the capability to test visual function before and after treatment to help assess the effectiveness of potential new therapies. Ultimately, the mazes and these ground-breaking studies will contribute to the global efforts to prevent sight loss in retinal degeneration."

Retinal degenerations are the leading cause of blindness worldwide. The retina is the light sensitive tissue at the back of the eye that contains photoreceptors. Photoreceptors are the cells that begin the process of seeing by absorbing and



Dr. Borooah and a patient entering the maze.

Intricate lighting system over the maze

converting light into electric signals that are sent to the optic nerve and the brain. Retinal degeneration, or death of the retinal cells, has many causes but ultimately all causes lead to sight loss. Common retinal degenerations include age-related macular degeneration and inherited retinal diseases such as retinitis pigmentosa.

Inherited retinal degenerations (IRD) often result in advanced visual loss due to genetic changes. In many IRD patients, standard ophthalmic assessments, like eye charts or visual fields, do not work. Therefore, an alternative vision test was developed to measure visual function – the visual mobility course.

Utilizing these mazes, IRD patients' can be assessed for walking accuracy, number of errors, and speed through the course. These measures can be used to reliably and objectively assess patient visual function. The courses have real life obstacles that the patient must distinguish while walking through. Obstacles can be representations of walls, people, plants or pets. These courses can accommodate various types and severities of vision loss by modifying light levels.

The primary aim of the new SEI Retinal Degeneration Clinic is to combine world-class clinical care with the latest research for patients with retinal degenerations. The center is fully structured around retinal degeneration patient's needs. The center's experienced team utilizes state of the art diagnostics and imaging, genetic testing, genetic counseling. It also connects patients to visual or low vision rehabilitation. Patients also have the opportunity to participate in pioneering studies, such as gene therapy and gene editing clinical trials, which utilize the new mazes to test new treatment approaches.

HEART DISEASE IS IN THE EYE OF THE BEHOLDER

In a study from Shiley Eye Institute (SEI) at UC San Diego Health, researchers have identified a potential new marker that shows cardiovascular disease may be present in a patient using an optical coherence tomography (OCT) scan — a non-invasive diagnostic tool commonly used in ophthalmology to create images of the retina. The finding suggests it may be possible to detect heart disease during an eye examination.

In the paper published in *EClinical Medicine by The Lancet (DOI: https://doi.org/10.1016/j.eclinm.2021.100775)*, the research team examined lesions of the retina, the inner-most, light-sensitive layer of the eye, to determine if a cardiovascular disorder may be present.

"The eyes are a window into our health, and many diseases can manifest in the eye; cardiovascular disease is no exception," said lead author Mathieu Bakhoum, MD, PhD, who joined the faculty at Yale following his retina fellowship at the Shiley Eye Institute. "Ischemia, which is decreased blood flow caused by heart disease, can lead to inadequate blood flow to the eye and may cause cells in the retina to die, leaving behind a permanent mark. We termed this mark 'retinal ischemic perivascular lesions,' or RIPLs, and sought to determine if this finding could serve as a biomarker for cardiovascular disease."

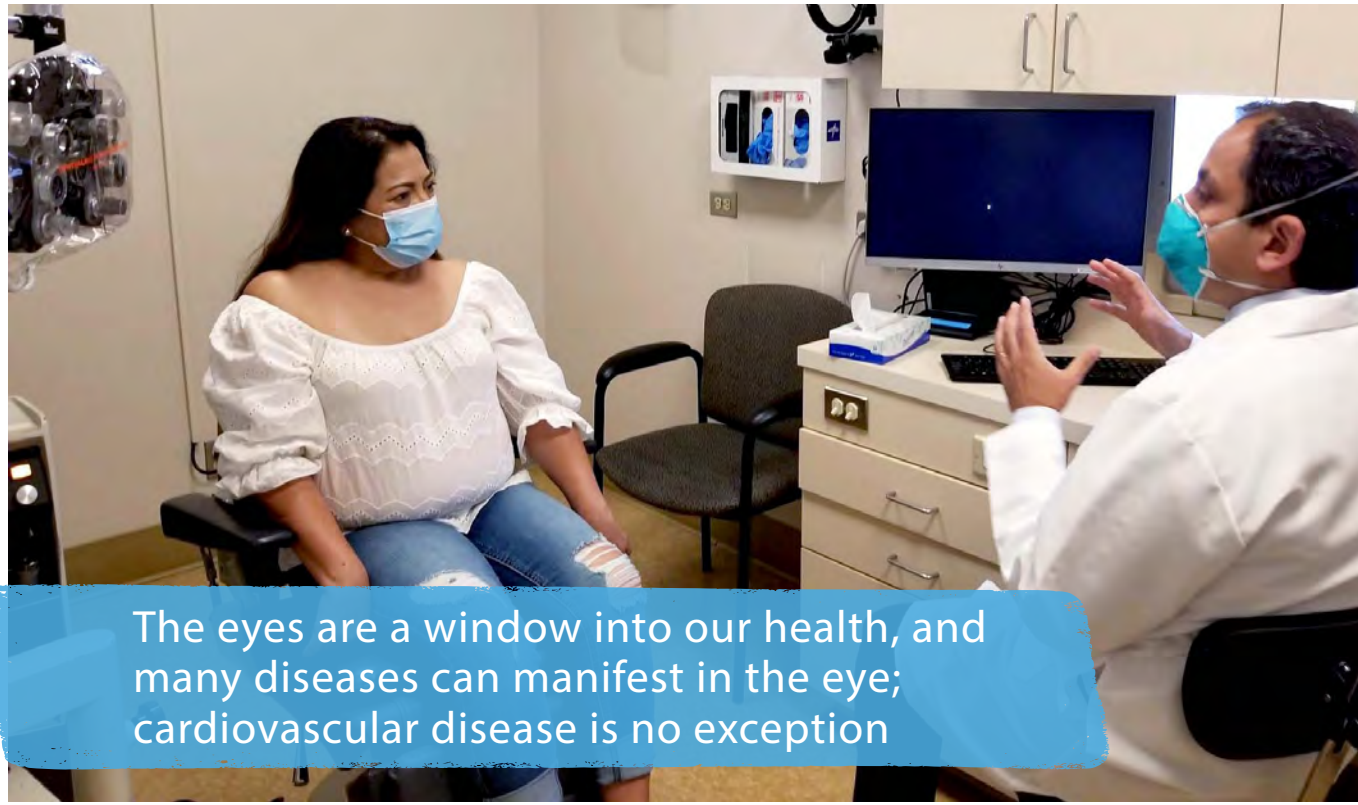
As part of the study, the team reviewed the records of individuals who received a retinal OCT scan at UC San Diego Health from July 2014 to July 2019. From that cohort, two groups were identified after medical chart review: one consisted of 84 individuals with heart disease and the

other included 76 healthy individuals as the study's control group. An increased number of RIPLs was observed in the eyes of individuals with heart disease. According to the researchers, the higher number of RIPLs in the eye, the higher the risk for cardiovascular disease.

A person's risk for cardiovascular disease is determined by the atherosclerotic cardiovascular disease (ASCVD) risk score calculator, the national guideline developed by the American College of Cardiology. The guideline is considered the gold standard for assessing a patient's 10-year risk of experiencing a cardiovascular event, such as heart attack or stroke. In the study, researchers found a correlation between the number of RIPLs in a patient's eye and their ASCVD risk score.

"Individuals with low and borderline ASCVD scores had a low number of RIPLs in their eyes, but as the ASCVD risk increased, so did the number of RIPLs," said Bakhoum.

The research team hopes this paper and future studies will result in RIPLs becoming a common ophthalmological marker for identifying potential cardiovascular disease, and incorporated into the overall ASCVD risk score.



The eyes are a window into our health, and many diseases can manifest in the eye; cardiovascular disease is no exception

"Globally, cardiovascular disease is the number one cause of death and unfortunately many people are unaware they may have heart issues," said Bakhoum. "The key in preventing this is early detection and treatment. It's our hope that by identifying RIPLs as a marker for cardiovascular disease providers will be able to identify heart issues before a catastrophic event, such as a heart attack or a stroke, occurs."

Additional co-authors of the study include: **Michael H. Goldbaum, MD**, **William R Freeman, MD**, Anthony N. DeMaria, MD, Christopher P. Long, MD, Christine Y. Bakhoum, MD, MAS, Anupam K. Garg, MD, PhD, medical students Alison X. Chan and Samantha Madala, as well as former SEI resident Christopher B. Toomey, MD, PhD.

WELCOME NEW FACULTY
ALEX A. HUANG, MD, PHD

The Viterbi Family Department of Ophthalmology and the Shiley Eye Institute at UC San Diego welcomes **Alex A. Huang, MD, PhD**, who enters to the Viterbi Department of Ophthalmology as an Associate Professor in the Glaucoma Division. He is a glaucoma specialist and clinician-scientist who performs all current (and minimally invasive) glaucoma surgical procedures.

Dr. Huang earned both his PhD in neuroscience and MD at The Johns Hopkins University School of Medicine. He completed his residency in ophthalmology at the University of Southern California. Dr. Huang is recognized by patients and staff upon his return as he was a postdoctural fellow in glaucoma at the SEi in 2012-2013.

When asked why he became a doctor, Dr. Huang answered, "I chose to become a physician-scientist ophthalmologist to help patients maximize their vision and to lead what I call a "sand-box" life." He went on to state, "Clinician-scientists explore challenging clinical and basic science questions like an inquisitive kid in a sand-box. Creatively free, we see patients and then are inspired by them to chase innovative diagnostic and treatment ideas to improve patient-care." Dr. Huang's clinical goal is to maximize the efficacy of glaucoma therapeutics while decreasing their burden to augment the best quality-of-life. He carries his interests regarding angle-based approaches and native outflow pathway improvement into his laboratory as a National Institutes of Health (NIH) R01-supported scientist. Thus, his NIH research program focuses on improving glaucoma surgical outcomes by enhancing aqueous humor outflow understanding.

He is also supported by the National Aeronautics and Space Administration (NASA) to protect the eyes of American astronauts on the International Space

Station from Space Flight-Associated Neuro-ocular Syndrome (SANS).

Dr. Huang is looking forward to the UC San Diego research collaborations and partnerships in his new position. He noted, "Put nicely, teamwork is the key. Put factually, no single person is smart enough to do everything and take any idea to fruition. UC San Diego epitomizes this ideal by bringing together the best and most diverse family of clinicians and scientists. This is why I am excited to be here - to work with other experts like **Robert N. Weinreb, MD** to tackle the most challenging glaucoma and eye care questions in the future."

The international publication, *The Ophthalmologist* named Dr. Huang the #1 Rising Star in the World in 2017 and recognized him on *The Ophthalmologist* Power 100 List in 2020. In 2021, Dr. Huang received the Association for Research in Vision and Ophthalmology (ARVO) Foundation Pfizer Ophthalmics Carl Camras Translational Research Award.

OFF THE PLANET

Alex A. Huang, MD, PhD conducts research for the National Aeronautics and Space Administration (NASA) to safeguard American astronauts' eyes on the International Space Station (ISS). His goal is to determine the cause of Spaceflight Associated Neuro-ocular Syndrome (SANS) and develop countermeasures necessary for a long-haul spaceflight Mission to Mars.

Eye health is a hurdle for the Mission to Mars. Based on the rotation of the planets and how fast spaceships fly, a planned human Mission to Mars would take years to travel there, to explore the planet and to return to Earth safely. Since 2011, it was discovered that the optic nerves of American astronauts on the ISS could become swollen, the eye globe flattens, and/or the retina folds. This new disease is called SANS. Since that time, 1 in 3 astronauts flying long duration ISS missions have developed these symptoms, and the longer astronauts resided in the weightless environment of the ISS, the worse the swelling.

Image courtesy of DLR.

SANS is modeled on Earth by placing subjects in head-down tilt so that lower body fluid shifts to the head. A lower-body negative pressure [LBNP] chamber, and other potential countermeasures, can be tested in this body position.

Thus, SANS represents a major barrier to long-haul exploration class spaceflight because of the risk to vision and the potential inability for astronauts to complete their missions or come home. It is urgent that SANS be better understood, risk factors identified, and mitigation strategies developed.

