

Summer 2019

# enVISION

News from the UC Davis Eye Center

## ENSURING THE FUTURE'S VISION

Defeating  
Childhood Glaucoma

P

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 UC Davis Eye Center





**UC DAVIS**  
**HEALTH**

Eye Center

our  
*MISSION*

We will realize our vision through pioneering collaborative vision research, providing state-of-the-art, world-class eye care, and training superbly prepared ophthalmologists and vision scientists.

our  
*VISION*

Our vision is to be the world's transformational leader in collaborative vision research and the development of cures for blinding eye disease from cornea to cortex.





# enVISION

News from the UC Davis Eye Center

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# From the Chair's Desk

In early 2020, we will begin the joyous task of building the Ernest E. Tschannen Eye Institute at UC Davis. This new edifice, designed with our patients in mind and looking to the future of eye care, will be the culmination of hard work on the part of numerous individuals at UC Davis and, of course, the largesse of Ernest E. Tschannen and many other generous donors. But an even more important beginning is the “groundbreaking” that we have been doing over the past decade, building a faculty of exceptional capability and leadership. Together, this faculty has brought our institution to national prominence and has served the region and the nation with distinction in both clinical care and innovative research.

What makes our department so unique are the strong and heavily traveled bridges between the clinicians in Sacramento and the vision scientists on the Davis Campus. Advances in retina, cornea, and glaucoma research are fueled by talented clinicians and basic scientists joining forces to open new areas of inquiry in translational science. Working hand-in-hand with our colleagues in the School of Veterinary Medicine, our physicians and PhDs are developing new procedures for treating corneal edema, developing an artificial cornea, exploring the genetic basis for retinal degenerations and their treatment through gene therapy, examining the nature of glaucoma at the most basic level, and developing new techniques for in-vivo imaging at the cellular level, among many others. Through the strong leadership of Paul FitzGerald, PhD, our talented cadre of vision scientists have organized to form the *Center for Vision Science*, drawing together talented researchers from across a wide range of university departments with

interest in the visual system. UC Davis now boasts nearly \$31M in vision research funding with a strong emphasis on the treatment of retinal degenerations, stem cell therapy, and gene therapy.

On the clinical front, the Eye Center is gaining momentum as a regional and national center for the management of childhood glaucoma. With referrals from around the world, James Brandt, MD is leading the initiative to establish a comprehensive West Coast center for the specialized treatment of congenital and other childhood glaucomas.

Our faculty have assumed significant positions of leadership nationally and internationally in glaucoma, cornea and eye banking, tele-ophthalmology, ophthalmic imaging, neuro-ophthalmology, retinal research, international eye care and resident education. They represent the most important facet of our new building that will house innovation, new discovery, and education of the next generation of ophthalmologists. “Ground breaking” has truly already begun, and our future is incredibly bright.



A handwritten signature in blue ink that reads "Mark J. Mannis". The signature is fluid and cursive, with a long, sweeping underline.

**Mark J. Mannis, M.D., F.A.C.S**  
Fosse Endowed Chair in Vision Science Research  
Professor and Chair  
Department of Ophthalmology & Vision Science  
University of California, Davis Eye Center



## Executive Advisory Council **2019-2020**

### *our mission*

Through community outreach and relationship building, we support and promote the UC Davis Eye Center as the premier provider of quality eye care for Northern California and of cutting-edge research for the world.

## Council Members

### **Council Chair**

DAVID MOTES, C.P.A.

### **Council Vice Chair**

MICHAEL SCHERMER, M.D.

### **Members**

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BONNIE DALE

BARBARA FINGERUT

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ROBERT MILLER, M.D.

DEBBIE PRICE

ROBERT B. PRICE, IV

PAMELA ROSMAN

ALAN ROTH, M.D.

JIM STRENG

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### **Honorary Council Members**

ANNIE FREDRIKS

KATHY HOWARD

LYN LIVINGSTON

SUSAN PRUDLER

ERNEST TSCHANNEN



# A Childhood Glaucoma Center of Excellence at UC Davis

**Our vision for the future to ensure the future's vision**





## You probably think of glaucoma as a disease of older adults, the “sneak thief of sight” that slowly, silently steals away vision.

For the most part this is true, with one important exception – *pediatric glaucoma*, a rare form of this blinding disease. Pediatric glaucoma can be present at birth or develop later in childhood or even in young adulthood. Even though pediatric glaucoma is rare, it is a leading cause of irreversible blindness in children.

Pediatric glaucoma has long been one of the most challenging eye conditions for children, parents and families. It can be difficult to diagnose and treat without specialized knowledge. Only an experienced team can provide this expertise and, just as important, the comfort and support for families beginning what will become a life-long medical journey.

Northern California has such an experienced team. Led by James D. Brandt, M.D., Professor of Ophthalmology and Director of the UC Davis Eye Center’s Glaucoma Service, the Childhood Glaucoma Team at UC Davis cares for children not only from the Central Valley but from all over the United States and abroad with families traveling here for specialized care. “Because pediatric glaucoma is a rare disease, most ophthalmologists have limited experience.” Brandt says. “It is estimated that the average ophthalmologist sees one new case of childhood glaucoma in their entire career. Here at the UC Davis Eye Center

we see a new case or two every week. Children do best when the appropriate operation is done quickly by an experienced surgeon.”

After arriving at UC Davis in 1989, Dr. Brandt set out to build a national practice in childhood glaucoma. A founding member of the Childhood Glaucoma

inaugural Noel Rice Lecture on Childhood Glaucoma at the UK Pediatric Glaucoma Society in London, and Dr. Brandt has taught courses on childhood glaucoma at each World Glaucoma Congress since that meeting’s inauguration in Vienna in 2005. The CGRN connects doctors around the globe to help them leverage each other’s unique expertise and understanding of pediatric eye disease to advance research and care. Dr. Brandt has traveled to more than a dozen developing countries to carry out and teach hands-on surgical



**Right now the childhood glaucoma center at UC Davis has all the key parts in place that has made it a national and international resource center for children and their families.**

Research Network (CGRN), he has published and lectured widely on childhood glaucoma. In 2012 Dr. Brandt gave the

teaching so that children can be cared for by properly-trained local surgeons. For his global work on childhood glaucoma,





Dr. Brandt was awarded the 2018 Humanitarian Award by the American Glaucoma Society (see *enVision* 2018)

At this time, the childhood glaucoma center at UC Davis has all the key parts in place that has made it a national and international resource center for children and their families. However, we are just a virtual center. We want to change that through philanthropy to make the Childhood Glaucoma Center

*real and sustainable.*

A child with congenital glaucoma usually has many issues that are best addressed by a multi-disciplinary team. The parents of a newborn with potentially blinding eye disease confront the daunting task of organizing and pursuing multiple consultations, weighing the different opinions they receive and then dealing with insurance and state agencies to arrange for proper coverage

of their child's care. It is not uncommon for some children to 'fall through the cracks' of our fragmented health care system. In a formal childhood glaucoma center, specialists from all the different ophthalmic disciplines would meet regularly to better plan the therapeutic needs of the child. A dedicated social worker would coordinate necessary support and help the family navigate the health care system.

Through philanthropy, we hope to establish endowments for a Professorship in Childhood Glaucoma and for a social worker dedicated to the care of these children. As we plan our move into the Tschannen Eye Institute in the next few years, it is our hope that the Childhood Glaucoma Center will become a physical reality in the new building, making sure that what we are already doing will be sustained into the future to assure that more of these children grow into adulthood with vision preserved. ■



## Childhood Glaucoma

- Childhood glaucoma is rare, occurring in **1:15,000** to **1:25,000** births
- The most common symptoms of childhood glaucoma include **excessive tearing, light sensitivity** and a **large, cloudy cornea** that can cause the eye to appear blue or hazy
- The **gene mutations** for some of the more common forms of childhood glaucoma have been discovered and can be tested for in children and families
- Glaucoma in children can be treated very effectively when **diagnosed early** in life before a child loses eyesight forever
- Older children with glaucoma tend to develop damage **without any obvious symptoms**, similar to adult glaucoma



# Success Stories

## Lucy's Story

**Lucy Maguire** was just three months old, and her family were out on the lake, enjoying a beautiful sunny day. Lucy's aunt noted to Brenna, Lucy's mom, "I think Lucy is going to have different colored eyes." Brenna looked at her baby's left eye and saw a metallic sheen she knew was not right (page 8, top picture: Lucy as a baby). After an emergency room visit with no answers, Brenna and Lucy were taken by ambulance to UC Davis where the problem was recognized. Thus began their journey together with Dr. James Brandt and something called congenital glaucoma.



Lucy is now five and seeing well. Dr. Brandt continues to manage her glaucoma. Access to Dr. Brandt and his team remains a requirement of the Maguires' long-term plans. A decision to move to a suburb must include consideration for proximity to the Eye Center. Nonetheless, the family counts Dr. Brandt to be a blessing. "We feel like we just fell into Dr. Brandt's lap," says Brenna. "He has always patiently answered all of my questions and has bridged the gap for us in understanding congenital glaucoma. Not knowing can be hard, but we know it'll be okay because we have Dr. Brandt."

## Sophia's Story

**In contrast** to Brenna Maguire, David Sexton knew exactly what was happening when his daughter Sophia was born in a hospital in rural India. David grew up in the Bay Area and has been blind since early childhood. David's mother became blind from congenital glaucoma in her early twenties and David has two siblings blind from the disease. In college, David completed training in computer engineering in the United States, but found his true calling while traveling in India. He met his wife Mary there and they decided to establish a school in rural India two hours away from the nearest paved road. When David and Mary decided to have children, they both knew there was a high chance their children too would have congenital glaucoma.



Sophia's eyes were cloudy at birth, a clear sign that she had not escaped congenital glaucoma. Because her family history suggested she was at high risk malignant hyperthermia, the local doctors in India could not safely care for her. David reached out to colleagues and quickly found out where he and Mary needed to take Sophia: UC Davis. With only the income from running a charity school in northeastern India, Mary and David crowdfunded their family's 8,000-mile trip to Sacramento, raising over \$6,000 from 75 people in 30 countries. Two days after they arrived, half asleep from jetlag, the Sextons were in the Eye Center, seeing Dr. Brandt. Sophia had surgery on both eyes just a few days later. David says, "I always knew I would have blind kids...I think the surprise for us now is that she is actually not blind."

## Bobby's Story

**It was surprising** to Bob and Debbie Price when they took their 7-month old son Bobby on a cruise and noticed the sun bothered him throughout the trip. Once home, they sought the advice of their pediatrician, who didn't detect anything wrong with Bobby. A second physician immediately recognized something and referred them to Dr. Brandt who broke the news that their baby had congenital glaucoma. "I remember the day we met Dr. Brandt and he said he'd be in our life for the rest of his life (knowing that our son Bobby would outlive him)," Debbie said. "That moment was very moving for us as parents and it immediately made us feel like we were in the best hands possible with Dr. Brandt – we instantly trusted him."



