

ANNUAL REPORT 2018

The Viterbi Family Department of Ophthalmology

 $\frac{UC\,San\,Diego}{\text{School of Medicine}}$ 



# SIMPLY WORLD CLASS

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

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On the cover: Artist Eva Henry's representation of a single bipolar cell from the lab of Dorota Skowronska-Krawczyk, PhD and Project VISIONS.



#### Dear Friends,

So many notables for 2018 at the Shiley Eye Institute (SEI). It was learned on August 21, 2018 that we had been the beneficiary of a transformative gift from visionary philanthropist Andrew Viterbi. Inspired by his father, an ophthalmologist, Viterbi's gift names The Viterbi Family Department of Ophthalmology and The Viterbi Family Vision Research Center. It also creates six new endowed chairs for faculty. As my dream for a dedicated Vision Research Center was becoming a reality, I found Darlene Shiley, wife of Donald Shiley, who was cruising off the coast of France, and shared the exciting news. She was overjoyed that the vision of her late husband and her, as our founding benefactors, for a world leading Eye Institute in San Diego for patient care, research, education and community service would take still another major step.

The Viterbi gift along with institutional support will catalyze laboratory discovery at the Shiley Eye Institute to transform the development of new treatments and drugs, and foster partnerships that bring these therapies to our patients. It means not only preventing vision loss, but restoring vision to those who have lost it. A gift of such magnitude also provides an opportunity to reimagine how we conduct our research.

Being successful in vision research today requires new technologies and integrated collaborative networks that include other disciplines, such as engineering, computation, genetics and neurosciences. Leading vision scientists can now be recruited to complement and collaborate with an extraordinarily productive group of SEI scientists already in place. And this will add to an environment at UC San Diego for innovation and translational ophthalmology that is already unsurpassed.

The year also will be remembered for the generosity of Patricia Shiley, the granddaughter of Donald and Darlene Shiley. Continuing the family legacy of philanthropy to support the Shiley Eye Institute at UC San Diego, her gift establishes the Patricia Shiley Low Vision Center, provides vital funding for the Shiley EyeMobile for Children, as well as honors her late grandfather by adding to the existing Stuart I. Brown, MD Chair in Ophthalmology in Memory of Donald P. Shiley.

As we move forward, our mission to provide exceptional patient care by offering the most advanced treatments to prevent, treat and cure eye disease is unwavering. Moreover, we will further endeavor to educate future ophthalmology leaders and serve patients in the San Diego and global community.

With the inspired leadership of Chancellor Pradeep Khosla, the Shiley Eye Institute – including The Viterbi Family Vision Research Center – and The Viterbi Family Department of Ophthalmology – are positioned for success. And who better to understand this than our own faculty, staff, alumni and trainees who serve our patients and their families each day.

Sincerely,

feet No Wind

Robert N. Weinreb, MD Chair and Distinguished Professor, Ophthalmology Director, Shiley Eye Institute Director, Hamilton Glaucoma Center Morris Gleich, MD Chair in Glaucoma



Dear Friends,

Each year, the visionary clinicians and scientists at the Shiley Eye Institute at UC San Diego Health and The Viterbi Family Department of Ophthalmology extend the boundaries of medicine, advance education for the next generation of ophthalmological innovators, accelerate groundbreaking research, and translate laboratory discoveries to clinical care.

Our faculty, students, fellows, residents, and staff continue to investigate the underlying causes of degenerative eye diseases, uncover new potential treatments for debilitating ophthalmological conditions, and collaborate across departments to identify new disease biomarkers. And the benefits of this work extend beyond the laboratory: the discoveries we make today influence the health of our local, national, and global communities, now and in the future.

UC San Diego and UC San Diego Health are making waves, here in San Diego and around the world. As the only academic health system in the region, we see the world differently and that vision allows us to create a healthier world — one life at a time — through new science, new medicine, and new cures.

Thank you for your continued support of Shiley Eye Institute and The Viterbi Family Department of Ophthalmology. Your partnership enables us to blaze a new path toward revolutionary ideas, unexpected answers, lifesaving discoveries, and planet-changing impact.

With kind regards,

**Pradeep K. Khosla** Chancellor University of California San Diego



David Brenner, MD Vice Chancellor, UC San Diego Health Sciences



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



Dear Friends of the Shiley Eye Institute,

UC San Diego Health is committed to providing high quality patient care and has been widely recognized as a national and international leader in excellent ophthalmologic care. As the San Diego region's sole academic medical center, every patient who comes through our doors has access to our extraordinary faculty and to innovative treatments and clinical trials. Our team members are dedicated to living our mission—to deliver outstanding patient care through a commitment to groundbreaking research and inspired teaching—each day.

It is this commitment that draws people, from newborns to seniors, to the Shiley Eye Institute. Patients come from around the country and the world because of the Shiley Eye Institute's focus on world class clinical care and pioneering research aimed at treating the most difficult eye conditions. The institute has an outstanding reputation for clinical care, one that is marked by nearly double-digit growth in visit and surgical volumes.

The strength of Shiley's clinical and research programs is a direct result of the strength of our nationally recognized physician scientists. We continue to recruit the nation's best faculty to join the Shiley Eye Institute. Once here, they find unparalleled scientific and clinical collaboration opportunities.

These collaborations, across the full spectrum of specialties and subspecialties, inform and enhance research and the quality of care our patients receive. Still, the exceptional physicians and staff at Shiley remain as dedicated to the community as they are to their patients.

Through the Shiley Eye Mobile, the center provides essential vision screenings and care to underserved children across San Diego. Last school year alone, more than 1,100 free glasses were given to children, and the Institute was recognized as a public health champion.

I am incredibly proud of the extraordinary work being done at the Shiley Eye Institute as we explore ways to grow and meet patient demand for ophthalmology services.

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



# 2018 Year in Review

0+-108



6,087  $\odot$  $\odot$ **SURGERIES**  $\odot$  $\odot$ 

14,174 **EYEMOBILE FREE VISION SCREENINGS** in San Diego County

1,628 **FREE PAIRS OF GLASSES GIVEN** by the EyeMobile





182 **PUBLICATIONS** 



# PER ASPERA AD ASTRA

Andrew Viterbi's father loved to quote a certain Latin phrase: *Per Aspera Ad Astra*, or, "from hardship to the stars." And Dr. Achille Viterbi knew hardship.

The younger Viterbi was only four years old in 1939 when his family packed up their comfortable life in Bergamo, Italy, and fled to the United States, slipping across the sea just before Mussolini's iron grip sealed the fate of that country's Jews for good. Dr. Achille Viterbi, a respected ophthalmologist with a thriving medical practice in the foothills of the Italian Alps, gave up everything to save his family. He chose hardship for the sake of his only son. Eight decades later, Andrew Viterbi – who went from a penniless immigrant kid in Boston to a crackerjack MIT scholar to the co-founder of Qualcomm Inc. – has spent a lifetime helping people better communicate. And now he is communicating his gratitude and love for his father by honoring his immense wartime sacrifice with a \$50 million philanthropic gift that will forever transform the landscape of ophthalmic care globally.

Photo by Erik Jepsen, UC San Diego Publications

Inspired by the legacy of his father, Viterbi's gift will name The Viterbi Family Department of Ophthalmology and The Viterbi Family Research Center at UC San Diego, and create

## "I am certainly honoring my father's memory."

six new endowed chairs for faculty. The naming of the chairs themselves is an act of gratitude and love from son to father: The first will be named after Dr. Achille Viterbi, and the second will be named after internationally recognized ophthalmologist Professor Alfred Vogt, who not only served as Dr. Achille Viterbi's mentor but who helped them flee Italy by securing them visas to Switzerland and then on to the United States.

Viterbi's generous support is dedicated to advancing research, education and eye care. For Viterbi, who has spent 45 years in San Diego, educated all three of his children through the University of California system and supported universities including MIT, Israel's Technion, University of Southern California and UCLA, this gift holds a special place in his heart. "I am certainly honoring my father's memory," said Viterbi. "He struggled to make a home for us in a new world and now I am in the position to honor his name."

Viterbi, who has split his career between industry and education, has always been an innovator. In 1967, he invented and proposed the Viterbi Algorithm, a mathematical formula that, to this day, serves as the foundation for every cell phone network in the world. Just one year later, he co-founded Linkabit Corporation, the small military contractor of which Qualcomm, the San Diego-based multinational semiconductor and telecommunications equipment giant, is a spinoff. In addition to his business ventures, he's made an indelible impact on the academic world, serving first as an engineering professor at UCLA and then at UC San Diego, where he is now Professor Emeritus.



Dr. Achille Viterbi and Maria Luria Viterbi

The Viterbi Family Department of Ophthalmology – the research and academic program of the UC San Diego School of Medicine – is the first named Health Sciences department at the University. The department is dedicated to clinical care and vision research, and complements the research and clinical efforts of the Shiley Eye Institute at UC San Diego Health.

And now, with the synergy of Viterbi's generosity and the commitment, innovation and prowess of UC San Diego's researcher-scholars, the potential to cure blindness is now within reach. At the Viterbi Family Vision Research Center, to be located on the La Jolla Campus of UC San Diego Health, groundbreaking studies will take place, as examples, to restore vision to those blinded by glaucoma, retinal degeneration and ocular infections.

The future of eye care at UC San Diego has never been brighter. It's so bright, in fact, that you can see stars.



"Visual impairment does not spell the end to an artistic life," Dr. Weinreb stated, "Famous artists have remained successful with impaired vision such as Claude Monet/cataracts, Edgar Degas/loss of central vision, Paul Cezanne/ nearsighted, Rembrandt van Rijn/stereo blindness, and Georgia O'Keefe/macular degeneration. The artists learned to adjust and created art until late into their lives."

Artwork by Faiya Fredman

# **AN ARTIST'S JOURNEY** FAIYA FREDMAN

"I have been expressing myself through art since I was a child" says San Diego artist Faiya Fredman. "Life isn't worth living without it!" In early September, coinciding with the first of two opening receptions for her latest exhibition, the artist celebrated her 93rd birthday at the Oceanside Museum of Art. Titled The Steel Goddess: Works by Faiya Fredman, 1998-2018, the exhibition features more than seventy of her works and will be on view through early 2019.

After attending San Diego State University for a year, Fredman graduated from the University of California, Los Angeles (UCLA) in 1951 with a degree in visual arts. Undaunted by the responsibilities of raising a family, marriage to a high-profile civic leader, and battling sexism in an era when women were not taken seriously as artists, Fredman went on to produce a critically acclaimed and ambitious body of work.



Shaped by her early fascination with archaeology and ancient civilizations, recurring themes in Fredman's art include decay and renewal, the cycles of nature and the cosmos, and the universality of human experience. At heart, Fredman considers herself to be a painter, but her works have ranged from sculptures to roomsized installations and she

prefers to let the concept dictate the medium in which a piece is executed. Consequently, she has used materials as diverse as sand, beeswax, photographs, clear plastic, and steel to convey her vision.

In 2002, anticipating a time when she might lose access to a fully equipped studio or be confined to her residence, Fredman began working with computers and digital technology. This was also a continuation of her lifelong interest in experimentation and unusual ways to create art. Notably, Fredman was one of the first contemporary artists in the United States to use the flatbed scanner instead of a camera to record images, which she subsequently manipulated using image-editing software. In recent years, undaunted by impaired vision, the artist entered one of the most exciting and productive phases of her career.

Late in life, Fredman began noticing changes in her vision. Initially diagnosed with glaucoma, she was subsequently treated by her ophthalmologist **Robert N. Weinreb, MD**. She later developed dry age-related macular degeneration. Despite the limitations imposed by these two diseases, she has continued her artwork.

Fredman has generously supported two ground-breaking programs at the Hamilton Glaucoma Center:

Impact of Glaucoma on Quality of Life and Visual Function Pilot Study: to understand the impact of glaucoma on the quality of and function in daily life and to develop methods for monitoring meaningful change in real world function at all stages of disease. A novel driving simulator was constructed to study the impact of glaucoma on driving. The interactive device recreated the maneuvering experience in a safe environment while assessing a person's ability to drive under a variety of hazardous conditions. This seed funding led to a National Institute of Health grant to study this subject.

Computational Visualization Laboratory for Glaucoma: to provide computing power and a wall of visualization displays for image processing and analysis. The latest generation of ophthalmic imaging instrumentation brings an unprecedented ability to visualize and measure the optic nerve in glaucoma as well as detect glaucoma earlier to improve patient management. The scientists at the Hamilton Glaucoma Center have used innovative technologies to diagnose the disease earlier than ever.

Fredman's works can be found in the permanent collections of many major museums throughout the United States. Locally, The San Diego Museum of Art, the Museum of Contemporary Art San Diego, and the Museum of Photographic Art own her works.

# PATRICIA SHILEY CONTINUES FAMILY LEGACY WITH GIFT TO SHILEY EYE INSTITUTE



Nearly thirty years ago, the late Donald Shiley and his wife Darlene donated the funds to create a comprehensive eye care facility at UC San Diego where top ophthalmologists would treat patients, conduct research and train the next generation of leaders in eye care and vision research. Now, the couple's granddaughter, Patricia Shiley, is continuing the family legacy of philanthropy with a gift of more than \$2 million to support the Shiley Eye Institute at UC San Diego.

Shiley's donation will support several areas of impact at the Shiley Eye Institute. Her gift will establish the Patricia Shiley Low Vision Clinic, which helps those with eye disease that is not correctable with medical treatment or surgical procedures. The gift also will benefit the Shiley EyeMobile for Children, which provides free eye screenings and glasses for underserved children in the local community. Honoring her grandfather, Shiley is also adding to the principal of the existing Stuart I. Brown, MD Chair in Ophthalmology in Memory of Donald P. Shiley.

"We are grateful to Patricia Shiley for her generous gift to the Shiley Eye Institute," said Chancellor Pradeep K. Khosla. "Her support is a gift to our community, helping countless individuals, from adults with low vision and eye disease to children who might not otherwise receive vision and eye care. Her contribution will also make a significant impact in driving research to better treat, and ultimately cure, diseases that cause blindness."

According to Shiley, she chose her areas of support within the Shiley Eye Institute to benefit the most people of all ages, while continuing her family's legacy of philanthropy. "The Shiley Eye Institute was very important to my grandfather, and continues to be very important to my grandmother. My grandparents truly believed that San Diego needed a place to not only provide clinical care to patients who were suffering from vision impairment, but also a place dedicated to research and education," said Shiley, who received her first set of glasses from the institute after struggling to see the blackboard in high school. "I would love to see the advancement in the techniques used to improve vision for people of all ages. I want more individuals to benefit from the research and care that the Shiley Eye Institute has to offer not only to residents of the San Diego area, but globally."

The Patricia Shiley Low Vision Clinic at the Shiley Eye Institute will be named in recognition of Shiley's gift to the clinic, which serves people who have eye disease that is not correctable with standard refractive glasses, medical treatment or a surgical procedure, yet do have some remaining vision, a condition referred to as "low vision." People with low vision have difficulty carrying out their daily activities or performing a job.

"We are honored that Patricia will continue the family tradition of philanthropy here at the Shiley Eye Institute," states **Robert N. Weinreb, MD**, Director of the Shiley Eye Institute and Distinguished Chair of The Viterbi Family Department of Ophthalmology. "Her support will be impacting patients of all ages, from the very young to seniors in San Diego County and beyond."

A portion of the gift will support the Shiley EyeMobile for Children, which provides no cost mobile eye screenings and glasses for children from underserved communities throughout San Diego County. The EyeMobile is the nation's first full state-of-the-art eye clinic on wheels that is dedicated to preschool children. Vision is one of the most important building blocks in the development of a child's life and their education. During the 2017-2018 school year, the EyeMobile completed 13,438 vision screenings, detected 83 children who had high risk for eye disease, and gave out 1,165 free glasses to children who needed them.

It is this impact that motivated Shiley to support the program. "The EyeMobile appeals to me because of the work it is doing in the

community with young children," she said. "It is truly serving the community and improving these children's lives and their education."

