



FOR SIGHT

Annual Report 2019

The Viterbi Family Department of Ophthalmology

 $\frac{UC\,San\,Diego}{_{SCHOOL\,_{OF}}MEDICINE}$ 



# SIMPLY WORLD CLASS

The UC San Diego Viterbi Family Department of Ophthalmology at the Shiley Eye Institute offers treatment across all areas of eye care. Our world class clinicians, surgeons, scientists 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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RETINAL UNCODED

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**On the cover**: Retinal pigment epithelial cells differentiated from a stem cell line established from the peripheral blood mononuclear cells of a patient. Generated by Pooja Biswas, a graduate student in the Avvagari laboratory.



Dear Friends,

An African proverb reminds us, "If you want to go fast, go alone. If you want to go far, go together."

Every day the Shiley Eye Institute (SEI) and the Viterbi Family Department of Ophthalmology team works together to improve the vision of our patients and provide a brighter future for them. With our imagination and creativity, we seek and identify groundbreaking solutions to clinically important questions. And, as we pursue these paths of discovery, we learn from each other how to better treat, prevent and cure blinding eye diseases.

Our clinicians and scientists do not work in a vacuum. As we seek to apply our research and knowledge to our patients, we reinvigorate (typically in July) each year with a new wave of residents and fellows who refresh our ongoing activities with novel ideas and unique skills. Along with our clinicians and scientists, they push the boundaries of knowledge and raise the expectations for clinical and scientific excellence.

We also are fortunate to have dedicated staff that are uniquely skilled in their work and take great pride in serving our patients. Several have partnered with us for more than a quarter century, and are well known and valued by our patients and faculty. One such colleague is Bill Ramirez, ophthalmic technician, who thoughtfully assists clinicians and helps patients understand their eye care management. Optometrist John Kulischak, OD provides eye examinations; he has prescribed thousands of glasses and contact lenses for patients with meticulous skill. Jo Adamcik, office manager for the Ratner Children's Eye Center, creates an atmosphere that brings comfort to young patients and their parents. Elham Antar, front desk manager, warmly greets longtime and new patients with a friendly smile. And Tess Acera, a research coordinator at the Hamilton Glaucoma Center, has been invaluable to the outstanding clinical research being conducted there.

All of our teams have skilled and experienced leaders and we are fortunate to have the very best in our Vice Chairs - Don O. Kikkawa, MD, Natalie A. Afshari, MD, William Freeman, MD and Craig Kishaba, MBA. Each of them is dedicated to pursuing excellence in our clinical care, vision research and education.

The pace of discovery and rapid proliferation of new technologies at the Shiley Eye Institute and the Viterbi Family Department of Ophthalmology is breathtaking. As we embrace vision research, we value innovations that expedite the translation of discovery for treatments and target the cures for blinding diseases. Our groundbreaking research, catalyzed by innovative diagnostic tools and laboratory resources, could not have been accomplished without our loyal donors, creating a vital team partnership. Their generosity accelerates progress and stimulates profound and lasting contributions to our vision research.

I am grateful for the teamwork and collaboration of our patients, staff, trainees, scientists and clinicians at the Shiley Eye Institute and Viterbi Family Department of Ophthalmology. Each individual contributes immensely and indelibly to our success. Although we have very different backgrounds and experiences, we embrace this diversity and are better because of it. Everyone is unique, but we all share a commitment to excellence!

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Robert N. Weinreb, MD Distinguished Professor and Morris Gleich MD Chair of Glaucoma Director, Shiley Eye Institute Chair, Viterbi Family Department of Ophthalmology



(Standing) Craig Kishaba, MBA, William Freeman, MD (Seated) Don O. Kikkawa, MD, Robert N. Weinreb, MD, Natalie A. Afshari, MD



(Standing) Jo Adamcik, Robert N. Weinreb, MD, Elham Antar (Seated) Bill Ramirez, John Kulischak, OD, Tess Acera



Dear Friends,

The internationally recognized physician-scientists at Shiley Eye Institute and the Viterbi Family Department of Ophthalmology, key elements of UC San Diego Health Sciences, are constantly redefining the way we understand and treat diseases of the eye. Part of our region's only academic medical center, they strive to advance education, research, and clinical care for the benefit of patients in San Diego and beyond.

I am excited by the wonderful progress being made in ophthalmology thanks to the partnership of our community. We recently celebrated the successful attainment of our \$2 billion goal for the Campaign for UC San Diego—several years ahead of schedule. This support has been leveraged to help reshape vision care at UC San Diego Health. And we're just getting started.

Thanks to the gifts of so many forward-thinking donors, this year's report is full of grateful patient stories, discusses technological innovations, shares breakthroughs in personalized therapeutics, and welcomes new faculty. All of this is made possible by supporters such as you.

You empower us to pursue bold ideas and breakthroughs. You pave the way for students to train alongside world-class physician-scientists. And you make revolutionary eye care possible. Thank you for your continued support of Shiley Eye Institute and the Viterbi Family Department of Ophthalmology.

With kind regards,

Pradeep K. Khosla, PhD Chancellor, UC San Diego



Patty Maysent, MPH, MBA

#### Dear Friends,

The Shiley Eye Institute has been at the forefront of eye care and ophthalmology for more than a quarter century. Patients from newborns to seniors are drawn to Shiley because of the focus on world class clinical care and pioneering research aimed at treating all eye conditions, including the most challenging ones.

The institute's outstanding reputation for clinical care is marked by continued growth in visit and surgical volumes. We recently opened a new eye clinic in Hillcrest and a clinic for oculofacial plastics at the Perlman Outpatient Center in La Jolla to increase patient access to our dedicated faculty.

The strength of Shiley's clinical and research programs is a direct result of the strength of our nationally and internationally 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 opportunities for collaboration.

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 EyeMobile, the center provides essential vision screenings and care to underserved children across San Diego. Last school year alone, more than 1,000 glasses were given free to children.

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

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



David Brenner, MD



Steven Garfin, MD

#### Dear Friends,

As we approach the close of 2019, we would like to take a moment to celebrate another year of achievement and distinguished success by the faculty and staff in the Viterbi Family Department of Ophthalmology and Shiley Eye Institute. Both continue to be innovative and vital hubs within UC San Diego School of Medicine and UC San Diego Health.

The researchers, physicians, and staff in the Viterbi Family Department of Ophthalmology and Shiley Eye Institute have always been on the leading edge of academic discovery, where the remarkable is the norm. Researchers work with stem cells to grow new retinas or use machine learning to improve clinicians' abilities to spot the smallest signs of vision problems. With the transformational \$50 million gift from Andrew J. Viterbi, we will be able to expand these efforts through the new Viterbi Family Vision Research Center.

Fifty-one years ago, UC San Diego School of Medicine was mostly bare ground, the site of a former U.S. Army base. From it has arisen an institution ranked as one of the finest schools in country and the world, one that produces doctors and scientists of comparable stature and acclaim. We could not have achieved this recognition without the incredible efforts of the Viterbi Family Department of Ophthalmology and Shiley Eye Institute, and we have no doubt the next half-century will bring many new discoveries that will benefit our community for generations to come.

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

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

### **SHILEY YEAR IN REVIEW 2019**





230,000 **EYEMOBILE FREE VISION SCREENINGS** in San Diego County since 1999







1,112  $\longrightarrow$ FREE GLASSES GIVEN by the EyeMobile











# **1 A TABLE A STATE OF A STATE OF**

# UC San Diego



Amongst the Top 200 Institutions in Biomedical Sciences Worldwide



#### U.S. Academic Institutions in Biomedical Sciences

**4**<sup>th</sup> Yale University

- **5**<sup>th</sup> University of Pennsylvania (Penn)
  - <sup>th</sup> University of California, San Diego



<sup>th</sup> Massachusetts Institute of Technology (MIT)



#### Healthcare Institutions in Biomedical Sciences

**4**<sup>th</sup> Duke University Health System

**5**<sup>th</sup> UW Medicine

- **5**<sup>th</sup> The University of Texas MD Anderson Cancer Center
- $\mathbf{Z}^{th}$  UC San Diego Health Sciences
- **8**<sup>th</sup> Michigan Medicine, U M

# 32 YEARS OF VISIONARY SUPPORT

Locally and globally, patients with blinding eye diseases have been the beneficiaries of the visionary support of Donald and Darlene Shiley for more than 32 years. Here we share some historical highlights of this generous couple's key role in championing the outstanding eyecare, research, education and service to the community at the Donald P. and Darlene V. Shiley Eye Institute.



**1991** Shiley Eye Center opens

**1986** Stuart I. Brown, MD met Donald and Darlene Shiley

**1987** Donation to create the Donald P. and Darlene V. Shiley Eye Center **1990** Groundbreaking of the new Shiley Eye Center



**1997** Circle of Sight Vision Research Lecture





**2003** Hamilton Glaucoma Center & Joan and Irwin Jacobs Retina Center and Shiley Surgery Expansion Ground Breaking



**2004** The opening of the Hamilton Glaucoma Center, Jacobs Retina Center and Expansion of the Shiley Surgery Suite





**2007** Support for retina research and community ophthalmology AMD research recovery room



**2008** Shiley building expansion with added Glaucoma and Retina clinics, faculty offices/labs and new surgery recovery room

**2010** Donald P. Shiley passes away

**2006** Circle of Sight celebration of Donald Shiley's birthday



**2009** Support for the new Shiley EyeMobile for Children





"It was always very clear that my late husband had a special place in his heart for the Shiley Eye Institute," said Darlene Shiley, who has provided unwavering and staunch support for the center since it was founded in 1991. "I will never forget how moved he was by (former director and department chair) Dr. Stuart Brown's description of the work being done and the work that still needed to be addressed..."



**2014** Stuart I. Brown, MD Chair in Memory of Donald P. Shiley



**2016** Shiley Eye Institute celebrates 25th Anniversary

**2015** Shiley Eye Center granted Institute status to become the Shiley Eye Institute



"...And now, decades later, Dr. Robert Weinreb is focused on patient-centric care excellence and leading the Shiley into new areas of vision research and treatment. Successful past, bright future – how fortunate we all are to have been to have such dedicated physicians, scientists, and staff as well as committed volunteers," Darlene Shiley says.

### CELEBRATION TO HONOR THE VITER BI FAMILY Robert N. Weinreb, MD. Burrene Shiley, Andrew Viterbi, PhD

On March 19, 2019, Dr. Andrew J. Viterbi and his family were honored for their transformative generosity naming the Viterbi Family Department of Ophthalmology, the Achille Viterbi Chair, the Alfred Vogt Chair, the future Viterbi Family Endowed Chairs, and the Viterbi Family Vision Research Center.

Hosted by Chancellor Pradeep K. Khosla and Thespine Kavoulakis at the Audrey Geisel University House, the evening was filled with gratitude from UC San Diego Health, UC San Diego Medical School and the Shiley Eye Institute. 

### CONGRATULATIONS NATALIE A. AFSHARI, MD

The American Medical Women's Association (AMWA) honored **Natalie A. Afshari, MD** with the 2019 Women in Science Award at the Medical Women's International Association (MWIA) Centennial Congress in New York. This award is given to a woman scientist who has made exceptional contributions to medical science, through her basic research, publications and leadership in the field. Founded in 1915, AMWA is the oldest multi-specialty organization of women physicians and functions at the local, national and international level to advance women in medicine as well as to improve women's health.

Natalie A. Afshari, MD is the Stuart I. Brown MD Chair in Ophthalmology in Memory of Donald P. Shiley, Chief of the Division of Cornea and Refractive Surgery, Vice Chair of Education and Professor of Ophthalmology UC San Diego Viterbi Family Department of Ophthalmology at the Shiley Eye Institute. She received her medical degree from Stanford University and her residency and fellowship trainings at Harvard University.

Dr. Afshari is an accomplished clinician, surgeon, and research scientist. She is the co-editor of a twovolume cornea book titled Principles and Practice of Cornea. Her National Institutes of Health research grant is on the study of anterior eye disorders as she investigates CRISPR Cas9 and stem cell regeneration of the cornea. When not researching or practicing, Dr. Afshari donates her time and surgical expertise as an international volunteer.

Dr. Afshari is a recognized expert in corneal transplantation, Fuchs Disease and refractive surgery. Her dedication to research and clinical care also inspires her teaching. She has mentored countless residents and fellows in the field of ophthalmology.

"What an honor it was to receive this prestigious award before such a respected group of international women leaders in medicine. Their unwavering commitment to make a difference for women worldwide is inspirational," Dr. Afshari commented. "While attending this global conference, I was honored to have met an exceptional consortium of women from Nigeria whose life task is to recruit and motivate women all over Africa to become doctors or scientists. I will never forget them."



Dr. Afshari and AMWA President, Connie Baum Newman, MD



According to Greek mythology, Odysseus, the Greek king of Ithaca, left his young son, Telemachus, in the care of his wise friend Mentor when he departed to fight the Trojan Wars. For the duration of the conflict and Odysseus' long voyage home, the aged Mentor advised the young prince and helped him fend off his mother Penelope's legion of suitors. More than two thousand years later, the job description of a mentor is quite a bit different than it was then. But like Telemachus, physicians and scientists still can benefit from association with a mentor, regardless of the stage of their career. More *important, they can inspire and* elevate a protégé (or mentee) to reach their potential and beyond.

Image: Telemachus and Mentor, the original mentor in Homer's Odyssey. By Pablo E. Fabisch [Public domain], via Wikimedia Commons

# MENTORING THE LEADERS OF TOMORROW

**Robert N. Weinreb, MD**, Distinguished Professor of Ophthalmology, was awarded the 2019 UC San Diego Health Sciences Faculty Excellence in Mentoring Award. This award recognizes faculty for their outstanding contributions to the mentorship of junior faculty and future leaders in academic medicine. A longstanding tradition in medicine is to teach what has been learned, and the responsibility of teaching is at the core of mentoring. Mentors impart experiential wisdom or knowledge to those who have less of it. They can provide guidance that improves medical or surgical skills.



my fellowship with Robert N. Weinreb, MD, at UC San Diego, that I witnessed how a well-organized, efficient, and productive research and clinical enterprise can advance medical

<sup>66</sup>Role models and mentors are

critical to becoming a successful

clinician-scientist. ... It was during

Glaucoma Today, July/August 2014

Arthur J. Sit, MD Professor and Vice Chair of Ophthalmology and Chief of Glaucoma, Mayo Clinic Glaucoma Fellow 2004-2005



<sup>66</sup> Dr. Weinreb has been an unparalleled mentor to generations of trainees. Consistently generous with his time, he continues to be committed to their success even after they have left UC San Diego. I know this well from personal experience. 99

Sameh Mosaed, MD Professor and Director of Glaucoma, UC Irvine Glaucoma Fellow, 2003-2004 For a clinician-scientist, they also can provide oversight with the planning, conduct and ethics of research, and scientific writing, as well as the review of manuscripts and grants. Mentors can provide an entry for a protégé to the professional community. A seasoned mentor also can advise on prioritization of competing responsibilities, as well as provide insight for issues that arise in departments and organizations.