Fast forward nine years, and the Eye Center has become like family to the Prices. Bob remarks, "the moment the teams from UC Davis came into our lives we didn't know what we were facing and we were scared. They did more than treat our son. Dr. Brandt and his team also helped my wife and me get through it. They were compassionate. They let us know we were in good hands, and they had all the resources to treat his glaucoma." Now, 11 years old, Bobby is an avid reader who loves to play Minecraft, swim and travel. He's undergone a number of surgeries and procedures in his young life, but his vision has been stable for the last four years and even improved. "UC Davis has impacted our lives tremendously and we were treated immediately as the teams acted with great speed," Bob said. "We are so lucky to have access to clinicians who are internationally recognized for their expertise in diagnosing and treating blinding eye diseases at all ages and stages in life."

# EYE ON **TELE-OPHTHALMOLOGY**

Michael Ellis, MD, and Glenn Yiu, MD, PhD





# The UC Davis Eye Center and Primary Care Network are teaming up to improve diabetic retinopathy screening and prevent vision loss using tele-ophthalmology.

Diabetic retinopathy is the leading cause of vision loss among working-age adults, and vision loss can be prevented if treatment is initiated at early stages.

Fewer than  
**50%** of the  
**29.1 MILLION**  
Americans diagnosed  
with diabetes  
undergo annual  
eye screening as  
recommended by the  
American Diabetes  
Association (ADA).

In fact, within many major  
health systems, including  
the UC Davis Health  
System, **screening rates**  
**are usually between**  
**30-50%**  
ANNUALLY.

**D**r. Glenn Yiu, an Associate Professor and Director of Tele-ophthalmology programs at the UC Davis Eye Center, is now partnering with **Dr. Christopher Lillis**, Medical Director of PRIME/PCMH, **Dr. Scott MacDonald**, EHR Medical Director, and **Dr. Michele Lim**, Eye Center Medical Director, to coordinate a new tele-medicine screening program at the UC Davis Midtown clinic in order to detect early signs of eye involvement in diabetic patients. With the launch of this new program, patients can now get their eye images taken while waiting to see their primary care provider and have those images remotely read by an ophthalmologist without having to schedule a separate visit to an eye care provider. Results are transmitted back to the primary provider to determine if the patient has disease requiring referral to an eye specialist, or needs simply routine annual follow-up.

The concept for this program began more than a year ago, when Dr. Yiu successfully secured grant funding from the **UC Davis Collaborative for Diagnostic Innovation** and the **CITRIS/Banatao Institute**. The planning process involved obtaining a non-mydratic fundus camera (i.e. a camera that captures a retinal image without dilating eye drops), training a team of ophthalmic photographers to operate the camera, and importantly,

designing both a physical and electronic workflow that could be integrated at the Midtown Clinic. This location was chosen as the initial site due to its central location near the medical center, and the high volume of diabetic patients seen there.

Within the first 6 months of the program, the tele-ophthalmology program has screened more than 200 patients and increased diabetic retinopathy screening rates at the Midtown clinic by more than 10%. A portion of these patients who otherwise would not have undergone screening were diagnosed with diabetic retinopathy and were promptly referred for treatment at the Eye Center. Drs. Michael Ellis and Colin Bacorn, current Ophthalmology residents, have analyzed this data and presented their preliminary findings at **the Association for Research in Vision and Ophthalmology (ARVO)** meeting in Vancouver, Canada in April this year.

However, the study has significant obstacles moving ahead. First, because tele-ophthalmology is very new, some insurance providers, including Medicare, do not have established mechanisms for payments. Payors do not routinely cover procedures if the patients are “asymptomatic.” However, eye screening is an important aspect of preventive care for diabetic patients. “Early



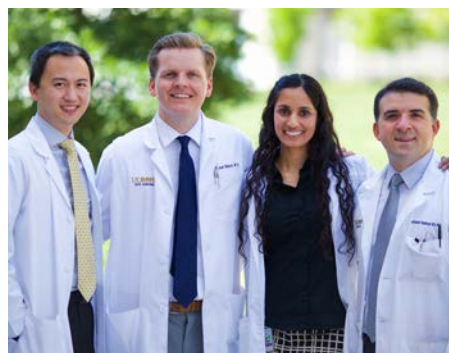
Christopher Lillis, MD, FACP  
Medical Director PRIME and PCMH

Scott MacDonald, MD  
Electronic Health Record Medical Director

stages of diabetic retinopathy may not only be markers for sight-threatening disease, but could also be harbingers of other serious systemic complications of diabetes,” said Dr. Yiu. Most patients with early stages of diabetic retinopathy are asymptomatic, so routine screening is necessary to look for early disease. “Even a single diabetic patient who is prevented from progressing to kidney dialysis or leg amputation could translate to substantial cost savings, not to mention the incredible benefit to our patients,” he said. To address this issue, Dr. Yiu and Dr. Lim have been working with the health policy experts at the **American Academy of Ophthalmology (AAO)** to discuss these issues with the leadership of insurance companies that administer federal Medicare programs. Dr. Yiu and Dr. Ellis have also discussed these issues with health policy staff at **Congresswoman Doris Matsui’s** office in Sacramento. “Congresswoman Matsui is known to be heavily in favor of telemedicine programs that aim to increase participation in preventative care,” said Dr. Ellis. “Her office is aware that

telemedicine is absolutely crucial in terms of preventive care and cost savings with wide-ranging implications on community healthcare and population health.”

Another ongoing barrier is physician work-flow. Many primary care physicians are already overwhelmed by their work-load, and they do not always remember to send a diabetic patient for eye screening. To this end, Dr. Yiu has been working with nurses and medical assistants who could help alert the physician that a certain patient needs eye screening. Automated electronic reminders such as “best practice alerts” (BPAs) or bulk messaging to patients, are other methods to improve uptake of the tele-ophthalmology program. Dr. Yiu is also collaborating with

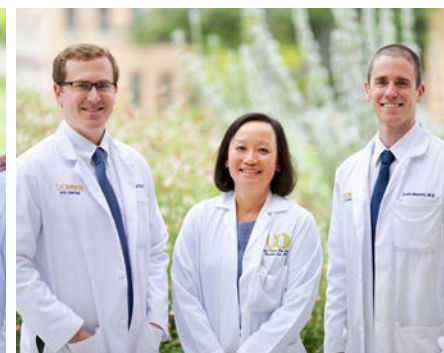


above:  
Glenn Yiu, MD, PhD  
R. Joel Welch, MD (Fellow)  
Lekha Mukkamala, MD (Fellow)  
Amirfarbod Yazdanyar, MD, PhD (Fellow)

industry partners such as **Verily Life Sciences**, the healthcare division of Google’s parent company Alphabet, to optimize the physician work-flow.

“Tele-ophthalmology has been around for years,” said Dr. Yiu, “but mainly in underserved communities or underdeveloped countries where access to eye care is limited.” Widespread deployment of tele-ophthalmology, however, could not be possible without innovations that are only starting to become mature in recent years. First, electronic health record (EHR) systems had to become fully-integrated into physician workflow, with automated triggers to alert doctors that a diabetic patient may be overdue for an eye exam. Also, fundus cameras must not only obtain high-quality images but also be easy to use. The newest generation of fundus cameras can automatically locate, focus, and photograph the retina with just one or two clicks of a button. Since the beginning of this year, the team has successfully placed an ultrawide field imaging camera from **Optos**, a Nikon company, at the Midtown clinic. This will enable the services to be even more sensitive in detecting retinal disease at the patient’s visit.

Finally, the process of interpreting the images by an



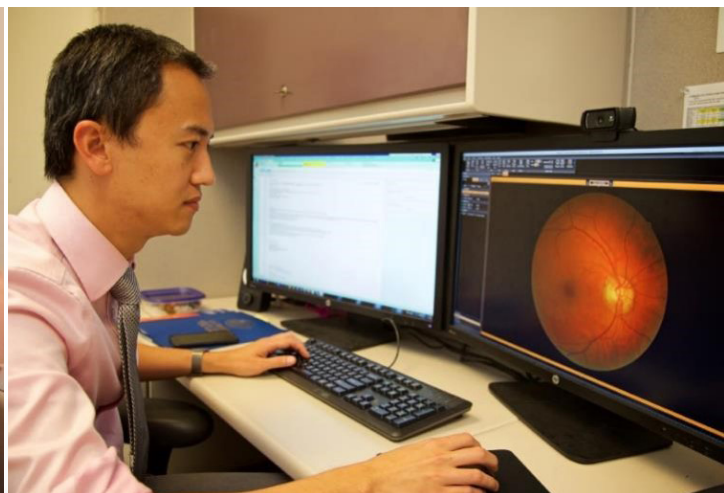
above:  
Michael Ellis, MD (Resident)  
Michele Lim, MD  
Colin Bacorn, MD (Resident)



below: Ophthalmic Clerk Yen Luu using a fundus camera



below: Dr. Yiu reviews images taken from a fundus camera



“There are two important advantages to the use of AI for remote diabetic retinopathy screening; they provide instantaneous feedback, and they never get tired and make a mistake.”

ophthalmologist must become faster and more efficient as well. That is why Dr. Yiu has teamed up with research partners to employ artificial intelligence (AI) to assist in the tele-ophthalmology screening initiative. In 2016, **Google** published the first report of a fully-automated “deep-learning” algorithm that could detect diabetic retinopathy from fundus photographs with accuracy matching that of human graders. “There are two important advantages to the

use of AI for remote diabetic retinopathy screening,” said Dr. Yiu, “they provide instantaneous feedback, and they never get tired and make a mistake.” If AI-integration becomes fully-realized in tele-ophthalmology, a diabetic patient could have their retinal photo taken and immediately find out if they will need an ophthalmology referral, even before they enter the exam room with their primary doctor.

Dr. Yiu’s goal for this project has been from the start to increase screening of diabetic patients at UC Davis until it reaches 100%. The Midtown Clinic tele-ophthalmology program was only a first step and there is expansion underway. Discussions have occurred with **Pediatric Endocrinology** and **Family Medicine** services to encourage deployment of tele-ophthalmology services

in other high-yield locations. Still, successful system-wide implementation will require more physician involvement, more cameras, and more funding. Eye exams for patients with Diabetes is one of many quality measures tracked by the National Committee on Quality Assurance (NCQA), Centers for Medicare and Medicaid Services (CMS) and private insurance carriers showing the potential positive financial footprint of the project. Dr. Yiu and his team remain optimistic that improving awareness, innovative technologies, and the immense passion of the physicians and staff on his team will ensure the success of this program. ■



above:  
Steven Tran, Ophthalmic Clerk  
Sophie Lee, Ophthalmic Clerk  
Danielle Gutterez, Senior LVN Supervisor



Left: Charleen Roccucci

# The Gift of Sight

## Sierra Donor Services makes a second chance possible

*Deanna Santana, Public Relations Manager, Sierra Donor Services*

It is not uncommon to see Charleen Roccucci hiking with her family, whale watching on the coast or kayaking on the American river. But for many years those activities were not always possible or rewarding.