The chair holder of the Stuart I. Brown, MD Chair in Ophthalmology in Memory of Donald P. Shiley is **Natalie A. Afshari, MD**, Professor of Ophthalmology and Chief of the Division of Cornea and Refractive Surgery. Dr. Afshari noted, "Tricia was so kind to support the endowed chair named for two innovators – her grandfather, Donald



Donald P. Shiley

P. Shiley, whose legacy here and in San Diego was thoughtfully envisioned and **Stuart I. Brown, MD**, who founded our department and still works tirelessly helping people. I am proud to carry both of their names as I care for patients, conduct research, teach and serve the community."

Shiley made the decision to support the endowed chair to drive important eye research, as well as to honor the founding director of the Shiley Eye Institute, **Stuart I. Brown, MD**, in memory of her grandfather, Donald. She recounts learning from a young age about the importance of helping others, either through volunteering at local organizations or just by helping her neighbors. She recalls that her grandfather said that he hoped one day when she was working and could make her own way that she would continue the family's legacy of helping others.

"I know it was important to him that future generations understand the importance of philanthropy and volunteering," said Shiley. "I hope that I can help continue that legacy for my generation and generations that follow. I have seen how my grandparents' giving has helped so many people and how rewarding it is to see such great things come out of those contributions."

# USING STEM CELLS TO TREAT RARE BLINDING EYE DISEASE

People who inherit a mutated version of the ATF6 gene are born with a malformed or missing fovea, the eye region responsible for sharp, detailed vision. From birth, their vision is severely limited, and there is no cure. **Jonathan Lin, MD, PhD**, Associate Professor of Ophthalmic Pathology at SEI and his team were the first to link ATF6 to this type of inherited vision impairment. In a study published in *Science Signaling* February 2018, Lin's team discovered that a chemical compound that activates ATF6 also converts patient-derived stem cells into blood vessels.

"We wanted to see if there was a way to correct this gene defect to restore function and help these patients with vision difficulties and blindness," Dr. Lin said. "But it turns out our findings could also help advance the development of new treatments for other diseases caused by lack of blood supply to an organ, such as occurs in stroke and heart attack." Dr. Lin directs the ophthalmic pathology service at the Shiley Eye Institute and is internationally recognized for his leading role in the research of endoplasmic reticulum stress and unfolded protein response in human disease. His investigations have established causes of stress in damaged cells of human retinal degenerations and neurodegeneration diseases.

The ATF6 protein is a transcription factor, meaning it helps turn other genes "off" or "on," depending on what's needed by the cell. ATF6 is normally activated when the cell is under stress due to the accumulation of unfolded or misfolded proteins. Dr. Lin's team previously found that ATF6 is naturally "on" during stem cell development.

After Dr. Lin's team first published the link between the ATF6 gene and this type of inherited vision loss, known as achromatopsia or cone-rod dystrophy, a few years ago, people with these conditions began contacting them from around the world. Many had never known the cause of their vision problems and they were eager to see if they had a mutated copy of the ATF6 gene. They were also eager to contribute to



Jonathan Lin, MD, PhD and his laboratory

research that would further the understanding of the disease and efforts to find a treatment.

For this latest study, Dr. Lin's team collected donated skin samples from a family living in New York. Three children in this family were born without fully functioning ATF6 genes. The researchers used the skin cells to produce induced pluripotent stem cells (iPSCs) — a special type of cell that can both selfrenew, making more iPSCs, and differentiate, specializing into almost any other cell type.

Meanwhile, collaborators at The Scripps Research Institute screened millions of chemical compounds, using robotic technology to test each for their abilities to activate ATF6. They found 10 compounds that looked promising and gave them to Dr. Lin's team for testing on the stem cells.

"We weren't sure what to expect," Dr. Lin said. "We just hoped one of these compounds would have some kind of positive effect." That's why the team was particularly surprised, Dr. Lin said, when they saw the effects of one of these compounds, known as AA147. Not only did treatment with the AA147 compound activate the ATF6 gene in the stem cells, it altered the cells' differentiation path. AA147 directed the stem cells to develop primarily into endothelial cells, which are essential for blood vessel formation.

"Normally, stem cells differentiate into many different cell types and it's difficult to get them to produce a good amount of any one specific cell type," Dr. Lin said. "Yet after AA147 treatment, around 70 percent of the culture turned into endothelial cells that were able to form blood vessels. That's the most efficient way to experimentally produce blood vessels that I know of." Lin cautioned that AA147 is not yet a "bona fide drug" for many reasons. First, the effects they saw have so far only been replicated in cells growing in a laboratory dish, using high concentrations of AA147. They are now developing newer generations of the compound that are more potent at lower doses. Ultimately, AA147 — or some version of it — would need to undergo clinical trials for safety and efficacy before it could potentially be used to treat patients.

In the meantime, Lin said, the study provides valuable new information on ATF6's role in human development and how its malfunctioning can lead to blindness.

Study co-authors also include Heike Kroeger, Neil Grimsey, Wei-Chieh Chiang, Ying Jones, Peter X. Shaw, JoAnn Trejo, UC San Diego; Ryan Paxman, Lars Plate, Evan Powers, Jeffery W. Kelly, R. Luke Wiseman, The Scripps Research Institute; and Stephen H. Tsang, New York Presbyterian Hospital, Columbia University. This research was funded, in part, by the National Institutes of Health, U.S. Department of Veterans Affairs and New York State.

# MENTORING STUDENTS -THE INNOVATORS OF TOMORROW

A phoropter is an instrument used to test individual lenses on each eye during an eye examination to determine patients' refraction. It allows multiple lenses in front of the eye to correct vision to be tested while evaluating patients with the letter chart. (big "E" chart).

Physicians at UC San Diego are used to teaching. They train Medical Students, Residents and Fellows every day. These efforts and interactions are acknowledged to be of high quality, drawing trainees from around the world and ensuring excellence in the doctors of tomorrow. An accomplished physician, a fine teacher, a trusted mentor - all in a day's work. For **Dr. Shira Robbins** of the Anne F. and Abraham Ratner Children's Eye Center, these roles were applied in an unexpected way to an unanticipated subject.

Ronak Roy is a student at Canyon Crest Academy and has worn eyeglasses since he was in the third grade. He has become used to the process of being refracted to get a prescription for his eyeglass lenses.

In 2016, his parents made an appointment with Dr. Robbins. During his first eye examination the refraction did not go as expected. As it turns out, the manufacturer who made his glasses had misread Ronak's prescription. The lenses were made into farsighted lenses instead of nearsighted lenses, a simple error, but one which rendered his glasses less than useful for his vision.

"I remember Ronak being particularly inquisitive, which stimulated me to explain in deeper detail the science behind the refractive process" recalls Dr Robbins. "He asked a lot of questions, good questions."

This experience led him to investigate how eyeglass prescriptions are determined. Ronak always had an interest in science, especially coding and engineering. He is a member of his school's robotics team.

Much of his attention was focused on the history and theory of the phoropter (device typically used to determine a need for glasses) which was invented in the early 1900's – and evolved only minimally even up to the current time.

He used his skills and experience in robotics and STEM (science, technology, engineering and math) to develop a modern and more efficient alternative. His invention is named the Smartphone-Controlled Portable Phoropter Powered by Variable Focal Length Liquid Lens.



It features a single liquid lens to replicate the multiple lenses in a phoropter. The liquid lens is controlled by a computer which prompts voltage to be applied to the lens thus changing its shape and power.

A smartphone mounted to the front of the device is used to display a vision chart. The smartphone then runs an algorithm that zeros in on the lens voltage that gives the subjectively better vision. This voltage can be used to calculate the correct spherical lens power based on test data obtained from patients. In order to prevent a person's natural ability to over focus at near (accommodation), a static lens setup is present between the liquid lens and the phone screen to refract the light to project the phone to optical infinity.

In 2018, Ronak entered his invention in several science competitions and won at the local, state and international levels.

Locally, he entered his invention in the Greater San Diego Science and Engineering Fair. Ronak then gained acceptance to the California Science and Engineering Fair. Finally, he earned a "Grand Award" at the prestigious Intel International Science and Engineering Fair. The device has been submitted for a US Patent.



Dr. Robbins was very knowledgeable and I knew that she would be able to answer my questions when I first developed the seedling of my idea for my phoropter.

When commenting on his future Ronak states, "I would like to further my passion for STEM by studying electrical engineering and computer science while applying my knowledge to the medical world. I hope I am fortunate to meet many more people like Dr. Robbins who are generous with their experience and supportive of my efforts."

Dr. Robbins concludes, "Mentoring is key to training the innovators of tomorrow. Although Ronak is only in high school he has been able to grasp complex concepts and push this project forward. I am glad that he respected our physicianpatient relationship and turned it into something more. My contact with Ronak has been very rewarding. I was able to step outside the usual role of a physician and have scientific conversations with him as a teacher."

# TECHNOLOGY TRANSFER AT SHILEY EYE



Todd Coleman, PhD and Robert N. Weinreb, MD

Not only have the physician scientists and researchers at the Shiley Eye Institute been working to treat, prevent and cure blindness but they have also been innovators and entrepreneurs over the past 24 years. In partnership with the UC San Diego Office of Innovation and Commercialization, they have been creating devices, formulating pharmaceuticals and starting companies to bring these developments to our patients.

SEI faculty have been issued 14 United States patents, received 21 invention licenses and created 15 start-up companies. *Toromedes, Inc.*, founded by **Todd Coleman**, **PhD** and **Robert N. Weinreb, MD**, specializes in hardware design in the electrical or electronic engineering services sector to enhance patient adherence with their eye drops. Spinnaker Biosciences, Inc., started by William R. Freeman, MD and Michael J. Sailor, PhD, is developing porous silicon, silicon oxide and silicon/polymer composite materials with uniquely designed optical, chemical and structural features that can be utilized in controlled drug delivery vehicles. Nanovision Biosciences, also started by Dr. Freeman, Gabriel Silva, PhD and Scott Thorogood uses nanotechnology to tailor electrical neural stimulation parameters to develop an artificial retina that is hoped to enhance the vision of patients with degenerative retinal disorders.

Recognized as one of the world's top 15 research universities, UC San Diego is driving innovation and leadership, to advance society, propel economic growth, and make the world a better place. Established in 1994, the Office of Innovation and Commercialization's mission is to accelerate the commercialization of UC San Diego innovations and contribute to a sustainable society by empowering a diverse entrepreneurial culture on campus and strengthening a dynamic innovation ecosystem.

Just over the last three years, the university's innovation programs have supported more than 220 startup companies and teams, adding nearly 200 jobs to the economy. These companies have gone on to attract nearly \$125 million in external funds. In total, more than 780 companies have been launched by or use technology developed by UC San Diego faculty, staff, students and alumni, contributing an estimated \$32 billion to the local economy.

## RICHARD C. ATKINSON LABORATORY FOR REGENERATIVE OPHTHALMOLOGY 2018 UPDATE

Retinal degenerative diseases, such as age-related macular degeneration (AMD), retinitis pigmentosa (RP) and glaucoma, cause blindness that is irreversible once photoreceptors or retinal ganglion cells are lost. Stem cells derived from one's own blood show an amazing regenerative capacity and hold the potential to restore vision once gone.

Under the direction of Karl Wahlin, PhD, of the Richard C. Atkinson Laboratory for Regenerative Ophthalmology, the Shiley Eye Institute has been developing new strategies for vision repair using pluripotent stem cells. Using laboratory grown 3D "mini-retinas" that resemble actual retinas and a powerful new genetic engineering approach called CRISPR, they are developing alternative ways to understand how the human retina forms during embryogenesis and degenerates during disease. The power of this new technique is highlighted by utilizing fluorescent reporters. When inserted into stem cells, they allow researchers to track in real-time, under a microscope, when a retinal cell is born or when it disappears due to disease. This real-time monitoring of living cells allows one to systematically improve methods for cultivating laboratory stem cell derived retinas or monitor their growth during injury. These innovative tools will accelerate the development of neuroprotective efforts to cure glaucoma, AMD and other retinal degenerations. As an example, this approach has been used to introduce disease relevant mutations into stem

Figure. Stem cell derived mini-retinas genetically engineered to fluoresce green when retinal cells are present and red when optic nerve cells are present. Thin red strings at the bottom of this structure reflect the beginning stages of optic nerves cells projecting outward.

cells that match exactly to those found in patients with Leber congenital amaurosis, a childhood retinal degeneration without any cure.

Also, new to the RCA laboratory is a new research direction referred to as endogenous regeneration. Similar to how a starfish can grow a new arm, the eye might also be capable of regenerating but needs the right instructions to do so. In collaboration with **Derek Welsbie**, **MD**, **PhD**, Mark Tuszynski, PhD (Professor of Neuroscience) and **Robert N**. **Weinreb**, **MD**, the team is studying ways to convert existing support cells in the eye into new retinal cells (for example, optic nerve cells) capable of restoring vision. With these exciting new technologies, the future of precision medicine has never been more exciting.



Nicholas Oesch. PhD

# NANO-ENGINEERED **RETINA PROSTHETIC HOLDS PROMISE** FOR BLINDNESS

The retina is a complex electrical system in which all parts are needed for healthy vision. Retinal degenerative diseases, including macular degeneration and retinitis pigmentosa, are among the leading causes of irreversible blindness in the world today. There is no known cure. These retinal diseases are characterized by the death of the light sensitive cells of the eye, called photoreceptors, while the rest of cells of the visual system remain healthy. Electrically stimulating these remaining cells with a retinal prosthetic connected to a camera has the potential to restore vision. Results from early attempts have been modest, but a new approach from Nanovision Biosciences (La Jolla, CA) uses light sensitive nanowires to directly detect patterns of light and electrically activate the remaining visual system, thereby restoring the vision to the patient.

The National Institutes of Health recently funded a grant from multi-disciplinary collaborators across the UC San Diego campus that include: Nicholas Oesch, PhD (Psychology and Ophthalmology) and co-investigators William R. Freeman, MD, (Ophthalmology) and Yu-Hwa Lo, PhD (Engineering) to design more effective retinal prosthetic devices. The grant funds research to better understand how prosthetic stimulation activates the remaining retinal circuitry to perform basic visual processing.

These experiments will produce needed insight into changes that occur during retinal degeneration and will guide strategies to improve the design of retinal prosthetic devices to compensate for these changes.

# NOVEL PRESSURE CHECKING IMPLANT

Intraocular pressure (IOP) also known as eye pressure is the leading risk factor for developing glaucoma. Moreover, IOP also is the leading risk factor for the worsening of glaucoma. It is not surprising that current medical and surgical therapies for glaucoma are directed at lowering IOP. Glaucoma is managed by occasional checks of IOP. Currently, patients have their IOP checked by an eye care provider in the clinic. This is time consuming for both the patient and doctor. Moreover, infrequent measurements of IOP may miss important hour-to-hour and day-to-day variations that typically occur.

A multidisciplinary team led by Frank E. Talke, PhD (Mechanical Engineering) and Alex Pham, PhD, with **Andrew Camp, MD, PhD** and **Robert N. Weinreb, MD** (Ophthalmology) have designed an implantable IOP monitor. This small device can be implanted at the time of cataract surgery, and will allow patients to check their own intraocular pressure at home using a special smart phone adaptor.

The team has successfully tested the device in rabbits. Moving forward, they will continue to miniaturize the device and develop new implantation techniques. The goal is that someday soon patients will be able to quickly and easily monitor their own IOP at home and transmit that data to their doctors so that this can be better managed.



# GENETIC COMPONENTS OF GLAUCOMA



Glaucoma is the leading cause of irreversible blindness in Americans of African descent, and the second leading cause in all Americans. While glaucoma can affect anyone, persons of African descent are disproportionately affected. In fact, Americans of African ancestry are about four to five times more likely than Americans of European ancestry to develop the disease.

The lack of understanding about what causes glaucoma impedes our ability to identify and treat it early in its development. Since glaucoma tends to run in families, identification of the genetic basis of the disease is important in order to develop effective therapies for early intervention. While some genetic studies for glaucoma have been completed for individuals of European ancestry, evidence from other studies have suggested that an analysis of glaucoma specific genes in the African-American population will yield unique and important findings for both this population and for glaucoma, in general.