**66** As a lifelong mentor for me and so many others, he continues to be a source of inspiration, wisdom and support. **99** 

Neeru Gupta MD, PhD, Professor and Dorothy Pitts Chair, Chief of Glaucoma, Professor, Dalla Lana School of Public Health, University of Toronto, Canada

Glaucoma Fellow 1996-1997





66 My glaucoma fellowship with Dr. Weinreb was a major turning point for me in terms of my career. He gave me flexibility and freedom, ...... One of the best pieces of advice that I received came from Dr. Weinreb. He told me to always value the people. ?? The Ophthalmologist, after being ranked as the top

ophthalmologist in the world under 40 years old in 2017

Alex Huang, MD, PhD Assistant Professor, Doheny -UCLA Glaucoma Fellow 2012-2013



<sup>66</sup>Dr. Weinreb has created the most fertile ground for advancements in glaucoma. He demonstrates daily the meaning of leading by example. His mentoring and support has continued to inspire well beyond the fellowship. <sup>99</sup>

Kaweh Mansouri, MD, MPH, Clinique de Montchoisi Clinic at Lausanne and Associate Professor, University of Colorado Glaucoma Fellow 2010-2012

# FACULTY SPOTLIGHT LINDA M. ZANGWILL, PhD

Linda M. Zangwill, PhD, Professor of Ophthalmology, has been appointed the holder of the Richard K. Lansche, MD and Tatiana A. Lansche Endowed Chair in Ophthalmology. At the Hamilton Glaucoma Center (HGC) in the Shiley Eye Institute (SEI), she is the Director of Clinical Research, the Diagnostic Imagining Laboratory, the Data Coordinating Center and the Imaging Data Evaluation and Analysis (IDEA) Reading Center. She is also Primary Investigator and Program Director for the UC San Diego wide National Eye Institute (NEI) supported P30 Vision Research Center Core Grant and the T32 Translational Vision Research Training for postdoctoral fellows.

Dr. Zangwill has published over 300 manuscripts in peerreviewed journals. She serves on the editorial board of the *Journal of Glaucoma*, and International Glaucoma Reviews and is an Association for Research in Vision and Ophthalmology Gold Fellow. Dr. Zangwill is also one of 100 elected members of the prestigious international group, Glaucoma Research Society, has served on its Executive Committee since 2015 and was elected to the position of secretary (2018-2022). She serves on the Executive Board of the Imaging and Perimetry Society (IPS) (2002-present).

#### WHEN DID YOU COME TO SHILEY?

I began my career at the Shiley Eye Center in 1993. **Robert N. Weinreb, MD** recruited me to join Pamela Sample, PhD, an expert in visual function, to enhance the UCSD Department of Ophthalmology's glaucoma clinical research enterprise.

In 1995, I received my first investigator initiated R01 grant from the National Eye Institute (NEI) to study structural changes in glaucoma using the latest imaging technology at the time, the Heidelberg Retina Tomograph. This grant together with Dr. Sample's NEI grant to study visual function in glaucoma was the beginning of the groundbreaking Diagnostic Innovations in Glaucoma Study (DIGS). For DIGS, we recruited healthy subjects and glaucoma patients from the Shiley Eye Center and the community. Initially, we investigated the relationship between structure and function in glaucoma by examining features of the optic nerve head and how they relate to reduction in visual function at one point in time. As the DIGS cohort grew and we had longer follow-up on the participants, we were able to examine how structural changes over time lead to visual disability in glaucoma patients.



In 2002, the NEI funded multi-centered African Descent and Glaucoma Evaluation Study (ADAGES) to help explain why individuals of African descent are four to five times more likely to have glaucoma than individuals of European descent. With collaborators at the University of Alabama at Birmingham (Christopher A. Girkin, MD) and now Columbia University (Jeffrey M. Liebman, MD), we recruited healthy individuals and glaucoma patients of African and European descent to participate in ADAGES following the same longitudinal protocol as DIGS.

Both the DIGS and ADAGES are still active projects funded by the NEI. The data from these projects have been used in over 200 peer-reviewed publications. The DIGS/ADAGES cohort is a unique resource to the glaucoma research community, and we are actively analyzing this data and collaborating with numerous investigators from around the world to tackle some of the most challenging problems in glaucoma management.

"For more than a quarter of a century, Dr. Zangwill has brought unparalleled scientific excellence, organizational skills and collegiality to the Hamilton Glaucoma Center at the Shiley Eye Institute," states Dr. Weinreb. "Her partnership in making the Hamilton Glaucoma Center a world leader - has been invaluable to our success."

### WHAT WAS YOUR LIFE AND CAREER HISTORY BEFORE SHILEY?

I grew up in Los Angeles and stayed in California to complete my BS from UC Berkeley in Nutrition and Food Science. Although my parents encouraged me to become a physician, I was more interested in public health and research. I met my husband, Marc Siegel, in Israel after graduation where I studied the breastfeeding patterns of Bedouin women in the Negev Desert. I then returned to the U.S. to complete a Masters in Science degree in Health Policy and Management from the Harvard School of Public Health. At Harvard, I found my passion for epidemiology and statistics and went on to obtain my PhD in Epidemiology from Ben-Gurion University of the Negev in Beer-Sheva, Israel. It was in Israel that I was introduced to ophthalmology, with a focus on diabetic retinopathy and glaucoma. After finishing our PhDs, we moved with our two daughters, who were born in Israel, to the University of Waterloo in Ontario, Canada for postdoctoral training, where our third daughter was born. We moved directly from Canada to San Diego so that I could join the faculty at UC San Diego.

### AS A RESEARCHER AT SEI, WHAT ARE YOUR RESPONSIBILITIES?

Although I hold many hats and leadership positions internationally and at UC San Diego, my primary focus is research.

As Principal Investigator for the DIGS and ADAGES longitudinal studies, I manage a wonderful team of clinical research coordinators who ensure that the study subjects complete all the required examinations and most importantly that our participants want to come back each year for testing. Through their hard work, some of our subjects have been in our studies for over 20 years, a remarkable accomplishment. As Director of the Imaging Data Evaluation and Analysis (IDEA) Reading Center and Data Coordinating Center, I oversee our outstanding reading center staff who develop the study protocols, process the data and review the quality of all tests and optical coherence tomography images for DIGS and ADAGES and also for industry and foundation sponsored studies and NIH funded multicenter studies including the Ocular Hypertension Treatment 20-year Follow-up Study.

Moreover, I am also fortunate to mentor and interact on a daily basis with glaucoma clinical and research fellows from around the world who come to SEI to improve their research skills and bring clinical research expertise back to their home institutions.



Another extremely rewarding aspect of my job is providing leadership to the vision research community internationally and at UC San Diego as Director of the NEI supported P30-UCSD Center Core Grant for Vision Research (2012-2023), and the T32 Translational Vision Research Training at UC San Diego grant for postdoctoral fellows (2016-2021). The Core grant is a unique National Institute of Health (NIH) resource designed to provide groups of investigators who have achieved independent NEI funding with additional shared support to enhance their own and their institution's capability for conducting vision research. At UC San Diego, the Core grant provides shared biostatistical, imaging, computational ophthalmology and histology resources to the vision research community. The T32 grant is designed to train postdoctoral fellows to be become outstanding translational vision research scientists by building on the exceptional training record of faculty from the UC San Diego School of Medicine in general, and the Shiley Eye Institute in particular.

#### "One of the most rewarding aspects of my job is interacting on a daily basis with outstanding staff and researchers from around the world."

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

Artificial intelligence is changing our daily lives and is transforming health care in general and ophthalmology in particular. One application of artificial intelligence is to use deep learning algorithms to automate the assessment of medical images. Ophthalmology is unique in that acquisition of retinal images has been the standard of care for decades. As part of DIGS and ADAGES we have over 250,000 photographs and images available to develop deep learning algorithms to automatically determine whether patients have glaucoma, whether their glaucoma is progressing and to better predict whether they will lose visual function due to the disease. We found that we can detect glaucoma from fundus photographs with high accuracy and that our algorithm is robust for detecting glaucoma in Japanese patients. We also found that we can predict visual function from optical coherence tomography images so that clinicians can utilize the images to more effectively individualize and reduce the frequency of visual field testing in glaucoma patients. The ultimate goal of these tools is to provide automated decision support for clinicians and to provide screening tools to detect glaucoma in the community particularly in underserved areas with limited access to ophthalmologists.

#### WHAT DO YOU DO IN YOUR FREE TIME?

In my free time I practice yoga, and play tennis. I also play pickleball and boogie board with my husband Marc. Marc and I

love to travel and experience new cultures and cuisines. Family plays a central role in my life. We have three extraordinary daughters, a wonderful son-in-law and an adorable two and a half year old granddaughter.



Linda M. Zangwill, PhD was recently appointed as the holder of the Richard K. Lansche, MD and Tatiana A. Lansche Endowed Chair in Ophthalmology to support her research and teaching activities at the Shiley Eye Institute. This appointment is a direct reflection of the high regard in which she is held by the members of the Viterbi Family Department of Ophthalmology and the UC San Diego academic community.

The endowed chair honors the work and memory of the late Richard K. Lansche, MD, (deceased in 2000) a respected San Diego-area ophthalmologist and his wife Tatiana.

Dr. Lansche practiced ophthalmology at Scripps Clinic and founded the La Jolla Academy of Medicine. He graduated from Northwestern University and Cornell Medical College. Dr. Lansche completed his residency at the Mayo Clinic and served as a captain in the U.S. Army in Germany.

# RICHARD C. ATKINSON LABORATORY FOR REGENERATIVE OPHTHALMOLOGY

The Richard C. Atkinson (RCA) Laboratory studies human eye development and disease, including age-related macular degeneration (AMD), retinitis pigmentosa and glaucoma. This work focuses on three main cell types within the eye including photoreceptors (PR), retinal pigment epithelium (RPE) and retinal ganglion cells (RGCs). Karl Wahlin, PhD, Derek Welsbie, MD, PhD, and others continue to develop cutting edge tools and technology to treat and cure these blinding eye diseases.

#### NEW RESEARCH AREAS

Based on pioneering work in the spinal cord, we have developed a ganglion cell repair strategy to create a new relay for damaged optic nerves using neural stem cells (NSC). This approach is similar to replacing a burnt out fuse. First, NSCs are injected into the optic nerve, just behind the eyeball. These stem cells convert into immature nerve cells that are more capable of growing axons down the optic nerve. Second, the diseased RGCs that are still remaining in the eye are genetically manipulated so that they survive and regrow damaged axons back to the relay (which is only a short distance; they no longer need to connect to the brain).

#### OTHER AREAS OF ACTIVE RESEARCH

- Developing new strategies for eye regeneration: Many animals can grow new body parts including the eye, but humans cannot. Similar to how a starfish can grow a new arm, or a lizard grows a new tail, the human eye might also be capable of regeneration after injury but it first needs instructions to do so. We are developing a strategy to convert existing support cells in the eye into new retinal cells with the instructions that work in other species and hope to be able to make new optic nerve cells or photoreceptors which, in theory, could be used to treat many diseases, such as glaucoma or age-related macular degeneration.
- Patient derived optic nerve cell project/drug screening: Blood samples from Shiley glaucoma patients have been converted to stem cells and gene-edited to incorporate a fluorescent tracker to monitor optic nerve cell health. The ability to see these cells under a microscope assists us in drug screening efforts to identify new neuroprotective

drugs since the presence or absence of a fluorescent signal will indicate whether a cell is alive or dead.

- 3 Identifying new drug targets to treat glaucoma: Dr. Welsbie's group is currently developing a drug to target dual leucine zipper kinase (DLK), a key mediator of nerve cell death. The lab is simultaneously developing a CRISPR-based gene therapy to target this important cell death pathway.
- 4 Studying human retinal disease in a dish: Dr. Wahlin's team has also generated photoreceptor reporter stem cells with mutations similar to those found in children with a devastating hereditary eye disease called Leber congenital amaurosis. Human stem cell derived retinas with this mutation are being cultivated to investigate what goes wrong in retinas during disease.
- **5** Developing age-related macular degeneration models for drug discovery: Retinal pigment epithelial (RPE) cells die during age-related macular degeneration. The RCA lab team has devised a fluorescent imaging approach to visualize cellular stress as a read-out for ongoing macular degeneration-like disease. To replicate actual disease, they have also introduced disease relevant mutations identical to those in AMD patients. This will help screen for drugs that reduce the course of disease in those cells.
- 6 Improving laboratory grown miniature human eyes: The RCA lab team has improved the quality and efficiency of laboratory grown mini-retinas by altering the chemical and gaseous environment that stem cells and young neurons live in. While this might seem trivial, progress in this area is crucial to growing human retinas for the purpose of studying human retinal disease and testing new treatments.



Genetically engineered human mini-retinas are designed to fluoresce red when optic nerve cells form. This allows living cells to be monitored in real-time.

NSC-derived nerve cells that have been engineered to express a red fluorescent protein. Left panel shows the graft of cells in the optic nerve, just behind the eye. Right panel shows axons growing down the optic nerve.

Tools for tracking living cells: New molecular tools are being developed to track fluorescent stem cell derived retinas in order to monitor them in growth. The ability to see optic nerve cells or photoreceptors will greatly assist in studies of human retinal disease since changes in these cell types will be immediately evident under a microscope. Studying human retinal biology is not possible without these vital tools.





Population of the regeneration: In collaboration with Mark Tuszynski, MD, PhD (Professor of Neuroscience), new member of the RCA Laboratory team, Jiun Do, MD, PhD, is focusing on regenerating the optic nerve using stem cells to form neuronal relays that restore lost connectivity (vision loss) between the optic nerve and the brain. Stem cell derived optic nerve relays could enhance the function and survival of existing connections, provide interfaces for bioprosthetics within the visual system of the eye or allow for whole eye transplantations to ultimately restore vision. We now believe that a whole eye transplant may be possible and will be pursued in the RCA Laboratory as a moonshot.

**9** Gene therapy and editing: **Shyamanga Borooah**, MD, PhD is also a new member of the RCA Laboratory team. His research focuses on the development of new regenerative treatments for AMD and inherited retinal disease. Different treatments are required at different stages of disease. In early retinal disease prevention, he has developed gene therapy and gene editing tools to prevent retinal degeneration. For intermediate stage disease, he is testing new antibody based treatments to slow degeneration. For end stage disease, he is testing stem cell replacement transplants to replace lost or dying cells (see image below). This research aims to not only build a range of treatments for different retinal diseases but also to treat these diseases at different stages with the ultimate aim of preventing blindness.



Image of human retinal cells (green) successfully transplanted into a mouse retina (blue and red).

### **EYE-IN-A-DISH**

Age-related macular degeneration (AMD) is the leading cause of vision loss in people over the age of 65 in the United States of America. There are two main forms of AMD, dry AMD and wet AMD. Dry AMD is caused by the slow loss of cells at the macula, the region of the back of the eye that is responsible for central vision. Wet AMD is a more rapid disease causing central vision loss from new blood vessels that leak or bleed at the macula.

The main treatment for wet AMD is currently repeated injections into the eye with drugs that reverse these new vessels. The injections are both demanding for patients and expensive. This highlights an urgent need to improve the understanding of AMD and identify better treatments.



Most research to identify the genetic causes of AMD has required expensive population studies that recruit thousands of patients. The genetic study of AMD has been greatly limited by the lack of models to study the disease. A recent study at UC San Diego, in collaboration with the SEI scientists **Radha Ayyagari, PhD** and **Shyamanga Borooah, MD, PhD**, addresses this need by showcasing a new model to study AMD in a dish.