Many reasons have been hypothesized for why SANS occurs, and one leading concept involves the fluid in our bodies. Without gravity, fluid in our legs re-distributes to our heads, and the extra volume may be the culprit. Thus, Dr. Huang's team is currently developing and testing countermeasures designed to reverse the fluid shift. Partnering with NASA, these countermeasures are currently being tested at the German Aerospace Center (Deutsches Zentrum fur Luft- und Raumfahrt or DLR).

Eye research is further performed directly on the ISS. The ocular nerves, eye blood flow, and eye electrical function are being directly tested on American astronauts in space. With these studies, Dr. Huang and his multi-centered team hope to improve the safety of future spaceflight and allow for the exploration of this next frontier. Lessons from these SANS investigations may also shed light onto Earthly eye disorders such as glaucoma optic neuropathy.

For more information, scan this barcode to reach the publication.

NEW GENES IDENTIFIED

International effort identified new and different causative gene variants for a group of diseases that can lead to severe vision loss or blindness.

An international team of researchers, led by **Radha Ayyagari, PhD**, Professor of Ophthalmology and Pathology at the Shiley Eye Institute and Viterbi Family Department of Ophthalmology, has broadened and deepened understanding of how inherited retinal dystrophies (IRDs) affect different populations of people and, in the process, have identified new gene variants that may cause the diseases.

Dr. Ayyagari's large team includes Kelly A. Frazer, PhD, Professor of Pediatrics and Director of the Institute for Genomic Medicine at UC San Diego School of Medicine; and S. Amer Riazuddin, PhD, Associate Professor of Ophthalmology at John Hopkins University, in collaboration with institutions in India, Mexico, Canada, Brazil, Pakistan and the United States.

IRDs are a group of diseases, from retinitis pigmentosa to choroideremia, that result in progressive vision loss, even blindness. Each IRD is caused by at least one gene mutation, though mutations in the same gene may lead to different IRD diagnoses. IRDs are rare, but they affect individuals of all ages, progressing at different rates, even within families afflicted with the same disease. Specific diagnosis depends on finding the genetic causative mutations.

The U.S. Food and Drug Administration has approved gene therapy for treating one form of IRD involving the gene RPE65, but for other IRDs caused by mutations in more than 280 different genes, there are no cures or treatments proven to slow disease progression.

The researchers conducted whole-genome sequences (WGS) of 409 persons from 108 unrelated family lineages, each with a previously diagnosed IRD. WGS is a process of determining the entirety, or near-entirety, of the DNA sequence of an individual. It provides a comprehensive portrait of the person's entire genome, including mutations and variants, which can be used for broad comparative purposes.

Study participants were recruited from three different geographic regions: Mexico, Pakistan and European Americans living in the United States. The study also identified a large proportion of new IRD causative mutations specific to the populations studied and revealed the types of mutations contributing to inherited retinal dystrophies.

The authors said the new findings boost understanding of the distribution of IRD causative mutations in these three diverse populations, which will further understanding of disease variation and presentation. That, in turn, will help design more efficient genetic testing strategies and therapies applicable to global populations.

Funding for this research came, in part, from the National Institutes of Health (grants EY031663, EY13198, EY21237, EY002162 and P30EY022589) the Foundation Fighting Blindness; Research to Prevent Blindness; The Claire Giannini Foundation; The L.L. Hillblom Foundation and That Man May See, Inc.

Full Study: *https://journals.plos.org/plosgenetics/article?id=10.1371/journal.pgen.1009848*

NEW DIVISION AT SEI

The Shiley Eye Institute and Viterbi Family Department of Ophthalmology has a new Division, Ophthalmology Informatics and Data Science. Under the direction of Assistant Professor, **Sally Baxter, MD, MSc**, the division is dedicated to advancing data science, artificial intelligence, and big-data analytics for the improvement of vision and health. The division is conducting cutting-edge research as well as providing clinical informatics support to develop and integrate state-of-the-art health information technology tools into the day-to-day care of our patients.

Faculty in the division have trained and mentored undergraduates, postbaccalaureate students, medical students, residents, and fellows via independent study courses, research electives, mentoring programs, summer internships, and other pathways.

The Division also offers an Ophthalmology Informatics and Data Science Fellowship Program, a unique postdoctoral training opportunity for physicians and scientists interested in advancing their understanding of biomedical and clinical informatics as applied to vision science and clinical ophthalmology.

“Collaboration with Medical BioInformatics, HDSI - we are well positioned to advance the diagnosis and treatment of eye diseases,” says Baxter.

EXAMPLES OF OPHTHALMOLOGY INFORMATICS AND DATA SCIENCE IN THE CLINIC INCLUDE:

- NIH-funded research in health information technology integration, big data, and artificial intelligence
  - Examples:
    - Deep learning analyses of optic nerve and retinal images
    - Big-data predictive analytics with electronic health record data
    - Innovations in sensor technology and wearables
    - Genomics
- Providing core resources such as high-performance computing and state-of-the-art custom computer programming through the UCSD Computational Ophthalmology Group
- Seminar series with notable ophthalmologists, informaticists, and data scientists from across the world
- Training programs to develop the next generation of ophthalmic informaticists and data scientists
- Journal clubs and research symposia to discuss cutting-edge research
- Providing support to faculty, staff, and trainees as they implement new informatics and digital tools for research and clinical applications
- Founding member of the UC San Diego Halicioglu Data Science Institute
- Member of the American Academy of Ophthalmology (AAO) Committee on Artificial Intelligence
- The values of diversity and inclusion are an utmost priority. Some of the ways the division has prioritized diversity include making concerted efforts to study individuals from backgrounds traditionally underrepresented in biomedical research, recruiting trainees from diverse backgrounds, and ensuring data analyses, algorithms, and implementation of tools are performed in a transparent fashion while minimizing bias and reducing health disparities.

SOME HELPFUL DEFINITIONS

Informatics is the "science of how to use data, information, and knowledge to improve human health and the delivery of health care services" (American Medical Informatics Association).

Data Science is the study of data or facts and figures/numbers. It involves recording, storing, and analyzing data to effectively extract useful information.

Artificial Intelligence is the ability of a computer to do tasks that are usually done by humans because they require intelligence and discernment. In other words, it is the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. Examples are learning and problem solving.

Big Data is extremely large groups of numbers or data sets that can be analyzed computationally to reveal patterns, trends, and associations – especially relating to human behavior or medically recorded numeric information.

Deep Learning is an artificial intelligence function that imitates the working of the human brain in processing data and creating patterns for use in decision making.

AFFILIATED SEI FACULTY

Sally L. Baxter, MD, MSc – Division Chief, Dual Board-Certified in Ophthalmology and Clinical Informatics
Dirk-Uwe Bartsch, PhD
Akram Belghith, PhD
Chris Bowd, PhD
Mark Christopher, PhD
William Freeman, MD
Michael Goldbaum, MD
Sasan Moghimi, MD
Robert N. Weinreb, MD
Derek Welsbie, MD, PhD
Linda Zangwill, PhD

COLLABORATING FACULTY FROM OTHER DIVISIONS/DEPARTMENTS AT UC SAN DIEGO

UCSD Health Department of Biomedical Informatics
UCSD Health Information Services
UCSD Halicioglu Data Science Institute
UCSD Division of Biostatistics & Bioinformatics in the Department of Family Medicine and Public Health
UCSD Department of Computer Science and Engineering

LIONS BIOBANK UPDATE

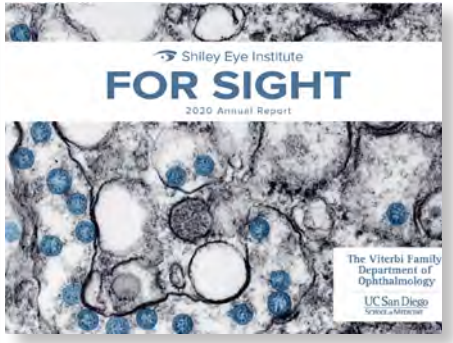
The Shiley Eye Institute (SEI) gratefully accepted a groundbreaking donation to establish the *Downtown San Diego Lions Club BioBank for Vision* in 2017. The BioBank stores a library of biological samples with complete background information that researchers can utilize to investigate predictors for diseases and effectiveness of therapies. The goal of the BioBank is to leverage the latest in bioinformatics technology and genetic sequencing tools to advance the understanding of eye diseases such as glaucoma and inherited retinal 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. In the past year, the Biobank obtained four thousand blood mononuclear cells from 2,315 patients to generate induced pluripotent stem cells for studying eye diseases. These cells have been carefully and confidentially catalogued along with their clinical status and stored at ultralow temperature (<160 degrees C) in liquid nitrogen freezers for future use. RNA samples were obtained from 3,422 patients and stored at -80 degrees C temperature in our BioBank freezers. These samples and others are awaiting proteomic analysis, a systematic identification and quantification of the proteins of a cell, tissue or biological fluid. SEI researchers will then examine how the samples contribute to the regulation of eye pressure and the delivery of nutrients to the eye.

2021

MARKS
TEN YEARS OF
FOR SIGHT
ANNUAL
REPORTS



VIEW OUR ENTIRE COLLECTION OF ANNUAL REPORTS ONLINE HERE:

CONGRATULATIONS

Sally L. Baxter, MD, MSc, Assistant Professor, received the 2020 NIH Director's Early Independence Award. This is among the most prestigious grants awarded by the National Institutes of Health, and Dr. Baxter is one of the only ophthalmologists to be so recognized.

Andrew Camp, MD, Assistant Professor, was awarded the 2021 Whitehill Prize for Excellence from UC San Diego.

Alex A. Huang, MD, PhD, Associate Professor, received the 2021 Achievement Award from the Academy of Ophthalmology.

Don O. Kikkawa, MD, Professor and Executive Vice Chair, was named to the Ophthalmology Residency Review Committee of the Accreditation Council for Graduate Medical Education (ACGME), the national organization that accredits resident training programs.

Shira L. Robbins, MD, Professor of Ophthalmology, has been elected UC San Diego Health (UCSDH) Vice Chief of Staff. She was elected by the UC San Diego Active Medical Staff that includes over 1,300 physicians and other clinicians. In 2 years, she will become UC San Diego Health (UCSDH) Chief of Staff. This position of Vice Chief of Staff merges patient safety with UCSD policies while being a physician advocate.

Robert N. Weinreb, MD, Distinguished Professor and Chair, received the Dr. Robert Ritch Award for Excellence and Innovation in Glaucoma from The Glaucoma Foundation (New York).

Robert N. Weinreb, MD, Distinguished Professor and Chair, was recognized by Ophthalmology Management as one of the 2021 "25 Leaders in Innovation" who have made notable contributions to ophthalmology.

Robert N. Weinreb, MD, Distinguished Professor and Chair, and **Jeffrey E. Lee, MD**, Associate Professor, were named to Newsweek's "America's Best Eye Doctors 2021".

Among 21 Viterbi Family Department of Ophthalmology faculty who were recognized by Expertscape as being among the best in their respective fields, **Robert N. Weinreb, MD** was named for the seventh consecutive year as the world's leading glaucoma expert. Also ranked highly at #12 was **Linda Zangwill, PhD**, Professor and interim Research Director.

Every year, Shiley Eye Institute specialists have been honored as being "the best" by every major national and local organization.