Scientists at the Shiley Eye Institute and Hamilton Glaucoma Center are leading a multi-center study to tackle this important issue and elucidate the genetics of glaucoma in individuals of African descent. Collaborating with glaucoma specialists at Columbia University, the University of Alabama Birmingham, the University of Texas Houston, and a practitioner in Atlanta, the multicenter "African Descent and Glaucoma Evaluation Study (ADAGES) III: Contribution of Genotype to Glaucoma Phenotype in African Americans" was funded by the National Eye Institute (NEI) in 2013 (**Robert N. Weinreb, MD**: Principal Investigator). Over 2000 individuals of African descent with glaucoma were recruited to participate in the study. And, working with a team of leading genetics experts at the Shiley Eye Institute (**Radha Ayyagari, PhD**) and the Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center (Jerry Rotter, MD, Director, and Kent Taylor, PhD), the group now has discovered an association of advanced primary open angle glaucoma with a novel gene ENO4. (Ophthalmology 2018 Oct20, pii:S0161-6420(18)30442-1, doi: 10.1016/j.ophtha.2018.10.031)

They also reported that there were different variants in genes previously found to be associated with glaucoma in individuals of European ancestry. In the future, the continuing ADAGES research should identify additional genes and delineate how they lead to disease in individuals in this population, which should bring about new methods of treatment and prevention. According to Dr. Rotter, "The results of this study demonstrate that if you use genetics to learn about the causes of glaucoma in African-American individuals, you actually have to study African-American individuals with glaucoma."

ADAGES has a long history. "ADAGES: Structure and Function" was originally funded by the NEI in 2002 to identify differences in optic disc structure, visual function, clinical findings, and risk factors associated with the diagnosis of glaucoma. The study was renewed in 2009 as "ADAGES II: Progression" to identify differences in the progression of glaucoma between individuals of African Descent and European Descent (Linda Zangwill, PhD: Principal Investigator). ADAGES III was a logical extension of these earlier studies.

## ARTIFICIAL INTELLIGENCE QUICKLY AND ACCURATELY DIAGNOSES EYE DISEASES

Using artificial intelligence and machine learning techniques, researchers at Shiley Eye Institute at UC San Diego Health and UC San Diego School of Medicine, with colleagues in China, Germany and Texas, have developed a new computational tool to screen patients with common but blinding retinal diseases, potentially speeding diagnoses and treatment.

The findings are published in the February 22, 2018 issue of Cell.

"Artificial intelligence (AI) has huge potential to revolutionize disease diagnosis and management by doing analyses and classifications involving immense amounts of data that are difficult for human experts — and doing them rapidly," said senior author Kang Zhang, MD, PhD, Professor of Ophthalmology at Shiley Eye Institute.

Current computational approaches are laborious and expensive, and require using millions of images to train an AI system. In their new paper, Zhang and colleagues used an AI-based convolutional neural network to review more than 200,000 eye scans conducted with optical coherence tomography, a noninvasive technology that bounces light off the retina to create two- and three-dimensional representations of tissue.

The researchers then employed a technique called transfer learning in which knowledge gained in solving one problem is stored by a computer and applied to different but related problems. They next added occlusion testing in which the computer identifies the areas in each image that are of greatest interest and the basis for its Thousands of optical coherence tomographs (OCT) form the iris and pupil of a human eye. OCTs are a non-invasive scan commonly used in clinics to diagnose diabetic retinopathy and macular degeneration. Image courtesy of Daniel Kermany and Kang Zhang



conclusions. "Machine learning is often like a black box where we don't know exactly what is happening," Zhang said.

The study focused on two common causes of irreversible blindness: macular degeneration and diabetic macular edema. Both conditions, however, are treatable if detected early. Machine-derived diagnoses were compared with diagnoses from five ophthalmologists who reviewed the same scans. In addition to making a medical diagnosis, the AI platform also generated a referral and treatment recommendation not done in previous studies.

With simple training, the authors noted, the machine performed similar to a well-trained ophthalmologist, and could generate a decision on whether or not the patient should be referred for treatment within 30 seconds, with more than 95 percent accuracy.

Such speed and accuracy would represent a profound step forward in medical diagnoses and treatment, according to Zhang, noting that current health care is often lengthy as patients are referred from general physicians to specialists, consuming time and resources and delaying effective treatment. Zhang also noted that a simplified and relatively inexpensive Al-based tool would be a boon in places and parts of the world where medical resources, particularly specialists, are scarce. The scientists have open-sourced published their data and tool so that others can further improve, refine and develop its potential.

"With more data, more computational power and more experience providing patient care, there is a promising future for significantly enhancing patient care," Zhang said.

# UC SAN DIEGO STARTUP AND SEI OPHTHALMOLOGIST PARTNER

Searching for your Glass.

a Verizoi

For individuals with severe irreversible vision loss from eye diseases such as retinal degenerations, untreated glaucoma or severe infections of the eye, just walking up a street can be challenging. These individuals work with low vision specialists to help them. Assistance can be provided by guide dogs, walking canes, braille and magnifiers.

A San Diego based startup company, Aira (*https://aira.io/*), has developed an innovative on-demand assistive wearable technology for the severely visually impaired. Aira was co-founded by UC San Diego alumni Suman Kanuganti and Yuja Chang, inspired by their friendship with blind communications professional Matthew Brock. Aira serves as an "augmented reality" conduit, where the user wears "smart glasses" with a video camera mounted that, when activated, livestreams to an "agent" who assists the user in the specified task (navigation, reading, etc). The agent's module consists of both the livestream and applications



such as maps that provide further real-time tracking (see picture). This service is available worldwide with hundreds of users.

Aira has been collaborating with Shiley ophthalmologist and retinal surgeon, **Daniel L. Chao, MD, PhD**, Assistant Professor of Ophthalmology, to conduct research to



Left to Right: Amy Bernal, Vice President of Customer Experience, Aira, Daniel L. Chao, MD, PhD, and Suman Kanuganti, CEO of Aira

determine the utility of their technology. Their initial study in *Translational Vision Science and Technology* showed that patients using Aira had an improvement in scores on a scientifically validated quality of life questionnaire after 3 months.

Dr. Chao stated, "The Aira technology is an innovative platform to help those individuals with poor vision which unfortunately we can not help with our current medical and surgical treatments. Further research into these types of technologies will hopefully lead to more solutions for low vision individuals."

Dr. Chao and Aira are continuing their research, looking at long term effects on quality of life after using the Aira technology, as well as analysis of data to help better determine the needs of low vision individuals.

## 35 YEARS AND STILL GOING STRONG



## STUART I. BROWN, MD

**Stuart I. Brown, MD**, Professor of Ophthalmology, came to the University of California, San Diego in 1983 as the founding Chair of the Department of Ophthalmology. The UC San Diego School of Medicine was just fifteen years old and the Division of Ophthalmology was under the Department of Surgery.

Born and raised in Chicago, Brown completed his medical training at the University of Illinois, Tulane, and Harvard. He began his academic career in ophthalmology at Massachusetts Eye and Ear and went on to Cornell Medical Center before becoming Chair at the University of Pittsburgh. Brown is best known for his contributions to the clinical research of the cornea. In the 1960's, he initiated studies on severely alkali-burned corneas that he was able to successfully transplant.

When moving to UC San Diego, Brown stated, "I came to UC San Diego to accept the challenge of forming an ophthalmology department. This was an offer impossible to ignore and what allowed me to bring brilliant clinician scientists and researchers at a time that would produce immediate clinical payoffs."

When the Department was officially formed, there were only a handful of physician faculty and staff treating patients in a trailer on the La Jolla UC San Diego campus and at the Hillcrest Medical Center. Brown began to recruit the best and the brightest in ophthalmology with **Robert N. Weinreb, MD** as his first new faculty member. He had the good fortune to be introduced to philanthropists Darlene and Donald Shiley in 1988, which brought his dreams of a new stateof-the-art eye center to fruition. With the support of the Shileys and many other generous donors, Brown became the Director of the Donald P. and Darlene V. Shiley Eye Center. In 1991, the Shiley Eye Center was opened and it was the first building to be located on the UC San Diego east campus medical complex. With this new facility, more outstanding faculty were recruited to the Department.

Brown noted, "It was an exciting time to raise private financial support to build the UC San Diego School of Medicine's first unattached Department center to house my remarkable young faculty as well as staff that were pleasant, caring, and willing to put the patients first. It all worked!"

Darlene Shiley stated at the groundbreaking ceremony, "The UCSD ophthalmology program under Stuart Brown is such a striking blend of science, technology and humanity that it is impossible not to be moved and impressed at the same time."

With the increase in patients with childhood eye disorders, Brown shared his vision for the departmental growth with Anne and Abraham Ratner. In 1995, the generous couple went on to establish the Anne F. and Abraham Ratner Chair in Pediatric Ophthalmology, as well as to create the Anne F. and Abraham Ratner Children's Eye Center (under the direction of **David B. Granet, MD**). Before coming to UC San Diego, Brown had pioneered surgery for corneal transplantation in babies born blind with corneal opacities, a cloudy covering over the eye. Since few surgeons in the world felt comfortable with this complicated procedure, infants and children from all over the world came to Shiley. With the generous commitment from grateful family members, Natan Blutinger with Vanessa and Darryl Frank, Dr. Brown launched the Blind Baby Fund (now called the For Sight For Children Fund) to provide assistance to these patients' families with overwhelming travel and hospital expenses.

In 2000, after noticing the great need in San Diego County for lowincome children's eye care, he launched the Shiley EyeMobile for Children. With funding from several caring donors, he purchased recreational vehicles and transformed them into mobile medical clinics with optometrists. After 18 years, the Shiley EyeMobile for Children has performed 215,000 vision screenings, 30,000 dilated eye exams and provided 12,000 pairs of glasses at no cost to the childrens' families. Brown then initiated EyeMobiles for Children at UC San Francisco, UCLA and UC Irvine to increase eye care for underserved kids throughout the state of California.

After starting with a handful of faculty physicians in 1983, the Department of Ophthalmology had grown to over 100 doctors, researchers and staff by 2002. To expand the vision research arm of the Department, San Diego philanthropists provided funds to build the Hamilton Glaucoma Center (under the direction of **Robert N**. **Weinreb, MD**) and the Joan and Irwin Jacobs Retina Center (under the direction of **William R. Freeman, MD**). These state-of-the-art research facilities were completed in 2004. The Shiley Eye Center further expanded with a new surgery suite in 2005 and additional clinical space in 2007.





Stuart I. Brown, MD, Darlene Shiley, and Robert N. Weinreb, MD

Brown was appointed as the inaugural holder of the Richard K. Lansche, MD and Tatiana A. Lansche Distinguished Chair in Ophthalmology in 2004. Mrs. Lansche wanted to remember her late husband Dr. Lansche, a friend of Dr. Brown's who was an ophthalmologist in La Jolla for many years and interested in his training program, with a gift to acknowledge his love of learning and commitment to eye care.

In 2002, several generous donors honored Brown's legacy by endowing a chair in his name; then in 2011 Darlene Shiley completed the funding to honor both Dr. Brown and Donald Shiley. The Stuart I. Brown Chair in Ophthalmology in Memory of Donald P. Shiley is now held by **Natalie A. Afshari, MD.** 

He has been and continues to be an innovator in his field. Brown's research has led to over 200 publications, and he continues to be invited to lecture around the world. The quality of life of countless individuals has been improved, often dramatically, through his pioneering research and patient care. After 35 years at the Shiley Eye Institute, Brown will not slow down. He has retired from full-time university status but continues his practice and works with the Shiley EyeMobile for Children across the state.

Brown stated, "I am grateful for the opportunity to work and contribute to UC San Diego. I am especially grateful to be working with our faculty, staff and all the donors and patients who together have contributed and continue to contribute so much to the Shiley Eye Institute. Finally, I especially would like to acknowledge Dr. Weinreb for his vision and accomplishments which continue to improve so significantly our patient care, vision research and educational programs."

# WELCOME NEW FACULTY

#### JIUN DO, MD, PhD

The UC San Diego Shiley Eye Institute welcomes glaucoma specialist and clinician-scientist Jiun Do, MD, PhD as an Assistant Professor of Ophthalmology. Dr. Do was an undergraduate at the University of California, Berkeley. He earned his MD and PhD of Philosophy in Neurosciences from the University of California, San Diego and completed a residency in Ophthalmology at the University of Southern California. He then was a glaucoma fellow at the UC San Diego Shiley Eye Institute and the Hamilton Glaucoma Center.

#### Dr. Do's clinical focus is on

glaucoma. His research involves basic science and translational approaches to replace injured cells of the eye, regenerate the optic nerve, and ultimately restore vision. He also is evaluating home monitoring devices that measure intraocular pressure to determine risks of glaucoma development and progression.

#### CATHERINE Y. LIU, MD, PhD

**Catherine Y. Liu, MD, PhD**, is a board-certified ophthalmologist who specializes in reconstructive and cosmetic surgery of the face, with special emphasis on the eyelid and periorbital region. She is one of a select number of surgeons worldwide to have completed an American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS) fellowship, with specialty training on the reconstruction of the eyelid, orbit, and lacrimal system.

Dr. Liu completed her undergraduate degree at the University of Pennsylvania. She then earned an MD and PhD in Cell Biology from Albert Einstein College of Medicine. After a transitional year internship at Memorial Sloan Kettering Cancer Center, she



completed her ophthalmology residency at University of California, Irvine. She further completed specialty training in oculofacial plastic surgery at the Illinois Eye and Ear Infirmary.

Dr. Liu is dedicated to treating patients with aging changes affecting the eyelid, tumors of the eyelid and orbit, tearing, complex conditions that require reconstruction, and surgical and non-surgical facial rejuvenation.

## LIONS PARTNERSHIP

The Shiley Eye Institute and the Downtown San Diego Lions Club established a partnership in 2017 as part of the Lions' generous gift of \$400,000 to support the Downtown San Diego Lions Club BioBank for Vision. The partnership provided an opportunity to have SEI physician scientists present educational ophthalmology update lectures to the members of the Lions Club.



On May 22, 2018, **Eric Nudleman, MD, PhD**, presented "The Retina and Emerging Therapies for Age Related Macular Degeneration" in the Lions Den. Past presidents Terry

Loftus and George Saadeh, who spearheaded the donation from the Lions, introduced Dr. Nudleman to the members.

On September 18, 2018, **Natalie A. Afshari, MD** presented "The Aging Eye" in the Lions Den. She discussed cataracts, macular degeneration, glaucoma and dry eye with examples of vision from famous artists'



Steve Zapoticzny, Natalie A. Afshari, MD and Ted Kay.

perspective. Past president Steve Zapoticzny, who leads the organization towards promoting the donation, hosted Dr. Afshari and she was introduced by current president Ted Kay.

## INTEGRATIVE OPHTHALMOLOGY **PHYSICIAN, HEAL THYSELF**



Laura MacElhern, MBA, Managing Director – Center for Integrative Medicine and Gordon Saxe, MD, PhD, MPH in the Food as "Medicine Kitchen"

In December 1987, while on a ski trip to Colorado, Dr. Gordon Saxe – then a 29-year-old PhD student in Epidemiology at the University of Michigan – noticed something scary but oddly beautiful: haloes with concentric rainbows that appeared at night around all of the lights at the ski lodge. Without realizing it, his eye pressure had gradually crept up to very high levels and he began to experience rapidly progressive and irreversible vision loss – the hallmarks of severe open-angle glaucoma. After unsuccessfully attempting to control the glaucoma with medication and laser treatments, he underwent multiple eye operations. Coincidentally, his world-renowned surgeon at Massachusetts General Hospital had been an instructor of **Robert N. Weinreb, MD** when he was then a medical student at Harvard Medical School. That surgery 30 years ago saved Dr. Saxe's eyesight – without need for medication – to this day. While he was going through treatment, Dr. Saxe also embraced a wide variety of integrative approaches: a nutritious whole, plant-based diet, t'ai chi, eye exercises, and ophthalmic acupuncture – which have added to the benefit of surgery by helping to further optimize the health of his eyes and enhance his functional vision. Inspired by his experience, he went on to complete his PhD, medical school, and a residency in Preventive Medicine. Afterwards, he joined the faculty at UC San Diego, became a founding member of the UC San Diego Centers for Integrative Health, and helped establish the Krupp Fund, the largest university-based endowment in the U.S. dedicated to clinical research on diet and natural therapeutics.