Immunofluorescence analysis of bestrofin 1, ZO-1 and MITF

The UC San Diego study's leader, Kelly A. Frazer, PhD, professor of pediatrics and director of the Institute for Genomic Medicine at UC San Diego School of Medicine and Moores Cancer Center, as well as her team Erin N. Smith, PhD and Agnieszka D'Antonio-Chronowska, published their innovative findings in *Stem Cell Reports* May 2019.

The 'eye in a dish' model was made by first taking skin samples from participants and then converting these skin cells into stem cells in the laboratory. These stem cells were then grown into retinal cells similar to those found at the macula. One of the key genes linked with wet AMD is vascular endothelial growth factor or VEGF for short.

Using this model and the latest genetic investigation techniques, the research team was able to study the cells and identify changes in the participants DNA that could turn the VEGF on or off. Remarkably, they found that a specific change in the DNA, away from the VEGF gene, was able to help turn down the VEGF gene thus showing that the gene could be modified.

These studies are important, as they are able to identify genetic treatment targets to reduce the risk of AMD. Additionally, these studies can confirm the genetic causes of AMD in the laboratory with relatively few patient samples. The team plans to develop this retinal model further to investigate other genes involved in AMD.

# TECHNOLOGY TRANSFER AT SHILEY EYE





Age-related macular degeneration (AMD) is a leading cause of blindness worldwide. The most common form of AMD is the dry form, for which there is currently no known treatment.

Research performed in the laboratories of the Viterbi Family Department of Ophthalmology by faculty members **Dorota Skowronska-Krawczyk, PhD** and **Daniel Chao, MD, PhD** has identified a novel lipid enzyme that may be involved in the development of AMD. They have found Food and Drug Administration (FDA) approved drugs which increase activity of this enzyme and may serve as a possible treatment for dry AMD.

Dr. Chao recently was awarded third place in The Winning Pitch Challenge with this idea, at the 2019 American Society of Retina Specialists Meeting. The Winning Pitch Challenge is a competition to promote innovation in ophthalmology by providing tools that can assist physician scientists transform novel ideas for improvements in patient care into functioning prototypes that can be early stage studies. The Challenge provides mentors comprised of successful entrepreneurs, investors and executives who volunteer their expertise on concepts, business models and regulatory issues. Drs. Chao and Skowronska-Krawczyk worked with the UC San Diego Office of Innovation and Commercialization to connect with industry support to bring their venture to market. This office supports and accelerates the pioneering community of students, faculty, staff and alumni at UC San Diego. UC San Diego is globally recognized as a fertile ecosystem for innovation leaders.

In February 2019, a patent was licensed from UC San Diego to Visgenx, a startup company focused on developing new treatments for dry AMD, of which Dr. Skowronska-Krawczyk and Dr. Chao are scientific co-founders. The company is focused on developing therapeutics for dry AMD by exploiting a novel lipid enzyme pathway involved in molecular aging of the eye. The first product is a reformulation of an FDA approved drug for eye injection as a therapeutic for dry AMD.

The physician scientists and researchers at the Shiley Eye Institute and Viterbi Family Department of Ophthalmology are not only working to treat, prevent and cure blindness but they are also innovators working to translate discoveries into new therapies for patients.

### GRATEFUL PATIENT

Dear Shiley Eye Institute,

**Cristiana Vasile, MD** is one of the best ophthalmologists at the Shiley Eye Institute! She is not only a great surgeon, but she provides exceptional care for her patients because she really cares for them.

Shiley Eye Institute

Dr. Vasile was recommended to us by a San Diego ophthalmologist in 2016. My son Joe was having problems with high eye pressure after he had detached retina surgery. Dr. Vasile operated on his eye and worked hard to decrease his eye pressure. She reduced it to a normal range over a three-year period of surgeries, patience and substantial effort.

My wife and I were so appreciative for her fine work, we felt that she deserved a prize. But what can you give to a doctor for great service? After checking her background on the Shiley website and seeing that she is from Romania, we found a picture of the Bucharest Medical University from which she received her medical degree. It was easy to print and frame for her. We are pleased that she really likes it and appreciate the staff for being gracious to their patients and families.

Bill, Cary and Joe Rundle Carlsbad, California

### OPHTHALMOLOGY AT THE FREE CLINIC

In addition to its international reputation as a leading center for eye care, the UC San Diego Viterbi Family Department of Ophthalmology at the Shiley Eye Institute (SEI) is also committed to serving the local surrounding communities of San Diego. As part of this mission, SEI faculty, fellows, and residents volunteer their time for the UC San Diego Student-Run Free Clinic. The Free Clinic is a partnership between the UC San Diego School of Medicine and the San Diego community. It provides highquality health care for underserved populations in San Diego County, while teaching and inspiring the next generation of health professionals. Most of the patients seen in the Free Clinic would not otherwise receive health care, so the care services provided serve as a critical safety net for these individuals.

Currently, SEI faculty, fellows, and residents volunteer at three sites: Downtown, Pacific Beach, and Normal Heights. At these sites, Shiley personnel oversee UC San Diego medical students and teach them how to elicit patient histories, perform ophthalmic physical exams, and make referrals for further treatment if needed. Shiley physicians who have generously donated their time to these teaching and service efforts include Jeffrey Lee, MD (Comprehensive Ophthalmology), Daniel Chao, MD, PhD (Retina), Andrew Camp, MD (Glaucoma), Derek Welsbie, MD, PhD (Glaucoma), Jiun Do, MD, PhD (Glaucoma), Doran Spencer, MD, PhD (Uveitis), Sally Baxter, MD (fellow), Jeffrey Wang, MD, and Zhiyong Yang, MD, Derek Mai, MD and Heather Chen, MD (former/current residents).

Chief of Ophthalmology at UC San Diego Hillcrest Medical Center, Dr. Lee states, "As our faculty and residents have made the free clinic a high priority, we have been able to mobilize more ophthalmic resources for these underserved patients than ever before!"





Dr. Lee in particular has played a large role in medical student education and care delivery to the underserved of San Diego. He has overseen tertiary ophthalmic care for a multitude of underserved patients referred from the Free Clinic with advanced disease such as proliferative diabetic retinopathy and end-stage glaucoma. He has made extensive efforts to coordinate care with SEI subspecialists on a number

of these cases. In addition, he has performed numerous cataract surgeries for patients referred from the Free Clinic, providing his surgical expertise free of charge to these patients who otherwise would have been blind. His compassion and generosity have restored sight to a wide array of individuals, empowering them so they are better equipped to address the challenges they already face. Finally, his patience and skilled teaching for medical students has inspired several medical students working in the Free Clinic to become ophthalmologists, thereby fueling the ophthalmic workforce of the future.

#### CONGRATULATIONS DR. VITERBI



Andrew J. Viterbi, PhD received the 2019 University of California San Diego Chancellor's Medal. This medal is one of the highest honors given by UC San Diego to recognize exceptional service in support of the campus mission.

A world-renowned pioneer in the communications world, Andrew J. Viterbi is credited for transforming the way people connect and communicate through his groundbreaking "Viterbi Algorithm." Viterbi spent equal portions of his career in industry and in academia.

The award is given at the annual UC San Diego Founders Celebration which recognizes the anniversary of the institution's 1960 founding and the dedicated individuals who have helped establish the campus as one of the top research universities worldwide. Since its establishment in 2000, the Chancellor's Medal has been awarded annually to select community leaders and philanthropists whose longstanding contributions and involvement have supported promising students, furthered meaningful research and helped the campus and local region grow and prosper.

In 2018, Viterbi gifted \$50 million to UC San Diego to create the Viterbi Family Vision Research Center and the Viterbi Family Department of Ophthalmology, the first named Health Sciences department at the university. Inspired by his father, Achille, an ophthalmologist, Viterbi's gift is dedicated to advancing research, education and eye care.

### RETINAL DEGENERATION CENTER

The retina is a light sensitive layer of tissue that lines the back of the eye. It sends visual messages through the optic nerve to the brain. The photoreceptor cells are the light sensing cells of the retina. Retinal degenerations result from damage to these photoreceptor cells that either malfunction or die. This causes vision to be blurred, distorted or lost in children and adults.

Retinal degenerations are a progressive set of diseases in which the patient suffers a progressive decline in vision. The most common and devastating retinal disease is age-related macular degeneration (AMD). It is debilitating and substantially impacts patients' daily lives when performing everyday tasks such as reading, watching television or driving. This group of diseases is the leading cause of blindness throughout the world. The Viterbi Family Department of Ophthalmology has existing expertise in genetic diagnosis and personalized medicine with both the Richard C. Atkinson Laboratory for Regenerative Ophthalmology and the Downtown San Diego Lions Club Biobank for Vision. Recent breakthroughs have led to the development of new treatments for some retinal degenerations. With the advancement of precision medicine and regenerative ophthalmology, there is a huge opportunity to restore vision to individuals with AMD.

The Retinal Degeneration Center is opening and the team will be led by physician scientists **Daniel Chao**, **MD**, **PhD** and **Shyamanga Borooah**, **MD**, **PhD**.

Although there are large numbers of retinal degeneration patients, there are currently only very few centers worldwide fully equipped to provide novel sight-saving therapies to treat these patients. Such centers are necessary to undertake the clinical trials which lead to the next wave of therapies, such as





gene therapy, for patients. This highlights a critical need for a new retinal degeneration center to provide the latest clinical treatment through a personalized medicine approach and provide clinical trials for novel therapies not only for patients in San Diego but beyond.

The primary aim of the UC San Diego Retinal Degenerations Center is to provide world class clinical care for patients by providing a one-stop clinic which addresses all the clinical needs of AMD and other retinal degeneration patients in a state-of the art precision medicine setting led by a highly trained team of physicians. The clinic will be designed around patients enabling the flow from detailed diagnostic imaging to diagnose and monitor disease to physician assessment before a needs based referral to in house genetics counseling or visual rehabilitation.

A key feature of the UC San Diego Retinal Degenerations Center will be seamless integration of clinical research, creating a unique clinic focused on translational research. Patients will have the opportunity to participate in national and international clinical studies as well as genetic, imaging and biomarker studies performed by investigators at the Shiley Eye Institute. The ultimate aim is to conduct cutting edge research to develop new diagnostics and novel treatments for retinal degenerations.

# SHILEY'S GLOBAL REACH FRIEDA BROWN, PhD

*"MY EYE DOCTORS SAY THAT DR. WEINREB SAVED MY SIGHT 25 YEARS AGO!"*  When obtaining eyeglasses in the 1980's, psychologist Frieda Brown, PhD was identified as having an unusually large optic nerve. The optic nerve is a bundle of nerve fibers that connect and send the visual message from the light sensitive retina at the back of the eye to the brain.

In 1990, she made a huge life change and accepted a position to teach in Kenya at the Nairobi Campus of the United States International University – Africa (USIU). Before her move, she went for her regular vision check and was diagnosed with glaucoma. The doctor gave her prescription drops to use for her eye pressure.

The glaucomas are a group of eye diseases that damage the optic nerve and can result in vision loss and blindness. Without treatment, people with glaucoma will slowly lose their vision. Prescription eye drops to lower eye pressure are the most common treatment for glaucoma.

Frieda finished using the drops in Kenya and thought that was the end of the problem. It was not until she returned to the United States, after teaching one term in Africa, that her colleague mentioned the importance of having glaucoma routinely examined by an ophthalmologist who specializes in glaucoma. He referred her to **Robert N. Weinreb, MD** at the Shiley Eye Institute.

When she went for the first visit, she expected that Dr. Weinreb would just tell her that her optic nerve was large and that the drops had cleared the glaucoma. "I was devastated when Dr. Weinreb explained the severity of my glaucoma and that I probably first had it in my 30's... for at least 10 years. No one in



my family had it and it was uncommon for someone my age to have it - or so I thought" stated Frieda.

She went on to say, "Everyone who knows Dr. Weinreb, knows how insistent he can be on getting proper treatment. He was quite clear that the drops were now a permanent part of my life. After I was in Kenya for a year, he explained it would be important for me to have surgery to ensure I would retain my eyesight."

She returned from Kenya to SEI in 1995 and 1996 to have trabeculectomy surgery in both eyes. Trabeculectomy surgery creates a new drainage channel in the eye for fluid and therefore lowers the eye pressure. The fluid drains between eye tissue layers and creates a reservoir bleb – otherwise known as a "bleb".

Frieda continued her career in Africa and was monitored by a private practitioner. They did not have visual field equipment and she came back to SEI annually. "As an educator, I also knew how important it was to participate in his research, which I did

for 20 years. I would return every year and get checked by Dr. Weinreb and participate in an ongoing study," said Frieda. Dr. Frieda Brown lived in Nairobi, Kenya for 21 years until she retired as the Vice Chancellor of the United States International University (USIU). After so many years working in Africa, she moved back to the U.S. to be closer to her family in St. Louis, Missouri.

Most recently, she was diagnosed with cataracts but was concerned because of possible consequent worsening of the earlier glaucoma surgery. Fortunately, the cataract surgery was successful and the trabeculectomies still worked fine. She was told that if everything stays the same, she will have sight for the rest of her life.

Frieda stated, "My doctors agree that the initial trabeculectomies done over 20 years ago probably saved my sight. I am thankful for Dr. Weinreb's dogged determination to make sure someone with severe glaucoma cupping could continue to see. Thanks Daktari!"





# A FUTURE IN EYE CARE

At nine years old, Lauren Lee is pretty sure she wants to be an eye doctor. She has been a patient of **David Granet**, **MD** and, more recently, **Shira Robbins**, **MD** at the Ratner Children's Eye Center since she was four years old. She started wearing glasses when she was about 2 1/2 years old because her parents noticed that her eyes were crossing.

As a Girl Scout, one of her service projects with her troop was collecting used eye-glasses for people who are not able to afford them. At their annual community picnic, the scouts set up a photo booth where the cost of having a photo taken was donating one pair of glasses! The first year they collected over 60 pairs of glasses and the second year, over 80 pairs of glasses. She continues this project year round and even goes into eyeglass stores asking for donations. Her good works were featured in the 2017 *For Sight*.

Since then, Lauren's passion for ophthalmology has only increased. She spent the "day as an ophthalmologist" at the Ratner Children's Eye Center and shadowed Dr. Robbins in clinic observing and learning what an ophthalmologist does. Lauren saw firsthand how eye surgeries, including corneal transplants and eye realignment surgery, can change a patient's life. This is a great start in her future career as an ophthalmologist!



Dear Shiley EyeMobile for Children,

I am so impressed with the amazing support for the children from the Silver Strand Elementary School in Coronado and their partnership with the UC San Diego Shiley EyeMobile for Children.

My son, Sawyer, happened to be one of those kids that needed help. What a blessing it was to have found out that he needed help with the Shiley EyeMobile for Children. Who would have suspected, only being in preschool, that he already has several aberrations in one eye that was straining the other eye and blurring his vision.