The Ophthalmologist
Expertscape
Castle Connolly
San Diego Magazine
TOP Doctors
U.S. News & World Report
Best Doctors
SuperDoctors
Newsweek

GLAUCOMA

Robert N. Weinreb, MD

Chair & Distinguished Professor, Viterbi Family Department of Ophthalmology
Director, Shiley Eye Institute
Director, Hamilton Glaucoma Center
Distinguished Professor of Bioengineering
Morris Gleich, MD Chair in Glaucoma

MEDICAL SCHOOL
Harvard Medical School

RESIDENCY & FELLOWSHIP
University of California San Francisco

GLAUCOMA

Linda M. Zangwill, PhD

Professor of Ophthalmology
Co-Director of Clinical Research, Hamilton Glaucoma Center
Director, Hamilton Glaucoma Center, Data Coordinating Center
Richard K. Lansche, MD & Tatiana A. Lansche Chair in Ophthalmology

GRADUATE SCHOOL
Harvard School of Public Health (MS)
Ben-Gurion University of the Negev (PhD)

POSTDOCTORAL FELLOWSHIP
University of Waterloo, Waterloo, Ontario, Canada

GLAUCOMA

Akram Belghith, PhD

Assistant Project Scientist of Ophthalmology

GRADUATE SCHOOL
University of Strasbourg, France

POSTDOCTORAL FELLOWSHIP
University of California San Diego

GLAUCOMA

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

GRADUATE SCHOOL
Washington State University

POSTDOCTORAL FELLOWSHIP
University of California San Diego

GLAUCOMA

Andrew S. Camp, MD

Assistant Professor of Ophthalmology

MEDICAL SCHOOL
University of Miami Miller School of Medicine

RESIDENCY
Bascom Palmer Eye Institute at the University of Miami Miller School of Medicine

FELLOWSHIP
University of California San Diego

GLAUCOMA

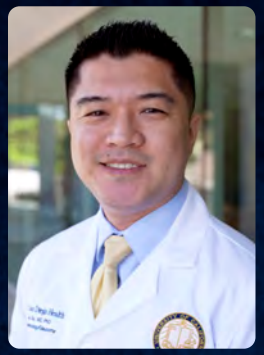
Mark Christopher, PhD

Assistant Project Scientist of Ophthalmology

GRADUATE SCHOOL
University of Iowa

POSTDOCTORAL FELLOWSHIP
University of California San Diego

GLAUCOMA



Jiun Do, MD, PhD

Assistant Professor of Ophthalmology

MEDICAL SCHOOL
University of California San Diego, School of Medicine

RESIDENCY
University of Southern California, Roski Eye Institute

FELLOWSHIP
University of California San Diego

POSTDOCTORAL FELLOWSHIP
University of California San Diego, Neurosciences

GLAUCOMA

Alex A. Huang, MD, PhD

Associate Professor of Ophthalmology
Alfred Vogt Chair in Ophthalmology

MEDICAL SCHOOL
The Johns Hopkins University School of Medicine

RESIDENCY
Los Angeles County & University of Southern California

FELLOWSHIP
University of California San Diego

POSTDOCTORAL FELLOWSHIP
The Johns Hopkins University School of Medicine

GLAUCOMA

Won-Kyu "Daniel" Ju, PhD

Associate Professor of Ophthalmology

GRADUATE SCHOOL
The Catholic University in Korea
(Masters & PhD)

POSTDOCTORAL FELLOWSHIP
Washington University in St. Louis
Sanford-Burnham Medical Research Institute

GLAUCOMA

John H.K. Liu, PhD

Professor of Ophthalmology
Director, Glaucoma Sleep Laboratory

GRADUATE SCHOOL
National Tsing Hua University
(MS Molecular Biology)
Texas A&M University (PhD Pharmacology)

POSTDOCTORAL FELLOWSHIP
Harvard Medical School

GLAUCOMA

Sasan Moghimi, MD

Associate Professor of Ophthalmology

MEDICAL SCHOOL
Tehran University of Medical Sciences

RESIDENCY
Farabi Eye Hospital, Tehran University of Medical Sciences

FELLOWSHIP
University of California Los Angeles, Stein Eye Institute
University of California San Francisco, Koret Vision Center

GLAUCOMA

Cristiana Vasile, MD

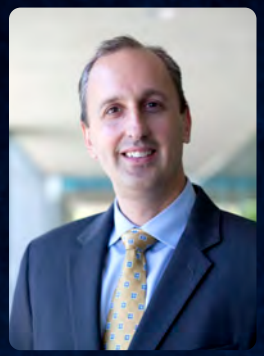
Associate Physician of Ophthalmology

MEDICAL SCHOOL
Bucharest University of Medicine, Romania

RESIDENCY
University of California San Diego

FELLOWSHIP
University of California San Diego

GLAUCOMA



Derek S. Welsbie, MD, PhD

Associate Professor of Ophthalmology

MEDICAL SCHOOL
University of California Los Angeles

RESIDENCY
The Johns Hopkins University School of Medicine/
Wilmer Eye Institute

FELLOWSHIP
The Johns Hopkins University School of Medicine/
Wilmer Eye Institute

POSTDOCTORAL FELLOWSHIP
David Gessen School of Medicine UCLA

COMPREHENSIVE OPHTHALMOLOGY

Sally L. Baxter, MD, MSc

Assistant Professor of Ophthalmology
Chief, Division of Ophthalmology Informatics and Data Science

MEDICAL SCHOOL
Perelman School of Medicine at the University of Pennsylvania

RESIDENCY
University of California San Diego

FELLOWSHIP
University of California, San Diego Health
Department of Biomedical Informatics

COMPREHENSIVE OPHTHALMOLOGY

Jeffrey E. Lee, MD

Associate Clinical Professor of Ophthalmology
Program Director, Ophthalmology Residency

MEDICAL SCHOOL
University of California San Diego

RESIDENCY
University of California San Diego

COMPREHENSIVE OPHTHALMOLOGY

Thao P. Nguyen, MD

Assistant Professor of Ophthalmology

MEDICAL SCHOOL
University of Oklahoma, Tulsa

RESIDENCY
University of Rochester, New York

FELLOWSHIP
University of California San Diego

CORNEA & REFRACTIVE

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

MEDICAL SCHOOL
Stanford University School of Medicine

RESIDENCY
Harvard University, Massachusetts Eye and Ear Infirmary

FELLOWSHIP
Harvard University, Massachusetts Eye and Ear Infirmary

CORNEA & REFRACTIVE

Stuart I. Brown, MD

Professor of Ophthalmology

MEDICAL SCHOOL
University of Illinois Medical School

RESIDENCY
Tulane Medical School

FELLOWSHIP
Harvard University, Massachusetts Eye and Ear Infirmary

CORNEA & REFRACTIVE

Weldon W. Haw, MD

Clinical Professor of Ophthalmology
Chief of Ophthalmology at Veterans Administration Medical Hospital

MEDICAL SCHOOL
University of California Los Angeles School of Medicine

RESIDENCY
Stanford University School of Medicine

FELLOWSHIP
Stanford University School of Medicine

CORNEA & REFRACTIVE

Chris W. Heichel, MD, FACS

Clinical Professor of Ophthalmology

MEDICAL SCHOOL
Chicago Medical School

RESIDENCY
University of California San Diego

FELLOWSHIP
University of California San Diego

GENETICS

Radha Ayyagari, PhD

Professor of Ophthalmology & Pathology
Chief of Ophthalmic Molecular Diagnostic Laboratory (CLIA certified)
Director of Downtown San Diego Lions Club BioBank for Vision
The Viterbi Family Chair III

GRADUATE SCHOOL
Osmania University, Hyderabad, India

POSTDOCTORAL FELLOWSHIP
Molecular Genetics at the National Eye Institute, NIH, Bethesda

NEURO-OPHTHALMOLOGY

Lanning Kline, MD

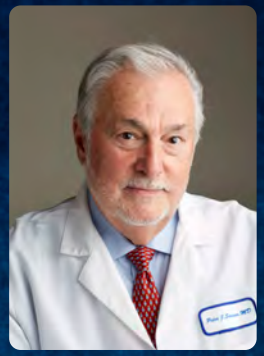
Clinical Professor of Ophthalmology

MEDICAL SCHOOL
Duke University

RESIDENCY
McGill University, Montreal

FELLOWSHIP
Bascom Palmer Eye Institute, University of Miami
Montreal Neurological Institute, McGill University

NEURO-OPHTHALMOLOGY



Peter J. Savino, MD

Professor of Ophthalmology & Neurosciences

MEDICAL SCHOOL
University of Bologna School of Medicine, Italy

RESIDENCY
Georgetown University Medical Center

FELLOWSHIP
University of Miami

OPHTHALMIC PLASTIC & RECONSTRUCTIVE SURGERY

Don O. Kikkawa, MD, FACS

Professor of 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

MEDICAL SCHOOL
St. Louis University School of Medicine

RESIDENCY
University of California Los Angeles

FELLOWSHIP
University of Wisconsin, Madison

OPHTHALMIC PLASTIC & RECONSTRUCTIVE SURGERY

Bobby S. Korn, MD, PhD, FACS

Professor of Ophthalmology and Plastic Surgery

MEDICAL SCHOOL
University of Texas, Southwestern Medical School

RESIDENCY
University of California San Diego

FELLOWSHIP
University of California San Diego

POSTDOCTORAL FELLOWSHIP
Massachusetts Institute of Technology

OPHTHALMIC PLASTIC & RECONSTRUCTIVE SURGERY

Yunxiang "Catherine" Liu, MD, PhD

Assistant Professor of Ophthalmology

MEDICAL SCHOOL
Albert Einstein College of Medicine

RESIDENCY
University of California Irvine

FELLOWSHIP
Illinois Eye and Ear Infirmary at the University of Illinois, Chicago

POSTDOCTORAL FELLOWSHIP
Albert Einstein College of Medicine

PEDIATRIC OPHTHALMOLOGY & ADULT EYE REALIGNMENT

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

Professor of Ophthalmology and Pediatrics
Vice Chair, Department of Ophthalmology
Director, Anne F. & Abraham Ratner Children's Eye Center
Anne Ratner Chair of Pediatric Ophthalmology

MEDICAL SCHOOL
Yale University School of Medicine

RESIDENCY
New York University Medical Center

FELLOWSHIP
Children's Hospital of Philadelphia University of Pennsylvania

PEDIATRIC OPHTHALMOLOGY & ADULT EYE REALIGNMENT

Mansoor Movaghar, MD

Associate Clinical Professor of Ophthalmology

MEDICAL SCHOOL
University of Medicine and Dentistry of New Jersey - Robert Wood Johnson

RESIDENCY
Long Island Jewish Medical Center

FELLOWSHIP
The University of Wisconsin in Madison

PEDIATRIC OPHTHALMOLOGY & ADULT EYE REALIGNMENT

Shira L. Robbins, MD, FAAO, FAAP

Professor of Ophthalmology
Educational Director of Pediatric Ophthalmology/ Strabismus Division

MEDICAL SCHOOL
Medical College of Pennsylvania Hospital

RESIDENCY
Hahnemann University Hospital

FELLOWSHIP
University of California San Diego & Naval Medical Center

PEDIATRIC OPHTHALMOLOGY & ADULT EYE REALIGNMENT

Jolene Rudell, MD, PhD

Assistant Professor of Ophthalmology

MEDICAL SCHOOL
University of California Davis

RESIDENCY
University of California Davis

FELLOWSHIP
University of Washington/Seattle Children's Hospital

POSTDOCTORAL FELLOWSHIP
University of California Davis

REGENERATIVE OPHTHALMOLOGY

Karl Wahlin, PhD

Assistant Professor of Ophthalmology
Director, Richard C. Atkinson Laboratory
for Regenerative Ophthalmology

GRADUATE SCHOOL
The Johns Hopkins School of Medicine
POSTDOCTORAL FELLOWSHIP
The Johns Hopkins School of Medicine/Wilmer Eye Institute

RETINA & PSYCHOLOGY

Nicholas Oesch, PhD

Adjunct Professor of Ophthalmology
Assistant Research Scientist Department of Psychology

GRADUATE SCHOOL
Oregon Health and Science University

POSTDOCTORAL FELLOWSHIP
National Institutes of Health

RETINAL VASCULAR

Napoleone Ferrara, MD

Distinguished Professor of Ophthalmology and Pathology
Senior Deputy Director for Basic Sciences,
UCSD Moores Cancer Center
Ben and Wanda Hildyard Chair for Diseases of the Eye

MEDICAL SCHOOL & RESIDENCY
University of Catania Medical School, Catania, Italy

FELLOWSHIP
University of California San Francisco

RETINA & VITREOUS

Dirk-Uwe Bartsch, PhD

Adjunct Professor of Ophthalmology

GRADUATE SCHOOL
University of California San Diego

POSTDOCTORAL FELLOWSHIP
University of California San Diego

RETINA & VITREOUS

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

Assistant Professor of Ophthalmology

MEDICAL SCHOOL
Imperial College London

RESIDENCY
University of Edinburgh

FELLOWSHIP
Moorfields Eye Hospital London

POSTDOCTORAL FELLOWSHIP
University of Edinburgh

RETINA & VITREOUS

Henry A. Ferreyra, MD

Clinical Professor of Ophthalmology

MEDICAL SCHOOL
University of California San Diego

RESIDENCY
University of California San Diego

FELLOWSHIP
University of California San Diego

RETINA & VITREOUS

William R. Freeman, MD

Distinguished Professor of Ophthalmology
Vice Chair, Department of Ophthalmology
Director, Jacobs Retina Center
Co-Director, Retina Division