One of the first research projects funded by the Krupp Fund was a study to determine whether a healthy diet could influence the underlying mechanisms and improve vision in patients with glaucoma. Dr. Saxe found enthusiastic collaborators at the Shiley Eye Institute in Linda Zangwill, PhD and Dr. Weinreb. A previous study found that the risk of developing glaucoma was 55 – 70% lower in individuals who regularly consume lutein– and nitrate–rich leafy greens such as kale and collards. Similarly, another study found that omega-3 supplementation significantly lowered intraocular pressure. The study now being launched at the Shiley Eye Institute and Hamilton Glaucoma Center will teach glaucoma patients how to adopt a healthy plant-based diet rich in these and other vegetables and measure its effects on various indicators of vision as well as on blood circulation to the eyes, density of pigmentation of the macula, and the diversity of the gut and oral microbiomes.

This study, and others that are planned, will place the Shiley Eye Institute at the forefront of an entirely new medical field that empowers patients to use nutrition and natural medicine to help combat eye disease, enhance their vision and greatly improve quality of life.

## PUBLIC HEALTH CHAMPIONS AWARDEES

On April 6, 2018, the County of San Diego presented the Shiley Eye Institute EyeMobile for Children at UC San Diego with the Live Well San Diego 2018 Public Health Champion Award for an organization. The honor recognizes the outstanding services provided to San Diego County children



The EyeMobile team with Mrs. Darlene Shiley

since 2000. Over the past 18 years, the EyeMobile has provided more than 215,000 vision screenings, 30,000 dilated eye exams and provided 12,000 pairs of glasses free of charge to underserved children.

The EyeMobile coincidentally shared the day of honors with **Darlene Shiley**, who received a Live Well San Diego Champions for Health Award as a leader in the San Diego community, championing opportunities for improved health, safety and wellness through numerous medical, scientific and educational arts causes especially for her work with Alzheimer's disease.

The Live Well San Diego Public Health Champion Awards Ceremony is an annual event during National Public Health Week hosted by the County of San Diego Health and Human Services Agency. The event honors people and organizations for their achievements in improving the health and quality of life of local San Diego residents.

# GRATEFUL PATIENT

As an acute glaucoma patient of Robert N. Weinreb, MD for the last 26 years, I am writing this letter of appreciation as a tribute to the Shiley Eye Institute and the man who saved my eyesight and kept me going all these years.

In 1991, at the early age of 51, I was diagnosed as suffering from serious glaucoma with very high eye pressures in Mumbai, India. By that time, more than 80% of the vision was lost in my left eye and 50% in my right eye. I was told that I would be blind in 5 years. My occupation was that of an industrialist. I set up factories in Mumbai as well as in other cities in India for over 50 years. This news was both upsetting and would significantly impact my life.

By my good fortune, through a friend living in California, I was told to contact Dr. Weinreb at UC San Diego. In 1992, I immediately flew to San Diego and was examined by Dr. Weinreb at the Shiley Eye Center. As soon as I met Dr. Weinreb, I had complete faith in him and became his patient from then on. In 1992, the Shiley Eye Center was just a year old. Although I lived at the other end



of the world in India, I made over 15 visits and had 6 surgeries with Dr. Weinreb.

Today, after 26 years of being treated by Dr. Weinreb, I am most fortunate and delighted that I still see well enough to be completely independent at the age of 78. I am now semi-retired and can enjoy my free time with my wife of 55 years, Katayun, and two sons and daughter along with their families.

The Shiley Eye Institute and Dr. Weinreb were both responsible for this miracle. I am greatly indebted to both without whom I would have become blind over 20 years ago. I wish them both, Dr. Weinreb and the Shiley Eye Institute, great success in the years ahead and may they continue to save the eyesight of tens of thousands of people across the globe. God bless them.

# 2018 ACCOLADES

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

## GLAUCOMA



### Robert N. Weinreb, MD

Chair & Distinguished Professor of Ophthalmology Director of the Shiley Eye Institute Director of the 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

#### **Special Interests**

Glaucoma surgery and minimally invasive glaucoma surgery; Optic neuropathy and aging of the eye; Glaucoma genetics; Imaging of the optic nerve; Optical Coherence Angiography; Mechanisms of optic nerve damage in glaucoma; Neuroprotection; Measurement of intraocular pressure; Drug delivery; Cataract surgery; Mentoring the next generation of world leaders in glaucoma



### Linda M. Zangwill, PhD

Professor of Ophthalmology Co-Director of Clinical Research, Hamilton Glaucoma Center Director, Hamilton Glaucoma Center, Data Coordinating Center

#### **Graduate School**

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

#### **Postdoctoral Fellowship**

University of Waterloo, Ontario, Canada

#### **Special Interests**

To improve our understanding of the complex relationship between structural and functional change over time in the aging and glaucoma eye; To develop computational and statistical techniques to improve glaucomatous change detection, reduce the number of visits and optimize the type of testing required; To identify risk factors that can predict glaucomatous progression and rapidly progressing glaucoma



### Akram Belghith, PhD

Assistant Project Scientist of Ophthalmology

#### Graduate School

University of Strasbourg, France

#### Fellowship

University of California, San Diego

#### **Special Interests**

Change detection and monitoring of glaucoma; Image processing and machine learning classifier analyses



### 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

#### **Special Interests**

Early detection and monitoring of glaucoma; Machine learning classifier; Analyses of imaging and visual function measurements

## GLAUCOMA



### Andrew S. Camp, MD

Assistant Professor of Ophthalmology

Medical School University of Miami Miller School of Medicine

#### **Residency & Fellowship**

- Bascom Palmer Eye Institute at the University of Miami Miller School of Medicine
- University of California, San Diego Shiley Eye Institute

#### **Special Interests**

Development of novel intraocular pressure measurement devices; Personalized glaucoma treatment regimens; National and international eye health in underserved populations; Anterior and posterior glaucoma imaging techniques

#### **Notables & Awards**

2018 Outstanding Clinical Teaching Award, 2018 Whitehill Prize for Excellence



Jiun Do, MD, PhD

Assistant Professor of Ophthalmology

#### **Medical School**

University of California San Diego, School of Medicine (MD) University of California San Diego, Neurosciences (PhD)

#### **Residency & Fellowship**

University of Southern California, Roski Eye Institute University of California San Diego, Shiley Eye Institute

#### **Special Interests**

Translational research; Retinal and optic nerve regeneration; Retinal ganglion cell replacement for glaucoma and other optic neuropathies; Optic nerve relays; Patient measured intraocular pressures and glaucoma progression



### 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

#### **Special Interests**

Mechanisms for neuroprotection and neurodegeneration in glaucoma; Oxidative stress and glutamate excitotoxicity in glaucoma; Mitochondrial dynamics; Bioenergetics and dysfunction in retinal ganglion cell (RGC) and optic nerve head (ONH) astrocyte in glaucoma; Mitochondriarelated gene therapy for retinal ganglion cells and optic nerve head astrocyte neuroprotection in 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

#### **Special Interests**

Regulation of intraocular pressure and ocular blood flow; 24-hour sleep laboratory for glaucoma and other eye diseases

## GLAUCOMA



### Dorota Skowronska-Krawczyk, PhD

Assistant Professor of Ophthalmology

**Graduate School** University of Geneva, Switzerland

#### **Postdoctoral Fellowship**

Eye Hospital Jules Gonin, Lausanne, Switzerland University of California, San Diego

#### **Special Interests**

Molecular mechanisms in retina development and in genetic and age related eye diseases, including glaucoma



Rigby Slight, MD

Associate Clinical Professor of Ophthalmology

Medical School University of Oklahoma; Internship at UCLA

**Residency** University of Southern California

#### **Special Interests**

Clinical research in glaucoma; UC San Diego Optic Disc Reading Center



### Cristiana Vasile, MD

Associate Physician of Ophthalmology

Medical School Bucharest University of Medicine, Romania

## Residency & Fellowship

University of California, San Diego

#### **Special Interests**

Clinical research in glaucoma; Optic Nerve Evaluation



### Derek S. Welsbie, MD, PhD

Assistant Professor of Ophthalmology

### Medical School

University of California, Los Angeles

#### **Residency & Fellowship**

The Johns Hopkins University School of Medicine / Wilmer Eye Institute

#### **Special Interests**

Neuroprotection in glaucoma and other optic neuropathies; Use of functional genomic technologies to identify novel mediators of axon injury signaling in neurons; Development of dual leucine zipper kinase inhibitors; Role of dual leucine zipper kinase in traumatic brain injury

#### **Notables & Awards**

2017 OKAP Teaching Award, Shiley Eye Institute, 2017 Whitehill Prize for Excellence, UC San Diego Academy of Clinician Scholar, 2017 Douglas H. Johnson Award for Glaucoma Research, Brightfocus Foundation
# GLAUCOMA & ENGINEERING

# Todd P. Coleman, PhD

Adjunct Professor of Ophthalmology Professor of Bioengineering Co-Director of Center for Perinatal Health, Institute of Engineering in Medicine

Graduate School Electrical Engineering, MIT (MS/PhD)

#### **Residency & Fellowship**

Dept of Brain & Cognitive Sciences, MIT Dept of Anesthesia, Mass General Hospital

#### **Special Interests**

Patient adherence; Digital medicine; Wireless communications; Machine learning

# CORNEA & REFRACTIVE



# Natalie A. Afshari, MD, FACS

Professor of Ophthalmology Stuart I. Brown, MD Chair in Ophthalmology in Memory of Donald P. Shiley Chief, Division of Cornea and Refractive Surgery Vice-Chair for Education, Department of Ophthalmology

Medical School Stanford University Medical School

#### Residency & Fellowship

Harvard University, Massachusetts Eye and Ear Infirmary

#### **Special Interests**

Corneal surgery; Fuchs Dystrophy; Corneal transplantation; Endothelial keratoplasty (DSAEK & DMEK); Intacs and collagen crosslinking for keratoconus; Laser refractive surgery, including LASIK and PRK; Surgical and medical diseases of cornea; Cataract surgery



# Stuart I. Brown, MD

Professor of Ophthalmology

Medical School University of Illinois Medical School

#### **Residency** Tulane Medical School

**Fellowship** Massachusetts Eye and Ear Infirmary, Harvard University

**Special Interests** 

Cornea and external diseases

# 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 (Chief Resident)

#### Fellowship

Stanford University School of Medicine (Chief Fellow)

#### **Special Interests**

Corneal and cataract surgery; Intraocular lenses; Dry Eye/Pterygium, Cornea transplantation; Refractive surgery/LASIK



# Chris W. Heichel, MD, FACS

Clinical Professor of Ophthalmology

Medical School Chicago Medical School

#### Residency

University of California, San Diego (Chief Resident)

#### Fellowship

University of California, San Diego

#### **Special Interests**

Corneal transplantations and Keratoprostheses; Challenging cataract and IOL surgeries; LASIK; Intacs & Visian ICL; Advanced techniques in laser & refractive surgery; Keratoconus; Ocular Surface Tumors; Limbal Stem Cell Transplantation

#### Notables & Awards

2018 Outstanding Surgical Teaching Award



## Jiagang "Jack" Zhao, PhD

Associate Project Scientist of Ophthalmology

#### Graduate School

Mount Sinai School of Medicine, New York

#### Postdoctoral Fellowship

Salk Institute for Biological Studies, La Jolla, California

#### **Special Interests**

Age related macular degeneration; Diabetic retinopathy; Inherited retinal degeneration

# NEURO-<u>OPHTHALM</u>OLOGY



# Peter J. Savino, MD

Clinical Professor of Ophthalmology & Neurosciences

#### **Medical School**

University of Bologna School of Medicine

Residency Georgetown University Medical Center

#### **Fellowship** University of Miami

#### **Special Interests**

Myasthenia gravis optic neuritis, atrophy and neuropathy brain and nervous system tumors visual field defects; Degenerative, metabolic, inflammatory & demyelinating diseases vascular disorders

**Notables & Awards** 

2018 OKAP Teaching Award

# **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

Medical School St. Louis University School of Medicine

Residency

University of California, Los Angeles

Fellowship University of Wisconsin, Madison

#### **Special Interests**

Oculofacial surgery; Eyelid, lacrimal and orbital surgery; Thyroid eye disease (orbital decompression and eyelid surgery); Craniofacial disorders involving the eyelids and orbits; Orbital and eyelid tumors; Facial aesthetics - soft tissue fillers and injectables



## Bobby S. Korn, MD, PhD, FACS

Professor of Ophthalmology and Plastic Surgery

Medical School

University of Texas, Southwestern Medical School (MD & PhD)

#### **Residency & Fellowship**

University of California, San Diego (Chief Resident)

#### **Special Interests**

Cosmetic & reconstructive surgery; Blepharoplasty; Ptosis surgery; Asian Blepharoplasty; Congenital birth defects; Endoscopic forehead lifting; Thyroid eye disease management; Eyelid & orbital tumors & cancers; Lacrimal/tear outflow system disorders; Bulging or proptosis of eyes; Reconstruction of eyelids post cancer removal; Reconstruction after trauma/eye injuries; Facial fillers; Skin rejuvenation – chemical peel

**Notables & Awards** 2018 OKAP Teaching Award



## Yunxiang (Catherine) Liu, MD, PhD

Assistant Professor of Ophthalmology

#### **Medical School**

Albert Einstein College of Medicine (MD) Albert Einstein College of Medicine (PhD)

#### **Residency & Fellowship**

University of California, Irvine Illinois Eye and Ear Infirmary at the University of Illinois, Chicago

#### **Special Interests**

Ptosis surgery; Blepharoplasty; Lacrimal disease and surgery; Eyelid and orbital oncology; Blepharospasm and hemifacial spasm; Orbital fractures; Craniofacial disorders involving the eyelid and orbit; Pediatric oculoplastics; Surgical and non-surgical facial rejuvenation

# **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, NY

#### Residency

Lenox Hill Hospital, New York, NY

#### Fellowship

University of California, San Francisco, CA (Uveitis & Immunology) University of Southern California, Los Angeles, CA (Vitreo-Retinal Surgery)

#### **Special Interests**

Complicated retinal detachment; Diabetic retinopathy; Macular holes & age related macular degeneration



## Michael H. Goldbaum, MD, MS

Professor of Ophthalmology in Residence Co-Director, Retina Division

#### Medical School Tulane University School of Medicine (MD)

Stanford University (MS)

#### Residency

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

#### Fellowship

Cornell University Medical Center and New York Hospital

#### **Special Interests**

Surgical & medical treatment of the retina and vitreous; Macular degeneration; Pediatric retina; Ocular tumors; Glaucoma informatics



## Radha Ayyagari, PhD

Professor of Ophthalmology Professor of Pathology Chief of Ophthalmic Molecular Diagnostic Laboratory (CLIA certified) Director of Downtown San Diego Lions Club BioBank For Vision

#### Graduate School

Osmania University, Hyderabad, India

#### **Postdoctoral Fellowship**

Molecular Genetics at the National Eye Institute, NIH, Bethesda

#### **Special Interests**

Molecular genetics of macular and retinal dystrophy; Biological mechanisms underlying retinal diseases; Agerelated macular degeneration; Diabetic retinopathy; Glaucoma

#### **Notables & Awards**

2017 Gold Fellow, The Association for Research in Vision and Ophthalmology



# Dirk-Uwe Bartsch, PhD

Associate Professor of Ophthalmology

#### **Graduate School**

University of California, San Diego

#### **Postdoctoral Fellowship**

University of California, San Diego

#### **Special Interests**

Retinal Imaging Scanning Laser Imaging confocal / non-confocal; Optical Coherence Tomography (OCT); Indocyanine Green and Fluorescein Angiography; Tomographic Reconstruction of the Posterior Pole

# **RETINA & VITREOUS**



# Daniel L. Chao, MD, PhD

Assistant Professor of Ophthalmology

Medical School Stanford University (MD) Stanford University (PhD)