Kudos to the eye doctor, whose bedside manner made the experience pleasant, easy and fun! Thanks to the Shiley EyeMobile, Sawyer's astigmatism risks were discovered. And furthermore, his glasses were free! I get choked up thinking that he can now see the world how it's supposed to be seen. Now he has a chance to correct his vision and not have to wear glasses ever again by the time he's in middle school. I was not so fortunate. There were no programs like that where I grew up. I didn't receive glasses until I was in seventh grade and also suffered from astigmatism. Because I didn't get my glasses until much later, surgery was the only option to correct my eyesight. Most parents don't think about checking a child's vision in preschool. I know I didn't.

Thank you for making my child's life better and taking the time to show how much you care. I am proud to say that my children go to Silver Strand Elementary School. I never thought in a million years I would be a part of such a great community, a great support system within the school district, and such wonderful educators.

I am grateful to see such devotion from a wonderful teacher, Lisa Alonso. Her collaboration with the Shiley EyeMobile for Children may very well have changed the trajectory of my sweet Sawyer's life.

Sincerely, Mickel Bohi

# INHERITED RETINAL DISEASES UNCODED

Inherited retinal diseases (IRD) are a group of rare eye disorders caused by congenital gene mutation that can result in partial vision loss or blindness. These disorders affect people of all ages and have varying degrees of progression. They are are triggered by a gene or genes that do not function correctly. This malfunction creates the prospect of gene therapy to help cure, slow or stop disease advancement by repairing the gene responsible for the disease in the patient's DNA.

Elena Dougan and her family met **Radha Ayyagari**, **PhD**, SEI Professor of Ophthalmology and Pathology, at a Foundation Fighting Blindness event and discussed her vision impairment. Elena had noticed her vision changing when she was 5 years old but was not diagnosed with inherited retinal degeneration till she was 13. She is now blind. Her parents and brother have normal vision.

Elena came to Dr. Ayyagari at the Shiley Eye Institute for assistance in determining which genes were causing her retinal disease. Since 1989 approximately 270 genes have been linked to inherited retinal diseases. In most cases, defects in a single gene can cause a retinal disease and vision loss. Dr. Ayyagari decided to analyze all of the genes in her genome to further explore the diagnosis. The genome is all the genetic information in a person made up of DNA in chromosomes. Chromosomes are located in the nucleus of our cells carrying genetic information.

Dr. Ayyagari's laboratory team sequenced the entire genome in Elena and her unaffected brother. In every human, there is normally found to be about 4 million to 4.5 million sequence changes in the genome. Unfortunately, they did not find mutations in any of
the genes that could explain her retinal disease. The team then compared the sequences of these siblings, analyzed the data using various techniques and found two changes that could affect a gene that may be responsible for her retinal disease. Elena inherited one of them from her mother and the other from her father. One of these two modifications is outside the coding region in the genome and the other changes the structure of the gene. As the impact of such alterations cannot be determined just based on the DNA changes found in the genome, Dr. Ayyagari was not certain if they were responsible for causing her retinal disease.



To figure out the impact of these changes on retinal cells, the team then approached Elena and her parents to collect their blood samples to isolate stem cells and re-program them to become a particular type of retinal cells called retinal pigment epithelial (RPE) cells which are observed to be abnormal in Elena. The stem cells of Elena and her parents were programmed to develop into RPE.

The RPE cells have a special role in the retina. One of their main functions is to engulf the large amount of cellular material shed

by adjacent cells in the retina and clear that debris by digesting. This is essential to maintain the normal function of retinal cells. The scientists on Dr. Ayyagari's team tested the ability of RPE cells from Elena and her parents in removing the cellular debris by simulating the conditions in the retina. Their test showed that the RPE derived from patient's stem cells did not clear the cellular debris while those of her parent's RPE did clear the debris. Additionally, when Elena's parents' RPE was tested for the presence of the gene carrying the mutations, the team detected the absence of the gene product in these cells.

Analyzing Elena's whole genome allowed Dr. Ayyagari to identify mutations that could not be detected by using other methods. Further, having access to samples to isolate her stem cells and program them to become RPE allowed to study if the changes found have abnormal consequences. Using the findings, the team was able to establish the absence of a functional product of the gene in which the patient has two mutations and the consequences of the lack of that gene product on the ability of RPE cells to perform their normal function of clearing the cellular debris in the retina.

These studies allowed Dr. Ayyagari to identify the mutations in Elena that are likely to be responsible for IRD and see how these mutations can lead to disease by altering the normal function of RPE cells. This investigation was made possible with a \$2.5 million 5-year grant from the Foundation Fighting Blindness with Dr. Ayyagari as the lead. Pooja Biswas, graduate student in Dr. Ayyagari's lab, performed many of the experiments under the direction of Dr. Ayyagari, and other SEI faculty members Karl Wahlin, PhD and Shyamanga Borooah, MD, PhD. The study will include more than 140 families and 400 individuals collaborating with scientists at University of Texas– Houston, Massachusetts Eye and Ear as well as University of Wisconsin-Madison.



#### GLAUCOMA Sasan Moghimi, MD

Sasan Moghimi, MD, Associate Professor, earned his medical degree at Tehran University of Medical Sciences in Iran. He completed a residency in ophthalmology at Farabi Eye Hospital and subsequently served as Professor and Vice-Chair. He completed fellowships in glaucoma at UC Los Angeles, and UC San Francisco.

Dr. Moghimi's clinical focus is glaucoma, including angle closure glaucoma. His research interests include role of glaucoma imaging in detection and monitoring of the disease, lamina cribrosa and choroidal changes in glaucoma, and the role of blood flow in glaucoma.

During his career, Dr. Moghimi has co-authored over 120 peerreviewed journal articles and book chapters related to glaucoma and vision science. He is an associate editor of the *Journal of Current Ophthalmology* and an editorial board member of the International Glaucoma Review.

#### RETINA Shyamanga Borooah, MD, PhD

Shyamanga Borooah, MD, PhD, Assistant Professor, is clinically trained in the diagnosis and management of diseases of the retina. He completed medical school at Imperial College in London and gained a postgraduate qualification in internal medicine before completing his Ophthalmology residency. He undertook two further retinal fellowships including Moorfields Eye Hospital in London.

Dr. Borooah leads a laboratory research program developing novel therapies for inherited retinal degenerations and age-related macular degeneration. He received a PhD from the University of Edinburgh for developing a model of macular degeneration in a dish using stem cells. His research accomplishments have been honored with multiple prestigious awards including a Rowling scholarship for translational medicine, a Foundation Fighting Blindness career development award and a Fulbright scholarship.



#### UVEITIS Doran B. Spencer, MD, PhD

Doran B. Spencer, MD, PhD, Assistant Clinical Professor, specializes in the medical and surgical treatment of uveitis and ocular inflammation. He received his MD and PhD in Immunology from Oregon Health and Science University and completed his residency at UC Irvine. He went on to complete two fellowships, Uveitis and Ocular Inflammation from Harvard Medical School and Vitreoretinal Surgery and Diseases at the Shiley Eye Institute at UC San Diego.

Dr. Spencer's approach to uveitis prioritizes minimizing damage to the eye from ongoing inflammation. As a uveitis specialist, he is trained to manage ocular inflammation with systemic non-steroidal antiinflammatory treatment, which often results in long-term remission without recurrence of inflammation.

#### PEDIATRIC OPHTHALMOLOGY Mansoor Movaghar, MD

Mansoor Movaghar, MD, Associate Clinical Professor, earned a medical degree from the University of Medicine and Dentistry of New Jersey. He served as Chief Resident in Ophthalmology and then joined the faculty at the Long Island Jewish Medical Center. He then completed a fellowship in Pediatric Ophthalmology & Strabismus at the University of Wisconsin in Madison, WI and then moved to State University of New York/Stony Brook where he was Clinical Professor.

He specializes in Pediatric Ophthalmology and Adult Realignment for strabismus and he examines patients at Rady's Children Hospital and at the Ratner Children's Eye Center at the Shiley Eye Institute. His clinical interests include childhood eye misalignments and disorders, adult eye movement disorders, teaching, mentoring and research opportunities.

#### PEDIATRIC OPHTHALMOLOGY Jolene Rudell, MD, PhD

Jolene Rudell, MD, PhD, Assistant Professor, received her MD and PhD Neuroscience degrees from the University of California Davis. She completed her residency in ophthalmology at UC Davis, and a fellowship in pediatric ophthalmology and strabismus at the University of Washington.

Dr. Rudell's practice focuses on pediatric ophthalmology and strabismus, including strabismus/ eye misalignment/double vision, amblyopia, pediatric cataracts, nasolacrimal duct disorders, congenital eye syndromes, and systemic diseases affecting the eyes. She also participates in basic science research to better understand strabismus and extraocular muscle disease, as well as its treatments and is the recipient of numerous research awards.



#### NEURO-OPHTHALMOLOGY Lanning B. Kline, MD

Lanning B. Kline, MD, Clinical Professor, is a native of Edmonton, Canada. He attended medical school at Duke University and completed an ophthalmology residency at McGill University in Montreal. He was a fellow in neuroophthalmology at the Bascom Palmer Eye Institute, Miami, Florida, before joining the faculty at the University of Alabama Birmingham (UAB). There he was professor of ophthalmology and an associate professor of neurology and neurosurgery since 1990. At UAB, he also served as Chair of the Department of Ophthalmology from 1998 to 2011 and held the EyeSight Foundation of Alabama Endowed Chair in Ophthalmology.

Dr. Kline has published more than 100 peer-reviewed manuscripts, as well as textbooks and monographs dealing with neuro-ophthalmology. He was the Editor-in-Chief of the Journal of Neuro-Ophthalmology from 2010 – 2018 and currently serves as the Vice-Chair of the Board of Directors of the American Board of Ophthalmology. He is a recipient of a Life Achievement Honor Award from the American Academy of Ophthalmology.



CHILDHOOD MYOPIA CLINIC AT THE SHILEY EYE INSTITUTE Nearsightedness or myopia is a condition that makes it hard to see in the distance. When the eye grows too long, the light entering the eye cannot focus on the retina making vision blurry. This can be corrected by changing the angle that light enters the eye and then focus it directly on the retina. Eyeglasses, contact lenses and refractive corneal surgery all change the angle of light that enters the eye yielding clearer vision.

Myopia is now an epidemic worldwide with increasing rates around the globe. Estimates predict that approximately half of the world's population will have nearsightedness by the year 2050. That statistic is astounding with very few other diseases affecting so many people. As a cutting edge clinical, teaching and research institute, the Shiley Eye Institute will inaugurate a Myopia Center for this common eye disease.

Since myopia naturally increases early in life, childhood is the only time to change the trajectory of eye growth and levels of myopia. If left unchecked, higher degrees of myopia can lead to other eye diseases in adulthood such as early onset cataracts, retinal detachments, glaucoma and crossed eyes.

Shira L. Robbins, MD, Clinical Professor of Ophthalmology specializing in Pediatric Ophthalmology, in collaboration with optometrists Carol Yu, OD and Andrew Vo, OD, offers state of the art myopia treatment to children including multiple modalities aimed at slowing the progression of myopia. They participate in studies to reduce nearsightedness using eyedrops. With these therapies parents might be able to keep their children's eyes from getting severely nearsighted. This service will have a clinical and research focus aimed at contributing to new treatments. Dr. Robbins' emphasis will be on education and time spent with patients and their family to fully explain treatment options.

## **2019 ACCOLADES**

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

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



#### 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

#### **Notables & Awards**

Ranked #1 in world by Expertscape in glaucoma, 2019 UC San Diego Health Sciences Faculty Excellence in Mentoring Award



#### Linda M. Zangwill, PhD

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

#### **Graduate School**

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

#### Postdoctoral Fellowship

University of Waterloo, Waterloo, Ontario, Canada

#### **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



#### 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, and 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



#### 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 aging as a component in age-related eye diseases; in vivo association of transcription factors with their target regulatory elements in the retina; genome-wide roles of key transcriptional regulators and changes in chromatin organization during organogenesis and the molecular pathways involved in glaucoma; nuclear organization, the 3D structure of the genome and roles in the regulation of gene expression underlying natural and pathological processes

#### **Notables & Awards**

2018 Association of Women in Science San Diego – Leadership Service Award, 2018 Ernest & Elizabeth Althouse Scholar Award



#### 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

Carol Davila University of Medicine and Pharmacy in Bucharest, Romania

**Residency** 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



#### Sasan Moghimi, MD

#### Associate Professor

Medical School Tehran University of Medical Sciences

#### Fellowship

University of California Los Angeles, Stein Eye Institute

University of California San Francisco, Koret Vision Center

#### **Special interests**

Imaging in early detection and monitoring of the disease, Angle closure glaucoma diagnosis and treatment



#### Hannah "Huiyuan" Hou, MD, PhD

Assistant Project Scientist

Medical School Fourth Military Medical University, China

**Graduate School** Fourth Military Medical University, China

#### Fellowship

University of California, San Diego

#### **Special Interests**

Ocular neovascularization; Intraocular sustained drug delivery system; Early diagnosis and management of glaucoma; Visual rehabilitation



#### Todd P. Coleman, PhD

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



#### 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

#### **Notables & Awards**

2018 Secretariat Award, American Academy of Ophthalmology



#### 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 (eyelid & face); Blepharoplasty (eyelid lift surgery); Ptosis surgery (droopy lid surgery); Asian Blepharoplasty (double eyelid surgery); 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

# JVEITIS



#### Doran B. Spencer, MD, PhD

Assistant Clinical Professor of Ophthalmology

Medical School Oregon Health & Science University

**Residency** University of California, Irvine

#### Fellowship

Massachusetts Eye Research and Surgery Institution, Harvard Medical School

#### **Special Interests**

Specializes in the medical and surgical treatment of uveitis and ocular inflammation

#### **Notables & Awards**

2018 Outstanding Clinical Teaching Award

# CULAR PATHOLOGY



#### Jonathan H. Lin, MD, PhD

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, UCSD 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®.