“My vision problems began very slowly,” Roccucci recalled. “First oncoming headlights would totally blind me for a few minutes, and later, even tail lights on freeways became blurry. So, I stopped driving on two-lane roads and at night.”

But over a 15-year period, Roccucci’s vision would become progressively worse, affecting her ability see clearly during the day as well.

“It’s like driving on a very foggy day,” she said. “I’d be looking for a particular street and have difficulty making out the names on the signs. I would creep up to an intersection, and the red, yellow or green light would be very hazy. It was a scary situation.”

In 1997, Roccucci learned that she had Fuch’s endothelial corneal dystrophy, a slowly progressing disorder that causes the clear layer (cornea) on the front of the eye to swell, leading to glare, cloudy vision and eye discomfort. The disorder is slightly more common in women than men, affects both eyes and does not become noticeable until

individuals reach their 50s or 60s. Initially, Roccucci used drops and ointments to help reduce swelling of her cornea and minimize her symptoms. But in 2013, when the words on a printed page became too blurry for her to read, she was referred to Dr. Jennifer Li, a corneal specialist at UC Davis Eye Center. It was at that time Dr. Li offered the option of a novel corneal transplantation procedure to help restore her vision and eliminate her disease.

“The prospect of being able to see was exciting but almost unbelievable” states Charleen. “Over the past decade, corneal transplantation has been revolutionized by new techniques that allow patients to see better, faster, and with fewer risks and complications,” says Dr. Li. “In particular, endothelial keratoplasty surgery has drastically improved the lives of many patients just like Ms. Roccucci. In endothelial keratoplasty surgery, only a thin layer of diseased cells is removed from the patient’s cornea and replaced which allows better outcome than traditional corneal

transplantation surgery.”

According to the National Eye Institute, corneal transplants are among the most common and successful transplantation procedures in medicine. Each year approximately 33,000 Americans undergo corneal transplants to replace diseased and injured corneas, the normally crystal clear tissue that protects the eye and helps focus light on the retina.

Today Roccucci has clear 20/20 distance vision, wears glasses for reading and shares her story as a volunteer with Sierra Donor Services, the organ, eye and tissue donation and transplantation Network that serves almost four million people in Northern California and Nevada.

“I am an adventurous person and like to travel, hike, camp and be outdoors. On a recent whale-watching trip to Point Reyes lighthouse, I could spot whale spouts way out in the ocean, well before others. Then I remembered all those other years when people pointed the whale spouts out to me and I could not see them.

“I am forever grateful for this precious gift of sight and my transformed life because of the two people who signed up to be donors,” Roccucci said. ■



*Consider giving the gift of life. Join the Donate Life Registry ([registerme.org](http://registerme.org)) or check the box on the DMV license application. Sierra Donor Services is committed to saving and improving lives by connecting one life to another through organ, eye and tissue donation and transplantation. Become one of the nearly 66,000 people in the U.S. who chose to give the gift of sight through Donate Life.*



Roccucci with the Sierra Donor Services team, which supplied 986 corneas for transplant in 2017.





On any given Friday morning at Society, you can hear peals of laughter, and a lot of energetic babbling as our infant/toddler support group gets underway. Parents of babies and toddlers with vision loss come together to help their young ones explore their world through tactile toys, Braille books, and other objects.

little people . . .

# BIG DREAMS





**T**hrough this play time, children who are blind or have low vision get to work on gross motor, orientation and mobility skills; sensory stimulation, cognitive development and early communication skills.

School-age youth receive one-to-one instruction and training in Braille, Assistive Technology and Orientation and Mobility from our professional staff through our After-School Academy. Each child receives an assessment to tailor the academic tutoring to their needs.

Society for the Blind is focused on the whole child, so we offer community events and family activities to engage everyone and develop the social and emotional skills of the children. From our “cooking without looking” classes, audio assisted movie nights, to kayaking and hiking, we aim to get our little people to dream big!

“It is so helpful to have Society for the Blind as a resource right here in our community,” said Dr. Nandini Gandhi, Pediatric Ophthalmologist at the UC Davis Eye Center.

“Giving parents a place to turn to for help and support so their child can grow up and pursue their hopes and dreams is incredibly helpful.”

The UC Davis Pediatric Ophthalmology Department has been referring patients to Society for the Blind since 2015. Children are served in our Low Vision Clinic, the Infant/Toddler Program and the After-School Academy.

In addition to our youth programs, Society offers courses and programs for working-age adults and seniors. We serve nearly 6,000 clients annually throughout our 27-county service area. We provide services at our training center in Sacramento, at our low vision clinic in Roseville, and through in-home services and community-based workshops and seminars. ■



**“It is so helpful to have Society for the Blind as a resource right here in our community.”**

Dr. Nandini Gandhi,  
Pediatric Ophthalmologist at  
the UC Davis Eye Center

To learn more, please visit our website at [www.societyfortheblind.org](http://www.societyfortheblind.org).

# Demorest Chair Filled



Byron Demorest, MD

This past November, the Eye Center received the final funds needed to establish the **Byron Demorest, MD** Chair in Pediatric Ophthalmology. Dr. Demorest (1925 – 2011) was a community ophthalmologist and is considered to be the department's first chairman. "He's the reason (the department) all exists," states Eye Center Alumnus Michael Schermer, MD. In addition to his efforts to help create an ophthalmic department at UC Davis, Byron specialized in pediatric ophthalmology and was also a national leader in setting ethical ophthalmic practices. Nandini Gandhi, M.D. — Director of the Pediatric Ophthalmology and Strabismus Service — currently holds this chair. Former director Mary O'Hara, M.D., was the Demorest Chair's inaugural holder.

From Dr. O'Hara: "We must recognize the giants who are our donors. You made the Demorest Chair possible. Without your help, we cannot continue the important work of this department. You honor Byron and all of us with your faith in support of the work that we do." On behalf of Dr. O'Hara and the rest of the Eye Center, a very special thank you to all the donors who helped to make the Demorest Chair a reality.

# seeing life again

UC Davis Health is improving lives and transforming health care by providing excellent patient care, conducting groundbreaking research, fostering innovative, interprofessional education, and creating dynamic, productive partnerships with the community.

## Creating health. Transforming lives.

**UC DAVIS  
HEALTH**

Eye Center



## Obituaries

This year, the Eye Center lost three great friends, whose dedication and generosity will be part of our future for many years to come.

**Charles Bradbrook, MD**  
(May 26, 1931 – Feb 8, 2019)

was a constant presence at every Eye Center event. Practicing ophthalmology in the community into his 80s, Dr. Bradbrook supported the Eye Center with his ongoing participation in our educational programs. He will be sorely missed.

**Gene Christopher**  
(January 18, 1935 – April 9, 2019)

passed away this year and was a dedicated supporter of the Eye Center. His quiet generosity was an expression of his interest in our mission of sight restoration.

**Fred Sauze**  
(February 6, 1924 – May 28, 2019)

left us this year as well. Fred, a vibrant and gracious WWII veteran, was a very grateful corneal transplant recipient and generously supported our program.

We will miss all three of these men, who so generously gave of their time and support to nourish the growth of the Eye Center. May they rest in peace.





# A Teacher to Us All

Wishing Good Luck and Fond Farewell to Dr. Mary O'Hara

**When Mary O'Hara joined the UC Davis Eye Center as its new Chief of Pediatric Ophthalmology in 2004, she brought a completely new range of dedicated services to the Health System.**

Trained in the military, having completed her residency in ophthalmology at Brooke Army Medical Center, Dr. O'Hara then went on to obtain fellowship training in Pediatric Ophthalmology and Strabismus at the Wills Eye Hospital in Philadelphia. She subsequently served as an instructor at Emory University and then as a Professor at the Uniformed Services University and the University of Texas Health Science Center in San Antonio.

The 15 years of her service to the Eye Center at Davis has seen significant growth of our pediatric ophthalmology services and has gained the department a position of prominence in the nation because of her stature in the pediatric ophthalmic community. Among other positions, Mary has been a leader in the Joint Commission on Allied Health Personnel in Ophthalmology (JCAHPO) and served as its president from 2002- 2003. She has also given considerable volunteer time to providing pediatric care

and instruction in other parts of the world through ORBIS International and other outreach organizations.

Here at home, in addition to her busy pediatric practice, Dr. O'Hara developed the annual Doctoring Course in ophthalmology for our medical students and has served as Surgical Director for the Department, coordinating surgical services among the ophthalmic subspecialties—often a demanding and tricky undertaking. She has also forged strong ties between the Eye Center and the Society for the Blind, supporting services to children with visual disabilities. In the community, Mary developed the annual “Eyes of a Child” course in pediatric ophthalmology directed at school nurses, pediatricians and ophthalmic care givers at all levels.

In 2018, Dr. O'Hara was inaugural holder of the Byron Demorest Chair in Pediatric Ophthalmology and Strabismus—a chair designated for the director of the service and named after our first department chair and pediatric ophthalmologist, the late Byron Demorest and given in recognition of her many contributions to our field.

But most importantly, Mary has served as a teacher to all of us. She has taught us about the special considerations in the management of children and their parents; she has collaborated with every faculty member whose activities touched the pediatric population; and she has served as a staunch advocate for the child in the Health System. All of this has been accomplished with a special combination of military



Dr. O'Hara shares her surgical skills on a surgical training program in Myanmar conducted by the Hawaiian Eye Foundation

“Mary has served as a teacher to all of us. She has taught us about the special considerations in the management of children and their parents; she has collaborated with every faculty member whose activities touched the pediatric population; and she has served as a staunch advocate for the child in the Health System.”

grit and efficiency tempered with genuine warmth and affection for kids and a refreshing sense of humor that puts all of what we do in perspective.

Mary O'Hara will be sorely missed at the Eye Center. However, she will go on to the next phase of her life with family and grandchildren. Her legacy at UC Davis will be lasting. ■



The Reynolds, a grateful family of Dr. O'Hara's, at her investiture as the inaugural holder of the Byron Demorest Chair in Pediatric Ophthalmology



# Full Circle. *Nandini Gandhi, MD Assumes*



**Nandini Gandhi likes circles.** Her life has been a series of circles. This Sacramento native has been committed to the welfare of children since she herself was a child. Her family describes how a young Nandini first settled on a career in medicine while in high school. This determined young woman then pursued her dream through a sterling medical education: undergraduate studies at Stanford University, a medical degree from the University of California, San Francisco, and ophthalmology residency at the University of Iowa. After that, she refocused on children by completing a pediatric ophthalmology fellowship at Duke University. She then circled home to Sacramento where the University of California, Davis Eye Center was fortunate to recruit Dr. Gandhi to its faculty as a pediatric ophthalmologist.