#### Residency

Bascom Palmer Eye Institute, University of Miami

#### Fellowship

University of California, San Francisco

#### **Special Interests**

Surgical and medical management of retinal diseases, diabetic retinopathy, age related macular degeneration; Translational research; Scientific focus on developing zebrafish as a model for retinal diseases; Technology development for new treatments and diagnostics for retinal disease



# Lingyun Cheng, MD

Adjunct Professor of Ophthalmology

Medical School Shanxi Medical University, China

#### Residency

The First Teaching Hospital of Shanxi Medical University, China

#### Fellowship

University of California, San Diego Ideta Eye Hospital, Japan

#### **Special Interests**

Ocular drug delivery and vitreoretinal diseases



# Henry A. Ferreyra, MD

Associate Professor of Ophthalmology

Medical School University of California, San Diego

**Residency** University of California, San Diego

Fellowship University of California, San Diego

#### **Special Interests**

Electrophysiology inherited disorders of the retina; Age-related macular degeneration; Diabetic retinopathy; Retinopathy of prematurity

Notables & Awards

2017 Outstanding Teacher Award (Resident Award)



# Eric Nudleman, MD, PhD

Assistant Professor of Ophthalmology

Medical School Albert Einstein College of Medicine (MD) Stanford University (PhD)

#### Residency

Washington University in St. Louis

#### Fellowship

Associated Retinal Consultants / William Beaumont Hospital

#### **Special Interests**

Adult and pediatric vitreoretinal diseases, including macular degeneration, diabetic eye disease, retinal vein occlusions, retinal detachments, proliferative vitreoretinopathy, macular holes and epiretinal membranes; Specialty interest in pediatric vitreoretinal diseases, including the surgical management of advanced retinopathy of prematurity, familial exudative vitreoretinopathy, Coats disease, persistent fetal vascular syndrome, and intraocular trauma; Scientific focus on developmental angiogenesis, with emphasis on the role of the Wnt Signaling pathway in developmental vascular diseases

# PEDIATRIC OPHTHALMOLOGY & ADULT EYE REALIGNMENT



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

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

#### **Medical School**

Yale University School of Medicine

#### Residency

New York University Medical Center (Chief Resident)

#### Fellowship

Children's Hospital of Philadelphia, University of Pennsylvania Medical Center Scheie Eye Institute

#### **Special Interests**

Pediatric ophthalmology & strabismus; Adult eye movement problems; Stateof-the-art adjustable suture strabismus surgery; Childhood eye misalignments & disorders; Nystagmus; Learning disorders & role of vision



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

Professor of Ophthalmology Educational Director of Pediatric Ophthalmology / Strabismus Division

#### Medical School

Medical College of Pennsylvania Hospital, Philadelphia

#### Residency

Hahnemann University Hospital, Philadelphia

#### Fellowship

University of California, San Diego & Naval Medical Center

#### **Special Interests**

Strabismus/eye misalignment/double vision; Amblyopia; Retinopathy of prematurity; Pediatric glaucoma & cataracts including intraocular lens placement; Nasolacrimal duct disorders; Congenital eye syndromes; Craniofacial syndromes; Systemic diseases affecting the eyes; Nystagmus

# **RETINA & PSYCHOLOGY**



Nicholas Oesch, PhD

Adjunct Professor of Ophthalmology

#### **Graduate School**

Oregon Health and Science University (Neuroscience)

#### **Postdoctoral Fellowship**

National Institutes of Health, Post-Doctoral Research Fellow

#### **Special Interests**

Electrophysiology of retinal neural circuits; Visual processing in retina; Synaptic and dendritic neural computation; Optical physiological recording techniques; Retinal degeneration; Retinal prosthetic technologies; Visual psychophysics

# REGENERATIVE <u>OPHTHALM</u>OLOGY



# Karl Wahlin, PhD

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

#### **Graduate School**

The Johns Hopkins School of Medicine (Neuroscience)

#### Fellowship

The Johns Hopkins School of Medicine / Wilmer Eye Institute

#### **Special Interests**

Directed differentiation of pluripotent stem cells and their application towards the study of retinal development and eye disease; Photoreceptor cell development and retinal connectivity; Retinal and optic nerve regeneration

# GENETICS



# Kang Zhang, MD, PhD

Professor of Ophthalmology Co-Director, Biomaterials and Tissue Engineering, Institute for Engineering in Medicine

#### **Medical School**

Harvard Medical School / Massachusetts Institute of Technology (MD / PhD Program)

#### Residency

The Johns Hopkins University School of Medicine / Wilmer Eye Institute

#### Postdoctoral Fellowship

University of Utah School of Medicine

#### **Special Interests**

Age related macular degeneration; Diabetic retinopathy; Inherited retinal degeneration



# Peter Shaw, PhD

Assistant Professor of Ophthalmology

**Graduate School** McMaster University, Ontario, Canada

#### **Postdoctoral Fellowship**

University of California, San Francisco

#### **Special Interests**

Evaluation and diagnosis of eye diseases including macular degeneration, diabetic retinopathy, glaucoma and inherited retinal degenerations by genetic variants and plasma biomarkers; Investigation of how genetic and oxidative stress risk factors impact on disease pathology; Development of molecular and gene therapy methods to treat eye diseases

# OCULAR PATHOLOGY



# Jonathan H. Lin, MD, PhD, FCAP

Associate Professor of Ophthalmology and Pathology

#### **Medical School**

Columbia University College of Physicians & Surgeons (MD & PhD)

#### Residency

Brigham Women's Hospital (Anatomic Pathology)

#### Fellowship

University of California, San Francisco (Ophthalmic Pathology)

#### **Special Interests**

Ophthamic Pathology including pigmented ocular lesions (uveal melanoma, primary acquired melanosis), basal cell carcinoma, sebaceous gland lesions, inflammatory lesions (sclerosing orbital inflammatory pseudotumor, IgG4 disease), MALToma, corneas (PKPs, DSAEKs), conjunctival biopsies (conjunctival intraepithelial neoplasia - CIN), orbital lesions, intraocular fine needle aspirates/vitrectomy specimens; Cellular and molecular mechanisms of retinal degeneration; RPE and ocular stem cells



# Napoleone Ferrara, MD

Distinguished Professor of Ophthalmology and Pathology Senior Deputy Director for Basic Sciences, UC San Diego Moores Cancer Center

#### Medical School & Residency

University of Catania Medical School, Catania, Italy

#### Fellowship

University of California, San Francisco

#### **Special Interests**

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



# Jeffrey E. Lee, MD

Associate Professor of Ophthalmology Program Director, Ophthalmology Residency

Medical School University of California, San Diego

## Residency

University of California, San Diego

#### **Special Interests**

Facial burns; Orbital trauma; Ocular manifestations of HIV, Optimizing residency cataract surgery education



# Thao P. Nguyen, MD

Assistant Clinical Professor of Ophthalmology

#### Medical School

University of Oklahoma, Tulsa

#### Residency

University of Rochester, New York

#### Fellowship

University of California, San Diego

# COMPREHENSIVE OPHTHALMOLOGY

# **OPTOMETRY & LOW VISION**



#### John F. Kulischak, OD

**Optometry School** University of California, Berkeley

Residency Palo Alto VA Medical Center



Alicia Lau, OD

**Optometry School** University of California, Berkeley

Residency Raymond G. Murphy VA Medical Center

Specialty Glaucoma



Maria Laura Gomez, MD, OD

Foreign Medical School & Residency Rosario University & Barraguer Institute of America, Bogota, Colombia

Fellowship Moorfield Eye Hospital, London, UK UC San Diego Shiley Eye Institute

**Specialty** Cornea and Dry Eye



Esmeralda McClean, OD

**Optometry School** University of California, Berkeley

Ocular Disease



Specialty



Pamela A. Hoo, OD

**Optometry School** Southern California College of Optometry



Lara D. Hustana, OD

Optometry School Pacific University

Residency Indian Health Services



Anne B. Lam, OD

**Optometry School** Southern California College of Optometry at Marshall B. Ketchum University



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 Cornea & Specialty Contact Lenses



# UNIQUE POSITION

Sally Liu Baxter, MD, MSc, is in a unique position of working in two different departments (Ophthalmology and Biomedical Information) at the same time. She is concurrently a postdoctoral research fellow in the UC San Diego Department of Biomedical Informatics, supported by a National Library of Medicine training grant as well as a prestigious Heed Ophthalmic Fellowship. She is receiving training in clinical informatics and operational management, as well as training in informatics research and clinical research design. She is examining the impact of technology implementation on clinical workflows and applying big data analytics to clinical questions in ophthalmology.

Dr. Baxter, a recent graduate of the Shiley Eye Institute Ophthalmology Residency Program, is also Chief Resident in Ophthalmology. In this role, she advocates for the residents, oversees their schedules, assists with administrative needs of the program, and coordinates much of the academic programming for the department, including educational activities for residents, fellows, and rotating medical students. She is also engaged in hands-on teaching in the clinic and operating room at the Veterans Affairs hospital.

Outside of her professional interests, Dr. Baxter maintains an active home life caring for her three children (ages 3-7), cat, and four chickens. She has help from her husband, Michael Baxter, MD, MSc, who is an otolaryngology resident at Naval Medical Center San Diego, as well as from her parents, Jiyao Liu and Hong Dai, who reside in Rancho Bernardo.

# 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 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.



# FELLOWS 2017 - 2018

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: Kyung Seek Choi, MD, PhD Xin Li, PhD Myoung Sup Sim, PhD

#### **GLAUCOMA**







Elham Ghahari, MD



Huiyuan Hou, MD, PhD

#### **GLAUCOMA**

Haksu Kyung, MD, PhD

**GLAUCOMA** 



Patricia Manalastas, MD





Erica Liu, MD



Sasan Moghimi, MD

Achal Patel, MD



Philip Ngai, MD, MBA

Ruti Sella, MD





Myoung Sup Sim, PhD

## PEDIATRICS



Vincent Vu. MD



Kim Evaristo, MD

Diva Yang, MD

#### **RETINA**



Manuel Amador, MD

# RETINA



Fangting Li, MD

RETINA



Jie Zhu, PhD



Amit Meshi, MD

Liliangi Ediriwickrema, MD







Tyler Ofstad, MD, PhD



Angel Soto Hermida, MD



### **OCULOPLASTICS**





Patrick Yang, MD



## REGENERATIVE



Amit Patel, PhD



Marina Voronchikhina, MD, PhD Wenqiu Wang, MD, PhD



Risa Broyer, PhD



Xiao Ying, MD



Sunayan Ray, PhD

# EDUCATION

# OPHTHALMOLOGY DISTINGUISHED PROFESSOR LECTURE SERIES AND GRAND ROUNDS

Monthly, the UC San Diego Viterbi Family Department of Ophthalmology offers the Distinguished Professor Lecture Series with a world-renowned invited visiting professor. Prominent specialists and international leaders update our residents, fellows and faculty as well as ophthalmologists and optometrists from around San Diego County. The lectures are followed by a buffet reception, allowing the attendees a chance to network. CME credits (continuing medical education) are available to attendees. The community is also invited to the departmental weekly Grand Rounds on Monday afternoon. The Grand Rounds consist of case presentations with moderated discussion. Interesting eye diseases, treatment dilemmas and surgical challenges are often the theme. These are offered in the Shiley Eye Institute Education Center.

# **BASIC SCIENCE IN VISION LECTURE SERIES**

March 29, 2018 SHYAMANGA BOROOAH, MD, MCRP, MRCSe, FRCOphth, PhD Fulbright-Fight for Sight Visiting Scholar TITLE: "Using Human Induced Pluripotent Stem Cells and CRISPR-Case 9 Gene Editing to Identify Disease Mechanism in Macular Degeneration" April 26, 2018 MARK TUSZYNSKI, MD, PhD Professor of Neurosciences Director, UC San Diego Translational Neuroscience Institute TITLE: "Neural Stem Cells in CNS Repair" June 21, 2018 MARIA CRISTINA KENNEY, MD, PhD Professor of Dept. of Ophthalmology Director of Mitochondrial Research The Gavin Herbert Eye Institute School of Medicine, UC Irvine TITLE: "'Personalized' Cybrid Cell Lines: Novel Approach in Drug Discovery for Age-related Macular Degeneration"

#### 2017 - 2018 VISITING PROFESSORS:







October 2, 2017 ERIC J. TOPOL, MD Director, Scripps Translational Science Institute Executive VP and Professor, Molecular Medicine, The Scripps Research Institute TITLE: "High Definition Medicine"

November 6, 2017 STEPHEN MCLEOD, MD Professor and Chair, Department of Ophthalmology UC San Francisco School of Medicine TITLE: "Is Bigger Better? Big Data in Ophthalmology Research"

January 8, 2018 STEVEN J. GEDDE, MD John G. Clarkson Chair in Ophthalmology Professor of Ophthalmology Bascom Palmer Eye Institute TITLE: "Lessons Learned from Glaucoma Surgical Trials"



March 12, 2018 BARRY KUPPERMANN, MD, PhD Roger F. Steinert Professor and Chair of Ophthalmology Director, Gavin Herbert Eye Institute Professor of Biomedical Engineering UC Irvine School of Medicine TITLE: "The Role of Mitochondrial Genetics in Age Related Macular Degeneration"

May 14, 2018 C. STEPHEN FOSTER, MD Founder and President Massachusetts Eye Research and Surgery Institution (MERSI) TITLE: "Preferred Practice Patterns for Treating Uveitis"

## VISION RESEARCH LECTURES

Monthly, the UC San Diego Viterbi Family Department of Ophthalmology offers the Vision Research Lecture Series with a world-renowned invited visiting professor. Prominent specialists and international leaders update our residents, fellows and faculty as well as ophthalmologists

July 14, 2017 RYO ASAOKA, MD Assistant Professor of Ophthalmology University of Tokyo TITLE: "Accurate Assessment of Progression of Glaucoma and How We Could Approach the Prevention of Blindness" July 20, 2017 RAJESH GUPTA, MD Professor of Computer Science and Engineering

and optometrists from around San Diego County. The lectures are followed by a buffet reception, allowing the attendees a chance to network. CME credits (continuing medical education) are available to attendees.

> February 16, 2018 GUSTAVO DE MORAES, MD, MPH Associate Professor & Medical Director Department of Ophthalmology Columbia University Medical Center TITLE: "Detecting Progression in Advanced Glaucoma"

March 22, 2018 BRIAN C. MANSFIELD, PhD Senior Vice President, Research Foundation Fighting Blindness TITLE: "Foundation Fighting Blindness: Funding Translational Research for Inherited Retinal Dystrophies" April 12, 2018 MAHNAZ SHAHIDI, PhD Professor of Ophthalmology and Biomedical Engineering Riffenburgh Professor in Glaucoma Vice Chair for Translational Research Roski Eye Institute Department of Ophthalmology University of Southern California TITLE: "Multimodal Imaging of Retinal Oxygen Delivery and Metabolism" April 24, 2018 NATALIA KURYSHEVA, MED.Sc.D Professor Head of the Consultative-Diagnostic Department of the Ophthalmological Center of the Federal Medical and Biological Agency of Russian Federation Ophthalmological Department of the Institute of Improvement of Professional Skill of FMBA TITLE: "Role of OCT-angiography and Electrophysiological Testing in Glaucoma Diagnostics and Monitoring"



SEI faculty, fellows and guest speakers: Jonathan C. Song, MD, MBA, Larry Smarr, PhD and C. Gustavo De Moraes, MD, MPH

# OPHTHALMOLOGY UPDATE

The 2018 Ophthalmology Update sponsored by the Shiley Eye Institute at UC San Dlego was held February 17-18, 2018 at Cape Rey Carlsbad. The event was a great success with over 300 attendees. Don O. Kikkawa, MD and Robert N. Weinreb, MD served as Program Chairs. The interdisciplinary faculty of ophthalmic subspecialists reviewed the continuing progress, latest surgical techniques, innovative ideas and research in ophthalmology.