#### **Notables & Awards**

2018 Web of Science Citation Laureate and 2019 G.B. Bietti Medal, Italian Society of Ophthalmology, Rome, Italy



#### 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

**Notables & Awards** 

2019 Woman in Science Award, American Medical Women's Association



#### 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



#### 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

Notables & Awards 2019 UC San Diego Department of Ophthalmology Resident Surgical Teaching Award



#### 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

# COMPREHENSIVE OPHTHALMOLOGY



#### 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



#### Peter J. Savino, MD

Professor of Ophthalmology & Neurosciences

#### Medical School

University of Bologna School of Medicine

#### Residency

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Georgetown University Medical Center Fellowship

#### 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



#### Lanning B. Kline, MD

**Clinical Professor** 

#### Medical School Duke University

**Residency** McGill University, Montreal

McGill University, Montreal University of Miami

#### **Special Interests**

Optic nerve disease; Double vision; Pupillary disorders; Demyelinating diseases; Visual abnormalities accompanying stroke

#### **Notables & Awards**

Life Achievement Honor Award, American Academy of Ophthalmology 2018



#### 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

#### **Notables & Awards**

2019 Distinguished Alumni Award, Doheny Eye Institute UCLA



#### 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



#### Dirk-Uwe Bartsch, PhD

Associate Professor of Ophthalmology

**Graduate School** University of California, San Diego

#### Postdoctoral Fellowship

University of California, San Diego

Retinal Imaging Scanning Laser Imaging -Tomographic Reconstruction of the Pos-



#### 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

**Special Interests** 

confocal / non-confocal; Optical Coherence Tomography (OCT); Indocyanine Green and Fluorescein Angiography; terior Pole



#### 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



#### 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



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

Assistant Clinical Professor of Ophthalmology

Medical School Imperial College London

Residency South East Scotland

Fellowship Moorfields Eye Hospital London

#### **Special interests**

Adult and Childhood inherited retinal degenerations, age-related macular degeneration, retinal vein occlusion, central serous retinopathy and diabetic eye disease



#### 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



#### Karl Wahlin, PhD

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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



#### Radha Ayyagari, PhD

Professor of Ophthalmology Professor of Pathology Chief of Ophthalmic Molecular Diagnostic Laboratory (CLIA certified) Director of Shiley Eye Institute BioBank

**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



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



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

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

#### Medical School

Yale University School of Medicine

#### Residency

New York University Medical Center (Chief Resident)

#### Fellowship

Children's Hospital of Philadelphia University of Pennsylvania

#### **Special Interests**

Pediatric & Adult Eye Re-Alignment and Strabismus; Nystagmus

#### **Notables & Awards**

- 2019 Swiss Academy of Ophthalmology Innovation Award,
  2019 Life Achievement Honor Award from American Association for Pediatric Ophthalmology & Strabismus
- 2019 "Champion of Change" Award from The Ophthalmologist2019 Ophthalmology "Power List"



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

Professor of Ophthalmology Educational Director of Pediatric Ophthalmology / Strabismus Division

#### Medical School

Medical College of Pennsylvania Hospital

#### Residency

Hahnemann University Hospital

#### Fellowship

University of California San Diego & Naval Medical Center

#### **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



#### Mansoor Movaghar, MD

Associate Clinical Professor Anne F. and Abraham Ratner Children's Eye Center Division of Pediatric Ophthalmology and Adult Realignment

#### **Medical School**

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

#### Residency

Long Island Jewish Medical Center

#### Fellowship

The University of Wisconsin in Madison

#### **Special Interests**

Strabismus /eye misalignment / double vision, adult eye movement problems, amblyopia, pediatric cataracts, nasolacrimal duct disorders, congenital eye syndromes, systemic diseases affecting the eyes



#### Jolene Rudell, MD, PhD

Assistant Professor of Ophthalmology

**Medical School** University of California Davis

**Residency** University of California Davis

#### Fellowship

University of Washington / Seattle Children's Hospital

#### **Special Interests**

Strabismus/eye misalignment/ double vision, amblyopia, pediatric cataracts, nasolacrimal duct disorders, congenital eye syndromes, systemic diseases affecting the eyes



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

Institute of America, Bogota, Colombia Fellowship Moorfield Eye Hospital, London, UK UC San Diego Shiley Eye Institute

Rosario University & Barraquer

Specialty Cornea and Dry Eye



Esmeralda McClean, OD

Optometry School University of California, Berkeley

Specialty Ocular Disease



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, FAAO

Optometry School University of California, Berkeley

Residency Nova Southeastern University

Specialty Specialty Contact Lens, Ocular Disease

# RESIDENTS

#### THE UC SAN DIEGO OPHTHALMOLOGY RESIDENCY TRAINING IS A THREE-YEAR PROGRAM WITH 12 RESIDENT PHYSICIANS (FOUR PER YEAR OF TRAINING).

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

As a result, graduating residents are regularly chosen for competitive post-residency Fellowship training in various subspecialties of Ophthalmology, such as Cornea, Glaucoma, Ophthalmic Plastic and Reconstructive Surgery and Retina at the Shiley Eye Institute. Under the supervision of the renowned Shiley faculty, residents learn to care for patients, from common to very rare eye conditions.

With departmental support, residents also partake in the many cutting-edge research opportunities available in the UC San Diego Viterbi Family Department of Ophthalmology and present their work at national meetings such as the American Academy of Ophthalmology and the Association for Research in Vision and Ophthalmology. The UC San Diego Ophthalmology Residency Training Program was recently recognized by the national accrediting body, the Accreditation Council for Graduate Medical Education, with a commendation on the excellence of the Residency Program and its faculty.



# FELLOWS 2018 - 2019

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.

#### **GLAUCOMA**



Sarah Ahmed, MD





#### Genea Edwards, PhD





Elham Ghahari, MD



Haksu Kyung, MD, PhD



Rafaella Cleto Penteado, MD



Brandon Wong, MD



Diya Yang, MD



Shagun Bhatia, MD

#### **CORNEA**





Ashlie Bernhisel, MD



Paco Male, MD



Ruti Sella, MD





Liliangi Ediriwickrema, MD





#### RETINA





Mathieu Bakhoum, MD



Anil Chekuri, PhD







Tyler Ofstad, MD, PhD

#### RETINA



Doran Spencer, MD, PhD

#### Not Pictured:

Jen-Hua Chuang, PhD Kunny Dans, MD Xin Li, PhD



Marina Voronchikhina, MD, PhD



Xiao Ying, MD



Risa Broyer, PhD



Amit Patel, PhD



Sunayan Ray, PhD

# ALUMNI

#### **GRADUATION OF RESIDENTS & FELLOWS**

On June 19, 2019, 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 & Café.

Graduating Residents A. Tommy Apara, MD, PhD Rohan Verma, MD Jeffrey Welly Wang, MD Zhiyong Yang, MD, PhD

Graduating Clinical Fellows Tyler Ofstad, MD, PhD Doran Spencer, MD, PhD Brandon Wong, MD Sarah F. Ahmed, MD Shagun Bhatia, MD Lilangi S. Ediriwickrema, MD Ashlie Bernhisel, MD Bradley Barnett, MD, PhD

Graduating International Clinical Fellows Ruti Sella, MD Manuel Amador, MD Elham Ghahari, MD

Graduating Research Fellows Young A. Kwon, MD Francisco Malé Valle, MD











The sixth annual "Lamont Ericson, M.D. Award for Outstanding Patient Care by a Resident" was presented by Residency Director, **Jeffrey E. Lee, MD** to Jeffrey Welly Wang, MD. Dr. Ericson was an outstanding resident in the department who passed away in 2007 at a young age. The department is grateful that Dr. Ericson's family has supported his memory in this special way.



#### **GLAUCOMA FELLOWS MEETING**

The Fourth UCSD Glaucoma Fellows Meeting was held on April 28, 2019 in Vancouver, BC at the Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting. The room was overflowing with distinguished alumni and guests from throughout the world.

Organized by Arthur J. Sit, MD (Fellow 2004-5) and Kaweh Mansouri, MD, MPH (Fellow 2010-12), the dinner meeting featured a lecture by Neeru Gupta, MD, PhD (Fellow 1996-7) titled "A Diary from the Operating Room".



From L to R: Ningli Wang, MD, PhD, Robert N. Weinreb, MD, Arthur Sit, MD, PhD, Neeru Gupta, MD, PhD and Kaweh Mansouri, MD, MPH



Neeru Gupta, MD, PhD and Christopher Leung, MD



Robert N. Weinreb, MD with Jonathan Crowston, MD



Andrew Young, MD and Benjamin Xu, MD, PhD

On October 27, 2018, many of our alumni, faculty, senior residents and fellows gathered at Gino's East in Chicago for our annual alumni gathering at the Academy of Ophthalmology (AAO) Annual Meeting. Each year the group gathers to reconnect and network with old and new friends from the department. The 2019 event will be held in San Francisco.



Don O. Kikkawa, MD, Derek Mai, MD, Kyle Godfrey, MD, Sally Baxter, MD, Ramzi Alamadine, MD, Nickisa Hodgson, MD, and Courtney Ondeck, MD

Jane Kuo, MD, PhD, Na'ama Hammel, MD and Linda Zangwill, PhD

Brenda Goldbaum, Michael Goldbaum, MD, and Dr. and Mrs. Leonard Kirsch

### CONGRATS DR. KIKKAWA



**Don O. Kikkawa, MD** was recently appointed as the holder of the Dr. Trude K. Hollander Endowed Chair. This chair will support Dr. Kikkawa's teaching and research activities in the Division of Ophthalmic Plastic and Reconstructive Surgery in the Viterbi Family Department of Ophthalmology and the Shiley Eye Institute.

Retired physician Dr. Hollander passed away at age 108 and had made arrangements in her estate plan to benefit the future of SEI. She came to know Dr. Kikkawa as a patient in the late 1990's. They became close friends and over time developed a special relationship with his family as well.

Dr. Hollander stated, "Dr. Don Kikkawa is and always has been the perfect example of a true physician who makes a difference. He is equipped with an extraordinary pair of hands and eyes which bring healing for most complicated and rare eye conditions."

The endowed chair is a highly honored academic position given for Dr. Kikkawa's outstanding research and service in the department and approved by an independent academic review committee at UC San Diego School of Medicine.

# EDUCATION: PHYSICIANS

#### **OPHTHALMOLOGY UPDATE**

The 2019 Ophthalmology Update sponsored by the Shiley Eye Institute at UC San Diego was held February 16-17, 2019 at Cape Rey Carlsbad. The event was a great success with almost 200 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 cutting-edge translational research in ophthalmology.

The Distinguished Invited Speakers were Jacque Duncan, MD (UC San Francisco), Ray Gariano, MD, PhD (Scripps Clinic and The Scripps Research Institute), Alex Huang, MD, PhD (Doheny Eye Institute/Jules Stein Eye Institute at UCLA), Andrea Kossler, MD (Stanford University), Elmer Tu, MD (University of Illinois College of Medicine), and Sanjay Kedhar, MD (Gavin Herbert Eye Institute, UC Irvine).



Monthly, the UC San Diego 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.



Pictured above are SEI faculty with Distinguished Speakers

#### **2018 – 2019 VISITING DISTINGUISHED PROFESSORS**



October 15, 2018 LANNING KLINE, MD Professor of Ophthalmology and Chair Emeritus University of Alabama, Callahan Eye Hospital TITLE: "Neuro-Ophthalmology Emergencies"



December 3, 2018 MARK ROSENBLATT, MD, PhD, MBA Professor & Head, Illinois Lions/ Charles I. Young Chair Department of Ophthalmology & Visual Sciences Illinois Eye & Ear Infirmary TITLE: "Corneal Nerves: Physiology, Pathophysiology & Repair"



January 14, 2019 HENRY D. JAMPEL, MD Odd Fellows Professor of Ophthalmology Wilmer Eye Institute Johns Hopkins University TITLE: "Glaucoma Update for the non-Glaucomatologist"



March 4, 2019 HANS E. GROSSNIKLAUS, MD, MBA Interim Vice Chair, Emory Eye Center F. Phinizy Calhoun Jr. Professor of Ophthalmology Emory University TITLE: "Ocular Melanoma Update"



April 22, 2019 THOMAS W. GARDNER, MD, MS Professor, Ophthalmology & Visual Sciences University of Michigan Medical School TITLE: "The Importance of Clinicians in Medical Innovation"

#### VISION RESEARCH LECTURES

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

April 18, 2019 ANDREW HUBERMAN, PhD Associate Professor of Neurobiology & Ophthalmology Stanford University TITLE: "Biology & Therapeutics of Visual System Regeneration & Plasticity"

May 10, 2019 MICHAEL J.A. GIRARD, PhD, MSc Assistant Professor, Department of Biomedical Engineering National University of Singapore TITLE: "Biomechanics & Al in Glaucoma"

May 23, 2019 MARTIN FRIEDLANDER, MD, PhD Professor, Department of Molecular Medicine The Scripps Research Institute TITLE: "Stemming Vision Loss with Stem Cells (and a little help from HIFs, VEGF & VHL"

#### **BASIC SCIENCE IN VISION LECTURE SERIES**

December 6, 2018 RAQUEL L. LIEBERMAN, PhD Professor, School of Chemistry & Biochemistry Georgia Institute of Technology TITLE: "Myocilin Structure & Misfolding: Molecular Basis of Hereditary Glaucoma"

January 17, 2019 KRZYSZTOF PALCZEWSKI, PhD The Irv Leopold Chair & Professor, Ophthalmology Gavin Herbert Eye Institute, UC Irvine TITLE: "Chemistry & Biology of Vision"

# BIG SHOWING AT ARVO MEETING

With dedication to cutting edge vision research, more than half of the SEI faculty, residents and fellows delivered 55 presentations at the Annual Meeting of Association for Research in Vision and Ophthalmology (ARVO) 2019 from April 28 - May 2, 2019 in Vancouver, British Columbia.

# EDUCATION: PATIENTS

#### **GLAUCOMA UPDATE**

The thirty-fifth annual Glaucoma Update was held on October 30, 2018 at the Goldberg Auditorium in the UC San Diego Moores Cancer Center. **Robert N. Weinreb, MD** presented the latest trends in glaucoma treatments and research from the Shiley Eye Institute, Hamilton Glaucoma Center and around the world. Chief Resident, Sally Baxter, MD explained her unique fellowship on artificial intelligence and **Derek Welsbie**, **MD**, **PhD** described his innovative stem cell investigations. Chancellor Pradeep Khosla updated the crowded audience on UC San Diego's plans for the future of the campus.





#### FUTURE OF CARE EVENT



UC San Diego Health presented an Ophthalmology Future of Care event titled "Curing Blindness – Our Vision for the Future" on April 16, 2019 at the Estancia La Jolla Hotel. The Future of Care events are interactive lectures and panel discussions that give our closest partners access to the experts who are redefining medicine. The event was hosted by David A. Brenner, MD, Vice Chancellor for Health Sciences, and Patricia Maysent, MPH, MBA, the Chief Executive Officer, UC San Diego Health. Robert N. Weinreb, MD provided an overview of the department's cutting edge research and moderated the panel discussion. Panelists included Natalie A. Afshari, MD, Vice Chair and Professor, Daniel L. Chao, MD, PhD, Assistant Professor, Eric Nudleman, MD, PhD, Assistant Professor, and Derek Welsbie, MD, PhD, Assistant Professor. Each faculty member summarized their specialty area investigations and highlighted the upcoming innovations in vision science.







#### ACUTE GLAUCOMA COMMENTARY

Primary angle closure glaucoma (sometimes called acute glaucoma) occurs when the iris blocks drainage of the eye through the trabecular network, an area of tissue located around the cornea responsible for draining the aqueous humor — the transparent, watery fluid that fills the space in the front of the eyeball between the lens and cornea.

Primary angle closure glaucoma is less common than primary open-angle glaucoma, but more visually destructive. Treatment is typically either cataract extraction or laser iridotomy, which creates a drainage path. Laser iridotomy is also used to treat persons suspected of having primary angle closure in order to prevent the development of glaucoma. Glaucoma is a condition in which the eye's optic nerve is damaged, typically by fluid pressure buildup and, if untreated, can result in permanent vision loss. Primary angle closure glaucoma is more common among persons of Asian descent; and more common among women than men.

In a paper published in *The Lancet*, Chinese researchers conducted a very large, long-term randomized clinical trial to determine if laser iridotomy was an effective prophylactic for glaucoma. In an accompanying commentary (*The Lancet*, Volume 393, Issue 10181, 20-26 April 2019, Pages 1572-1574) by **Robert N. Weinreb**, **MD**, director of the Shiley Eye Institute at UC San Diego Health and **Sasan Moghimi**, **PhD**, describe the study's value and findings (laser iridotomy decreases incidences of primary angle closure in eyes at risk, but only modestly) and the need for more expansive research involving other ethnic groups, for whom very little or no data exists.