In this position, Dr. Gandhi demonstrated special skills that were well known to her Sacramento family. Her parents, Gautam and Harsha Gandhi, note that their daughter is “loving and giving, with compassion in her heart. We also feel that she is very bright yet humble and at all times gives one hundred percent of herself.” These attributes are very important in the practice of pediatric ophthalmology. An ability to connect with people, to be authentic and trustworthy, is essential when dealing with

pediatric patients. Children can sense a “faker” and will not engage with that person. Nandini Gandhi is able to gain the confidence and trust of her little patients. Her compassionate heart also helps her to deal with their families, many of whom are stressed and worried about their children.

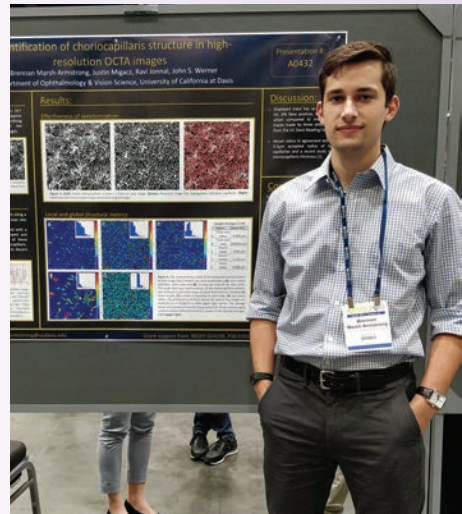
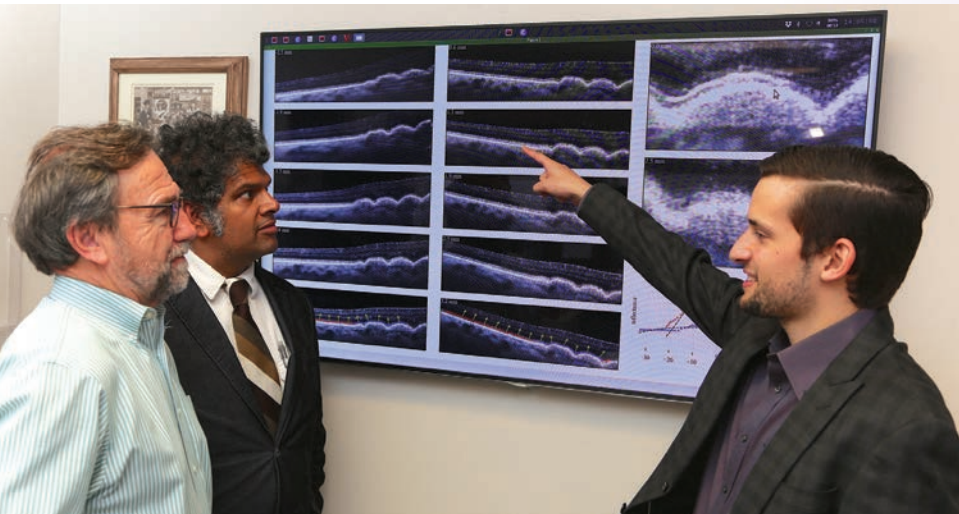
These same skills have also helped Dr. Gandhi connect with the ophthalmology residents of the University of California, Davis Eye Center. In the past year, she has been named Program Director of the Eye Center residency program. In this role, Dr. Gandhi has put in place innovative changes that have improved the educational experience for the next generation of eye doctors.

The coming year will bring new challenges. Dr. Gandhi will assume the directorship of the Pediatric Ophthalmology and Adult Strabismus Service and will be named the Byron Demorest Chair of Pediatric Ophthalmology and Strabismus, making her circle complete. It is a great distinction to be named to an endowed chair. It is an especial honor to be named to Dr. Demorest’s chair. Byron Demorest, MD was the consummate physician, a beloved eye doctor to the Sacramento community, the Department’s first chairperson, and a national leader in the ophthalmic profession. He taught all of us that it is a privilege to be a physician, a and a special privilege to care for children and their families. Dr. Nandini Gandhi brings distinction to this privileged role. ■



*Directorship of the Pediatric Ophthalmology and Adult Strabismus Service*

# CODING ONESELF OUT OF A JOB



**D**r. Jack Werner’s Vision Science and Advanced Retinal Imaging (VSRI) Laboratory at the UC Davis Eye Center, a familiar name is making discoveries: Marsh-Armstrong. But it is not glaucoma research specialist and faculty Nick Marsh-Armstrong, Ph.D. In fact, it is his son, Brennan, who has joined the ranks on a temporary assignment before he heads off to UC San Diego for medical school in Fall 2019.

Brennan’s research career started at 16 years of age — Maryland’s minimum age for researchers—which he knows because he tried to start before that. His first investigations were at Johns Hopkins in glycobiology, continuing at Amherst College with biochemical chemical development, and later to translational ophthalmology at the Eye Center.

Brennan is excited to become a physician so that he can provide care to those in need. But those very lives that need care are why Brennan aims to be a true physician researcher. “Having taken part in the revolutionary translational research being conducted by the Werner Lab and the doctors at the Eye center, I have met numerous patients in need of yet undiscovered treatments. I have come to believe that a physician’s duty to treat their patients extends into the future through the betterment of the care they provide. Who better to develop and improve the tools physicians use than physicians themselves?” reflects Brennan. The phrase that captures Brennan’s ambition best is one not that is common the medical field but in computer science, an area of study from his Amherst days. “ ‘Code oneself out of a job.’ It refers to the moment when a programmer develops a solution for a problem so thorough and efficient that they are no longer needed,” explains Brennan. “I hope to look back fifty years from now and realize that I researched myself out of a job. If I can, through careful study, provide a solution to a yet uncured ailment my future patients face, I will have succeeded.”

Dr. Werner states, “Brennan embodies the high standards and integrity that scientific research requires for the betterment of clinical medicine.”

We wish Brennan luck on his next chapter at UC San Diego and thank him for the great work he has during his time at the Eye Center, which he has shared to the right.



## 1

**Teaching the colorblind to “see” color**

While the color discrimination of those with abnormal color vision has been carefully characterized, this population’s color contrast sensitivity has not been studied. We are using a computerized test to measure whether a commercial color filter affects the vision of color-deficient individuals. We found significant differences between contrast sensitivity in patients with normal and abnormal color vision and determined that wearing the filter-glasses improves color contrast perception in color deficient individuals even after they remove the glasses. For this project, I programmed the psychophysical test and used it to assess subjects’ color vision profiles, and I am writing our findings for a fall 2019 publication.

## 2

**How do drusen affect photoreceptors in age-related macular degeneration?**

Photoreceptors are specialized neurons lining the back of the eye that convert light into electrical signals destined for the brain, providing us with sight. One of the indications of age-related macular degeneration is the presence of excessive drusen, bubbles of accumulated cellular waste and debris underneath the photoreceptors. Over the last year I have operated a lab-built optical coherence tomography (OCT) camera and imaged over 20 AMD patients to obtain evidence of whether these drusen are simply pointed the wrong way or if they are also unhealthy. Based on an analysis of the data conducted by programs I wrote, we have gained evidence that these cells are not only reoriented but are likely also degenerating.

## 3

**Developing new biomarkers for detecting vascular abnormalities behind the retina**

The VSRI Laboratory conducts revolutionary research on imaging the choriocapillaris, the complex network of blood vessels behind the eye. Seeing an opportunity to use these images to identify novel biomarkers, I invented a robust algorithm that I have coined “linear-filter local min-max normalization” to resolve and trace the choriocapillaris images. The traces from my algorithm allowed me to generate the first OCT-derived direct measurements of a slew of biometrics including flow-void radius, vessel radius, and vessel branching rates. While it’s a long way off, I hope that I have made the first step toward developing a new diagnostic tool to aid physicians in diagnosing retinal disease.

# AWARDS & MORE

## SPECIAL RECOGNITION TEACHING AWARD

Tyrone Glover, M.D.



Volunteer Clinical Faculty member Dr. Glover was recognized by the UC Davis School of Medicine for his excellence in teaching and significant contributions in the field of medicine.

## YOUNG OPTOMETRIST OF THE YEAR AWARD

Heidi Miller, O.D., F.A.A.O.



Dr. Miller was selected as one of the 2018 California Optometric Association's Young Optometrists of the Year.

The Eye Center proudly applauds our friends at Society for the Blind for their receipt of the Sierra Sacramento Valley Medical Society's Medical **Community Service Award**. This award was given to recognize Society for the Blind's provision of services and empowerment of individuals living with low vision or blindness to discover, develop and achieve their full potential.





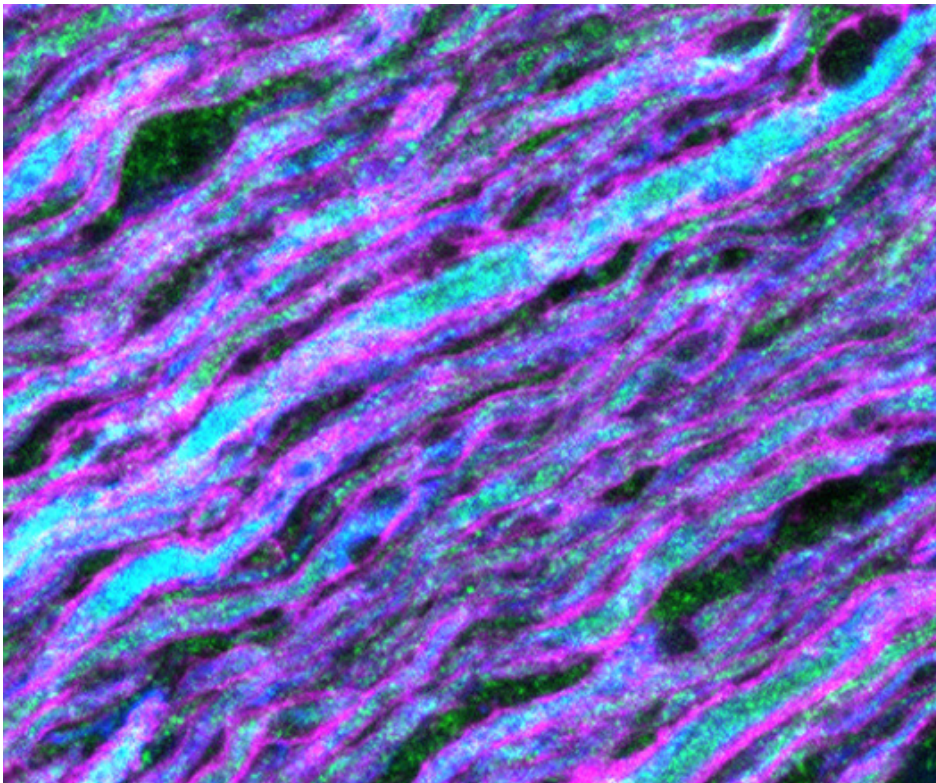


**CONGRATULATIONS TO ALA MOSHIRI, M.D., PH.D.,  
AND SARA THOMASY, D.V.M., PH.D.!**

They are part of a dual-institution research team with three colleagues from Baylor University who are among select group of recipients to receive a grant from the National Eye Institute's Audacious Goals Initiative. This team will explore cases where animals have naturally occurring ocular diseases. The clinical implications of this research in non-human models is that if the treatment is successful, there is the potential that this stem cell-based therapy could be translated into ophthalmologic practice to restore vision in many forms of blinding retinal disease.