MEDICAL SCHOOL
Mount Sinai School of Medicine New York

RESIDENCY
Lenox Hill Hospital New York

FELLOWSHIP
University of California San Francisco
University of Southern California

RETINA & VITREOUS

Michael H. Goldbaum, MD

Professor of Ophthalmology
Co-Director, Retina Division

MEDICAL SCHOOL
Tulane University School of Medicine

RESIDENCY
Tulane University School of Postgraduate Medicine &
U.S. Naval Hospital

FELLOWSHIP
Cornell University Medical Center and New York Hospital

RETINA & VITREOUS

Eric Nudleman, MD, PhD

Associate Professor of Ophthalmology

MEDICAL SCHOOL
Albert Einstein College of Medicine

RESIDENCY
Washington University in St. Louis

FELLOWSHIP
Associated Retinal Consultants / William Beaumont Hospital

POSTDOCTORAL FELLOWSHIP
Stanford University

RETINA & VITREOUS

Peter Shaw, PhD

Associate Adjunct Professor of Ophthalmology

GRADUATE SCHOOL
McMaster University, Ontario, Canada

POSTDOCTORAL FELLOWSHIP
University of California San Francisco

UVEITIS

Doran B. Spencer, MD, PhD

Assistant Clinical Professor of Ophthalmology

MEDICAL SCHOOL
Oregon Health & Science University

RESIDENCY
University of California Irvine

FELLOWSHIP
Massachusetts Eye Research and Surgery Institution,
Harvard Medical School
University of California San Diego

POSTDOCTORAL FELLOWSHIP
Oregon Health & Science University

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

Anne B. Lam, OD
OPTOMETRY SCHOOL
Southern California College of Optometry at Marshall B. Ketchum University

Alicia Lau, OD
OPTOMETRY SCHOOL
University of California Berkeley

RESIDENCY
Raymond G. Murphy VA Medical Center

SPECIALTY
Glaucoma and Ocular Disease

Esmeralda McClean, OD
OPTOMETRY SCHOOL
University of California Berkeley

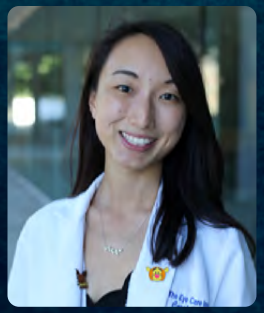
SPECIALTY
Ocular Disease

Lianne Mizoguchi, OD
OPTOMETRY SCHOOL
New England College of Optometry

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
OPTOMETRY SCHOOL
Pacific University

RESIDENCY
Indian Health Services

50 YEARS OF OPHTHALMOLOGY RESIDENCY TRAINING

Residents at SEI are medical school graduates who have chosen to specialize in ophthalmology. The Residency Program lasts for three years and four Residents begin training each July for a total of twelve.

In 2021, we celebrated 50 years of training residents at UC San Diego Ophthalmology. The high-quality training and instruction encompassing the Residency Program are high in priority for the department and an essential part of the overall mission.

Natalie A. Afshari, MD, Vice Chair for Education for the Department believes, "The Shiley Eye Institute Residency Program is a top training program that offers close mentorship between faculty and residents, broad exposure to a variety of clinical and surgical experiences, and access to exceptional research opportunities. At our program we are committed to educating a diverse and passionate group of physicians and surgeons to provide the highest quality of patient care and avenues for scientific discovery. We strive to empower our trainees to be leaders, innovators, and pioneers in the field of Ophthalmology."

Dr. Afshari continued, "The residents recruited to our program are enthusiastic, caring, passionate, and intelligent physicians who strive not only to promote the wellbeing of the many patients they touch, but also continually improve themselves and their community of colleagues. The UC San Diego ophthalmology resident is someone who entrenches themselves into curious pursuits of knowledge and innovation, into promoting an environment of enrichment and congeniality, and, most importantly, into caring for patients. Selecting prospective residents with such qualities can be challenging yet rewarding given the number of high caliber individuals who espouse these qualities, as reflected in their high academic performance, innovative research, and dedication to community service."

On August 3, 2021, the Shiley Eye Institute and Viterbi Family Department of Ophthalmology welcomed our new class of residents and fellows at an outdoor event.

Currently, the Ophthalmology Residency Program emphasizes excellence, ethics and humanity while training residents to

Jeffrey Lee, MD, Natalie A. Afshari, MD and Robyn Austin pictured with the residents.

become exceptional ophthalmologists equipped to succeed in any aspect of ophthalmology, be it academics, research, or the private sector. The overarching goal is the acquisition of the knowledge, skills, clinical judgment, and attitudes necessary to provide skilled and compassionate care to patients.

Residency Program Director and alumni, **Jeffrey Lee, MD**, states, "I have been fortunate to have done my training here at Shiley and experienced what a world class organization is like at all levels, starting with residency then becoming faculty – I see the big picture. It is an amazing organization to be a part of."

Dr. Lee's goals for the Program are to create individualized educational plans for each Resident so they have clinical, surgical, elective and research opportunities with a flexible schedule, therefore optimizing each person's learning experiences. He went on to note, "We want every Resident to become the best version of themselves when they graduate from our Program."

Residents are provided with clinical exposure in multiple facilities to gain mastery of the ophthalmology knowledge and judgment needed while assuming increasing levels of responsibility for the medical and surgical management of patients with a wide variety of acute and chronic ophthalmological diseases. Because we recognize that ophthalmology education continues beyond the residency training years, we emphasize the importance of self-directed study habits.

Four residents begin training each July for a total of twelve. While training at our multiple facilities, each resident is exposed to a diverse patient population with a wide variety of ophthalmic needs—all of this while being given increasing responsibilities in a one-on-one teaching environment with our clinical attending physicians.

Department Chair, **Robert N. Weinreb, MD** noted, "We are so proud of our residents. They have distinguished themselves in academic positions and also in their communities. As faculty, it is gratifying to mentor the leaders of tomorrow and watch them grow into clinical, surgical and research trailblazers."

Since 1971, the Department has graduated 137 residents. Many receive additional training and they enter academic or private practices throughout the country. The SEI faculty also collaborates with many of our graduates on multi-center research investigations.

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 scholarly activity 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 partake 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

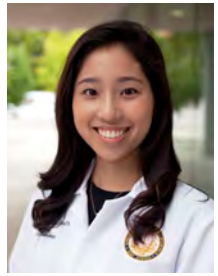



PGY-3 Residents




PGY-2 Residents



PGY-4 Residents
Allison J. Chen, MD
David Kuo, MD
Adeleh Yarmohammadi, MD
Kaileen Yeh, MD

PGY-3 Residents
Aimee Chang, MD
Liane Dallalzadeh, MD
Lingling Huang, MD, PhD
Mark C. C. Lin, MD

PGY-2 Residents
Justin Arnett, MD
Medi Eslani, MD
Jenny Q. Hu, MD
Maya Yamane, MD

FELLOWS

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

Not Pictured: **GLAUCOMA** Rui Fan, PhD
RETINA Tahmineh Motevasseli, MD

GLAUCOMA


Nevin El-Nimri, OD, PhD


Alireza Kamalipour, MD


Eleonora Micheletti, MD


Golnoush Mahmoudi Nezad, MD, MPH

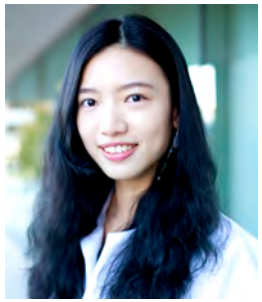

Takashi Nishida, MD, PhD

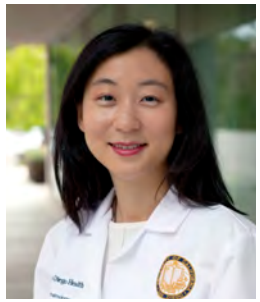

Ryan Phan, MD

GLAUCOMA


Jasmin Rezapour, MD

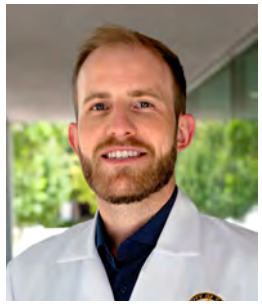

Joo Youn Shin, MD, PhD


Jo-Hsuan Wu, MD


Yue "Carrie" Zhao, MD

CORNEA

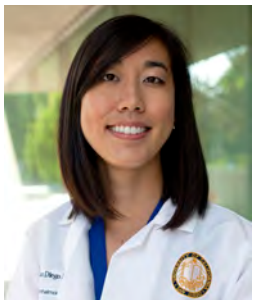

Michael J. Ang, MD


Alex Beazer, MD

RETINA


Melina Cavichini Cordeiro, MD


Darren Knight, MD


Alexa Li, MD


Alexandra Warter, MD


Chris Wu, MD

OCULOPLASTICS


DJ Ozzello, MD

GRADUATION 2021

GRADUATION OF RESIDENTS & FELLOWS

On June 24, 2021, the Viterbi Family Department of Ophthalmology graduated outstanding residents and fellows with a virtual online ZOOM ceremony and socially distanced ceremony in the Shiley Conference Room. We are so proud of our graduates!

Graduating Residents
Allison Chen, MD
David Kuo, MD
Adeleh Yarmohammadi, MD (Co-Chief)
Kaileen Yeh, MD (Co-Chief)

Graduating Fellows
Michael Ang, MD (Cornea)
Alex Beazer, MD (Cornea)

Nevin El-Nimri, OD, PhD (Glaucoma)
Ryan Phan, MD (Glaucoma)
Carrie Zhao, MD (Glaucoma)

Darren Knight, MD (Retina)
Tahmineh Motevasseli, MD (Retina)
Chris Wu, MD (Retina)

DJ Ozzello, MD (Plastics)

The eighth annual "Lamont Ericson, MD Award for Outstanding Patient Care by a Resident" was presented by Residency Director, **Jeffrey E. Lee, MD** to Kaileen Yeh, 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.

GRADUATION AWARDS

Award for Outstanding Surgical Teaching

2021 Christopher W. Heichel, MD
2020 Jeffrey E. Lee, MD
2019 Weldon Haw, MD
2018 Christopher W. Heichel, MD
2017 Jeffrey E. Lee, MD
2016 Weldon Haw, MD

Award for Teaching by a Resident Rounds or Didactics (Formerly Resident Teaching Award)

2021 Allison J. Chen, MD, MPH
2021 Kaileen Yeh, MD
2020 James T. Walsh MD, PhD
2019 Ziyong Yang, MD, PhD
2018 Amir Marvasti, MD
2017 Kyle Godfrey, MD
2016 Abigail E. Huang, MD

Award for Fellow Appreciation

2021 Darren Knight, MD
2020 Daniel James (DJ) Ozzello, MD
2019 Doran Spencer, MD, PhD
2018 Tyler Ofstad, MD
2017 Audrey Ko, MD
2017 Joseph Ho, MD
2016 Frank F. Tsai, MD

Award for Outstanding Clinical Teaching

2021 Lanning Kline, MD
2020 Henry A. Ferreyra, MD
2020 Derek S. Welsbie, MD, PhD
2019 Shira Robbins, MD
2018 Andrew Camp, MD, PhD
2017 Henry A. Ferreyra, MD
2016 Christopher W. Heichel, MD

Knowledge & Academic Performance

2021 Lingling Huang, MD, PhD
2020 James T. Walsh, MD, PhD
2019 James T. Walsh, MD, PhD
2018 Zhiyong Yang, MD, PhD
2017 Amir Marvasti, MD
2016 Brian Chang, MD

Award for OKAP Teaching

2021 Jiun Do, MD, PhD
2020 Daniel James Ozzello, MD
2019 Don Kikkawa, MD
2018 Bobby S. Korn, MD, PhD, FACS
2018 Peter Savino, MD
2017 Derek S. Welsbie, MD
2016 Bobby S. Korn, MD, PhD, FACS

Inaugural Residency Leadership Award

2016 Robert N. Weinreb, MD

Outstanding Volunteer Faculty Teaching Award

2019 Scott K. McClatchey, MD
2018 Arthur C. Perry, MD
2017 Sirini S. Iyengar, MD, FACS
2016 Ray Gariano, MD

Award for Teaching Excellence

2021 Tony Ly
2020 Erika C. Acera, OC(C)

Lamont Ericson, MD Award

2021 Kaileen Yeh, MD
2020 Heather Chen, MD
2019 Jeffrey Wang, MD
2018 Sally Baxter, MD, MSc
2017 Sally Baxter, MD, Msc
2016 Abigail E. Huang, MD

Whitehill Award

2021 Andrew Camp, MD
2020 Catherine Liu, MD, PhD
2019 Daniel Chao, MD
2018 Andrew Camp, MD
2017 Derek S. Welsbie, MD

ASCRS – Resident Excellence Award

Shiley Chief Resident Liane Dallalzadeh, MD was awarded the 2021 Resident Excellence Award by the American Society of Cataract and Refractive Surgery (ASCRS).