# PUBLICATIONS

#### **CORNEA**

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#### **NEURO-OPHTHALMOLOGY**

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#### **OCULOPLASTICS**

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#### PATHOLOGY

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#### **UVEITIS**

D. Spencer, N. Protopsaltis and D. Chao. New Pharmacotherapies for Diabetic Retinopathy. Annals of Eye Science. August, 2018

Christopher Toomey, Andrew Gross, Jeffrey Lee and Doran Spencer. A Case of Unilateral Coccidioidal Chorioretinitis in a Patient with HIVassociated Meningoencephalitis. Case Reports in Ophthalmological Medicine. Accepted

# LECTURES

#### NATALIE A. AFSHARI, MD

2019 Jerome Bettman, MD Lecture, Stanford University Byers Eye Institute, Stanford, CA "New Horizons in Corneal Endothelium and Fuchs: Surgical Interventions, Stem Cell Regeneration, and Genetics"

2018 Inaugural Ronald G Michels, MD Lectureship in Cornea, Cataract, and External Disease, Johns Hopkins University Wilmer Eye Institute, Baltimore, MD "New Horizons in Corneal Endothelium and Fuchs Dystrophy: Surgical Interventions, Stem Cell Regeneration & Genetics"

The International Society of Cornea, Stem Cells and Ocular Surface Congress 2019, Turin, Italy "New Horizons in Fuchs Dystrophy: Cell Regeneration & Gene Editing"

2019 Naval Medical Center San Diego, 22nd Annual U.S. Navy Refractive Surgery Course, San Diego, CA "Diffuse Lamellar Keratitis" "Epithelial Ingrowth"

2019 The University of Oklahoma Department of Ophthalmology, Dean McGee Eye Institute, Oklahoma City, OK "New Horizons in Corneal Endothelium: Stem Cell Regeneration, Genetics & Gene Editing"

2019 Weill Cornell Medicine Department of Ophthalmology, New York, NY "New Horizons in Corneal Endothelium and Fuchs Dystrophy: Surgical Interventions, Stem Cell Regeneration & Genetics" "A Journey Through the Cornea: From A to Z"

2019 Kellogg Eye Center Michigan Medicine 91st Annual Spring Postgraduate Conference, Ann Arbor, MI "DSAEK: Current Gold Standard for Endothelial Disease" "Future of Keratoplasty: Where Are We Going?" "Imaging for Infectious Keratitis"

2019 The Gavin Herbert Eye Institute 6th Annual Bench to Bedside Symposium, Irvine, CA "New Horizons in Corneal Endothelium: Stem Cell Regeneration, Genetics & Gene Editing"

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA "Tips on Anterior Vitrectomy" "Update on Herpes Simplex Keratitis" 2019 Bascom Palmer Eye Institute Interactive Consultations in Cornea and Refractive Surgery, Miami, FL "HSV: Treatment of Acute and Chronic Disease" "Keratoprosthesis: The Bionic Eye" "Why do DMEK Grafts Roll that Way?" "Management of Vitreous for the Anterior Segment Surgeon" "Corneal Collagen Crosslinking"

2018 XXVIII Simposium Internacional de Catarata Córnea & Cirugia Refractiva, Colegio de Oftalmologia de Baja California, Tijuana, Mexico "Cornea Transplants, Flaps, Lasers, Bubbles: Recent Advances in Cornea and Refractive Surgery" "New Horizons in Corneal Endothelium and Fuchs Dystrophy: From the Laboratory to the Lane" "Challenging Cases in Cornea and Cataract Surgery" "DMEK and DSEK" "All About Amniotic Membrane"

2018 CSE 3rd Year Residents Program, Fort Worth, TX "Advanced Nucleus Disassembly Techniques"

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

September 5, 2018 Invited Presentation at the Biennial International Meeting of Retinal Degeneration, Killarney, Ireland "Complex Genetic Causality of IRD Revealed by Whole Genome Sequence Analysis"

May 21, 2019 Presentation, Department of Ophthalmology, Emory University, Atlanta, GA "Molecular Genetics and Functional Genomics of Retinal Dystrophies"

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

2019 Vit Buckle Meeting, Las Vegas, NV "What Should a Retina Specialist Know About Inherited Retinal Diseases?"

#### LINGYUN CHENG, MD

2019 ARVO Paper Session, Moderators: Karl G Csaky (Retina Foundation of the Southwest), Vancouver, Canada "Drug Delivery, Drug and Gene Delivery System"

#### JIUN L. DO, MD, PhD

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA "New Surgical Treatments for Glaucoma"

2018 Ophthalmic Technicians/Nurses Program, San Diego, CA "Medical Treatment of Glaucoma"

#### NAPOLEONE FERRARA, MD

July 25-31, 2018 Lipari School on Computational Sciences, Lipari, Italy

November 27-30, 2018 Banbury Conference, Diverse Effects of nNeutrophils in Cancer, Cold Spring Harbor

March 21, 2018 5th Annual John F. Enders Lecture, Harvard Medical School, Boston, MA

October 19, 2018 Kobe International Symposium on Drug Discovery, Kobe, Japan

January 19-20, 2019 Vascular Biology Gordon Research Seminars (GRS), Ventura, CA "Frontiers in Vascular Cell Communication: Implications in Health and Disease" (Keynote Talk)

March 29-31, 2019 Mikamo Lecture, 83rd Annual Scientific Meeting Japanese Circulation Society, Yokohama, Japan

May 9-12, 2019 Asia Pacific Vascular Biology Organization Conference 2019, Guangzhou, People's Republic of China

May 24, 2019 G.B. Bietti Award Lecture, Rome, Italy

May 29, 2019 Ho-Am Forum on Medicine, Seoul, South Korea

#### HENRY A. FERREYRA, MD

The International Pediatric Ophthalmology Forum, 2018 International Pediatric Ophthalmologic Forum, Guangzhou, China "The Role of Genetic Testing in a Retinal Dystrophy Clinic"

September 2018 UC San Diego, Department of Ophthalmology, La Jolla, CA "ERG Physiology Review"

October 2018 UC San Diego, Department of Ophthalmology, La Jolla, CA "Retinal Dystrophies Review"

March 2019 UC San Diego, Department of Rheumatology, La Jolla, CA Grand Rounds, "Inflammatory Eye Diseases"

March 2019 VA Eye Clinic, La Jolla, CA "Optical Coherence Tomography (OCT) Review"

#### WILLIAM R. FREEMAN, MD

June 2018 NYU School of Medicine, New York, NY "Lecture on Retinal Prosthesis; Where Do We

Stand?" "Lecture on Clinical Applicability of Imaging Techniques" "Lecture on Ocular Drug Delivery"

March 30, 2019 Distinguished Alumnus Award Doheny Eye Institute UCLA, Los Angeles, CA "The Intravitreal Injection"

April 5, 2019 Yale School of Medicine Homer Rees Lecture, New Haven, CT "New Treatments and Paradigms for Therapy of Wet AMD"

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

January 2019 UC San Diego, Department of Ophthalmology, La Jolla, CA "Nystagmus" "Strabismus, etc." "Strabismus Surgery"

#### WELDON W. HAW, MD

Colegio de Oftalmologos de Baja California 2019 Cornea Section, Baja California, Mexico "Diagnosis and Management of Neurotrophic Keratopathy – United States Experience" "Ocular Surface Disease – Impact and Optimization of Surgical Results" "Postoperative Management of Corneal Transplantation – Endothelial and Penetrating Keratoplasty"

June 2019 UC San Diego Department of Ophthalmology Resident Research Day, San Diego, CA "Effect of Phacoemulsification Platform on Resident Surgical Outcomes"

May 2019 Dallas, TX "Diagnosis and Management of Allergic Conjunctivitis"

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA "New Approaches to Medical and Surgical Therapies." Jobson Publishing

February 2019 Dallas-Fort Worth, TX "Cataract Surgery - Efficient and Safe Nucleus Removal and Irrigation And Aspiration Surgical Techniques. Continuing Specialized Education. Cataract Surgery and Wet Laboratory." "Cataract Surgery -Top 3 Pearls for Developing Surgical Excellence. Cataract Surgery and Wet Laboratory." Jobson Publishing

July 2018 UC San Diego School of Medicine, Department of Ophthalmology, La Jolla, CA "Boot Camp" Lecture Series - "Examination of the Anterior Segment"

#### CHRISTOPHER W. HEICHEL, MD

2019 Evolution of Corneal Transplantation, Continuing Education for Allied Ophthalmic Personnel,

International Joint Commission on Allied Health, Personnel in Ophthalmology

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA "New Treatments for Neurotrophic Keratitis" "Optimizing and Individualizing Lens Selection, Which Lens Should I Choose?"

#### DON O. KIKKAWA, MD

April 26, 2019 University of Wisconsin-Madison Department of Ophthalmology and Visual Sciences - Visiting Professor, Madison, WI, "Precision Oculoplastic Surgery"

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA, "Prostaglandin Associated Periorbitopathy"

February 13-14, 2019 SIMASP 42nd Conference, Sao Paolo, Brazil "Transblepharoplasty Ptosis Repair," "Lower Lid Blepharoplasty and Fat Redraping," "Lower Lid Blepharoplasty" How I Do It. Pearls and Pitfalls," "Eyelid Recconstruction," "Management of the Failed DCR," "Frontlis Flap in Severe Blepharoptosis," "Perfecting Your Skills with the Aesthetic Patient," "Ophthalmology Residency Program in the US."

December 15-18, 2018 Combined APSOPRS and HKOS Annual Scientific Meeting, Hong Kong "Keynote Lecture: Medical Failures and Surgical Triumphs in Thyroid Eye Disease"; "Keynote Lecture: Endoscopic Forehead and Midface Lift; Managing Suboptimal Outcomes after Fracture Repair; Optic Nerve Biopsy through Eyelid Crease Incision; Major Eyelid Reconstruction"

December 13, 2019 Department of Ophthalmology Second Hospital of Dalian, China Medical University, China "Multidisciplinary Treatment of Thyroid Orbitopathy"

October 2018 AAO Annual Meeting Symposium, Chicago, IL, "Controversies Orbital Decompression and Supermaximal Levator Resection," "Ptosis Repair- Case Based Approach," "Cultural and Anatomical Differences – Tips for Cosmetic Surgery in Asian Patients"

October 27, 2018 Oculoplastics Subspecialty Day American Academy of Ophthalmology, Chicago, IL "TED: How to Battle the Bulge" October 12-13, 2018 30th Anniversary Meeting of the Korean Society of Ophthalmic Plastic and Reconstructive Surgery, Seoul, Korea "Management of Recalcitrant Thyroid Eye Disease," "Upon Further Review"

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

July 14, 2018 Lifeline Express, Yuncheng Eye Hospital, Yungcheng, China "Management of Thyroid Eye Disease" "Lower Eyelid Blepharoplasty Pearls" "Transitioning to Endoscopic DCR" "Complex Eyelid Reconstructions" "Management of Eyelid Retraction"

September 13, 2018 American Academy of Ophthalmology Webinar "Minimally Invasive Brow Ptosis Repair: Techniques"

September 21, 2018 Oculoplastica 2018, Sao Paulo, Brazil "Treatment of Upper and Lower Eyelid Retraction" "Lower Eyelid Blepharoplasty with Fat Redraping" "Upper Eyelid Blepharoplasty: Evaluation, Treatment and Complication Minimization"

October 13, 2018 Phoenix, AZ "Periocular Reconstruction after Mohs Surgery" American Society of Dermatologic Surgeons Annual Meeting

December 15, 2018 Asian Pacific Society of Ophthalmic Plastic and Reconstructive Surgeons, Hong Kong "Step by Step Facelifting" "Pretrichial Brow Lifting" "Dawn of Precision Medicine for Oculoplastics"

January 18, 2019 Winter Oculoplastic Meeting, Allen M. Putterman MD Symposium, Park City, UT "The 2 Minute Ptosis Repair"

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA "Tissue Sparing Blepharoplasty"

February 23, 2019 International Thyroid Eye Disease (ITEDS) Meeting, Singapore "Management of the Mt. Fuji Sign."

May 17, 2019 Korean Society of Ophthalmic Plastic and Reconstructive Surgeons (KSOPRS), Jin Jo, South Korea "More than Meets the Eye." "Orbital Decompression Complications."

June 6, 2019 Vegas Cosmetic Surgery Meeting, Las Vegas, NV "The Reverse Canthoplasty." "Demystifying the Lateral Canthus."

June 29, 2019 5th International Conference of Ophthalmic Endoscopic Surgery (ICOES), Changchun, China "Pearls for Endoscopic DCR." "Eyelid Retraction Repair"

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

September 2018 Stanford University, Departments of Pathology and Ophthalmology, Palo Alto, CA "Genetic Variation of the Unfolded Protein Response in Human Disease"

September 2018 International Society for Eye Research, Belfast, Ireland "Stem Cell Modeling of ATF6 Cone Photoreceptor Diseases"

January 2019 Johns Hopkins University, Wilmer Eye Institute, Baltimore, MD "Protein Misfolding Diseases of the Eye"

March 2019 SUNY Buffalo, Department of Biochemistry, Buffalo, NY "Endoplasmic Reticulum Stress in Neurodegeneration"

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

July 2018 Thammasat University, Bangkok, Thailand "Orbital Masses and a New Marker for Lacrimal Gland Tumors"

February 2019 San Diego Winter Regional Continuing Education Program, San Diego, CA "All About That Droop: Differentiating Ptosis, Dermatochalasis, and Brow Ptosis"

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA, "Ptosis Made Simple"

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

October 16, 2018 National Central University, College of Health Sciences and Technology, Zhongli, Taiwan "Lessons from My Works on Intraocular Pressure"

#### SASAN MOGHIMI, MD

8th World Glaucoma Congress 2019, Melbourne, Australia "Consensus Meeting in Glaucoma Surgery," "Minimally Invasive Glaucoma Surgery", "Glaucoma Surgery for Secondary Glaucoma"

#### MANSOOR MOVAGHAR, MD

September 2018 1st Annual Stony Brook Ophthalmology-Optometry Symposium, Stony Brook, NY, "Double Trouble: An Approach to Diplopia"

#### SHIRA L. ROBBINS, MD

2018 Rady Children's Hospital Grand Rounds, Pediatric Hematology and Oncology, San Diego, CA "Clinical Progress in the Management of Congenital Plasminogen Deficiency" 2018 Ophthalmology Residents, UC San Diego, "What Every Resident Needs to Know About ROP"

2018 American Eye Study Club Annual Meeting, Deer Valley, UT "The Relationship Between Steroids and Pediatric Intraocular Pressure"

2018 Ophthalmology Residents, Internal Medicine Residents, Medical Students, UC San Diego "Craniofacial Anomalies"

2018 Talk Featured on the American Academy of Ophthalmology Website - Post Strabismus Surgery Orbital Giant Cyst, "When the Third Eye Is Not So Wise"

2018 Ophthalmology Residents, Fellows, Medical Students, UC San Diego "Phakomatose"

2018 ROP-Hot Topics Conference, Chicago, IL "What We Know About ROP and Omega-3 Fatty Acids" 2019 Ophthalmology Residents, Internal Medicine Residents, Medical Students, UC San Diego "Pediatric Cataracts"