**VISION SCIENTIST ANDREW ISHIDA AND A TEAM OF  
RESEARCHERS FROM UC DAVIS HAD THEIR IMAGE  
SELECTED AS BRAINFACTS.ORG'S IMAGE OF THE WEEK.**

The optic nerve contains the elongated extensions of cells that send electrical signals from the eye to the brain. The UC Davis vision science laboratory provided the first-ever evidence that the protein pCaMKII regulates the speed at which these signals travel and the first-ever visualization of pCaMKII in individual optic nerve fibers. The cyan color (flanked by magenta) in the image on the front of this card illustrates this localization in a high magnification view of a length-wise slice through an optic nerve.



**SIERRA SACRAMENTO  
VALLEY MEDICAL  
SOCIETY'S GOLDEN  
STETHOSCOPE AWARD**

Denise Satterfield, M.D.



Denise Satterfield, M.D. '87, RS '91, was awarded the Sierra Sacramento Valley Medical Society's (SSVMS) Golden Stethoscope Award. "Dr. Satterfield is the only pediatric ophthalmologist in private practice in the greater Sacramento area and has tirelessly served the needs of our community for nearly 30 years," says SSVMS and Eye Center alumnus President Chris Serdahl, MD. "Her warm bedside manner and excellent surgical skills have given her national recognition as one of the best pediatric ophthalmologists in America. It has been my pleasure to both train and practice alongside such an excellent physician."

# TO RESEARCH WITH AUDACITY

Daring vision sciences research made possible by the Burns family

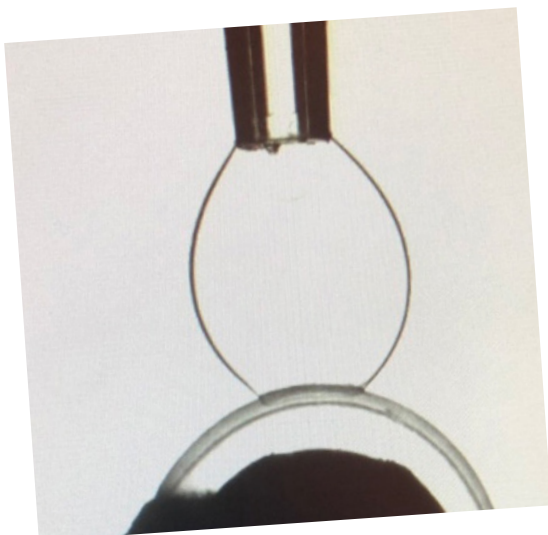
**"When we stop taking risks is when we stop being competitive."**

For the Burns family, these words from Intel co-founder Gordon Moore apply beyond the boardroom and into their personal lives. Claire Burns, a longtime patient of Dr. Mark Mannis, needed a corneal transplant in a complex set of circumstances. Reflecting on Moore's words, the Burns family made the decision to make a gift to the department to fund a research of a unique variety. Establishing the Claire Burns Cornea Research Support Fund, their contributions are a resource to scientists like Dr. Min Zhao who are taking radically novel approaches to treat the cornea. Through this same fund, the Eye Center also developed the Claire Burns Audacious Grants program to fund proposals that demonstrate out-of-the-box thinking for cornea research. From the Burns family: "We cannot know the likelihood of success with this research, but if the thought process is good, that is significant, too, even if the research fails. It takes courage to take that risk."

The research projects described on this page have been made possible by the Burns Family's gift. The Eye Center considers it a privilege to care for Claire and is humbled by the family's generous and thoughtful recognition.

## **Brian Leonard, DVM, PhD, DACVO**

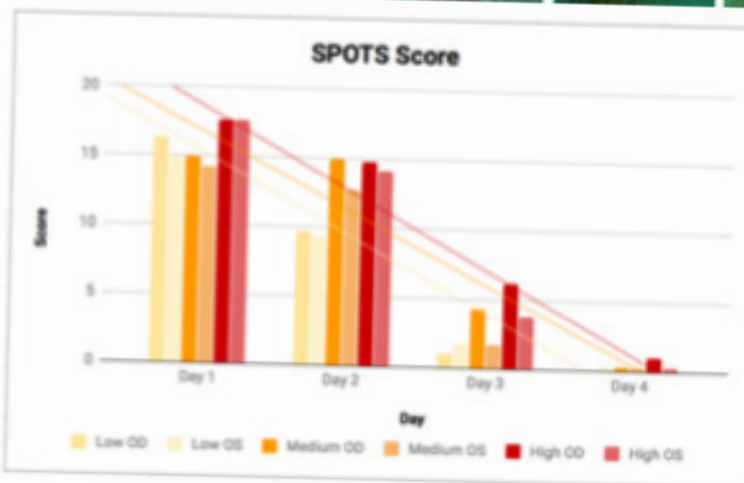
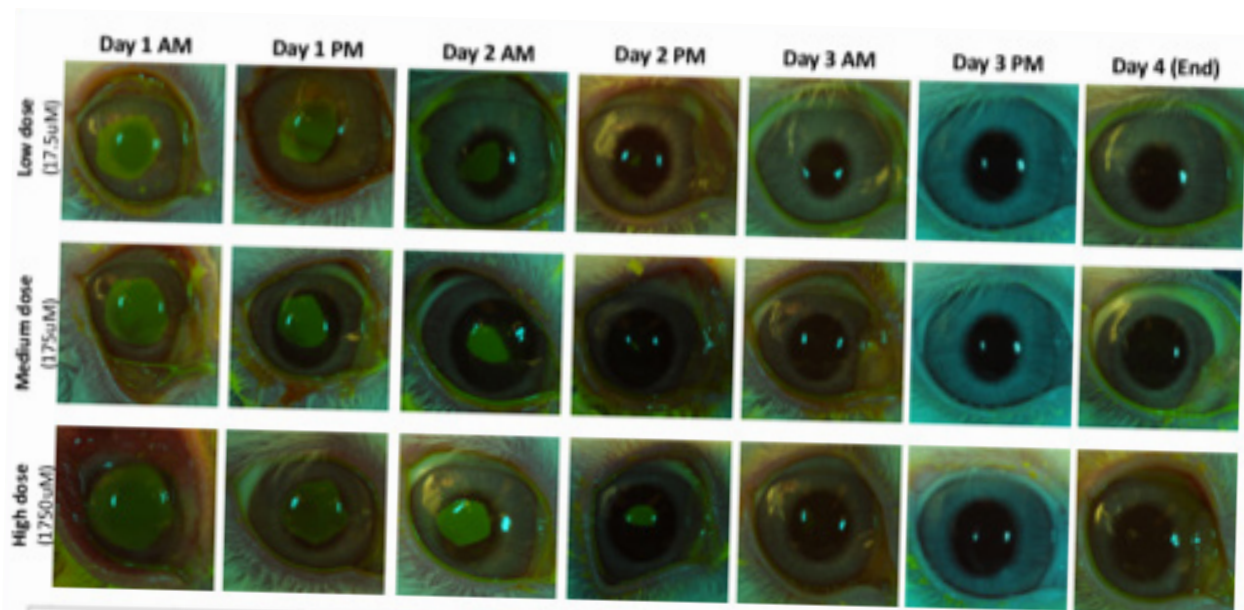
Dry eye disease is one of the most common diseases for which patients seek an ophthalmologist with an overall prevalence of 6.4% of the US adult population, affecting nearly 16.4 million individuals. Our research is focused on a novel approach to therapy for dry eye disease patients, through the engineering of the tear film to improve wettability and hydration of the eye. This approach is very unique since it would be applicable to all patients with dry eye disease, regardless of the underlying cause.





## Andrew Minella, DVM, PhD

Corneal haze and scar tissue development is a significant and sight-threatening complication of corneal wound healing, including the healing that occurs following common corneal surgeries such as LASIK. We hypothesize that inhibiting tissue transglutaminase 2 (TGM2), a compound with established involvement in scar tissue formation, we can decrease or eliminate this complication during corneal wound healing. We have shown the ocular safety of this method via *in vitro* and *in vivo* toxicity trials (Figure 1), and we propose *in vivo* efficacy trials in a rabbit model of corneal wounds to test these compounds. Ultimately, we aim to provide the data needed to lead to the development of an eye drop to prevent corneal scarring during healing.



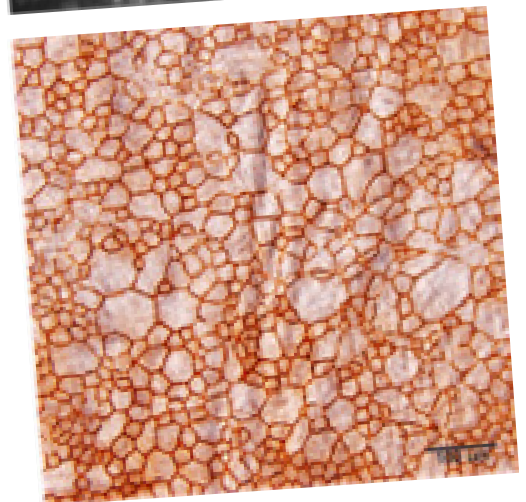
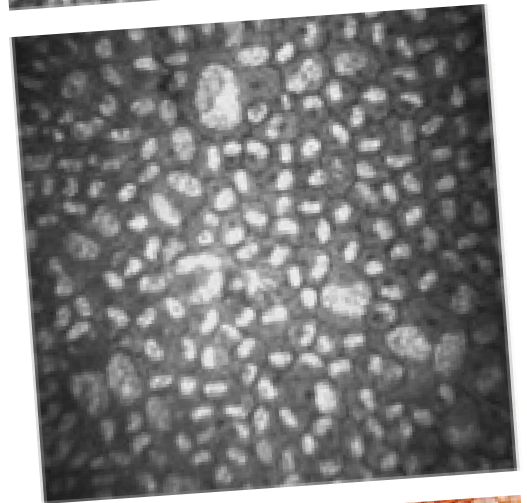
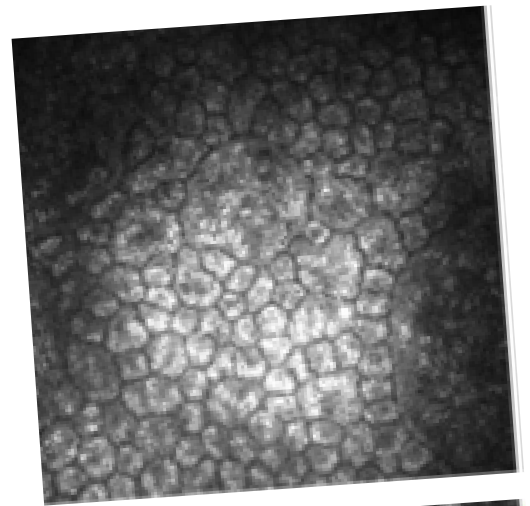
**Figure 1: Safety of TGM2 inhibition on wounded rabbit cornea. A:**

Four-time daily application of TGM2 inhibitor cystamine dihydrochloride to wounded rabbit corneas did not impede epithelial healing at all doses tested. B: Grading of inflammation (“SPOTS” scoring) shows decreasing inflammation consistent with normal healing with no difference between drug test eyes (OD) and control eyes (OS).