The Keynote Speaker was Larry Smarr, PhD presenting "How Quantified Self Enables Precision Medicine". Dr. Smarr is the founding Director of the California Institute for Telecommunications and Information Technology (Calit2) and holds the Harry E. Gruber professorship in Computer Science and Engineering at UC San Diego's Jacobs School of Engineering.

## **GRADUATION HIGHLIGHTS**

On June 25, 2018, The Viterbi Family Department of Ophthalmology graduated outstanding residents and fellows with a ceremony and dinner at the Sanford Consortium for Regenerative Medicine and Bella Vista Social Club and Cafe. Graduating residents were Sally Baxter, MD, Landon Grange, MD, Derek Mai, MD, and Amir Marvasti, MD.

Graduating fellows include: Jiun Do, MD, PhD, Patricia Manalastas, MD and Philip Ngai, MD, MBA in glaucoma; Erica Liu, MD and Achal Patel, MD in cornea; Patrick Yang, MD in oculoplastics; Kevin Chen, MD, Amit Meshi, MD and Tiezhu Lin, MD in retina and J. Rotsen Minlay Evaristo, MD and Vincent Vu, MD in pediatrics.

The fifth annual "Lamont Ericson, MD Award for Outstanding Patient Care by a Resident" was presented by Residency Director, Jeffery E. Lee, MD to Sally Baxter, MD. Dr. Ericson was an outstanding former resident in the Department who passed away in 2007 at a young age.



Graduating residents (Landon Grange, MD, Amir Marvasti, MD, Sally Baxter, MD, and Derek Mai, MD) with Jeffrey Lee, MD, Residency Director

# PATIENT EDUCATION – GLAUCOMA UPDATE

The thirty-forth annual Glaucoma Update was held on October 4, 2017 at Goldberg Auditorium in the UC San Diego Moores Cancer Center. Hosted by **Robert N. Weinreb, MD**, he and **Derek Welsbie, MD**, **PhD** presented the latest trends in glaucoma treatments and research from the Shiley Eye Institute and around the world.

Introduced that evening was "Project Visions" started by **Dorota Skowronska-Krawczyk, MSc, PhD** with Canadian artist Eva Henry. Their goal is to take science from the laboratory and make it more accessible to non-scientists.



# SHILEY EYE INSTITUTE GLAUCOMA FELLOWS MEETING @ ARVO

On April 29, 2018, the Third Annual Shiley Eye Institute Glaucoma Fellows Meeting, organized by Arthur J. Sit, MD (Mayo Clinic) and Kaweh Mansouri, MD (Lausanne, Switzerland), was held during the Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting in Honolulu. The dinner was hosted by SEI friend, Elliot Loden and took place at the Outrigger Canoe Club in Waikiki, Hawaii.

The featured alumni presenter was Jonathan Crowston, MD, PhD, Ringland Anderson Professor of Ophthalmology and Managing Director of the Centre for Eye Research Australia at the University of Melbourne. His lecture was entitled "Live Well – Age Slow".



Kaweh Mansouri, MD, Robert N. Weinreb, MD, Jonathan Crowston, MD and Arthur J. Sit, MD.

# LECTURES

#### NATALIE A. AFSHARI, MD

2017 Inaugural Robert Copeland, MD, Philadelphia, PA, USA, National Medical Association Ophthalmology Section "Advances in Corneal Surgery: Implications for Endothelial Diseases"

2017, San Diego, CA, USA, Women in Ophthalmology Summer Symposium 2017 "Managing Patient Expectations in the Internet Age"

2017, Boston, MA, USA, 30th Biennial Cornea Conference "Fuchs Dystrophy and Corneal Endothelium from Genetics to Stem Cells and Regeneration"

2017, Cancun, Quintana Roo, Mexico, International Cornea Course Anterior Segment Reconstruction 2017 - Asociación para Evitar la Ceguera en México "Amniotic Membrane Graft vs Serum Tears for Ocular Surface Treatment" "DMEK vs. DSEK for Endothelial Disease Treatment"

2018, Honolulu, HI, USA, The Association for Research in Vision and Ophthalmology Annual Meeting 2018: Treatment on the Horizon for Fuchs Endothelial Corneal Dystrophy – Minisymposium - "The Genetic Basis of Fuchs Endothelial Corneal Dystrophy and Stem Cell Regeneration of Corneal Endothelium"

2018, Coeur d'Alene, ID, USA, The Pacific Coast Oto-Ophthalmological Society 102nd Meeting - "Cultivating the Physician-Patient Relationship"

2018, Carlsbad, CA, USA, University of California, San Diego Ophthalmology Update 2018 - "Cultivating the Physician-Patient Relationship"

2018, San Diego, CA, USA, 21st Annual US Navy Refractive Surgery Course - "Epithelial Ingrowth"

2018, The Pulido Lecture, Chicago, IL, USA - UIC Illinois Eye and Ear Infirmary

2018, Resident Alumni Day - "New Horizons in Corneal Endothelium and Fuchs Dystrophy- Surgical Interventions, Stem Cell Generation & Genetic"

#### **RADHA AYYAGARI, PhD**

May 2, 2018, ARVO Lecture, Oahu, Hawaii, USA. Deciphering the Genetic Architecture of IRD By Integrated Analysis of 425 Whole Genomes

July 28, 2018, India, ARVO Key Note Lecture, Hyderabad, India, Molecular Genetics of Inherited Retinal Degenerations: Lessons Learned from Whole Genome Analysis

#### ANDREW S. CAMP, MD

2018 Ophthalmic Technicians/Nurses Program, San Diego, California. "Advances in Intraocular Pressure Measurement"

2017 Ophthalmology Update, San Diego, California. "Update on Intraocular Pressure"

#### LINGYUN CHENG, MD

September 15, 2017, FuZhou, China, Dual Drug-Loaded Systems for Synergistic Therapy of Chronic Eye Diseases, The 22th Congress of Chinese Ophthalmological Society,

April 14, 2018, Hangzhou, China, Moderator, World Chinese Eye Researcher Forum (3) The 10th Congress of Research in Vision and Ophthalmology

April 30, 2018, Honolulu, Hawaii, Cytotoxicity And Ocular Safety Of Silicic Acid, The Degradation Product Of Porous Silicon, Annual Meeting of the Association for Research in Vision and Ophthalmology (ARVO)

#### **TODD P. COLEMAN, PhD**

September 2017, Cambridge, MA, Electrical Digestive Engineering, Invited Speaker, MIT Celebration of Emery N. Brown's 60th Birthday

October 2017, La Jolla, CA, Enabling Objective and Non-Invasive Ways to Phenotype Gastrointestinal Function and its Association with the Nervous System in Disease, Invited Speaker, Autism Tree Project Foundation Annual Neuroscience Conference

January 2018, Los Angeles, CA, Optimal Transport and Stochastic Optimization for Modern Inference and Prediction Applications, Invited Speaker, UCLA Applied Math Seminar

February 2018, Los Angeles, CA, Quantitative Electrophysiologic Digestive Monitoring, UCLA Gastroenterology Seminar

March 2018, Palo Alto, CA, Enteric Neural Engineering, Invited Stanford Neurosciences Institute Speaker April 2018, Madison, WI, Variational Formulations and Distributed Convex Optimization Methods for Modern Data Science Applications Invited Speaker, University of Wisconsin Department of ECE Distinguished Lecture Series

May 2018, La Jolla, CA, Bench to Bedside; A Road to Ambulatory Monitoring and Neuromodulation of GI Function, Grand Rounds, Department Of Pediatrics, UC San Diego

#### **NAPOLEONE FERRARA, MD**

July 10-15, 2017, Lipari, Italy, Lipari International Summer School in Computational Life Sciences

August 6-11, 2017, Newport, RI, Gordon Research Conference on "Angiogenesis and Microcirculation"

October 31-November 1, 2017, Seoul, South Korea, Korean Academy Science and Technology Forum

November 13-17, 2017, Guangzhou, People's Republic of China, Inaugural APVBO Conference

November 30-December 1, 2017, Honolulu HI, Weinman Symposium

March 21, 2018, 25th Annual John F. Enders Lecture. Harvard Medical School, Boston MA

March 23, 2018, Irvine, CA, 5th Gavin Herbert Eye Institute "Bench to Bedside Research Symposium

May 10, 2018, Pathology Ground Rounds, Yale University

June 3-7, 2018, Helsinki, Finland, 20th International Vascular Biology Meeting (IVBM 2018)

#### HENRY A. FERREYRA, MD

July 2017, UC San Diego, Department of Ophthalmology, La Jolla, CA "Retinal Examination, Fundus Autofluorescence, Laser, B-Scan Lecture"

September 2017, UC San Diego, Department of Ophthalmology, La Jolla, CA, "Erg Physiology Review"

October 2017, UC San Diego, Department of Ophthalmology, La Jolla, CA "Retinal Dystrophies Review"

#### **DAVID B. GRANET, MD**

August 2017, Dana Point, California, Invited Speaker, "Leadership Lessons from Comic Book Superheroes". American Eye Study Club Annual Meeting December 2017, Hyderabad, India, Invited Speaker, "Pediatric Eye Examination Made Easy", 4th World Congress of Paediatric Ophthalmology and Strabismus Meeting

#### WELDON W. HAW, MD

May 2018, Grand Rapids, MI, "Is Allergic Conjunctivitis the Whole Story ? – Impact of Dry Eye Disease On Allergic Conjunctivitis"

May 2018, Troy, MI, "Update on Diagnosing and Treating Allergic Conjunctivitis"

May 2018, Carmel Valley, CA, "Update on Diagnosing and Treating Allergic Conjunctivitis"

February 2018, Carlsbad, CA, "Update on Ocular Surface Diseases: Dry Eye Disease. Ophthalmology" Update 2018: New Approaches to Medical and Surgical Therapies. Jobson Publishing

February 2018, Carlsbad, CA, "Cataract Surgery Advances – Managing the Difficult Iris" Ophthalmology Update 2018: New Approaches to Medical and Surgical Therapies. Jobson Publishing

February 2018, Carlsbad, CA, "Surgical Video Grand Rounds – Complex Cataract and Intraocular Lens Surgery Techniques" Ophthalmology Update 2018: New Approaches to Medical and Surgical Therapies. Jobson Publishing

February 2018, Dallas-Fort Worth, TX, Cataract Surgery - Developing Efficient Nucleus Disassembly and Irrigation/Aspiration Techniques. Continuing Specialized Education. Cataract Surgery and Wet Laboratory. Jobson Publishing

February 2018, Dallas-Fort Worth, TX, Cataract Surgery -Top 3 Pearls for Developing Surgical Excellence. Cataract Surgery and Wet Laboratory. Jobson Publishing

October 2017, Update on Management of Herpes Simplex Keratitis, UC San Diego School of Medicine & Shiley Eye Institute, Department of Ophthalmology

September 2017, San Diego, CA, Inflammatory Conditions of the Anterior Segment, UC San Diego School of Medicine & Shiley Eye Institute Lecture Series

August 2017, Dallas-Fort Worth, TX, Cataract Surgery – Adapting Techniques to Address White, Brown, and Other Cataracts, Continuing Physician Education. Cataract Surgery and Wet Laboratory, Jobson

August 2017, Dallas-Fort Worth, TX, Optimizing Cataract Surgery Technique, Continuing Physician Education, Cataract Surgery and Wet Laboratory, Jobson August 2017, Dallas-Fort Worth, TX, Managing Coexisting Cataract and Astigmatism – Advanced Techniques, Continuing Physician Education, Cataract Surgery and Wet Laboratory, Jobson

August 2017, Dallas-Fort Worth, TX, Surgical Grand Rounds – When Disaster Strikes, Continuing Physician Education, Cataract Surgery and Wet Laboratory, Jobson

August 2017, Dallas-Fort Worth, TX, Capsulorhexis & Cataract Wet Laboratory, Continuing Physician Education, Cataract Surgery and Wet Laboratory, Jobson

July 2017, Disorders of the Anterior Segment, UC San Diego School of Medicine, Department of Ophthalmology, Cornea Lecture Series

#### **CHRISTOPHER W. HEICHEL, MD**

February 2018, Ophthalmology Update 2018 La Jolla, CA, Managing the Dislocated IOL

February 2018, Ophthalmology Update 2018 La Jolla, CA, Allergic Eye Disease: What is New?

February 2018, Ophthalmology Update 2018 La Jolla, CA, Grand Rounds of Challenging Cataract and Lens Surgery

August 2017, UC San Diego School of Medicine & Shiley Eye Institute Cataract Surgery Wet Lab Workshop

#### WON-KYU JU, PhD

2017, Atlanta, GA, Functional Role of Camp in Oxidative Stress-Induced Optic Nerve Head Astrocytes, Basic Science Catalyzing Treatments for Glaucoma, International Society for Eye Research (ISER)/BrightFocus 2017 Glaucoma Symposium

2017, Taipei, Taiwan, Functional Role Of Mitochondrial Dynamics in Glaucomatous Optic Neuropathy, The 11th UC San Diego-UST (University System of Taiwan) Bilateral Symposium

2018, New York, NY, Coenzyme Q10 And Oxidative Stress-Induced Retinal Neurodegeneration, The 9th Conference of the International Coenzyme Q10 Association

2018, San Diego, CA, Oxidative Stress And Mitochondrial Dysfunction in Retinal Degeneration, The 12th UC San Diego-UST (University System of Taiwan) Bilateral Symposium

#### DON O. KIKKAWA, MD

October 31, 2017, Perth, Australia, Peter Rogers Lecture, "Surgery Management of Thyroid Eye Disease" Royal Australian New Zealand College of Ophthalmology Congress

June 2, 2018, Tokyo, Japan, "Complicated Ptosis Repair" JSOPRS, Keio University

May 5, 2018, Barretos Brazil, Surgical Demonstrations: "Upper Blepharoplasty Associated With Ptosis Repair (Anterior/Posterior Approach)/ Browpexy, "Lower Blepharoplasty Associated With Fat Repositioning/ SOOF Lift," "Endoscopic DCR." Oculoplastic Course (COP), IRCAD

May 4, 2018, Barretos Brazil, Lectures: "Upper Blepharoplasty Associated With Ptosis Repair And Browpexy, "Lower Blepharoplasty: How To Avoid And Manage Complications." Oculoplastic Course (COP), IRCAD

April 7-8, 2018, Iowa City, IA, "Cases from the UC San Diego Oculoplastics Archives," "Finding New Solutions to Vexing Problems in Oculoplastics," and "Building Effective Teams in Ophthalmology," University of Iowa Department of Ophthalmology

February 22, 2018, Seattle, WA, "Finding New Solutions to Vexing Problems in Oculoplastics " and "Building Effective Teams in Ophthalmology," University of Washington Department of Ophthalmology

February 21, 2018, Seattle, WA, "The Challenging and Changing Landscape of Aesthetic Surgery," Washington Academy of Eye Physicians and Surgeons."