2019 8th Grade Students at Francis Parker Middle School, San Diego, CA "Global Awareness Panel/ International Medical Work Experiences"

UC San Diego, Ophthalmology Update 2019, Carlsbad, CA "Changing Paradigms: Ocular Gene Therapy in Pediatrics"

2019 American Association for Pediatric Ophthalmology & Strabismus 45th Annual Meeting, San Diego, CA ""Coding: Another Day in the Life of a Pediatric Ophthalmologist"" ""Socioeconomic Committee: Practice Management Workshop: From Getting Started to Retirement, Practice Management Strategies That Do (and Don't) Work"

2019 Pediatric Ophthalmology, Ophthalmology Residents, UC San Diego "OKAP Review"

2019 Child Health and Disability Prevention Program, Pediatricians/Optometrists/ Nurses/Medical Assistants "Vision Screening in Young Children"

2019 Ophthalmology Residents and Fellows, UC "Breaking Bad News"

#### PETER J. SAVINO, MD

2018 Graduate Course Lecture, UC San Diego, "Supranuclear Disorders and Nystagmus" "Optic Track and Chiasm Lesions" "Functuional Visual Loss" September 22, 2018, UT Southwestern Medical Center, Dallas TX, Invited Speaker, Carrol F. Zimmerman Lectureship in Neuro-ophthalmology

October 5, 2018, San Diego CA, Invited Guest Speaker, The California Neurology Society. Innovations in Neurology & Neurosurgery 2018

February 16-17, 2019, Carlsbad, CA, Invited Guest Speaker, Review of Ophthalmology

February 27, 2019, Philadelphia, PA, Invited Guest Speaker, 44th Annual Wills Eye Institute Review Course

## DOROTA SKOWRONSKA-KRAWCZYK, PhD

June 2019 GenomeWeb Webinar "A CRISPR Study to Decipher the Role of Genetic Risk Variants in Glaucoma"

May 2019 UC Irvine, Gavin Herbert Eye Institute, Department of Ophthalmology, Distinguished Lecture "Decoding the Role of Aging in Age-related Eye Diseases"

April 2019 UC Los Angeles, Department of Ophthalmology Invited Lecture "How Aging Contributes to Age-Related Eye Diseases: A Lesson from Glaucoma and AMD"

May 2019 Special Interest Group at ARVO 2019 "Aging as a Factor in Age-Related Eye Diseases"; Moderator and Presenter: "Senescence and Aging in Neurodegeneration - What we Can Learn From Glaucoma"

February 2019 UC San Diego Center for Healthy Aging Public Lecture "VISIONS: From Microscope to Watercolor The Science and Art of the Aging Eye"

December 2018 Regional Workshop for NanoCellect Biomedical Inc. "ATAC-seq and RNA-seq to Analyze Neurodegeneration in Glaucoma"

November 2018 Pat Ledden Memorial Luncheon Lecture UC San Diego Faculty Club "Decoding the Mechanisms Underlying Age-Related Eye Disorders"

October 2018 The European Association for Vision and Eye Research (EVER) meeting, Nice (France) "The Molecular Role of the Six6 Transcription Factor in Glaucoma" October 2018 Retina Degeneration 2018 Meeting, Killarney, Ireland "Aging as a Factor in Macular Degeneration"

#### DORAN SPENCER, MD, PhD

August 2018, UC San Diego, Department of Ophthalmology, La Jolla, CA "Clinical Assessment of Uveitis"

#### **KARL WAHLIN, PhD**

2019, UC San Diego, Lecture for Cell and Molecular Medicine "Stem Cells and Retinal Disease Modeling"

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

2019 The Twenty-First Annual Ulrich Ollendorff, MD Lecture, Edward S. Harkness Eye Institute, Department of Ophthalmology, Columbia University Medical Center, New York, NY "Smart Glaucoma"

2019 Inaugural Distinguished Faculty Lecture, USC Department of Ophthalmology, 44th Annual Symposium, USC Health Science, Los Angeles, CA "Initiating Treatment with Smart Glaucoma"

2019 VIII World Glaucoma Association, Keynote Lecture, Melbourne, Australia "The Future of Glaucoma"

#### LINDA ZANGWILL, PhD

2018 OCT Angiography Summit. Portland, OR "Utility of OCTA in Early and Advanced Glaucoma."

2018 Glaucoma Research Society Meeting Parma, Italy "Statistical Modeling of the Retinal Nerve Fiber Layer to Predict Progression."

2018 6th International Congress on OCT Angiography and Advances in OCT, Rome, Italy "Utility of OCTA from Early to Late Glaucoma."

2019 World Glaucoma Congress, Melbourne, Australia "What is Al?"

2019 Optical Coherence Tomographic Angiography of the Eye Special Interest Group. Association for Research in Vision and Ophthalmology (ARVO) Vancouver, Canada "OCTA Dynamic Range and Number of Steps"

2019 American Society for Cataract and Refractive Surgery, San Diego, CA "OCT: Which Tek is Best?"

2018 XXXVIII National and International Congress of the Colombia Society of Ophthalmology, Cartagena de Indias, Colombia "Artificial Intelligence and Deep Learning in Ophthalmic Diagnostics" "Optical Coherence Tomography for Detection of Macular Damage in Glaucoma" "Ophtalmic Imaging in Glaucoma: Past, Present and Future" "How to Detect Progression Using OCT"

## CLINICAL TRIALS

#### **CORNEA**

A Phase I/II Prospective, Randomized, Multicenter, Double-Masked, Vehicle-Controlled Clinical Trial to Evaluate the Safety and Efficacy of Corneal Collagen Cross-Linking of Keratoprosthesis Carrier Tissue in High-Risk Keratoprosthesis Implantation Site PI: Natalie A. Afshari, MD Funding: U.S. Department of Defense

A Multiarm, Open-label, Multicenter, Phase 1b/2 Study to Evaluate Novel Combination Therapies in Subjects with Previously Treated Advanced EGFRm NSCLC Sub-I: Natalie A. Afshari, MD Funding: MedImmune LLC

A Phase 1/2, Open-label, Multicenter Study to Evaluate Safety, Tolerability, Pharmacokinetics and Efficacy of Oral Once-Daily Administration of HS-10296 in Patients with Locally Advanced or Metastatic Non- Small-Cell Lung Cancer Who Have Progressed Following Prior Therapy with an Epidermal Growth Factor Receptor Tyrosine Kinase Inhibitor Agent Sub-I: Natalie Afshari

Funding: Jiangsu Hansoh Pharmaceutical Co., Ltd.

Ceritinib + Trametinib in Patients with Advanced ALK-Positive Non-Small Cell Lung Cancer (NSCLC) Sub-I: Natalie Afshari Funding: University of California, San Francisco" "An Open-Label Phase ½ Study of INCB039110 in Combination with Osimertinib Industrial Treatment Phase I/II MCC Cancer Center Thoracic (Lung) Study Sub-I: Natalie Afshari Funding: Incyte Corporation

A Phase I/IIa Study of BMS 986148, a Mesothelin Directed Antibody Drug Conjugate, in Subjects with Select Advanced Solid Tumors Sub-I: Natalie Afshari Funding: Bristol-Myers Squibb

A Phase 1a/1b Study of FPA008 in Combination with Nivolumab in Patients with Selected Advanced Cancers Sub-I: Natalie Afshari Funding: Five Prime Therapeutics, Inc An Open-Label, Multicenter, Global Phase 2 Basket Study of Entrectinib for the Treatment of Patients with Locally Advanced or Metastatic Solid Tumors that Harbor NTRK1/2/3, ROS1, or ALK Gene Rearrangements Sub-I: Natalie Afshari Funding: Hoffmann-La Roche

Phase 1/2, First-in-Human, Dose -Escalation Study to Evaluate the Safety, Tolerability, and Pharmacokinetics of X - 396 in Patients with Advanced Solid Tumors and Expansion Phase in Patients With ALK+Non-Small Cell Lung Cancer Sub-I: Natalie Afshari Funding: Xcovery

A Multi-arm, Phase Ib, Open-Label, Multicentre Study to Assess the Safety, Tolerability, Pharmacokinetics and Preliminary Anti-tumour Activity of AZD9291 in Combination with Ascending Doses of Novel Therapeutics in Patients with EGFRm+ Advanced NSCLC who have Progressed Following Therapy with an EGFR TKI (TATTON) Sub-I: Natalie Afshari Funding: AstraZeneca

Evaluation of Efficacy of 20 µg/ml rhNGF New Formulation (with Anti-Oxidant) in Patients with Stage 2 and 3 Neurotrophic Keratitis, Dompe Farmaceutici, Spa, 2016 - Present Pl: Natalie A. Afshari, MD

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 PVP-lodine and Placebo in the Treatment of Adenoviral Conjunctivitis. PI: Weldon Haw, MD Funding: Shire Human Genetic Therapies, Inc.

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 Bacterial Conjunctivitis. PI: Weldon Haw, MD Funding: Shire Human Genetic Therapies, Inc. A Thirteen-year Study of the Indications and Visual Outcomes of Capsular Tension Ring Implantation in Cataract Surgery 2016 PI: Christopher W. Heichel, MD

#### **GLAUCOMA**

Multi-Center Study for a Normal Database of Optic Nerve Head, Retinal Nerve Fiber Layer, and Macula Parameters Measured with the Heidelberg Spectralis OCT within an African American Population Site PI: Linda Zangwill, PhD Funding: Heidelberg Engineering

Multi-Center Study for a Normal Database of Optic Nerve Head, Retinal Nerve Fiber Layer, and Macula Parameters Measured with the Heidelberg Spectralis OCT within a Hispanic Population Site PI: Linda Zangwill, PhD Funding: Heidelberg Engineering

The Heidelberg Engineering ANTERION Imaging Agreement Study Reading Center Site PI: Linda Zangwill, PhD Funding: Heidelberg Engineering

Biological Basis of Glaucoma PI: Robert N. Weinreb, MD Funding: Downtown San Diego Lions Club BioBank for Vision

Effects of a Single Osteophathic Manipulative Treatment (OMT) on Intraocular Pressure (IOP) Reduction

Co-PI: Linda Zangwill and Hollis King (Family Medicine)

Funding: Private Osteopathic Foundation of the American Academy of Ophthalmology (AAO) and the Foundation of Osteopathic Research and Continuous Education (FORCE)

A Randomized, Single Center, Masked, Crossover Study Comparing the Effects of Latanoprostene Bunod and Timolol on Intraocular Pressure and retinal Blood Vessel Density in Patients with Ocular Hypertension or Primary Open Angle Glaucoma PI: Robert N. Weinreb, MD Funding: Bausch & Lomb

Evaluation of the Repeatability and Reproducibility of AngioVue in Normal Subjects, Retinal Patients, and Glaucoma Patients PI: Robert N. Weinreb, MD Funding: Optovue The Efficacy and Safety of Bimatoprost SR in Patients with Open-angle Glaucoma or Ocular Hypertension PI: Andrew Camp, MD Funding: Allergan

The Effects of Body Position on Episcleral Venous Pressure and Intraocular Pressure in Glaucoma PI: Andrew Camp, MD Funding: Allergan

XEN-45 Gel Stent Versus Trabeculectomy in Glaucoma: Gold-Standard Pathway Study (GPS) PI: Andrew Camp, MD Funding: Allergan

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 Funding: Aerie

Prospective Randomized 12 233k Controlled Study of Visual Field Change in Subjects with Partial Seizures Receiving Pregabalin or Placebo Pl: Christopher Bowd, PhD Funding: Pfizer

Grading Ocular Images and Datasets for B-2018-4 Study PI: Linda Zangwill, PhD Funding: Heidelberg

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

Subconjunctival Mitomycin-C Injection Versus Direct Sclera Application in Trabeculectomy PI: Robert N. Weinreb, MD Sub-I: Jiun Do, MD

#### PEDIATRIC OPHTHALMOLOGY

Omega-3 Fatty Acids as a Non-Invasive Therapy for the Prevention of Retinopathy of Prematurity PI: Shira L. Robbins, MD Funding: The Hartwell Foundation, Hartwell Individual Biomedical Research Award, 2014- Present

An Observational, Multicenter Study of the Prevalence of Cerebrotendinous Xanthomatosis (CTX) in Patient Population Diagnosed with Early Onset Idiopathic Bilateral Cataracts. Project #160146 PI: Shira L. Robbins, MD Funding: Retrophin, 2016 – Present

#### RETINA

Testing and Evaluation of a Retinal Prosthesis. PI: Dirk-Uwe Bartsch, PhD Funding: Nanovision Biosciences

A Dose-Ranging Study of the Intravitreal OPT-302 in combination with ranibizumab, compared with ranibizumab alone, in patients with Neovascular Age-Related Macular Degeneration PI: Daniel Chao, MD, PhD Funding: Ophthea, Ltd

Study to Compare the Efficacy and Safety of Intravitreal APL-2 Therapy with Sham Injections in Patients with Geographic Atrophy (GA) Secondary to Age-Related Macular Degeneration PI: Daniel Chao, MD, PhD Funding: Apellis"=

Efficacy and Safety Trial of Conbercept Intravitreal Injection for Neovascular Age-related Macular Degeneration (PANDA-1) PI: Daniel Chao, MD, PhD Funding: Chengdu Pharmacueticals

A Study to Evaluate the Efficacy and Safety of Faricimab (RO6867461) in Participants With Diabetic Macular Edema PI: Daniel Chao, MD, PhD Funding: Genentech

A Phase III, Multicenter, Randomized, Double-Masked, Active Comparator-controlled Study to evaluate the Efficacy and Safety of Faricimab in Patients with Neovascular Age-related Macular Degeneration (TENAYA) PI: Daniel Chao, MD, PhD Funding: Genentech

ARCHWAY Study. William Freeman, MD 01/16/2019 – 05/31/2019 Funding: Genentech, Inc.

LADDER Study. William Freeman, MD 04/04/2016 – 12/31/2019 Funding: Genentech, Inc.

PANORAMA. William Freeman, MD 08/01/2016 – 12/31/2019 Funding: Regeneron Pharmaceuticals ZIMURA Study. William Freeman, MD 03/15/2018 – 12/31/2021 Funding: Ophtotech, Inc.

PORTAL Study. William Freeman, MD 02/21/2019 – 12/31/2022 Funding: Genentech, Inc.