### Sara Thomasy, DVM, PhD

Worldwide, there is a shortage of donor tissue for corneal transplantation, which is critical for the treatment of diseases such as Fuchs endothelial corneal dystrophy and pseudophakic bullous keratopathy. We hypothesize that an injection of human adult corneal endothelial stem cells (hC ESCs) may potentially regenerate the inner layer of the cornea that is damaged by these two diseases. We propose to determine safety and efficacy of hC ESCs in a rabbit endothelial cryoinjury model, which if successful, could allow us to transition to human subject testing, and ultimately make treatment widely available while also significantly reducing costs.

In a rabbit transcorneal cryoinjury model, variability in endothelial cell size and shape can be observed at Days 7 (left) and 15 (center) post-wounding using in vivo confocal microscopy with a Heidelberg Rostock Corneal module (left) or Nidek Confoscan 4 (center). These non-invasive corneal imaging techniques provide very similar information as staining of the cells with Alizarin red post-mortem (right). We will use all 3 imaging techniques to determine if the efficacy of human adult corneal endothelial stem cells (hC ESCs) at regenerating the endothelium post-injury in this rabbit model.

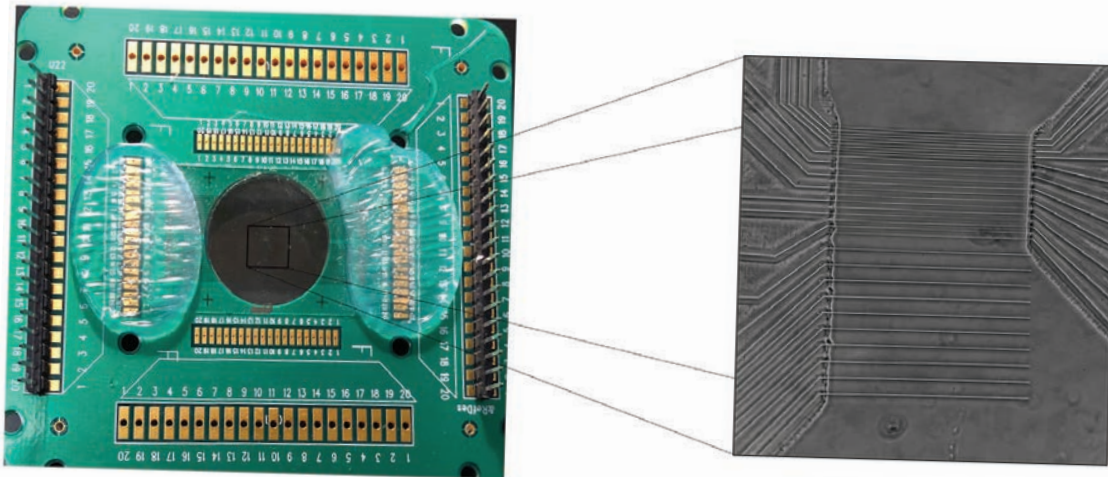




## Min Zhao, MD, PhD

We are using electrical stimulation to target and precisely control intracellular signaling pathways that are important for corneal biology. To regulate electrically intracellular signaling pathways, corneal epithelial sheet migration offers an exciting and novel approach to treat diverse corneal diseases, like chronic and non-healing corneal wounds. In collaboration with engineers and physicists, we are developing a contact lens with microelectrode arrays for potential clinical use.

### Microelectrodes for Precision AC EF Delivery



10-50 micron spacing

Prototype of microelectrode arrays to deliver electrical stimulation.

Team members (from the left to right): Shenzhou Shan, Dr. Brian Reid, Dr. Adam Contreras, Beiyao Gao



# Donors

## Gratitude — Progress — Hope

With gratitude to the following donors who have provided sustaining support to the UC Davis Eye Center since inception.

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It is with deep gratitude that the UC Davis Eye Center recognizes the following individuals for making us a part of their estate plans.

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Curtis and Amy Chiuu  
Phyllis Christopher  
Eileen Doran  
Patricia Ekstam  
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Jill Frechette  
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**\$2,500,000 or more**

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Ernest Tschannen

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**\$1,000,000 or more**

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Research To Prevent Blindness  
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Karen Zaharas, R.N. and Michael Zaharas

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John and Ai-Ling Shiels  
Indarjit and Gurcharan Sidhu  
Sierra Health Foundation  
Susan and Stanley Silva  
Calvin and Josephine Skancke  
John Thomas Small  
Marguerite Smart  
Lynda SooHoo  
Sharon and William Sousa  
Ryan Sponsler  
Frederick Stannard, II  
Henry Stanton  
Christianna Stuber, M.D.  
Gang Sun, Ph.D. and Daihua Yao  
Joel and Susan Swift  
Ernest Tark, III, M.D.  
Francie Teitelbaum  
Joseph Todoroff  
Frederic Troy, II, Ph.D. and Linda Troy  
Ramona Trujillo  
Turlock Eye Physicians Medical Group  
Joe Valadez, Jr.

Virginia Vigo-Henggeler  
Noble and Susan Vosburg  
Du Vu  
Daniel and Doris Walters  
Karin and Craig Ward  
Donald Warner, USAF Ret. and  
Gwendoline Warner  
Charles Weber, M.D. and Lana Weber  
Duane and Cheri Werth  
Robert Wing, M.D.  
Wendy Wood-Kjelvik  
David Woods, M.D. and Alison Woods  
Yuen Yu

### Gifts up to \$99

William and Jerry Adams  
Holland Adams and Christopher Lattin  
Joseph Anglesio, Jr. and Wanda Anglesio  
Lynn Armstrong  
Melissa Barnett-Erickson, O.D., F.A.A.O., F.S.L.S.  
Petr and Vera Baydak  
M.B. Bernard  
Annette and Ken Bertolini  
Paul and Patricia Bianucci  
Laureen and Warren Blum, Jr.  
Susan Boamah  
Eugene and Olga Bochkarev  
Joyce Boehm  
Christine Brown  
Miguel and Eva Calilan  
Gwendolyn Caramanica  
Roger Carling  
Brian and Rebecca Casey  
Edith Cassidy  
Paul and Harumi Chaffee  
Michael Colvin  
Lualhati and Danalbino Dano  
Leonila de Guzman  
Hind De Souza  
Steven Delgado  
Ilona Derosa  
James and Elaine H. Dierberger  
Charles Dills  
John and Sara Doke  
Douglas and Lois Dollarhide  
Robert Dulak  
Paula Dulak  
Richard and Patricia Dumas  
Maggie Dunaway  
Mary Ellen Ferguson  
Grace Fong  
Steven and Rhonda Franks  
David and Cheryl Freeman



Norma Gabriel  
 Raymond Garrett  
 Vietta Gill  
 Francisca Gomez  
 Kathy Goodrich  
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 Shirley Hammon  
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 Donald and June Henry  
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 Carol Hobbs  
 Mary Hogarty  
 Barbara and Greg Holderreed  
 Glenn Holderreed  
 Linda and Richard Holmes  
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 Sergio Jaramillo and Maria de Jaramillo  
 Anne Marie Jauernig  
 Clara Jones  
 Ilene and Gary Katz  
 Shaun Keister, Ph.D. and Walter Allen  
 Lauren and Billy Kelley  
 Robert Kerr, Ph.D. and Cathryn Kerr  
 Dale and Ileen Koehn  
 Roland Krapf  
 Julie Lam and Tanh Phung  
 Douglas and Judy Laugero  
 Janice Legnitto  
 Jennifer Lemmons-Keogh  
 R. Levy  
 Elia Lim  
 David and Judith Livingston  
 Delia Lucic

Xijing Mao and Chunqi Fan  
 Muhammad Marrush, Ph.D. and Delores  
 Marrush  
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 Kay Matecki  
 Dorothy Miles  
 Geraldine Miller  
 Patricia Muir-Reilly  
 Christopher Nelson  
 Daniel Neumann  
 Kyle Nunley  
 Judith Paslay  
 Betty Pederson and Mark Arnold  
 Arlette and William Peterson  
 Lynn and Milan Popovac  
 Rogene Prange  
 Jennifer Prevatt, R.N.  
 Robert and Janice Pugh  
 Duong Quy  
 Peggy Rader  
 Ely and Amelia Ramos  
 Dennis and Nancy Randall  
 Richard Rawson, M.D. and  
 Cynthia Neuman, Ph.D.  
 Robert and Charleen Roccucci  
 Mildred and Don Sams  
 Mark Schaal, MBA and Tanya Schaal  
 Elizabeth and Jack Schmidt  
 Michael Schmidt and Sonia Rhea  
 Alan and Robin Schroeder  
 Terry and Freddie Schutten  
 Robert and Elizabeth Schwantes  
 Faye Sentman  
 Sherilyn and Scott Sexsmith  
 David Shigekawa  
 Austin and Alice Smith  
 Margaret Smith

Don and Judy Steinfield  
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 Fay Young

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 or incorrectly listed your name  
 please accept our apology and  
 contact us at 916.734.3966 or  
 ejbauer@ucdavis.edu.***

***We will correct our records  
 immediately.***



## GIVEDAY SUCCESS!

Thank you to those who participated in Bonnie Dale's Give Day challenge to support the Childhood Glaucoma Initiative at the UCDH Eye Center. Bonnie's goal was to inspire 50 gifts to help children like Leo. Through the overwhelming generosity of individuals like you, we received **more than 70 gifts and raised \$21,795** to support this initiative led by Dr. James Brandt!