ACADEMY OF OPHTHALMOLOGY (AAO)

The American Academy of Ophthalmology (AAO) is the world's largest association of eye physicians and surgeons. It is a global community of 32,000 medical doctors that protect sight and empower lives by setting the standards for ophthalmic education and advocating for patients and the public. The AAO innovates to advance the profession and ensure the delivery of the highest-quality eye care.

AAO ANNUAL MEETING

With dedication to vision research, as well as patient care excellence, community service and education, many of our alumni, faculty, senior residents and fellows attended the Virtual AAO Annual Meeting from November 13-15, 2020 and both in-person as well as virtual November 12-15, 2021 in New Orleans. Each year the Shiley Eye Institute group gathers to reconnect and network with old and new friends from the department.

SEI faculty from all ophthalmology specialty areas presented papers or lectured at the events. Topics included: glaucoma, cataracts, cornea/external disease, electronic health records/ information technology, health policy, oculoplastics/orbit, pediatric ophthalmology/strabismus and retina/vitreous.

Each year the AAO recognizes its members for several different types of achievements. These awards honor ophthalmologists in multiple stages of practice and for a range of activities, from humanitarian service and significant contributions to the profession, to mentorship and faithful volunteer service.

Sally Baxter, MD, MSc and Liane Dallalzadeh, MD

Bobby S. Korn, MD, PhD Speaking at AAO 2021

CONGRATULATIONS TO AAO AWARDEES:

Secretariat Award 2020 - Natalie A. Afshari, MD

The Secretariat Award is an annual award recognizing special contributions to the Academy and ophthalmology, as determined by Academy Senior Secretaries and Secretaries in their respective areas. It was created to increase opportunities for ophthalmologists to be recognized for contributions outside of the scope of the current Achievement Awards Program.

Achievement Award 2021 - Alex A. Huang, MD, PhD (Faculty and Alumnus)

Achievement Award 2021 - Bradford W. Lee, MD (Alumnus)

The Achievement Award program recognizes individuals for their contributions to the Academy based on a cumulative point system. Points are earned through participation in the annual meeting (e.g., as a course instructor or scientific poster, paper or video presenter); by supporting advocacy efforts; or by serving the Academy as a counselor, representative, committee member, author, co-author or reviewer.

ALUMNI SPOTLIGHT

Congratulations to SEI alumna Neeru Gupta, MD, PhD, MBA, FRCSC, Diplomate ABO, for being elected President of the International Council of Ophthalmology (ICO). Dr. Gupta is the first female President of the organization since its founding in 1857. Her role officially began on January 1, 2021. Dr. Gupta is an alumna of the SEI Glaucoma Fellowship Program at the Hamilton Glaucoma Center under the direction of Robert N. Weinreb, MD.

Dr. Gupta is Professor of Ophthalmology and Vision Sciences and Chief of the Glaucoma Service at the University of Toronto, Canada. She is an internationally renowned physician scientist and a professor at the Temerty Faculty of Medicine and the Dalla Lana School of Public Health at the University of Toronto.

She serves as President-Elect of the World Glaucoma Association and is Editor-in-Chief of the Journal of Glaucoma. She is a member of the Board of Trustees for the International Agency for the Prevention of Blindness. She has served as leadership in every major glaucoma and ophthalmic organization worldwide.

Dr. Weinreb noted, "Dr. Gupta has accomplished so much in her career focusing on glaucoma and championing worldwide eye health. We applaud her efforts and encourage her amazing progress in the future."

The ICO works with ophthalmologic societies and others to enhance ophthalmic education and improve access to the highest quality of eye care in order to preserve and restore vision for the people of the world.

POWER LIST

"The Ophthalmologist" international magazine recognized Neeru Gupta, MD, PhD, MBA, FRCSC in"The Power List 2021".

This biannual list celebrates the achievements of the most influential figures, thought leaders and opinion makers in the world of Ophthalmology. This list of 100 individuals is selected from more than 100,000 clinicians, scientists and industry executives.

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.

September 14, 2020
Moderated by Robert N. Weinreb, MD and William Freeman, MD
GUEST LECTURER: EMILY Y. CHEW, MD
Director of Division of Epidemiology and Clinical Applications,
National Eye Institute/National Institutes of Health
TITLE: "Age-Related Macular Degeneration: The Update of the Age-Related Eye Disease Studies (AREDS/ AREDS2) 10 Year Follow-Up"

CASE PRESENTATIONS
Lingling Huang, MD, PhD
PGY-3 Resident
TITLE: "Can We Treat Geographic Atrophy?"

Alexandra Warter, MD
Retina Fellow
TITLE: "Combined Anti-VEGF and Steroid Therapy in DME (Diabetic Macular Edema)"

September 21, 2020
Moderated by Robert N. Weinreb, MD
GUEST LECTURER: ARTHUR J. SIT, MD
Consultant, Department of Ophthalmology
Practice Chair, Department of Ophthalmology
Mayo Clinic
Rochestor, Minnesota
TITLE: "Understanding Glaucoma Therapy through Aqueous Humor Dynamics"

CASE PRESENTATION
Mark Lin, MD
PGY-3 Resident
TITLE: "Nearly Glaucoma?"

October 5, 2020
Moderated by Robert N. Weinreb, MD
GUEST LECTURER: IVAN MAYNART TAVARES, MD, PHD
Professor and Chair
Dept. of Ophthalmology and Visual Sciences
Paulista School of Medicine -
Univ Federal Sao Paulo (UNIFESP)
Glaucoma Fellow - UCSD (2005-2006)
TITLE: "A Clinical Case about Iris Cysts. Introduction to the UNIFESP Dept Ophthalmology"
CASE PRESENTATIONS
Michael J. Ang, MD
Cornea & Refractive Fellow
TITLE: "Lumps and Bumps"

Yue "Carrie" Zhao, MD
Glaucoma Fellow
TITLE: "What Next?"

October 19, 2020
Moderated by Robert N. Weinreb, MD and Peter J. Savino, MD
GUEST LECTURER: NEIL R. MILLER, MD
Frank B. Walsh Professor of Neuro-ophthalmology
Professor of Ophthalmology
Wilmer Eye Institute

Johns Hopkins University School of Medicine
TITLE: "The Relative Afferent Defect in Clinical Practice"

CASE PRESENTATIONS
Adeleh Yarmohammadi, MD
PGY-4 Resident
TITLE: "To Shunt or Fenestrate, That is the Question"
David Kuo, MD
PGY-4 Resident
TITLE: "Occam v Hickam"

October 26, 2020
Moderated by Robert N. Weinreb, MD and Don O. Kikkawa, MD
GUEST LECTURER: KYLE J. GODFREY, MD
Orbital and Oculofacial Plastic Surgery
Assistant Professor of Ophthalmology
Associate Director,
Ophthalmology Residency
Weill Cornell Medical College
New York Presbyterian Hospital
TITLE: "Stop the Postop Drop: Understanding and Preventing Postoperative Ptosis"

CASE PRESENTATIONS
Liane Dallalzadeh, MD
PGY-3 Resident
TITLE: "Fix One, But Which One?"

Aimee Chang, MD
PGY-3 Resident
TITLE: "Aiming Higher"

November 2, 2020
Moderated by Robert N. Weinreb, MD and David B. Granet, MD
GUEST LECTURER: JESSE L. BERRY, MD
Associate Professor of Ophthalmology, Clinical Scholar
Associate Director, The Vision Center
Children's Hospital Los Angeles & The USC Roski Eye Institute
USC Keck School of Medicine
TITLE: "Innovations and Updates in the Management of Retinablastoma"

CASE PRESENTATION
Aimee Chang, MD
PGY-3 Resident
TITLE: "Small Eye, Big Problems"

November 9, 2020
Moderated by Robert N. Weinreb, MD and Natalie A. Afshari, MD
GUEST LECTURER: ALI DJALILIAN, MD
Professor of Ophthalmology
Cornea Service
University of Illinois College of Medicine
Department of Ophthalmology
TITLE: "Diagnosis and Medical Management of Limbal Stem Cell Deficiency in the Community"

CASE PRESENTATIONS
Allison Chen, MD
PGY-4 Resident
TITLE: "And Then There Was Light"

Michael Ang, MD
Cornea & Refractive Fellow
TITLE: "Lumps and Bumps"

November 23, 2020
Moderated by Robert N. Weinreb, MD and Michael H. Goldbaum, MD
GUEST LECTURER: LEE JAMPOL, MD
Northwestern Medicine Department of Ophthalmology
TITLE: "DRCR Retina Network: Past"

CASE PRESENTATIONS
Lingling Huang, MD, PhD
PGY-3 Resident
TITLE: "Risks vs. Benefits"

Alexandria Li, MD
Retina Fellow
TITLE: "Mystery Swelling"

November 30, 2020
Moderated by Robert N. Weinreb, MD
GUEST LECTURER: CHRIS GIRKIN, MD
Chair, University of Alabama at Birmingham (UAB)
Department of Ophthalmology
Chief Medical Officer,
Callahan Eye Hospital

TITLE: "What can Imaging of the Deep Optic Nerve Head Tell Us About Glaucoma?"

CASE PRESENTATIONS
Kaileen Yeh, MD
PGY-4 Resident
TITLE: "Use It or Lose It"

Ryan Phan, MD
Glaucoma Fellow
TITLE: "After Trab and Tube"

January 4, 2021
Moderated by Robert N. Weinreb, MD
GUEST LECTURER: CHERYL ANDERSON, PHD, MPH, MS
Professor and Dean,
University of California San Diego Herbert Wertheim School of Public Health and Human Longevity Science
TITLE: "Advancing Health Equity and Justice: The Promise of Public Health Partnerships"

CASE PRESENTATION
Liane Dallalzadeh, MD
PGY3 Resident
TITLE: "Through Thick and Thin"

January 11, 2021
Moderated by Robert N. Weinreb, MD and Doran B. Spencer, MD, PhD

GUEST LECTURER: JENNIFER THORNE, MD, PHD
Chief, Division of Ocular Immunology
Cross Family Professor of Ophthalmology & Epidemiology
Wilmer Eye Institute -
Johns Hopkins Medicine
TITLE: "Use of Systemic Corticosteroids and Immunosuppressive Agents in the Treatment of Uveitis"

CASE PRESENTATIONS
Medi Eslani, MD
PGY-2 Resident
TITLE: "Pick Your Poison"
Darren Knight, MD
Retina Fellow
TITLE: "The other C(O)VID"

January 25, 2021
Moderated by Robert N. Weinreb, MD
GUEST LECTURER: MICHELLE TARVER, MD, PHD
Acting Deputy Director,
Office of Strategic Partnerships and Technology Innovation
Director, Patient Science and Engagement, Program Director for Patient Science, Digital Health Center of Excellence
Food and Drug Administration
TITLE: "Integrating Patient Perspectives in Medical Device Innovation"

CASE PRESENTATIONS
Allison Chen, MD
PGY-4 Resident
TITLE: "And Then There Were None"

Kaileen Yeh, MD
PGY-4 Resident
TITLE: "When Friend Becomes Foe"

February 1, 2021
Moderated by Robert N. Weinreb, MD
GUEST LECTURER: ROBERT T. "CHIP" SCHOOLEY, MD
Interim Faculty Director, Global Education
Senior Director, International Initiatives
Professor of Medicine, Division of Infectious Diseases
and Global Public Health
Co-Director, Center for Innovative Phage Applications
and Therapeutics
UC San Diego
TITLE: "COVID-19: The End of the Beginning"

CASE PRESENTATIONS
Aimee Chang, MD
PGY-3 Resident
TITLE: "More than the Common Cold"

Liane Dallalzadeh, MD
PGY-3 Resident
TITLE: "Right Under Our Noses"

February 22, 2021
Moderated by Robert N. Weinreb, MD and William Freeman, MD
GUEST LECTURER: J. FERNANDO AREVALO, MD, PHD, FACS
Edmund F. and Virginia B. Ball Professor of Ophthalmology
Chairman, Department of Ophthalmology
Johns Hopkins Bayview Medical Center
Retina Division, Wilmer Eye Institute
The Johns Hopkins University School of Medicine
Baltimore, MD, USA
TITLE: "Lessons Learned from PACORES in PDR Management: Real World Data from Latin America & Spain"

CASE PRESENTATIONS
Mark Lin, MD
PGY-3 Resident
TITLE: "Recurrent CSCR"

Darren Knight, MD
Retina & Vitreous Fellow
TITLE: "An Approach to Recurrent Macular Holes "

March 22, 2021
Moderated by Robert N. Weinreb, MD
GUEST LECTURER: LEON W. HERNDON, JR., MD
Chief of Glaucoma
Professor of Ophthalmology
Duke Ophthalmology
Duke University School of Medicine
TITLE: "Inequity in Glaucoma Services Costs Sight"

CASE PRESENTATIONS
Lingling Huang, MD, PhD
PGY-3 Resident

Yue "Carrie" Zhao, MD
Glaucoma Fellow

March 29, 2021
Moderated by Robert N. Weinreb, MD and William Freeman, MD
GUEST LECTURER: GLENN J. JAFFEE, MD
Robert Machemer Professor of Ophthalmology
Chief, Vitreoretinal Division
Director, Duke Reading Center
Duke Eye Center
TITLE: "The Age-related Macular Degeneration Treatment Trials - Are the Lessons Learned Still Useful in 2021?"