February 6, 2018, San Diego, CA, "Triumphs and Tribulations in Anophthalmic Socket Management." International Academy of Ocularistry

December 8, 2017, "Oculofacial Surgery in the 21st Century" and "Challenging Cases in Pediatric Oculoplastic Surgery." "Cases from the UC San Diego Oculoplastics Archives" University of Pennsylvania Department of Ophthalmology, Scheie Eye Institute and Children's Hospital of Philadelphia

November 11-12, 2017, New Orleans, LA, "Orbital Floor And Lateral Wall Decompression," Ptosis Repair- Case Based Approach," "Cultural and Anatomical Differences – Tips for Cosmetic Surgery in Asian Patients." AAO Annual Meeting Symposium

November 9-10, 2017, New Orleans, LA, "How to Stop TED in its Tracks- TED Symposium," "Upon Further Review – Complications Panel" ASOPRS Fall Scientific Symposium

November 3-4, 2017, Sao Paolo, Brazil, "The Changing Landscape of Aesthetic Surgery," 'Transconjunctival Lower Blepharoplasty: Fat Excision or Repositioning?" 'Injectables: A Replacement For Surgery?" "Small Incision Non-Endoscopic Browlift" UNIFESP Aesthetic Conference

October 31- November 1, 2017, Perth, Australia, "Keynote Lecture: Finding New Solutions to Vexing Problems in Oculoplastics," "Lacrimal and Ptosis Surgery: Contextual Differences in the Developed Versus Developing Setting," and "Clinical Controversies: Dacrocystorhinostomy" Royal Australian New Zealand College of Ophthalmology Congress

October 28, 2017, Perth, Australia, "Complicated Ptosis Repair," Australian New Zealand Ophthalmic Plastic and Reconstructive Surgery Society

September 1-2, 2017, Osaka, Japan, "Multidisciplinary Treatment of Thyroid Eye Disease," "Oculoplastics As A Specialty: Doing Your Best For Patients" Osaka Medical College

July 7, 2017, Dalian, China, "Soft Tissue Fillers And Neurotoxins," 2nd Hospital of Dalian Medical University

#### **BOBBY S. KORN, MD, PhD**

June 16, 2018, San Diego, CA, "Eye Manifestations of Thyroid Eye Disease" Graves' Disease and Thyroid Foundation Patient and Family Conference

June 2, 2018, Yokohama, Japan, "Management of Blepharoplasty Complications" Annual Meeting of the Japan Society of Ophthalmic Plastic and Reconstructive Surgeons

February 17, 2018, San Diego, CA, "Orbital Complications After Skull Base Surgery" North American Skull Base Society 28th Annual Meeting

December 14, 2017, Dubai, UAE, "Minimally Invasive Orbital Decompression." Emirates Society of Ophthalmology

December 14, 2017, Dubai, UAE, "How to Perform a 10 Minute DCR" Emirates Society of Ophthalmology

December 14, 2017, Dubai, UAE, "Nonsurgical Rejuvenation of Eyelid and Face" Emirates Society of Ophthalmology

December 14, 2017, Dubai, UAE, "Management of Post Blepharoplasty Lid Retraction" Emirates Society of Ophthalmology

September 23, 2017, Los Angeles, CA, "The 10 Minute DCR" Oculofacial Plastic Surgery CME Conference, University of Southern California October 6, 2017, Chicago, IL, "Eyelid Reconstructions after Mohs Surgery"

August 30, 2017, "Management of Ptosis." Plastic Surgery Grand Rounds. University of California, San Diego, Division of Plastic Surgery

July "Complex Lid Reconstructions" Facial Plastic and Reconstructive Surgery Resident Core Lecture Series. University of California, San Diego, Division of Head and Neck Surgery

#### JOHN H. K. LIU, PhD

2017 National Sun Yat-sen University, Institute of Medical Science and Technology, Kaohsiung, Taiwan. "Continuous Measurement of Intraocular Pressure"

2018 APAO Latest Development in Ocular Imaging Symposium, Hong Kong, "Retinal and Choroidal Imaging In Different Postures"

#### SHIRA L. ROBBINS, MD

July 2018, San Diego, CA, Clinical Progress in the Management of Congenital Plasminogen Deficiency, Rady Children's Hospital Grand Rounds, Pediatric Hematology and Oncology

June 2018, San Diego, CA, Strabismus in Thyroid Eye Disease. Graves' Disease and Thyroid Foundation Patient & Family Conference

May 2018, Pittsburgh, PA, Clinical Progress in the Management of Congenital Plasminogen Deficiency, Shira Robbins and Per Morten Sandset, American Society of Pediatric Hematology and Oncology

February 2018, Intrauterine and Perinatal Infections. Ophthalmology Residents And Medical Students, University of California, San Diego

February 2018, Carlsbad, CA, Dispelling Myths: The Relationship between Steroid and Pediatric IOP. Regional Ophthalmologists, UC San Diego Annual Update Meeting

January 2018, Retinopathy of Prematurity, Ophthalmology Residents, University of California, San Diego

December 2017, Hyderabad, India, Plasminogen Deficiency, Systemic Diseases Symposium, 4th World Congress of Paediatric Ophthalmology and Strabismus

December 2017, Hyderabad, India, Anti-VEGF for Types 1 and 2 ROP in Zone I: Structural and Functional Benefits and Risks. The Great Debate: Retinopathy of Prematurity. Robbins SL, Mintz-Hittner H. 4th World Congress of Paediatric Ophthalmology and Strabismus December 2017, Hyderabad, India, The Relationship Between Steroids and IOP: Dispelling Myths. Paediatric Uveitis Symposium. 4th World Congress of Paediatric Ophthalmology and Strabismus

November 2017, New Orleans, LA, Ligneous Conjunctivitis and Plasminogen-Related Disease: Can We Finally Treat Them? American Academy of Ophthalmology Corporate Program

November 2017, New Orleans, LA, Pediatric Eye Emergencies You Don't Want To Miss! American Academy of Ophthalmology Annual Meeting

November 2017 Operative Surprises: When the Third Eye is Not so Wise, American Academy of Ophthalmology Pediatric Ophthalmology Pre-Day

November 2017, Hyderabad, India, Orbital Surprises After Strabismus Surgery, Eye on the Future 2017: Cross Talk Strabismus and Beyond, LV Prasad Eye Institute

November 2017, Las Vegas, NV, Ramkumar, HL, Koduri MP, Kim JH, Metallo C, Quehenberger O, Robbins SL. High n-6:n-3 Fatty Acid Ratios In Preterm Infants From A Coastal San Diego Population Despite Maternal N-3 Dietary Enrichment. North American Society For Pediatric Gastroenterology, Hepatology and Nutrition

September 2017, Raleigh, NC, Omega-3 Fatty Acids as a Non-Invasive Therapy for the Prevention of Retinopathy Of Prematurity: Stopping Blindness in the Smallest of Babies, Hartwell Foundation Annual Investigator Meeting

August 2017, Dana Point, CAPrenatal Ultrasound: The Eyes in the Hopper, American Eye Study Club Annual Meeting

#### PETER J. SAVINO, MD

February 17-18, 2018, Carlsbad, CA, Review of Ophthalmology

April 20-21, 2018, Rochester MN, Neuro-Ophthalmology and Glaucoma Symposium. Mayo Clinic

May 19, 2018, Philadelphia, PA, Neuro-Ophthalmology Update, Wills Eye Hospital

August 10, 2018, Grand Rounds- Neuroscience Department, UC San Diego, La Jolla, CA

#### **PETER SHAW, PhD**

2017, Chengdu Biomedicine Symposium, Chengdu, China "Soluble Adenyl Cyclase And Retinal Neuron Differentiation" 2018, San Diego, CA "Oxidized Phospholipids, Complement Pathways And Age-Related Macular Degeneration"

2018, ARVO, Honolulu, Hawaii "HTRA1 Synergizes With Oxidized Phospholipids In Activation Of Vegf And Inflammatory Factors in ARPE-19 Cells"

#### DOROTA SKOWRONSKA-KRAWCZYK, PhD

13th International Congress of the Polish Neuroscience Society; "Molecular Mechanisms of Retinal Ganglion Cells Degeneration and Neuroprotection"

Citizen Lecture Series, Talk at San Diego Central Library "Neural Degeneration in Glaucoma"

UC San Diego Leichtag Biomedical Research Building, Public Lecture "From Microscope to Watercolor"

2nd Annual La Jolla Aging Meeting, Salk Institute; Invited Speaker: "Removal Of Early Senescent Cells To Protect The Retina In Glaucoma"

Citizen Lecture Series, talk at San Diego La Jolla Library "Aging Eye – Do We Know The Mechanism?"

#### **ROBERT N. WEINREB, MD**

2017, Bruno Boles Carenini Lecture, 1st International Congress of the Associazione Italiana Studio Glaucoma, Rome, Italy "Enhancing Angle Surgery for Glaucoma with Anterior Segment Optical Coherence Tomography"

#### KANG ZHANG, MD, PhD

2018, Federal University of Goias Congress, Goias, Brazil Speaker

2018, Guangzhou, China, Molecular Mechanism for Eye Development & Ocular Pathogenesis and Beyond

2018, Chengdu, China, 8th Nature Conference on Genome Variation in Precision Medicine, "Translating Genomics, Stem Cell Technology, and Artificial Intelligence into Therapy in Precision Medicine"

2018, Liquid Biopsy Summit, San Francisco, CA "Circulating Tumor DNA Methylation Markers for Diagnosis and Prognosis of Hepatocellular Carcinoma"

2018, ARVO Minisymposium, Honolulu, HI "Lens and Cornea Regeneration Using Endogenous Stem Cells"

2018, PRISM Lecture Series, La Jolla, CA "Harnessing Genomics, Epigenomics, And Stem Cell Technology To Address Unmet Medical Needs"

2017, ESGCT Congress, Berlin, Germany "Gene And Mutation Independent Therapy Via Crispr/Cas9 Mediated Cellular Reprogramming In Rod Photoreceptors"

# CLINICAL TRIALS

#### **CORNEA**

SHP640-301: A Phase 3, Multi-Center, Randomized, Double-Masked Study to Evaluate the Clinical Efficacy and Safety of SHP640 (Pvp-Iodine 0.6% And Dexamethasone 0.1%) Ophthalmic Suspension Compared to Placebo in the Treatment of Adenoviral Conjunctivitis. Shire Human Genetic Therapies, Inc. Pl: Weldon W. Haw, MD

SHP640-303: A Phase 3, Multi-Center, Randomized, Double-Masked Study to Evaluate the Clinical Efficacy and Safety of SHP640 (Pvp-lodine 0.6% And Dexamethasone 0.1%) Ophthalmic Suspension Compared to Placebo in the Treatment of Bacterial Conjunctivitis. Shire Human Genetic Therapies, Inc. PI: Weldon W. Haw, 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

Autologous Limbal Stem Cells to Promote Recovery Following Photorefractive Keratectomy PI: Christopher W. Heichel, MD

Evaluation of Efficacy of 20 mg/ml Rhngf New Formulation (with Anti-Oxidant) in Patients With Stage 2 And 3 Neurotrophic Keratitis, Dompe Farmaceutici, Spa, 2016 - Present PI: Natalie A. Afshari, MD

Randomized Double-Blind Phase II Study of Radioactive Iodine (RAI) in Combination With Placebo or Selumetinib for the Treatment of Rai-Avid Recurrent/Metastatic Thyroid Cancers. Academic and Community Cancer Research United. May 2015 - Present. Sub-I: Natalie A. Afshari, MD

A Phase I/lia Study of BMS 986148, A Mesothelin Directed Antibody Drug Conjugate, in Subjects with Select Advanced Solid Tumors. Bristol-Myers Squibb. November 2016 - Present. Sub-I: Natalie A. Afshari, MD

#### **GENETICS**

Evaluating Genotypes Using Intravitreal Aflibercept Injection PI: Kang Zhang, MD, PhD

#### **GLAUCOMA**

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, September 2018 - August 2019, Pl: Robert N. Weinreb, MD

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

The Efficacy and Safety of Bimatoprost Sr in Patients with Open-Angle Glaucoma or Ocular Hypertension PI: Andrew S. Camp, MD

Study to Assess Rapid Disease Progression by Clinical and Genetic Factors in Glaucoma Patients that are High Risk (STARFISH) PI: Robert N. Weinreb, MD

Genentech Neighbors Genotyping PI: Robert N. Weinreb, MD

Efficacy and Safety of Abgn-168H in Patients with Active Psoriatic Arthritis: A 24-Week, Open-Label, Multi-Center, Phase II Proof of Principle Trial PI: Andrew S. Camp, MD

A Prospective, Double-Masked, Randomized, Multicenter, Placebo Controlled, Parallel-Group Study Assessing the Safety and Ocular Hypotensive Efficacy and Optimum Concentration to be Used Clinically of Netarsudil Ophthalmic Solution In Japanese/Japanese American PI: Andrew S. Camp, MD

Subconjuctival Mitomcyin-C Injection Versus Direct Sclera Application In Trabeculectomy PI: Robert N. Weinreb, MD, Sub-I: Jiun Do, MD

Live Human Aqueous Angiography for Aqueous Humor Outflow Visualization PI: Robert N. Weinreb, MD, Sub-I: Alex Huang, 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

Effects of A Single Osteopathic Manipulative Treatment (OMT) on Intraocular Pressure (IOP) Reduction PI: Hollis King, Sub-I: Linda M. Zangwill, PhD

Evaluation of the Repeatability and Reproducibility of Angiovue In Normal Subjects, Retinal Patients, and Glaucoma Patients PI: Robert N. Weinreb, MD

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 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

#### **PEDIATRIC OPHTHALMOLOGY**

An Observational, Multi-Center Study of the Prevalence of Cerebrotendinous Xanthomatosis (CTX) in Patient Populations Diagnosed with Early Onset Idiopathic Bilateral Cataracts PI: Shira L. Robbins, MD Sub-I: David B. Granet, MD

#### **RETINA**

Suprachoroidal Injection of Triamcinolone Acetonide with IVT Aflibercept in Subjects with Macular Edema Following Rvo (SAPPHIRE) PI: Daniel L. Chao, MD, PhD

A Two-Year, Randomized, Double-Masked, Multicenter, Three-Arm Study Comparing the Efficacy and Safety of Rth258 Versus Aflibercept in Subjects with Neovascular Age-Related Macular Degeneration PI: William R. Freeman, Md Sub-I: Eric Nudleman, MD, PhD, Daniel L. Chao, MD, PhD

A Randomized, Masked, Controlled Trial to Study the Safety and Efficacy of Suprachoroidal CIs-Ta in Conjunction with Intravitreal Aflibercept in Subjects with Central Retinal Vein Occlusion PI: Daniel L. Chao, MD, PhD Sub-I: Eric Nudleman, MD, PhD, William R. Freeman, MD

A Phase III, Multicenter, Randomized, Double-Masked, Sham-Controlled Study to Assess the Efficacy and Safety of Lampalizumab Administered Intravitreally to Patients with Geographic Atrophy Secondary to Age-Related Macular Degeneration PI: Henry Ferreyra MD, Sub-I: Kang Zhang, MD, PhD

A Multicenter, Open-Label Extension Study to Evaluate the Long-Term Safety and Tolerability of Lampalizumab in Patients with Geographic Atrophy Secondary to Age-Related Macular Degeneration who have Completed a Roche-Sponsored Study PI: Henry Ferreyra, MD, Sub-I: Kang Zhang, MD, PhD

A Dose-Ranging Study of Intravitreal Opt-302 in Combination with Ranibizumab, Compared with Ranibizumab Alone, in Participants with Neovascular Age-Related Macular Degeneration (Wet AMD) PI: Daniel L. Chao, MD, PhD

A Phase 2B Randomized, Double-Masked, Controlled Trial to Assess the Safety and Efficacy of Zimura<sup>™</sup> (Anti-Complement Factor 5 Aptamer) in Subjects with Geographic Atrophy (GA) Secondary to Dry Age-Related Macular Degeneration PI: William R. Freeman, MD Eagle: Evaluating Genotypes Using Intravitreal Aflibercept Injection PI: Kang Zhang, MD, PhD

A 24-Week, Double-Masked, Multicenter, Two-Arm Extension Study to Collect Safety and Efficacy Data on Brolucizumab 6 mg Drug Product Intended for Commercialization in Patients with Neovascular Age-Related Macular Degeneration who have Completed the Crth258a2301 Study PI: William R. Freeman, MD

# GRANTS

#### **RADHA AYYAGARI, PhD**

Genetics of Hereditary Retinal Degenerations, PI: Radha Ayyagari, PhD, The Foundation Fighting Blindness, July 2011 - July 2017

Insights Into AMD Derived from the Genetic Mechanisms in Late Onset Retinal Macular Degeneration (L-Ormd), PI: Radha Ayyagari, PhD, Thome Memorial Foundation, December 2014 - December 2017

Molecular Pathology Underlying Retinal Degeneration Due to the Involvement of CTRP5/C1QTNF5 and MFRP Genes, PI: Radha Ayyagari, PhD, The Foundation Fighting Blindness, June 2015 - June 2018

Molecular Basis of Hereditary Retinal Degenerations, PI: Radha Ayyagari, PhD, NIH/NEI, June 2016 - May 2021

#### NATALIE A. AFSHARI, MD

Vision Restoration with a Collagen Crosslinked Boston Keratoprosthesis Unit Study Consortium PI: Natalie A Afshari, MD, DoD, September 2015 - August 2019