## LEADERSHIP



**Mark J. Mannis, M.D., F.A.C.S**  
Fosse Endowed Chair in Vision  
Science Research  
Distinguished Professor and  
Chairman, Cornea and External  
Disease



**Michele C. Lim, M.D.**  
Vice Chair and Medical  
Director  
Professor, Glaucoma



**James D. Brandt, M.D.**  
Vice Chair of International  
Programs and New Technology  
Director, Glaucoma Service  
Professor, Glaucoma



**Christopher J. Murphy, D.V.M.,  
Ph.D.**  
Vice Chair for Innovation and  
Industry Relations  
Professor, Comparative  
Ophthalmology

## FACULTY



**Annie K. Baik, M.D.**  
Associate Professor,  
Glaucoma  
Veterans  
Administration, Mather



**Jeffrey J. Caspar, M.D.**  
Director, Cataract and  
Refractive Surgery  
Professor, Comprehensive  
Ophthalmology and Refractive  
Surgery



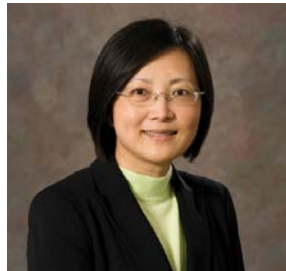
**Nandini Gandhi, M.D.**  
Byron Demorest Endowed Chair in  
Pediatric Ophthalmology  
Director, Pediatric Ophthalmology  
and Strabismus Service  
Director, Residency Program  
Associate Professor, Pediatric  
Ophthalmology and Strabismus  
Service



**Ravi S. Jonnal, Ph.D.**  
Assistant Professor, Vision  
Science and Advanced Retinal  
Imaging



**John L. Keltner, M.D.**  
Research Director  
Chair Emeritus  
Distinguished Professor/Emeritus,  
Neuro-Ophthalmology



**Esther S. Kim, M.D.**  
Director, Comprehensive and  
Optometric Services  
Professor, Comprehensive  
Ophthalmology and  
Ophthalmic Pathology



**Jennifer Li, M.D.**  
Director, Cornea and External  
Disease Service  
Professor,  
Cornea, External Disease and  
Refractive Surgery



**Lily Koo Lin, M.D.**  
Professor, Oculoplastic  
Surgery



# FACULTY



**Allison Liu, M.D., Ph.D.**  
Assistant Professor,  
Neuro-Ophthalmology



**Nick Marsh Armstrong, Ph.D.**  
Professor, Glaucoma Basic  
Research



**Zeljka Smit-McBride, Ph.D.**  
Associate Adjunct Professor,  
Vitreoretinal Research Lab  
Research Interests:  
Genomics and epigenetics of aging  
and age-related eye diseases,  
age-related macular degeneration  
and diabetic retinopathy



**Lawrence S. Morse, M.D., Ph.D.**  
Director, Retina Service  
Professor, Vitreo-retinal  
Surgery and Uveitis



**Ala Moshiri, M.D., Ph.D.**  
Associate Professor,  
Vitreo-retinal Surgery



**Susanna S. Park, M.D., Ph.D.**  
Professor,  
Vitreo-retinal Surgery



**Roma Patel, M.D., MBA**  
Chief of Ophthalmology and Eye  
Care Division,  
Sacramento Veterans Affairs Hospital  
Assistant Professor of  
Ophthalmology,  
UC Davis Eye Center



**Ivan R. Schwab, M.D., F.A.C.S.**  
Professor Emeritus, Cornea  
and Uveitis



**Sara Thomasy, DVM, Ph.D.**  
Associate Professor of  
Comparative Ophthalmology  
Research Interests: Corneal  
wound healing, glaucoma, ocular  
pharmacology, antiviral therapy  
for FHV-1, large animal models of  
ophthalmic disease



**John S. Werner, Ph.D.**  
Distinguished Professor,  
Visual Psychophysics  
Research Interests:  
Color and spatial vision, normal  
aging and age-related disease,  
retinal and optic nerve imaging



**Glenn C. Yiu, M.D., Ph.D.**  
Associate Professor,  
Vitreo-retinal Surgery



**Robert J. Zawadzki, Ph.D.**  
Associate Professor,  
Vision Science and Advanced  
Retinal Imaging

# VETERANS AFFAIRS NORTHERN CALIFORNIA HEALTH CARE SYSTEM



**Jenny Chen, M.D.**  
Glaucoma  
Veterans Affairs,  
Sacramento Valley Division



**David Chu, M.D.**  
Comprehensive and  
Cataract Surgery  
Veterans Affairs,  
East Bay Division



**Vivian Lien, M.D.**  
Cornea  
Veterans Affairs,  
Sacramento Valley Division



**Linda Margulies, M.D.**  
Chief, Eye Care Services  
Veterans Affairs,  
Northern California Health  
Care System  
Vitreoretinal Diseases



**Roma Patel, M.D., MBA**  
Chief, Eye Care Sacramento Division  
Glaucoma  
Veterans Affairs,  
Sacramento Valley Division



**Ernest Tark, M.D.**  
Comprehensive and  
Cataract Surgery  
Veterans Affairs,  
East Bay Division



**Tiffany Wong, M.D.**  
Comprehensive and Cataract  
Surgery  
Veterans Affairs, Sacramento  
Valley Division



# VISION SCIENTISTS



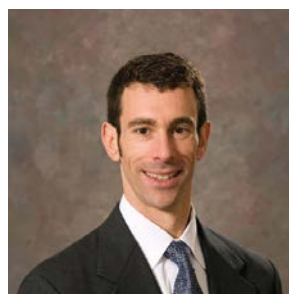
**Marie E. Burns, Ph.D.**  
Professor, Retinal Physiology  
Research Interests:  
Photo transduction,  
photoreceptor adaptation, and  
protein movement



**Andrew T. Ishida, Ph.D.**  
Professor Emeritus, Neurobiology  
Physiology & Behavior  
Research Interests:  
Modulation of retinal ganglion  
cell excitability



**Paul FitzGerald, Ph.D.**  
Professor, Cell Biology  
and Human Anatomy  
Director, Center for Vision  
Science  
Research Interests:  
The role of intermediate  
filaments in the biology  
of the ocular lenses



**Mark S. Goldman, Ph.D.**  
Associate Professor,  
Neuroscience  
Research Interests:  
Computer models of eye  
movement



**Leonard Hjelmeland, Ph.D.**  
Professor Emeritus,  
Molecular & Cellular Biology  
Ophthalmology  
Research Interests:  
Senescence of retinal  
pigment epithelium



**Edward N. Pugh, Jr., Ph.D.**  
Professor, Cell Biology and  
Human Anatomy, Physiology &  
Membrane Biology,  
Ophthalmology  
Research Interests:  
Retinal photoreceptors and  
color vision

# VISION SCIENTISTS



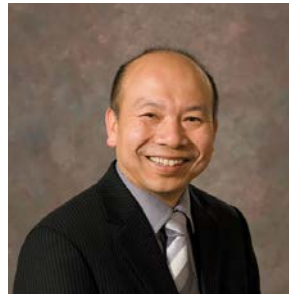
**Vivek J. Srinivasan, Ph.D.**  
Assistant Professor,  
Biomedical Engineering  
Research Interests: Retinal  
and optic nerve imaging,  
blood flow and metabolism



**Charles E. Thirkill, Ph.D.**  
Adjunct Professor Emeritus,  
Immunology & Biology  
Research Interests:  
Ocular immunology



**John S. Werner, Ph.D.**  
Distinguished Professor,  
Visual Psychophysics  
Research Interests:  
Color and spatial vision, normal  
aging and age-related disease,  
retinal and optic nerve imaging



**Min Zhao, M.D., Ph.D.**  
Professor, Dermatology and  
Ophthalmology,  
Institute for Regenerative Cures  
Research Interests:  
Electrically stimulating cell  
migration in corneal wound  
healing and neuron regeneration



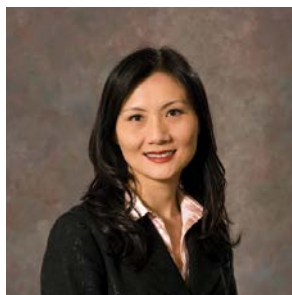
## OPTOMETRISTS



**Melissa Barnett Erickson, O.D.,  
F.A.A.O., F.S.L.S.**  
Principal Optometrist



**Paul Nefedov, O.D., M.S.**  
Optometrist



**Brooke S. Chang, O.D.**  
Senior Optometrist



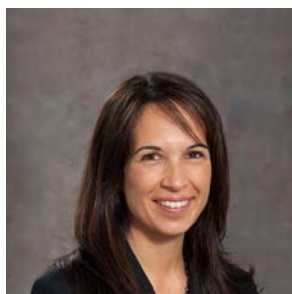
**Kaaryn Pederson-Vanbuskirk,  
O.D., F.A.A.O.**  
Senior Optometrist



**Heidi Miller, O.D., F.A.A.O.,  
F.S.L.S.**  
Senior Optometrist



**Jonathon Ross, O.D., M.S.,  
F.A.A.O.**  
Optometrist

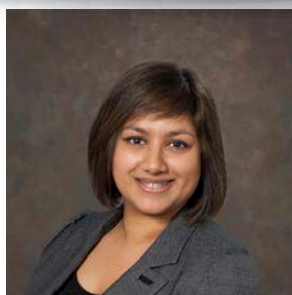


**Marcia Nearing, O.D., F.A.A.O.**  
Senior Optometrist



**Hai Tong, O.D.**  
Senior Optometrist

## ORTHOPTIST



**Tania Usner, B. Med. Sci.**  
Orthoptist

# VOLUNTEER CLINICAL FACULTY



**Barbara Arnold, M.D.**

Clinical Professor

**Robert Bellinoff, M.D.**

Clinical Instructor

**Craig Berris, M.D.**

Clinical Professor, Emeritus

**John Canzano, M.D.**

Associate Clinical Professor

**David Chu, M.D.**

Assistant Clinical Professor

**Ronald Cole, M.D.**

Clinical Professor

**Charles Cooper, M.D.**

Clinical Professor

**Tyrone Glover, M.D.**

Clinical Professor

**J. Charles Hartley, M.D.**

Clinical Associate

**Sukhjit Johl, M.D.**

Assistant Clinical Professor

**Daniel King, M.D.**

Clinical Professor

**David Kira, M.D.**

Clinical Instructor

**Daniel Lee, M.D.**

Associate Clinical Professor

**Samuel Lee, M.D.**

Clinical Instructor

**Vivian Lien, M.D.**

Assistant Clinical Professor

**Jennifer Long, M.D.**

Clinical Instructor

**Linda Margulies, M.D.**

Clinical Professor

**Robert Miller, M.D.**

Clinical Professor

**Gary Novack, Ph.D.**

Clinical Professor

**Roma Patel, M.D., M.B.A.**

Assistant Clinical Professor

**Jonathan Perlman, M.D.**

Associate Clinical Professor

**James Ruben, M.D.**

Clinical Professor

**Bradley Sandler, M.D.**

Assistant Clinical Professor

**Denise Satterfield, M.D.**

Clinical Professor

**Francis Sousa, M.D.**

Clinical Professor

**Ernest Tark, M.D.**

Clinical Professor

**David Telander, M.D., Ph.D.**

Clinical Instructor

**Tiffany Wong, M.D.**

Assistant Clinical Professor

**John Zeiter, M.D.**

Clinical Professor



## FELLOWS



Philip DeSouza, M.D.  
Clinical Retina Fellow 2021



Jonathan Hernandez, M.D.  
Clinical Glaucoma Fellow 2020



Milad Modabber, M.D.  
Clinical Cornea Fellow 2020



R. Joel Welch, M.D.  
Clinical Retina Fellow 2020

### *Patient comments:*

Dr. Ala Moshiri and his team always provide excellent care, are empathetic, and kind. I couldn't be in better hands.