CASE PRESENTATIONS
Chris Wu, MD
Retina Fellow
TITLE: "A White Macula After Pars Plana Vitrectomy"

Alexandra Warter, MD
Retina Fellow
TITLE: "Combined Anti-VEGF and Steroid Therapy in Resistant Wet AMD (Wet Age-related Macular Degeneration)"

April 19, 2021
Moderated by Robert N. Weinreb, MD and Natalie A. Afshari, MD
GUEST LECTURER: JENNIFER LI, MD
Director, Cornea and External Disease Service
Professor, Department of Ophthalmology
UC Davis Medical Center
TITLE: "The Current State of Eye Banking and the Impact of COVID-19"

CASE PRESENTATION
Alex Beazer, MD
Cornea & Refractive Fellow
TITLE: "Corneal White Dot Syndrome"

April 26, 2021
Moderated by Robert N. Weinreb, MD and Eric Nudleman, MD, PhD
GUEST LECTURER: COLE FERGUSON, MD, PHD
Assistant Professor
Department of Pathology
University of California, San Diego
TITLE: "The Diagnosis and Management of Incidental Pigmented Lesions of the Choroid"

CASE PRESENTATION
Alexandria Li, MD
Retina & Vitreous Fellow
TITLE: "Out of the Blue"

May 10, 2021
Moderated by Robert N. Weinreb, MD and Peter J. Savino, MD
GUEST LECTURER: M. TARIQ BHATTI, MD
Senior Associate Consultant
Neuro-Ophthalmology
Professor of Ophthalmology
and Neurology
Mayo Clinic College Of Medicine
TITLE: "Stem Cell Therapy for Optic Neuropathy: Real Science or Science Fiction?"

CASE PRESENTATIONS
Allison Chen, MD
PGY-4 Resident
TITLE: "Sometimes, Always, Never"
David Kuo, MD
PGY-4 Resident
TITLE: "Disc-y Business"

May 17, 2021
Moderated by Robert N. Weinreb, MD and Shyamanga Borooah, MBBS, MRCP (UK), MRCSEd, FRCOphth, PhD
GUEST LECTURER: AMIR H. KASHANI, MD, PHD
Associate Professor of Ophthalmology (PAR)
Wilmer Eye Institute
Johns Hopkins School of Medicine
TITLE: "Revisiting the Eye-Brain Connection Using Optical Coherence Tomography Angiography"

CASE PRESENTATIONS
Alexandria Li, MD
Retina & Vitreous Fellow
TITLE: "Lord of the Eyes"

Darren Knight, MD
Retina & Vitreous Fellow
TITLE: "Clinical Findings in COL18A1 Related Chorioretinal Degeneration"

May 24, 2021
Moderated by Robert N. Weinreb, MD and David B. Granet, MD
GUEST LECTURER: STEPHEN KRAFT, MD
Staff Ophthalmologist, Depts. of Ophthalmology and Vision Sciences at University Health
Network and SickKids Hospital, Toronto,
Professor, Dept. Ophthalmology and Vision Sciences,
Temerty Faculty of Medicine, University of Toronto
TITLE: "The Functional Benefits of Adult Strabismus Surgery: It Is Not Cosmetic!"

CASE PRESENTATION
Aimee Chang, MD
PGY-3 Resident
TITLE: "A Helping Hand"

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.

April 22, 2021
Sayantan Datta, BSc, MSc, PhD
Assistant Professor of Ophthalmology
Emory Eye Center
TITLE: "Identification of Novel Mitochondrial Retrograde Signaling Pathway that Affects RPE Structure and Function"

June 24, 2021
Debasish Sinha, PhD
Professor of Ophthalmology, Cell Biology and Developmental Biology
University of Pittsburgh School of Medicine
Adjunct Faculty, Ophthalmology, The John's Hopkins University School of Medicine
TITLE: "The Potential Role of Neutrophils and NK Cells in the Pathogenesis of Atrophic AMD"

2021 OPHTHALMOLOGY UPDATE

Chaired by **Don O. Kikkawa, MD** and **Robert N. Weinreb, MD**, the 2021 Ophthalmology Update, sponsored by the Viterbi Family Department of Ophthalmology and the Shiley Eye Institute at UC San Diego, was held virtually on February 12-13, 2021. **Don O. Kikkawa, MD, Robert N. Weinreb, MD, Natalie Afshari, MD** and **William Freeman, 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. The special guest speaker was Robert T. "Chip" Schooley, MD who discussed "COVID-19: An Evolving Virus in an Evolving Epidemic – Implications for Vaccine Effectiveness."

RETINA CONFERENCE

William R. Freeman, MD and **Michael Goldbaum, MD**, Co-Directors of the Retina Division, host Tuesday morning Retina Case Reviews at the Joan and Irwn Jacobs Retina Center for the Shiley Eye Institute (SEI) retina faculty, residents, fellows and alumni to discuss complex cases and new treatments.

FACULTY FEATURED LECTURES

FIRST GLOBAL WEBINAR OF THE WORLD GLAUCOMA ASSOCIATION ON GLAUCOMA SURGERY

The first global webinar of the World Glaucoma Association on glaucoma surgery was moderated by **Robert N. Weinreb, MD** on October 10, 2020, garnering over 9,000 live views from 137 different countries.

10TH ANNUAL "FOCUS ON EYE HEALTH NATIONAL SUMMIT" BY PREVENT BLINDNESS

Sally Baxter, MD, MSc lectured at the 10th Annual "Focus on Eye Health National Summit" hosted by Prevent Blindness on Thursday July 15, 2021.

GLAUCOMA RESEARCH FOUNDATION PRESENTS AN INNOVATIONS IN GLAUCOMA WEBINAR: "UNDERSTANDING VISION RESTORATION"

January 22, 2021, **Derek Welsbie, MD, PhD** presented his newest research on vision restoration during an Innovations in Glaucoma Webinar: "Understanding Vision Restoration" hosted by the Glaucoma Research Foundation. He is a principle investigator in the Catalyst for a Cure Vision Restoration Initiative.

"ASK THE EXPERTS" VIRTUAL WORKSHOP

David Granet, MD spoke at "Ask the Experts" Virtual Workshop on February 10, 2021 on "Eyes on Screens: Maintaining Your Kids' Ocular Health in a Digital World."

DATA SCIENCE AND OPHTHALMOLOGY MIXER

This was a collaboration with the Viterbi Family Department of Ophthalmology and the UC San Diego Halıcıoğlu Data Science Institute (HDSI) on Friday May 14, 2021. It was a special HDSI Faculty Seminar featuring SEI faculty guest speakers for lightning talks on interdisciplinary research in ophthalmology and data science.

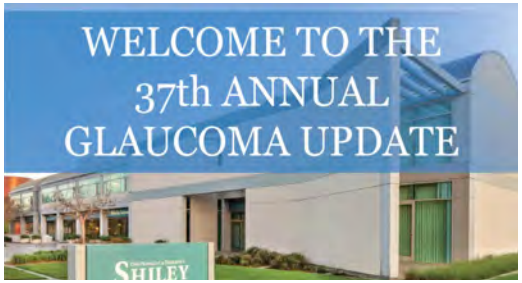
BRAILLE INSTITUTE

David Granet, MD was featured at the Low Vision Seminar hosted by the Braille Institute discussing Pediatric Low Vision on Thursday, February 4, 2021. **Shyamanga Borooah, MBBS, PhD**, discussed the latest research involving stem cells, with a focus on technologies that are at or near clinical trial research, to treat sight loss on February 25, 2021 at the Braille Institute.

EDUCATION PATIENTS

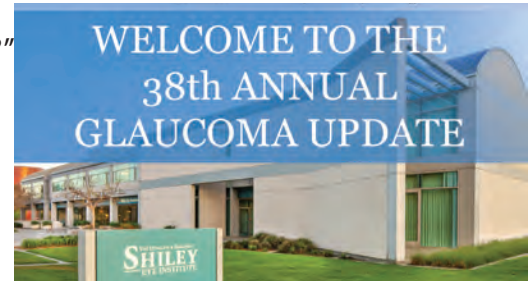
2020 GLAUCOMA UPDATE

The 37th Annual Glaucoma Update was virtually held on December 16, 2020. The title of this year's talk was "Turning Back the Clock in Glaucoma." **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 faulty: **Sally Baxter, MD, MSc, Andrew Camp, MD, Jiun Do, MD, PhD, Derek Welsbie, MD, PhD**, and **Linda Zangwill, PhD**.

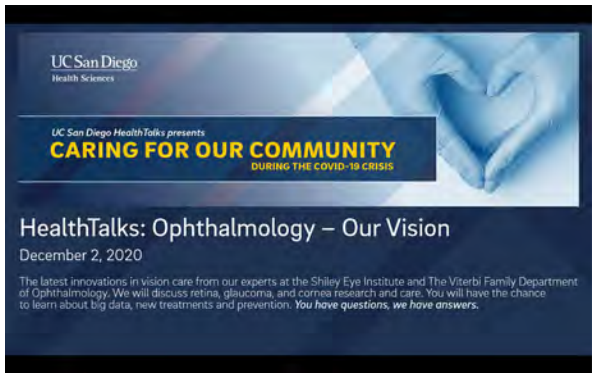


2021 GLAUCOMA UPDATE

On November 3, 2021, SEI hosted the 38th Annual Glaucoma Update virtually, "What is Next in Glaucoma?" **Robert N. Weinreb, MD** presented as well as **Sally Baxter, MD, MSc, Jiun Do, MD, PhD** and **Alex A. Huang, MD, PhD**. They discussed innovative new glaucoma treatments, adherence to glaucoma medications, and collaborations the Hamilton Glaucoma Center is initiating with institutions worldwide.



HEALTHTALKS: OPHTHALMOLOGY - OUR VISION



UC San Diego Health Sciences sponsored the virtual HealthTalks: Ophthalmology-Our Vision event on December 2, 2020, hosted by Vice Chancellor of UC San Diego Health Sciences David A. Brenner, MD. Shiley Eye Institute and Viterbi Family Department of Ophthalmology speakers included **Robert N. Weinreb, MD, Sally Baxter, MD, MSc, Eric Nudleman, MD, PhD**, and **Derek Welsbie, MD, PhD**. The team presented the latest innovations in vision care, new treatments and prevention, as well as glaucoma and cornea research.

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NEW GRANT

Sasan Moghimi MD, Associate Professor, is seeking to enhance understanding about smoking-related effects on the microvasculature and neural tissue of the retina in eyes of individuals with glaucoma and their association on glaucoma progression. In more than 350 patients with glaucoma, his team (including **Robert N. Weinreb, MD** and others) has observed that visual field progression and retinal nerve fiber thinning are linked to high smoking intensity. Evaluation of smoking intensity adds essential information to the assessment of risk of glaucoma progression. This research is funded by the University of California Tobacco Related Disease Research Program ("Racial differences in smoking-related glaucoma progression").