Application of Rna-Targeting Cas9 to Fuchs' Dystrophy Co-I: Natalie A. Afshari, MD, NIH, April 2018 - March 2023

#### **DIRK-UWE G. BARTSCH, PhD**

Mechanistic-Based Non-Invasive Assessment of Retinal Damage in HAART Era PI: Dirk-Uwe G. Bartsch, PhD, NIH, June 2006 - August 2021

Animal Structure and Function PI: Dirk-Uwe G. Bartsch, PhD, NIH, July 2012 - June 2018

Test Intravitreal Injection Drug Devices PI: Dirk-Uwe G. Bartsch, PhD, Nanovision Biosciences, Inc. March 2014 - May 2018

#### SHYAMANGA R. BOROOAH, PhD

Testing Disease Modifying Treatments for Macular Degeneration PI: Shyamanga R. Borooah, PhD, Bayer Healthcare, April 2017 - March 2018

Investigating Disease Modifying Interventions for Late-Onset Retinal Degeneration PI: Shyamanga R. Borooah, PhD, The Foundation Fighting Blindness, August 2018 - July 2021

#### **CHRISTOPHER BOWD, PhD**

Machine Learning Methods for Detecting Disease-Related Functional and Structural Change in Glaucoma PI: Christopher Bowd, PhD, Co-I: Robert N. Weinreb, MD, Co-I: Michael H. Goldbaum, MD, Co-I: Linda Zangwill, PhD, NIH, July 2017 - June 2019

#### DANIEL L. CHAO, MD, PhD

Effects Of Hypoxia-Induced Injury in Zebrafish PI: Daniel L. Chao, MD, PhD Bright Focus Foundation, July 2017 - July 2019

A Zebrafish Model of Wet Macular Degeneration PI: Daniel L. Chao, MD, PhD, UC San Diego Academic Senate, January 2018 - December 2018

#### **TODD P. COLEMAN, PhD**

"Digital High Resolution Melt and Machine Learning for Rapid and Specific Diagnosis in Neonatal Sepsis", Co-I: Todd P. Coleman, PhD, NIH/NIAID 1R01AI134982

"International Collaboration to Develop Scalable Methods for Early Detection of Neurodevelopmental Disorder Due to Prenatal Alcohol Exposure", Co-I: Todd P. Coleman, PhD, NIH/NIAAA 1R01AA026579

"Adhesive Wearable Sensor for Kangaroo Mother Care", PI: Todd P. Coleman, PhD, Gates Foundation

#### MICHAEL H. GOLDBAUM, MD

Evaluating Phenotypes Using Intravitreal Aflibercept Injection PI: Michael H. Goldbaum, MD Regeneron, 2014-2018

#### **DAVID B. GRANET, MD**

Amblyopia Treatment Study: Study of Binocular Computer Activities for Treatment of Amblyopia (ATS18) Co-PI: David B. Granet, MD; Co-PI: Shira Robbins, MD, Pedig Jaeb Center for Health Research, October 2014 - December 2018

#### WON-KYU JU, PhD

Mitochondrial Dysfunction in Glaucomatous Optic Neuropathy PI: Won-Kyu Ju, PhD, Co-I: Robert N. Weinreb, MD, NIH, September 2009 – August 2019

Mitochondrial Dysfunction in Glaucomatous Optic Neuropathy PI: Won-Kyu Ju, PhD, UC San Diego Academic Senate, June 2018 - May 2019

#### DON O. KIKKAWA, MD

Gene Expression in Nonspecific Orbital Inflammation Disease Co-I: Don O. Kikkawa, MD, NIH, September 2016 - August 2021

#### JONATHAN H. LIN, MD, PhD

Protein Homeostasis and Proteotoxicity Mechanisms PI: Jonathan H. Lin, MD, PhD NIH/NINDS, February 2015 - January 2020

Cellular and Molecular Mechanisms of Age-Related Retinal Degeneration PI: Jonathan H. Lin, MD, PhD Va/BIr&D, April 2014 - March 2018

Endoplasmic Reticulum Stress in Neurodegeneration PI: Jonathan H. Lin, MD, PhD Va/Rr&D, February 2017 - January 2021

The Jackson Laboratory Center for Precision Genetics: New Models To Novel Therapeutics PI: Burgess, Nishina, Subcontract: Jonathan H. Lin, MD, PhD NIH/ OD, August 2015 - June 2020

UC San Diego Alzheimer Disease Research Center Pilot Project 3 Pl: Galasko, Pilot Project: Jonathan H. Lin, MD, PhD NIH/AG, September 2016 - August 2017

Amydis Diagnostics Ocular Tissue Project PI: Jonathan H. Lin, MD, PhD Amydis Diagnostics, Inc, September 2016 - August 2017

#### ERIC D. NUDLEMAN, MD, PhD

Testing Intravitreal Injection Drug Particles PI: Eric D. Nudleman, MD, PhD, Biospinnaker Sciences, Inc. April 2017 - June 2018

Role of PDLIM1 in Retinal Vascular Leakage and Proliferation PI: Eric D. Nudleman, MD, PhD, NIH/NEI, April 2018 - March 2021

#### NICHOLAS OESCH, PhD

Computing Luminance and Contrast in Prosthetically Driven Retina PI: Nicholas Oesch, PhD, NIH, Sept 2018 - June 2023

#### **NAPOLEONE FERRARA, MD**

Identification of Novel Inhibitors of Ocular Neovascularization PI: Napoleone Ferrara, MD, NIH/NEI, July 2018 - June 2020

#### SHIRA ROBBINS, MD

An Observational, Multi-Center Study of the Prevalence of Cerebrotendinous Xanthomatosis (CTX) in Patient Populations Diagnosed with Early Onset Idiopathic Bilateral Cataracts PI: Shira L. Robbins, MD Co-Pi: David B. Granet, MD Retrophin, Inc., 2016 - Present

Omega-3 Fatty Acids as a Therapy for the Prevention of Retinopathy of Prematurity PI: Shira Robbins, MD, Hartwell Foundation, April 2015 - March 2018

#### PETER SHAW, PhD

HTRA1 as a Therapeutic Target in the Treatment of Wet AMD PI: Peter Shaw, PhD, NIH/NEI, August 2015 – August 2020

#### DOROTA SKOWRONSKA-KRAWCZYK, PhD

Molecular Mechanism of Glaucoma PI: Dorota Skowronska-Krawczyk, PhD, NIH, March 2017-February 2022

Age-Related Alterations in 5-Hydroxymethyl Cytidine Levels and Their Impact on Human Physiology Co-PI: Dorota Skowronska-Krawczyk, PhD Center for Healthy Aging, UC San Diego, Center for Healthy Aging Research Pilot Award, October 2016 - September 2017

Understanding Senescence to Develop Glaucoma Treatments PI: Dorota Skowronska-Krawczyk, PhD, Research To Prevent Blindness, June 2018 - June 2020

Nanoparticle-Based Glaucoma-Targeted Gene Therapy: A New Look at the Therapy for People who are Losing their Sight Ability PI: Dorota Skowronska-Krawczyk, PhD, Eppley Foundation, July 2018 - June 2019

Eliminate to Protect PI: Dorota Skowronska-Krawczyk, PhD, Glaucoma Research Foundation, March 2018 - February 2019

#### **KARL J. WAHLIN, PhD**

Modeling Photoreceptor Development and Disease Using Human Pluripotent Stem Cells PI: Karl J. Wahlin, PhD, NIH, August 2016 - July 2019

Microenvironment Based Optimization of Retinal Induction Using Crispr-Cas9 Reporter Pluripotent Stem Cells as an Expandable Source of Retinal Progenitors and Photoreceptors PI: Karl J. Wahlin, PhD, California Institute for Regenerative Medicine, October 2016 - September 2019

Complement Factor H Mutant Pluripotent Stem Cells to Model Early Onset Macular Degeneration and their Application in Drug Discovery PI: Karl J. Wahlin, PhD, BrightFocus Foundation, July 2016 - August 2018

An IPSC Cell Based Model of Macular Degeneration for Drug Discovery PI: Karl J. Wahlin, PhD, California Institute for Regenerative Medicine, April 2018 - March 2020

#### **ROBERT N. WEINREB, MD**

ADAGES III: Contribution of Genotype to Glaucoma Phenotype in African Americans PI: Robert N. Weinreb, MD, Co-I: Radha Ayyagari, PhD, Co-I: Linda Zangwill, PhD, NIH/NEI, September 2013 – August 2018

Diagnosis and Monitoring of Glaucoma with Optical Coherence Tomography Angiography PI: Robert N. Weinreb, MD, NIH/NEI, May 2018 - April 2022

Ophthalmology and Visual Sciences Career Development K12 Program PI: Robert N. Weinreb, MD, Co-I: Natalie A. Afshari, MD, NIH/NEI, April 2015 – March 2020

Ocular Hypertension Treatment Study 20-Year Follow-Up: Clinic Center PI: Robert N. Weinreb, MD, NIH/NEI, April 2015 – March 2018

Unrestricted and Challenge Grant - Research To Prevent Blindness PI: Robert N. Weinreb, MD, January 2018 - December 2023

#### DEREK S. WELSBIE, MD, PhD

Kinase Multitargeting for Glaucoma Neroprotection PI: Derek Welsbie, MD, PhD, NIH, September 2018 - June 2023

Targeting Dual Leucine Zipper Kinase as a Therapeutic Strategy for Traumatic Optic Neuropathy and Brain Injury PI: Derek Welsbie, MD, PhD Department of Defense Vision Research Program Translational Research Award, July 2014 -June 2018

Glaucoma Neuroprotection: Rho-Associated Kinase 2 (ROCK2) as an Upstream Activator of Dual-Leucine Zipper Kinase (DLK) in Response to Axonal Injury PI: Derek Welsbie, MD, PhD Ziegler Foundation Career Development Award, November 2014 - October 2017

Novel AAV/CRISPR Therapeutic for DLK Inhibition PI: Derek Welsbie, MD, PhD Brightfocus Foundation Glaucoma Research Award, July 2017 - June 2018

Collaboration on the Development of an Inhibitor of Dual Leucine Zipper Kinase (DLK) and Leucine Zipper Kinase Consortium PI: Derek Welsbie, MD, PhD, July 2017 - June 2018

Characterization of the Role of Dual Leucine Zipper Kinase (DLK) in Structual and Functional Retinal Ganglion Cell Loss in Rodent Models of Optic Neuropathy PI: Amit K. Patel, PhD, Fight For Sight Foundation, July 2016 - December 2017

#### LINDA ZANGWILL, PhD

Diagnostic Innovations in Glaucoma Study (DIGS): High Myopia and Advanced Diseases PI: Linda Zangwill, PhD, Co-I: Robert N. Weinreb, MD, Co-I: Christopher Bowd, PhD, NIH, March 2017 – February 2022 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

P30-Center Core Grant for Vision Research PI: Linda Zangwill, PhD, Co-I: William R. Freeman, MD, Co-I: Dirk-Uwe G. Bartsch, PhD, Co-I: Lingyun Cheng, MD, NIH, September 2018 – August 2022

Translational Vision Research Training at UC San Diego PI: Linda Zangwill, PhD, Co-I: Radha Ayyagari, PhD, NIH, April 2016 – March 2021 The Role of Microvasculature in the Pathophysiology of Glaucoma PI: Linda Zangwill, PhD Brightfocus Foundation. July 2017-June 2019

Ocular Hypertension Treatment Study 20-Year Follow-Up: Resource Center For The UC San Diego Optical Coherence Tomography Reading Center PI: Linda Zangwill, PhD, NIH, April 2015 – March 2018

Personalized Forecasting of Disease Trajectory for Patients with Open Angle Glaucoma Co-I: Linda Zangwill, PhD, NIH, July 2016 – June 2021

Effects of a Single Osteopathic Manipulative Treatment (OMT) in Intraocular Pressure (IOP). Co-I: Linda Zangwill, PhD 2016 - 2018

Optical Coherence Tomography in the Ocular Hypertension Treatment Study (Zeiss) PI: Linda Zangwill, PhD 2015-2018

Dietary Interventions to Improve Vision UC San Diego Krupp Endowment Fund (KEF) Research Awards, November 2016 – October 2018 PI: Linda Zangwill, PhD

#### KANG ZHANG, MD, PhD

Limbal Stem Cell Fate and Corneal Specific Enhancers PI: Kang Zhang, MD, PhD, Co-I: Natalie A. Afshari, MD, NIH/NEI, April 2015 – March 2020

Non-Coding Variants Predisposing to Age-Related Macular Degeneration PI: Kang Zhang, MD, PhD, NIH/NEI, August 2015 – June 2018

Molecular Mechanism and Therapy for Ocular Melanoma PI: Kang Zhang, MD, PhD NIH/National Cancer Institute, March 2017 – February 2022

HITI-Mediated Gene Editing for RYR1 Myopathy PI: Kang Zhang, MD, PhD, RYR-1 Foundation, May 2017-May 2019

# DETECTING OPEN ANGLE GLAUCOMA

Detecting primary open angle glaucoma in individuals with myopia is one of the most challenging aspects of glaucoma clinical management. Myopia or nearsightedness is a condition where distant objects appear blurry. The clinical challenge is that the myopic optic nerve head mimics glaucomatous damage, which makes it difficult to diagnose glaucoma in myopes (people with myopia). It also contributes to the difficulty in such patients of managing glaucoma.

For this reason, there is evidence that individuals with myopia may mistakenly be diagnosed as having glaucoma resulting in the over-diagnosis and overtreatment of glaucoma in myopic individuals without the disease. Moreover, as the prevalence of myopia is rapidly increasing, from "1.4 billion worldwide in 2010 to an estimated 5 billion by 2050 according to the World Health Organization, it is critical that methods are developed to improve our ability to differentiate between myopes with and without glaucoma.

Under the direction of Linda M. Zangwill, PhD, Professor of Ophthalmology, the Diagnostic Innovations in Glaucoma Study (DIGS) has been awarded a grant by the National Eye Institute to tackle this important public health issue. DIGS will provide the critical longitudinal data required to improve our understanding of differences in myopic eyes with and without glaucoma in order to improve detection of the disease. Very near-sighted individuals, with or without glaucoma, are being recruited for this study and followed for approximately 4 years with state-of the art retinal imaging and visual function testing. With this data, automated tools will be constructed to identify features that can be used to detect glaucoma in myopic eyes and predict which of them are more likely to have progressive disease.



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Immunohistochemistry of human corneal endothelial cells. Cell membranes are stained green and cell nuclei are red.

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For over 30 years, the philanthropic support from generous individuals, foundations and corporations has provided the 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. Every donation makes an impact on our patients, faculty, and staff, as well as the field of Ophthalmology. We cherish the partnership that we have developed with those generous members of the community and beyond 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 donation to be utilized.

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The Circle of Sight, founded in 1996, is the Shiley Eye Institute's program for donors who make an annual contribution to support the greatest clinical and research needs in The Viterbi Family Department of Ophthalmology. Circle of Sight members are invited to yearly educational lectures. They act as ambassadors for SEI within the community by spreading the word about the amazing accomplishments of the Shiley Eye Institute.

On September 13, 2018, Karl Wahlin, PhD, Assistant Professor of Ophthalmology, spoke on "Stem Cells and Regenerative Ophthalmology." He updated the members on our ophthalmic genetic engineering, drug screening and mini-retinas that his lab is creating.

The group was updated on SEI by **Robert N. Weinreb, MD** then treated to a very special Circle of Sight lecture by authors, Natasha Josefowitz, PhD and Irwin Zahn on April 18, 2018. They read selections and discussed their joint venture "He Writes, She Writes" to a packed house.





# THE HONOR ROLL FOR THE VITERBI FAMILY DEPARTMENT OF OPHTHALMOLOGY GRATEFULLY ACKNOWLEDGES DONATIONS FROM JULY 1, 2017 THROUGH JUNE 30, 2018. THANK YOU TO ALL OF THE INDIVIDUALS, FOUNDATIONS AND CORPORATIONS LISTED BELOW.

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