Dr. Glenn Yiu and his staff went out of their way to help me and seemed to genuinely care about my level of care — not because it was their job, but because of the kind of people they are.

Dr. Heidi Miller and staff were all very kind, helpful, and attentive. I was 100% satisfied with my visit and will recommend to friends and family.

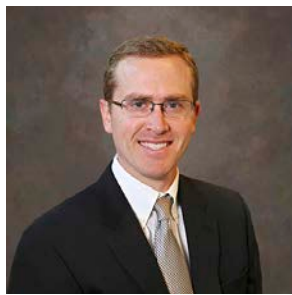
Dr. Jennifer Li and Dr. Ralph Kyrillos provided excellent care addressing my medical issue. Dr Li is very communicative, efficient, and considerate in her patient rapport. She listens well.

The fellow, Dr. Han Kim, was outstanding in the way he explained the results of my optic nerve scan.

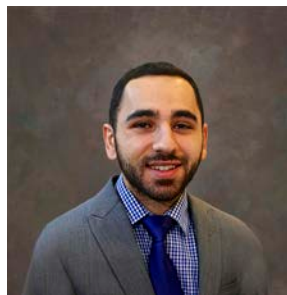
# RESIDENTS



Jefferson Berryman, M.D.  
Third Year Resident 2020



Michael Ellis, M.D.  
Third Year Resident 2020



Abdala Sirajeldin, M.D.  
Third Year Resident 2020



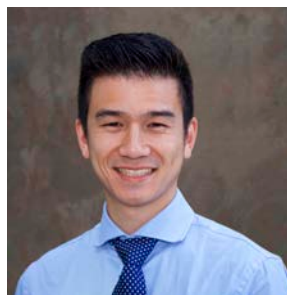
Alex Willoughby, M.D.  
Third Year Resident 2020



Colin Bacorn, M.D.  
Second Year Resident 2021



Ruth Tessema, M.D.  
Second Year Resident 2021



Alexander Vu, M.D.  
Second Year Resident 2021



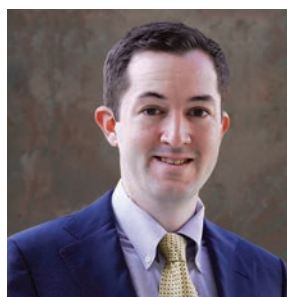
Vivian Vuong, M.D.  
Second Year Resident 2021



Emily Armstrong, M.D.  
First Year Resident 2022



Evan Chang, M.D.  
First Year Resident 2022



Matthew De Niar, M.D.  
First Year Resident 2022



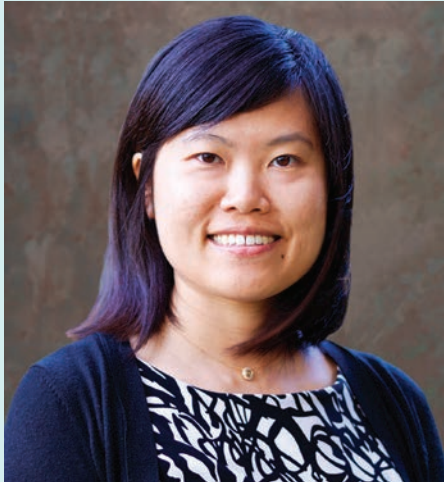
Edward Lee, M.D.  
First Year Resident 2022



# ANNOUNCING OUR NEWEST FACULTY POSITIONS

## Welcome

**YIN ALLISON LIU,  
M.D., PH.D.**



### SELECTED HONORS & AWARDS

**2011**

Young investigator scholarship,  
International Society of Pediatric  
Oncology (SIOP)

**2018**

Resident scholarship, American  
Academy of Neurology (AAN)

**2019**

Young investigators forum  
scholarship, Society of  
Neuro-Oncology (SNO)

**Dr. Liu has been appointed to assistant professor of Neuro-Ophthalmology at the UC Davis Eye Center.**

Dr. Liu strives to develop a collaborative relationship with her patients and their families.

She believes that information sharing is essential for a joint informed decision, through which a successful treatment plan is developed and implemented.

For each patient, Dr. Liu is devoted to understanding the most important component of life that is affected by the neuro-ophthalmologic conditions and to find a cure by the best and latest treatment options, or ways to restore quality of life both in the short term and in the long run.

Dr. Liu is fellowship trained in both adult and pediatric Neuro-Ophthalmology. She provides care to children and adults with neurologic disorders that affect the eyes or manifested as eye abnormalities.

Her prior training included general pediatrics, adult and child neurology. She is board certified in both Neurology with Special Qualification in Child Neurology and General Pediatrics. These training opportunities provide a foundation that allows her to understand the basics of a broad spectrum of disorders.



**UC DAVIS  
HEALTH**

Eye Center

# OPTICAL SHOP

Ask an eye center staff member today!

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(916) 734-6300

**UC Davis Cadillac Drive Optical Shop**

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Sacramento, CA 95825  
(916) 734-6644

**UC Davis Folsom Optical Shop**

251 Turn Piuke Dr., Suite 1070  
Folsom, CA 95630  
(916) 357-4888

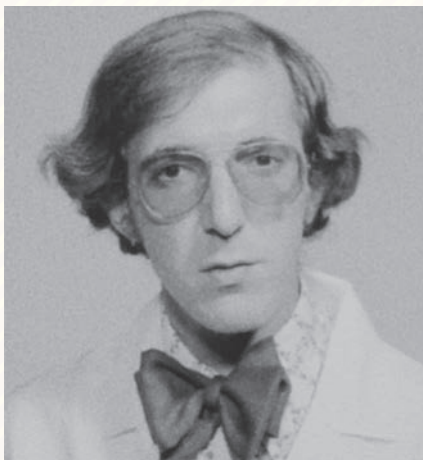
[www.ucdmc.ucdavis.edu/eyecenter](http://www.ucdmc.ucdavis.edu/eyecenter)



The alumni of UC Davis Eye Center continue to make an impact in their practices and areas of research. We would like to highlight several success stories and congratulate our alumni for their ongoing achievements.

## Michael Schermer, M.D

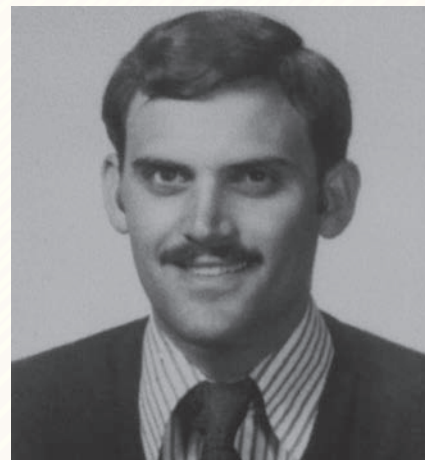
Resident Class of 1976  
Schermer Eye Associates



**Michael Schermer, M.D.**, was awarded the Ernest E. Tschannen Visionary award for his leadership and contributions to the UC Davis Eye Center and to the ophthalmic community in Sacramento. This award recognizes an individual who has shown leadership within and a commitment to the ophthalmic field. Dr. Schermer is the model recipient through his tireless volunteerism for organizations that serve blind athletes and community members, his efforts and philanthropy to advance the Eye Center, countless hours teaching and mentoring residents, and keeping the highest ethical standard for the betterment of his patients' health.

## Frank Sousa, M.D

Resident Class of 1979  
UC Davis School of Medicine



The UC Davis School of Medicine gave **Frank Sousa, M.D. '74, RS '79** its Special Recognition Teaching Award in February. Vice Chancellor Lubarsky and the schools of medicine and nursing present this award annually to those volunteer clinical professors who have made contributions through excellence in teaching and significant contributions in the field of medicine.





# See the difference you can make

**The mission** of the UC Davis Eye Center is to provide the highest possible quality of patient care, to conduct pioneering research on the visual system and its disorders, and to train residents, medical students, practicing physicians, allied health personnel, and fellows for outstanding careers in either academic or clinical practice. We welcome gifts that support this mission.

Donate today at  
<https://give.ucdavis.edu/eyes>





**UC DAVIS  
HEALTH**

Eye Center

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Sacramento, CA 95817  
(916) 734-6602  
Eye Center Optical Shop  
(916) 734-6300

UC Davis Eye Services Folsom  
251 Turn Pike Dr., Suite 1070  
Folsom, CA 95630  
(916) 357-4880  
Folsom Optical Shop  
(916) 357-4888

UC Davis Eye Services  
Cadillac Drive  
77 Cadillac Drive  
Sacramento, CA 95825  
(916) 734-6602 Appointments  
(916) 734-4642 Office  
(916) 734-6650 Laser Eye Surgery  
(LASIK) Appointments  
Cadillac Drive Optical Shop  
(916) 734-6644

UC Davis Eye Services Roseville  
2261 Douglas Blvd.  
Roseville, CA 95661  
(916) 771-0251

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Services Optometry Clinic and  
Optical Shop for current UC  
Davis students only  
(530) 752-2349  
<https://shcs.ucdavis.edu/services/optometry>

## enVISION

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### EDITORIAL COMMITTEE

- Jack Blanks
- James Brandt, M.D.
- Mark Mannis, M.D.
- Nick Marsh-Armstrong, Ph.D.
- Larry Morse, M.D., Ph.D.
- Roma Patel, M.D.
- John Werner, Ph.D.

### CONTRIBUTORS

- James Brandt, M.D.
- Erin Bauer
- Kimber Chavez
- Brian Leonard, D.V.M., Ph.D.
- Mark Mannis, M.D.
- Brennan Marsh-Armstrong
- Andréa Minella, D.V.M., Ph.D.
- Matt Moore
- Ala Moshiri, M.D., Ph.D.
- Mary O'Hara, M.D.
- Shari Roeseler
- Deanna Santana
- Sara Thomasy, D.V.M., Ph.D.
- Glenn Yiu, M.D., Ph.D.
- Min Zhao, M.D., Ph.D.

### PRODUCTION MANAGER

Matt Moore

### PHOTOGRAPHY

Bhupinder Dhillon

### GRAPHIC DESIGN

Symbology Creative



UC Davis Eye Center  
4860 Y Street, Suite 2400  
Sacramento, CA 95817

---

## Design of the Ernest E. Tschannen Eye Institute has been selected!

We look forward to sharing it with you  
in the next issue of **enVision!**

---

**To learn more about ways to partner with us to transform eye care, please contact:**

**Erin Bauer**

Senior Director of Development

916-734-3966

[ejbauer@ucdavis.edu](mailto:ejbauer@ucdavis.edu)