RICHARD C. ATKINSON LABORATORY FOR REGENERATIVE OPHTHALMOLOGY UPDATE

STEM CELL REGENERATION & TRANSPLANTATION

Using stem cell technologies, **Jiun Do, MD, PhD**, investigates potential treatments to regenerate 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. In collaborations with Karl Wahlin, PhD, and Derek Welsbie, MD, PhD, Dr. Do 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.

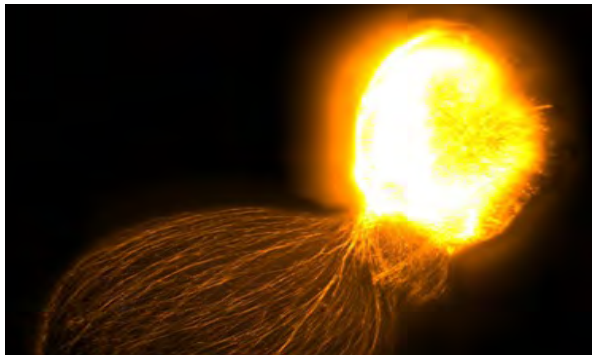
Additionally, Dr. Do is pioneering the development of "neuronal relays" to reconnect the injured optic nerve to the brain. By adapting this stem cell strategy to the optic nerve, it may be possible to successfully transplant a whole eye. Ultimately, these research directions aim to provide vision restorative therapies that do not yet exist.

NEW STRATEGIES FOR EYE REGENERATION

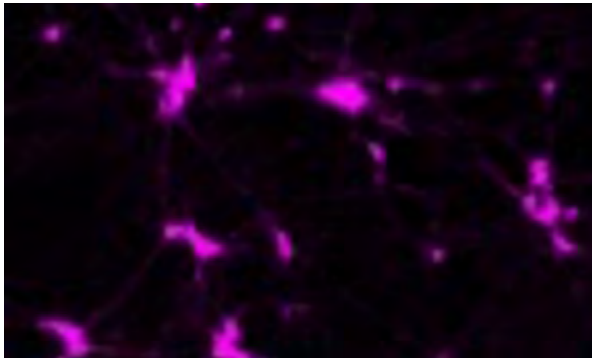
Researchers under the supervision of **Karl Wahlin PhD**, Director of the Richard C. Atkinson Laboratory for Regenerative Ophthalmology, are developing a strategy to convert existing support cells already present within the eye into new optic nerve cells.

Many species, including fish, can regrow damaged eyes but this does not naturally occur in humans. Dr. Wahlin and his team believe that the human eye is capable of regeneration but is lacking the biological cues to do so.

The main limitation to restoring vision is human's inability to grow new cells that are lost during disease. One approach to solving this problem is to regenerate new cells by activating sets of genes that control normal eye development, as well as what is active during eye regeneration in other species. By activating these 'regulator genes', they are able to make new human optic nerve cells in record time. The ability to generate new optic nerve cells could lead to new ways to study and reverse glaucoma as well as retinal degenerations. A similar approach has also been successful for creating new light sensing photoreceptor cells. Solving this first piece of the puzzle brings the team one step closer to reversing a variety of retinal degenerations spanning from glaucoma, which destroys the optic nerve, to retinitis pigmentosa and macular degeneration that destroy light sensing photoreceptors.



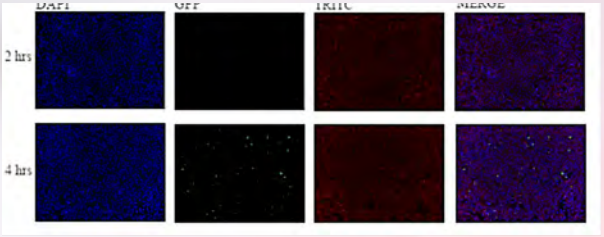
Laboratory grown human retinas are engineered to express fluorescent markers that allow researchers to monitor their status during disease and regeneration. Here we show that stem cell derived human retinas grow optic nerve connections into developing brain organoids and visualization of their fluorescence within these cells assists in assessing regeneration.



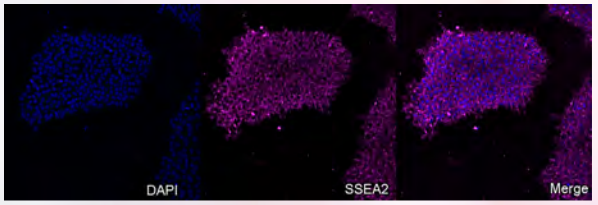
Neurons generated by gene activation express fluorescent proteins in newly formed optic nerve cells.

LATE-ONSET INHERITED RETINAL DEGENERATION

Shyamanga Borooah, MD, PhD and his team are developing innovative therapies for inherited retinal diseases. Cases of late-onset retinal degeneration (L-ORD) are caused by an autosomal dominant mutation in the C1QTNF5 gene. The Borooah lab is working to knock down the mutant protein with an allele-specific CRISPR-Cas9 based gene editing system. The team is growing retinal pigment epithelium (RPE) cells, differentiated from the iPSCs of LORD patients, as a translational in-vitro model to show the efficacy of this approach. They are also developing a LORD mouse model so that in vivo editing efficiency and phenotypic recovery can be assessed. This approach is also being translated to other retinal dystrophies caused by mutations in the TIMP3 and EFEMP1 genes.



Phagocytosis of photoreceptor outer segments by retinal pigment epithelial (RPE) cells at 2 and 4 hours. Fluorescently tagged photoreceptor outer segments are incubated on RPE cells to test the proper function of the cells. Over time, the cells internalize the outer segments (green) through phagocytosis. Nuclei are DAPI stained (blue) and the actin cytoskeleton is stained with Rhodamine phalloidin (red).



Induced pluripotent stems cells, from a L-ORD patient, stained for a marker of pluripotency, SSEA2 (pink). Nuclei are DAPI stained (blue).

CLINICAL TRIALS 2021

DIVISION	PRINCIPAL INVESTIGATOR	TITLE	FUNDING AGENCY
Cornea	Afshari, Natalie, MD	Vision Restoration with a Collagen Crosslinked Boston Keratoprosthesis Unit Study	Massachusetts Eye & Ear Infirmary; DOD as Prime
Cornea	Heichel, Christopher, MD	A Thirteen-year Study of the Indications and Visual Outcomes of Capsular Tension Ring Implantation in Cataract Surgery 2016 PI: Christopher W. Heichel, MD	
Glaucoma	Bowd, Christopher, PhD	A0081096 Prospective Randomized 12 233k Controlled Study of Visual Field Change in Subjects with Partial seizures Receiving Pregabalin or Placebo - Pfizer Inc PI: Christopher J. Bowd, PhD	Pfizer
Glaucoma	Camp, Andrew, MD, PhD	The Efficacy and Safety of Bimatoprost SR in Patients With Open-angle Glaucoma or Ocular Hypertension PI: Andrew S. Camp MD	
Glaucoma	Camp, Andrew, MD, PhD	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 PI: Andrew S. Camp, MD	
Glaucoma	Camp, Andrew, MD, PhD	Effects of the Body Position on Episcleral Venous Pressure and Intraocular Pressure in Glaucoma.	Allergan
Glaucoma	Camp, Andrew, MD, PhD	XEN-45 Gel Stent Versus Trabeculectomy in glaucoma: Gold Standard Pathway Study (GPS)	Allergan
Glaucoma	Camp, Andrew, MD, PhD	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	Weinreb, Robert, MD	Subconjuctival Mitomcyin-C Injection Versus Direct Sclera Application in Trabeculectomy PI: Robert N. Weinreb, MD, Sub-I: Jiun Do, MD	
Glaucoma	Weinreb, Robert, MD	Determining the Correlation Between Intraocular Pressures Measured by Self-Monitoring Rebound Tonometry and Glaucoma Development or Progression PI: Robert N. Weinreb, MD, Sub-I: Jiun Do, MD	
Glaucoma	Weinreb, Robert, MD	Evaluation of the Repeatability and Reproducibility of AngioVue in Normal Subjects, Retinal Patients, and Glaucoma Patients PI: Robert N. Weinreb, MD	
Glaucoma	Zangwill, Linda, PhD	Effects of a Single Osteopathic Manipulative Treatment (OMT) on Intraocular Pressure (IOP) Reduction PI: Hollis King, Sub-I: Linda M. Zangwil, PhD	
Glaucoma	Zangwill, Linda, PhD	Multi-Center Study for a Reference Database of Optic Nerve Head, Retinal Nerve Fiber Layer, and Macula Parameters Measured with the Heidelberg Spectralis OCT within a Hispanic Population PI: Linda M. Zangwill, PhD	Heidelberg Engineering
Glaucoma	Zangwill, Linda, PhD	Multi-Center Study for a Reference Database of Optic Nerve Head, Retinal Nerve Fiber Layer, and Macula Parameters Measured with the Heidelberg Spectralis OCT within an African-American population PI: Linda M. Zangwill, PhD	Heidelberg Engineering
Glaucoma	Zangwill, Linda, PhD	Grading the Ocular Images and Datasets for the B-2018-4 Study	Heidelberg Engineering
Oculoplastic	Liu, Catherine, MD	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.

DIVISION	PRINCIPAL INVESTIGATOR	TITLE	FUNDING AGENCY
Pediatrics	Robbins, Shira, 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 [CHAPERONE]	Eyenovia, Inc.
Retina	Borooah, Shyamanga, PhD	Natural History Study of Patients with X-linked Retinal Dystrophy Associated with Mutations in Retinitis Pigmentosa GTPase Regulator (RPGR)	Meiragtx UK II Limited
Retina	Borooah, Shyamanga, PhD	Phenotyping and Genotyping Patients with Achromatopsia in Preparation for Gene Therapy Trials	MeiraGTx UK II Ltd
Retina	Borooah, Shyamanga, 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	Borooah, Shyamanga, 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	Freeman, William, MD	A Phase 2b, Randomized, Double-Masked, Controlled Trial to Assess the Safety and Efficacy of Zimura (Anti-Complement Factor 5 Aptamer) in Subjects with Geographic Atrophy 2nd to AMD [ZIMURA]	Ophtotech Corp.
Retina	Freeman, William, 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	Freeman, William, 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 [DAZZLE]	Kodiak Sciences, Inc.
Retina	Freeman, William, 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 Seondary to Dry Age-Related Macular Dengeneration [GATHER2]	IVERIC Biosciences
Retina	Freeman, William, 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
Retina	Freeman, William, 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	Freeman, William, 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	Freeman, William, 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.

DIVISION	PRINCIPAL INVESTIGATOR	TITLE	FUNDING AGENCY
Retina	Freeman, William, 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	Nudleman, Eric, MD, PhD	A 2-year, Three-Arm, Multicenter, Randomized, Double-Masked, Multicenter, Phase III Study assessing the Efficacy and Saferty of Brolucizumab vs Aflibercept in Adult Patients with Visual Impairment due to Diabetic Macular Edema [KESTREL]	Novartis Pharmaceuticals
Retina	Nudleman, Eric, 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	Nudleman, Eric, 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" [BUTTERFLEYE]	Regeneron Pharmaceuticals
Retina	Spencer, Doran, MD	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]	Genentech, Inc.

STAFF SPOTLIGHT

Congratulations to Juan Arias, the new Assistant Director of Ophthalmology Services, at the Shiley Eye Institute. Arias is now a member of the Viterbi Family Department of Ophthalmology's Operations Management Team and partners with the Director of Ophthalmic Services, Cathi Lyons. The team plans the Department's business development, operational and programmatic growth aiming to create high quality clinic flow and processes via EPIC, training and clinical standards.

Juan is responsible for providing clinical and technical support in key areas such as imaging and documentation. He is developing and managing strategic initiatives to improve efficiencies and quality, leading teams, and projects to address and resolve complex issues in all Ophthalmology and Optometry clinics.