A 2-year, Three-Arm, Multicenter, Randomized, Double-Masked, Phase III Study assessing the Efficacy and Safety of Brolucizumab vs Aflibercept in Adult Patients with Visual Impairment due to Diabetic Macular Edema (KESTREL) PI: Eric Nudleman, MD, PhD 11/01/2018 - 07/20/2022 Funding: Novartis Pharmaceuticals

## GRANTS

#### NATALIE A. AFSHARI, MD

2019 Jerome Bettman, MD Lecture, Stanford Application of RNA-targeting Cas9 to Fuchs Dystrophy Co-I: Natalie A. Afshari, MD National Institutes of Health, R01EY029166-01, April 2018 – March 2023

FGF Signaling in Lacrimal Gland Homeostasis, Regeneration and Disease Co-I:Natalie A. Afshari, MD Scripps Research Institute, National Institutes of Health/National Eye Institute as Prime, R01 EY028983-01, April 2018 – March 2023"

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

Molecular Basis of Hereditary Retinal Degenerations PI: Radha Ayyagari, PhD NIH/NEI, R01EY021237, June 2016 - May 2021

Identification of the Elusive Genetic Causality of Inherited Retinal Degenerations (IRDs) PI: Radha Ayyagari, PhD Foundation Fighting Blindness, December 2018 -November 2023

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

Mechanistic-Based Non-Invasive Assessment of Retinal Damage in HAART Era PI: Dirk-Uwe Bartsch, PhD RO1 Grant NIH/NEI September 2016 - August 2021

#### SHYAMANGA R. BOROOAH, PHD

Combining the Utility of Human Induced Pluripotent Stem Cell Modeling and CRISPR-Cas9 Gene Editing with Adenoassociated Virus Vector Gene Delivery to Develop and Optimize Novel Gene Editing in Inherited RPE Disease Pl: Shyamanga R. Borooah, PhD The Foundation Fighting Blindness September 2018 -August 2023

Investigating disease modifying interventions for lateonset 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/NEI July 2017 - June 2019

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

Characterization of a Zebrafish Model of Wet Macular Degeneration PI: Daniel L. Chao, MD, PhD BrightFocus Foundation July 2017 - August 2021

Ophthalmology and Visual Sciences Career Development K12 program PI: Daniel L. Chao, MD, PhD National Institutes of Health, K12 EY024225. April 2015-March 2020

#### JIUN L. DO, MD, PhD

Direct Cellular Replacement of Retinal Ganglion Cells, Pl: Jiun L. Do, MD, PhD American Glaucoma Society Mentoring for Advancement of Physician-Scientists Award, November 2018 – November 2019

Ophthalmology and Visual Sciences Career Development K12 program PI: Jiun L. Do, MD, PhD National Institutes of Health, K12 EY024225. April 2015-March 2020

Restoration of Visual Function Through the Development of Optic Nerve Relays PI: Jiun L. Do, MD, PhD UC San Diego Academic Senate, February 2019 – March 2020

#### NAPOLEONE FERRARA, MD

Identification of Novel Inhibitors of Ocular Neovascularization PI: Napoleone Ferrara, MD Co-I: Eric Nudleman, MD, PhD R21 NIH/NEI April 2018 - March 2021

#### 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

#### DON O. KIKKAWA, MD

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

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

Protein Homeostasis and Proteotoxicity Mechanisms, PI: Jonathan H. Lin, MD, PhD NIH/NINDS, R01NS088485, February 2015 – January 2020

Cellular and Molecular Mechanisms of Age-Related Retinal Degeneration PI: Jonathan H. Lin, MD, PhD VA/BLR&D, 1101BX002284, April 2014 – March 2023

Endoplasmic Reticulum Stress in Neurodegeneration, PI: Jonathan H. Lin, MD, PhD VA/RR&D, 1101RX002340, February 2017 – January 2021

HTRA1 in Age-Related Macular Degeneration Co-I: Jonathan H. Lin, MD, PhD NIH/NEI, R01EY025693, November 2015 – October 2020

The Jackson Laboratory Center for Precision Genetics: New Models to Novel Therapeutics, Sub Co-I: Jonathan H. Lin, MD, PhD NIH/OD, U54OD020351, August 2015 – June 2020

Small Molecule Proteostasis Regulators to Treat Photoreceptor Diseases PI: Jonathan H. Lin, MD, PhD California Institute for Regenerative Medicine, CIRM DISC2-10973, February 2019 – January 2021

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

Analysis of DNA Mutations and Transcriptional Changes in Lacrimal Gland Pleomorphic Adenomas. PI: Catherine Y. Liu, MD PhD UC San Diego Academic Senate, RG084154 June 2019-May 2020

#### SASAN MOGHIMI, MD

Optical Coherence Tomography Angiography in Angle Closure Glaucoma, Tehran University of Medical Sciences PI: Sasan Moghimi, MD November 2016 - August 2019

#### ERIC NUDLEMAN, MD, PhD

Role of PDLIM1 in Retinal Vascular Leakage and Proliferation PI: Eric Nudleman, MD, PhD K08 NIH/NEI April 2018 - March 2021

#### NICHOLAS OESCH, PhD

Computing Luminance and Contrast in Prosthetically Driven Retina RO1 PI: Nicholas Oesch, PhD NIH/NEI September 2018 - June 2023

#### PETER SHAW, PhD

HTRA1 as a Therapeutic Target in the Treatment of Wet AMD 1R01EY025693-01 PI: Peter Shaw, PhD NIH/NEI, August 2015 – August 2020

#### SHIRA L. ROBBINS, MD

Pediatric Eye Disease Investigator Group Coordinating Center PI: Shira Robbins, MD JAEB/NIH December 2014 - December 2018

Amblyopia Treatment Study: Study of Binocular Computer Activities for Treatment of Amblyopia (ATS18) PI: Shira Robbins, MD PEDIG JAEB Center for Health Research, October 2014 - December 2018

#### JOLENE RUDELL, MD, PhD

Ophthalmology and Visual Sciences Career Development K12 Program PI: Jolene Rudell, MD, PhD National Institutes of Health, K12 EY024225. April 2015-March 2020.

#### DOROTA SKOWRONSKA-KRAWCZYK, PhD

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

Understanding Senescence to Develop Novel Glaucoma Treatments PI: Dorota Skowronska-Krawczyk, PhD Research to Prevent Blindness Special Scholar Award July 2018 - June 2020

Nanoparticle-Based Glaucoma-Targeted Gene Therapy PI: Dorota Skowronska-Krawczyk, PhD The Eppley Foundation for Research May 2018 - April 2019 Advancing the Understanding of Neuroprotective Function of Senolytic Drugs in Glaucoma PI: Dorota Skowronska-Krawczyk, PhD NIH/Clinical and Translational Research Institute/ NCATS March 2019-February 2020

Role of Elovl2 in Aging of the Retina PI: Dorota Skowronska-Krawczyk, PhD UCSD Senate Health Sciences Research Grant January 2019 - December 2019

Lipid Supplementation as a Treatment for Age-Related Eye Diseases Co-PI: Dorota Skowronska-Krawczyk, PhD AIM/MEET Rapid Grant Award UCSD Office of Innovation and Commercialization June - July 2019

Eliminate to Protect Glaucoma Research Foundation February 2018 - January 2019

#### KARL WAHLIN, PhD

Complement Factor H Mutant Pluripotent Stem Cells to Model Early Onset Macular Degeneration and Their Application in Drug Discovery PI: Karl Wahlin, PhD Brightfocus Foundation, August 2018 - July 2020

Modeling Photoreceptor Development and Disease with Human Pluripotent Stem Cells PI: Karl Wahlin, PhD National Institutes of Health, R00 EY024648-01 July 2014 - July 2020

An iPSC Cell Based Model of Macular Degeneration for Drug Discovery PI: Karl Wahlin, PhD California Institute for Regenerative Medicine (CIRM) August 2018 - July 2020

Dissecting the Biochemical Role of Epigenetically Modified Regulatory Sequences within the Genomes of Retinal Neurons. Subcontractor: Karl Wahlin, PhD National Institutes of Health, R15 EY028725. August 2018 - June 2021

Micronenvironment Based Optimization of Retinal Induction Using CRISPR-CAS9 Reporter Pluripotent Stem Cells as an Expandable Source of Retinal Progenitors and Phoptoreceptors California Institute for Regenerative Medicine October 2016 - September 2019

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

Diagnosis and Monitoring of Glaucoma with Optical Coherence Tomography Angiography PI: Robert N. Weinreb, MD National Institutes of Health, R01 EY029058. April 2018-March 2023

ADAGES III: Contribution of Genotype to Glaucoma Phenotype in African Americans PI: Robert N. Weinreb, MD National Institutes of Health, R01 EY023704. September 2013-August 2019

Ophthalmology and Visual Sciences Career Development K12 program PI: Robert N. Weinreb, MD National Institutes of Health, K12 EY024225. April 2015-March 2020

Ocular Hypertension Treatment Study: 20 Year Follow-Up: Clinical Center Co-PI: Robert N. Weinreb, MD, Linda Zangwill, PhD National Institutes of Health, UG1 EY025181. July 2015-June 2020

Unrestricted and Challenge Grant - Research to Prevent Blindness PI: Robert N. Weinreb, MD

Machine Learning Methods for Detecting Disease-Related Functional and Structural Change in Glaucoma PI: Robert N. Weinreb, MD National Institutes of Health, R01 EY027945. July 2017-June 2022

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

Kinase Multitargeting for Glaucoma Neuroprotection RO1 PI: Derek S. Welsbie, MD, PhD NIH/NEI July 2018 - June 2023

High-Throughput Functional Genomic Screening in Retinal Ganglion Cells PI: Derek S. Welsbie, MD, PhD Glaucoma Research Foundation February 2019 -January 2022

Novel AAV/CRISPR Therapeutic for DLK Inhibition PI: Derek S. Welsbie, MD, PhD BrightFocus Foundation July 2016 -June 2019

Development of DLK Inhibitors PI: Derek S. Welsbie, MD, PhD Johns Hopkins University; Bayer AG as Prime July 2016 - May 2019

#### LINDA ZANGWILL, PhD

P30 Center Core Grant for Vision Research PI: Linda Zangwill, PhD National Eye Institute, P30EY022589, September 2018-June 2023

Diagnostic Innovations in Glaucoma Study (DIGS): High Myopia and Advanced Disease PI: Linda Zangwill, PhD National Eye Institute, R01EY027510, March 2017-February 2022

African Descent and Glaucoma Evaluation Study (ADAGES) IV: Alterations of the Lamina Cribrosa in Progression PI: Linda Zangwill, PhD Co-I: Robert N. Weinreb, MD National Eye Institute, R01 EY026574, April 2017-March 2021

Ocular Hypertension Treatment Study 20-Year Follow-Up: Resource Center Grant, National Eye Institute, UG1 EY025183, July 2015 – June 2019

T32 Translational Vision Research Training at UCSD, National Eye Institute, T32, April 2016 – March 2021

The Role of Microvasculature in Pathophysiology of Glaucoma PI: Linda Zangwill, PhD BrightFocus Foundation, July 2017- June 2019

Dietary Interventions to Improve Vision PI: Linda Zangwill, PhD Krupp Endowment Fund, January 2017 – December 2019

Translational Vision Research Training at UCSD PI: Linda Zangwill, PhD Co-PI: Robert N. Weinreb, MD National Institutes of Health, T32 EY026590. April 2016-March 2021

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

# NEW LOCATIONS

The Shiley Eye Institute has expanded its reach with two additional locations:

Hillcrest (4060 4th Avenue) offers all specialties including retina, glaucoma, cornea, neuro-ophthalmology, pediatric ophthalmology and optometry services. To make an appointment, please call 619-543-6244.

A new eye clinic, the OculoPlastics Clinic at the Perlman Medical Offices (9350 Campus Point Drive), offers oculoplastics and reconstructive surgery services. To make an appointment, please call 619-543-2255.



# EVERY GIFT HAS IMPACT

For over 30 years, the philanthropic support from generous individuals, foundations and corporations has provided the Viterbi Family Department of Ophthalmology with valuable resources for patient care, research, education and community service.

As a friend of the Department of Ophthalmology, there are several giving options for those who wish to contribute to our tradition of excellence. 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.



Making a gift of real estate is a generous and financially advantageous way to support the Shiley Eye Institute. Many people have residential rental units or vacation homes that no longer serve their needs or have become too burdensome to maintain. Even commercial property and vacant land can be a used as gifts to support Shiley's programs. Real estate can be given as an outright gift or in a bargain sale; it can be used to create a retained life estate, a charitable gift annuity or a charitable remainder trust.

There are many creative ways that your real estate can unlock financial security and provide tax benefits for you now while supporting the Shiley Eye Institute and the programs that mean the most to you.

Please allow our experts at the UC San Diego gift planning department to work with you and your legal and financial advisors to explore these various options and determine the right plan for you.

### **VISIONARY CIRCLE**

Members of the Visionary Circle are cumulative lifetime contributors of one million dollars or more to the Department of Ophthalmology. We appreciate their generosity.

#### Anonymous

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# **GIVING** OPPORTUNITIES

#### **ANNUAL GIFTS** - CIRCLE OF SIGHT

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

#### MATCHING GIFTS - DOUBLE OR TRIPLE YOUR GIFT

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

#### **ENDOWMENTS** - GIFTS IN PERPETUITY

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

#### **TRIBUTE GIFTS** - ACKNOWLEDGE SOMEONE SPECIAL

Contributions can be made in memory, honor or in celebration of a loved one or to commemorate a special occasion. Gifts can be made to honor a special physician, for example, who has played a significant role in your eye health. Such a gift creates a legacy and memorializes the person by providing direct support to the Department.

#### **OUTRIGHT GIFTS** - IMMEDIATE IMPACT

Outright gifts of all sizes made with cash, check, credit cards, savings bonds, stocks, marketable securities or property provide immediate impact to our faculty and facility.

#### **PLANNED GIFTS**

There are a variety of creative and mutually beneficial ways to support our physician-scientists at the Shiley Eye Institute today and in the future as they continue to lead the way in the sight-saving innovations.

One way to offer your support is through a Qualified Charitable Distribution, which is an easy, tax-beneficial way to make a gift from your IRA. You can give using this method whether or not you itemize on your tax return. If you are 70½ or older, a gift from your IRA will fulfill part or all of your required minimum distribution and will not be considered taxable income.

Gifts of appreciated securities also permit you to maximize your contribution by eliminating any capital gains tax. In addition, you can receive a charitable tax deduction for the full value of the gift if you itemize.

A charitable gift annuity is another excellent way to help ensure your future financial security and receive tax benefits while helping Shiley Eye Institute and the programs that mean the most to you.

And you can ensure your long-term impact to the Shiley Eye Institute with a gift from your will or trust, or through a beneficiary designation on a retirement account or life insurance policy.

For further information about making a donation, please contact: KAREN ANISKO RYAN Phone: 858-534-8017 Email: KANISKO@UCSD.EDU

If writing a check, please make payable to the *"UC San Diego Foundation"* and put the *Shiley Eye Institute* in the memo section. The check should be accompanied with a letter stating the focus of your donation and mailed to:



The Shiley Eye Institute Mailcode 0946 9415 Campus Point Drive, Room 241B La Jolla, CA, 92093-0946







## CIRCLE OF SIGHT

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 the department within the community by spreading the word about the amazing accomplishments of the Shiley Eye Institute.

On February 6, 2019, Eric D. Nudleman, MD, PhD, Assistant Clinical Professor of Ophthalmology, presented "Diabetes and the Eye" to the Circle of Sight. He updated the members on the symptoms, treatments and future research on diabetic retinopathy and other retinal related diseases.

## THE HONOR ROLL FOR THE DEPARTMENT OF OPHTHALMOLOGY GRATEFULLY ACKNOWLEDGES DONATIONS FROM JULY 1, 2018 THROUGH JUNE 30, 2019. THANK YOU TO ALL OF THE INDIVIDUALS, FOUNDATIONS AND CORPORATIONS LISTED BELOW.

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The Viterbi Family Department of Ophthalmology sadly acknowledges friends and key supporters who have passed away during the past year. They remain in our thoughts.

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