Arias was awarded a Biology Undergraduate and Master's Mentorship Program Award from UC San Diego to study the use of TENS machines in

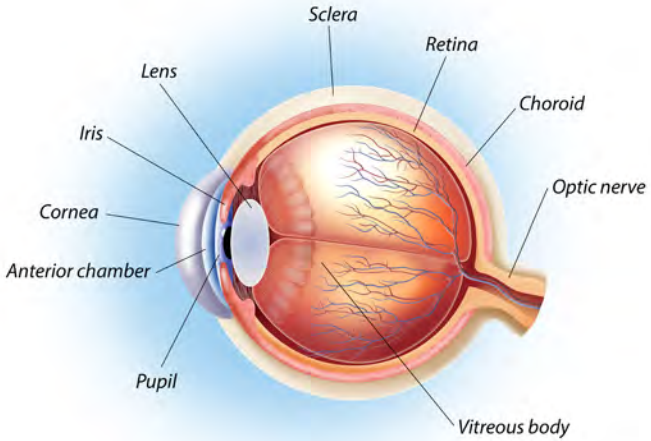
the reduction of pain associated with wet age-related macular degeneration injections in the clinic. He has started the MBA program at Point Loma University.

GRANTS 2021

DIVISION	PRINCIPAL INVESTIGATOR	TITLE	FUNDING AGENCY
Cornea	Afshari, Natalie, MD	Application of RNA-Targeting CAS9 to Fuchs' Dystrophy	NIH/NEI R01
Cornea	Shaw, Peter, PhD	Interplay of Genetic Risk and Oxidative Stress in AMD Pathogenesis	UC Academic Senate
Glaucoma	Baxter, Sally, MD	Multi-modal Health Information Technology Innovations for Precision Management of Glaucoma	NIH/NEI
Glaucoma	Baxter, Sally, MD	Supplemental. Graduate Student Support for Multi-modal Health Information Technology Innovations Project	NIH/NEI
Glaucoma	Christopher, Mark, PhD	Deep Learning Approaches to Detect Glaucoma and Predict Progression from Spectral Domain Optical Coherence Tomography	NIH/NEI
Glaucoma	Coleman, Todd, PhD	Biosensor and Eyedrop Bottle Technologies for Glaucoma Adherence Monitoring	NIH/NEI
Glaucoma	Do, Jiun, MD, PhD	Optic Nerve Relays to Restore Vision	American Glaucoma Society
Glaucoma	Do, Jiun, MD, PhD	Optic Nerve Relays for the Restoration of Visual Function	Glaucoma Research Foundation
Glaucoma	Ju, Wonkyu, PhD	Mitochondrial Protection in Glaucomatous Optic Neuropathy	NIH/NEI R01
Glaucoma	Moghimi, Sasan, MD	Racial Differences in Smoking-related Glaucoma Progression: Effect on Neural and Vascular Tissue	Tobacco-Related Disease Research Program
Glaucoma	Weinreb, Robert, MD	Ophthalmology and Visual Sciences Career Development K12 Program PI: Robert N. Weinreb, MD, Co-I: Natalie A. Afshari, MD, NIH, April 2015 – July 2026	NIH/NEI K12
Glaucoma	Weinreb, Robert, MD	Unrestricted and Challenge Grant - Research to Prevent Blindness PI: Robert N. Weinreb, MD, January 2018 - December 2023	Research to Prevent Blindness
Glaucoma	Weinreb, Robert, MD	Diagnosis and Monitoring of Glaucoma with Optical Coherence Tomography Angiography PI: Robert N. Weinreb, MD, May 2018 - April 2022	NIH/NEI R01
Glaucoma	Weinreb, Robert, MD	Molecular Mechanisms of Glaucoma	NIH/NEI R01
Glaucoma	Weinreb, Robert, MD	A Randomized, Single Center, Masked, Crossover Study Comparing the Effects of Latanoprostene Bunod and Timolol on Retinal Blood Vessel Density and Visual Acuity in Patients with Ocular Hypertension or Primary Open Angle Glaucoma	Bausch & Lomb
Glaucoma	Weinreb, Robert, MD	Ocular Hypertension Treatment Study 20-Year Follow-up: Clinical Center Grant	NIH
Glaucoma	Weinreb, Robert, MD	iGLAMOUR Study: Innovations in Glaucoma Adherence and Monitoring of Under-Represented Minorities	NIMHD
Glaucoma	Welsbie, Derek, MD, PhD	Kinase Multitargeting for Glaucoma Neuroprotection	NIH/NEI R01
Glaucoma	Welsbie, Derek, MD, PhD	High-Throughput Functional Genomic Screening in Retinal Ganglion Cells	Glaucoma Research Foundation
Glaucoma	Welsbie, Derek, MD, PhD	Developing an Optic Nerve Relay for Vision Restoration	Research to Prevent Blindness
Glaucoma	Welsbie, Derek, 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	Zangwill, Linda, 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 R01
Glaucoma	Zangwill, Linda, PhD	African Descent and Glaucoma Evaluation (ADAGES) IV: Alterations of the Lamina Cribrosa in Progression PI: Linda Zangwill, PhD, Co-I: Robert N. Weinreb, MD, NIH, April 2017 – March 2021	NIH/NEI R01
Glaucoma	Zangwill, Linda, PhD	Translational Vision Research Training at UCSD PI: Linda Zangwill, PhD, Co-I: Radha Ayyagari	NIH/NEI
Glaucoma	Zangwill, Linda, PhD	Personalized Forecasting of Disease Trajectory for Patients with Open Angle Glaucoma	NIH/NEI

Glaucoma	Zangwill, Linda, PhD	Dietary Interventions to Improve Vision UCSD Krupp Endowment Fund (KEF) Research Awards, PI: Linda Zangwill, PhD	Krupp Foundation
Glaucoma	Zangwill, Linda, PhD	P30 NEI Center Core Grant for Vision Research	NIH/NEI
Glaucoma	Zangwill, Linda, PhD	OCT in the Ocular Hypertension Treatment Study: 20 Year Follow-Up	NIH/NEI
Glaucoma	Zangwill, Linda, PhD	A Randomized Clinical Trial Evaluating Fenofibrate for Prevention of Diabetic Retinopathy Worsening	NIH/NEI
Glaucoma	Zangwill, Linda, PhD	Improve OCT Detection of Optic Nerve Head (ONH)	Glaucoma/Myopia OCT Phenotyping Consortium
Oculoplastics	Kikkawa, Don O., MD	Gene Expression in Nonspecific Orbital Inflammation Disease Co-I: Don O. Kikkawa, MD NIH, September 2016 - August 2021	NIH/NEI
Pediatric	Rudell, Jolene, M.D., Ph.D.	The Characterization of the Neuromuscular Junction in Extraocular Muscles in Patients with Strabismus	Knights Templar Eye Foundation
Retina	Ayyagari, Radha, PhD	Identification of the Elusive Genetic Causality of Inherited Retinal Degenerations (IRDs)	The Foundation Fighting Blindness
Retina	Ayyagari, Radha, PhD	Molecular Basis of Hereditary Retinal Degenerations	NIH/NEI
Retina	Ayyagari, Radha, PhD	Molecular Mechanism Underlying Late-Onset Retinal/Macular Degeneration	NIH/NEI R01
Retina	Ayyagari, Radha, PhD	Unraveling the Molecular Pathology of Retinal Degeneration Through Single Cell Genomics	NIH/NEI R01
Retina	Bartsch, Dirk-Uwe, PhD	Mechanistic-Based Non-Invasive Assessment of Retinal Damage in HAART Era	NIH/NEI R01
Retina	Borooah, Shyamanga, 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	Borooah, Shyamanga, PhD	Rescue of LAMP2 Associated Retinopathy	Knights Templar Eye Foundation
Retina	Ferrara, Napoleone, MD	Identification of Novel Inhibitors of Ocular Neovascularization	NIH/NEI
Retina	Ferrara, Napoleone, 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 R01
Retina	Freeman, William, MD	Multimodal Retina Image Alignment and Applications Co-I: William Freeman, MD, Contact PI: Truong Q Nguyen, PhD, September 2021 - August 2025	NIH/NEI R01
Retina	Nudleman, Eric, MD, PhD	Role of PDLIM1 in Re.tinal Vascular Leakage and Proliferation	NIH/NEI
Retina	Oesch, Nicholas, PhD	Computing Luminance and Contrast in Prosthetically Driven Retina	NIH/NEI R01
Stem Cell	Wahlin, Karl, PhD	Endogenous Generation of Cone Photoreceptors to Increase Light Responses in Foveal Hypoplasia	Vision of Children
Stem Cell	Wahlin, Karl, PhD	Modeling Photoreceptor Development and Disease with Human Pluripotent Stem Cells	NIH/NEI R01
Stem Cell	Wahlin, Karl, PhD	A Stem Cell Based Optic Nerve Model for Studies of Axon Guidance and Regeneration	NIH/NEI
Stem Cell	Wahlin, Karl, PhD	Pluripotent Stem Cell Derived 3D Retinas for Studies of Early Onset Retinal Degeneration	NIH/NEI R01 BrightFocus Foundation
Stem Cell	Wahlin, Karl, PhD	Complement Factor H Mutant Pluripotent Stem Cells to Model Early Onset Macular Degeneration and Their Application in Drug Discovery	James Madison University; NIH/NEI as Prime
Stem Cell	Wahlin, Karl, PhD	Dissecting the Biochemical Role of Epigenetically Modified Regulatory Sequences within the Genomes of Retinal Neurons (A1)	Bayer AG
Stem Cell	Wahlin, Karl, PhD	Differential Expression of miRNAs Serve as Biomarkers of AMD-like Disease Progression in Human Stem Cell-derived RPE	

UNIQUE GRANT



Assistant Professor, **Karl Wahlin, PhD** was awarded a two-year grant from The Vision of Children Foundation to support his research on "Endogenous Generation of Cone Photoreceptors to Correct Foveal Hypoplasia". This research delves into the defects of the retina associated with rare forms of ocular albinism and other ophthalmic disorders which can lead to serious life-long visual impairment.

The retina is the thin tissue that lines the back of the eye which contains light sensing (photoreceptor) cells (rods and cones) that send visual signals to the brain. The macula is the center of the retina and its function is to process clear straight ahead vision. The fovea is the center of the macula that is responsible for fine vision – it is where your vision is sharpest. The fovea is the main focus of this research project.

A large quantity of light sensing cone photoreceptors accounts for the visual acuity that most people enjoy. However, in foveal hypoplasia, the photoreceptors which typically grow in size during development remain small and underdeveloped, as well as are fewer in number. No current treatment exists but new advances in stem cell biology and gene-editing now make it possible to study human retinal disease in a controlled laboratory setting. Dr. Wahlin and his team are now able to test new cell-based approaches that could potentially restore vision in these patients.

Did you know that amphibians and fish regenerate their retinas after injury? Recent studies in mice suggests this might happen in mammals too. The process, referred to as endogenous regeneration, has not been studied in humans so Dr. Wahlin's team will explore this in human stem cell derived retinas. If applied to the retina by viral delivery, this approach holds the potential to increase cone density in the treated areas, thereby offering one possible way to correct the cone deficiency in foveal hypoplasia.

Dr. Wahlin and his team hope to gain a greater understanding of the molecular events driving human photoreceptor development and possible control over endogenous generation. His research could lead to a design of future viral based therapies for restoring vision. It would be groundbreaking since in addition to its direct application for ocular albinism, this approach also lends itself to addressing vision loss stemming from more common disorders like age-related macular degeneration and retinitis pigmentosa that affect millions worldwide.

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 example, 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.

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 a 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.

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.

Shiley Eye Institute

The Viterbi Family Department of Ophthalmology

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

ADDRESS SERVICE REQUESTED

CONTRIBUTORS
Lilian Gischler
Jade Griffin
Jill Herndon
Natasha Josefowitz, PhD
Craig Kishaba, MBA
Scott LaFee
Bob Lee
Corey Levitan
Karen Anisko Ryan, MS
Jeanna Vazquez
Kim Perkins Wenrick, MA, CSPG

EDITORS
Karen Anisko Ryan, MS
Robert N. Weinreb, MD

CREATIVE
Grace Chang
Rey Moreno

PHOTOGRAPHY
Robyn Austin
Grace Chang
Lilian Gischler
Melissa Jacobs
Chris Park
Bob Ross

PRINTING
Tu's Printing & Graphics

CHANCELLOR, UC SAN DIEGO
Pradeep K. Khosla, PhD

VICE CHANCELLOR, UC SAN DIEGO HEALTH SCIENCES
David Brenner, 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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