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News from the UC Davis Eye Center

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UC Davis Eye Center

The Tschannen Eye Institute at UC Davis

UC DAVIS HEALTH | Eye Center

OUR VISION

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

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.

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

Christopher Murphy, D.V.M. and students performaing an eye exam on a rabbit.

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News from the UC Davis Eye Center

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Eye to Eye

One often thinks of human medicine and veterinary medicine as two totally separate sciences. And in many ways, they are.

Yet, the crossover between veterinary and human medicine has led to a significant number of important therapeutic achievements over the past several decades, especially in the realm of bringing new therapeutics into practice.

UC Davis is only one of two institutions in the United States that boasts the combination of a university-based medical school, a top-ranked school of veterinary medicine, and a primate center. As such, it is poised to host dynamic collaborations across the causeway between the School of Veterinary Medicine on the campus in Davis and the Health System in Sacramento. This unique and dynamic exchange is one of the very special attributes of UC Davis and is the basis of the concept of "**One Health**."

A number of departments at UC Davis Health have enjoyed strong collaborative relationships with the Vet School—oncology, general surgery, and neurobiology, among others. In this arena, the Department of Ophthalmology has led the way, with strong collaborations between the two faculties, especially in the exploration of retinal and corneal diseases. Our department has fostered collaborative grants and philanthropic support as well as cross-appointments of veterinary faculty to the School of Medicine, and we enjoy the regular participation of veterinarians in our Grand Rounds as well as ophthalmology Grand Rounds organized by the vet school annually.

Our hope is to establish an Endowed Chair in Comparative Ophthalmology, which underscores the importance and prestige of such a unique program and will fuel the pipeline to advance clinically oriented research and bring novel pharmaceuticals and surgical techniques to both faculties and to the patients we serve. The Eye Center and the School of Veterinary Medicine are uniquely positioned for new and important discoveries. How glad we are to be part of this!

Mark J. Mannis, M.D. F.A.C.S.
Natalie Fosse Endowed Chair in Vision Science Research
Chairperson
Department of Ophthalmology & Vision Science
Director, Ernest E. Tschannen Eye Institute

UC DAVIS HEALTH | Eye Center

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Reviving Clarity:

Innovative Approaches to Regenerating Corneal Endothelial Cells and Treating Fuchs' Dystrophy

BY SARA THOMASY, D.V.M.

Corneal endothelial cells are specialized cells on the back of the cornea (the clear window to the eye). These cells are responsible for keeping the cornea clear. When injured, from either disease or surgery the endothelial cells do not regenerate, but rather increase in size to continue the pump function that keeps the cornea from becoming swollen with fluid and losing its clarity. Once these cells reach a threshold density, they can no longer do their job, and the cornea fills with fluid and becomes cloudy.

Dr. Sara Thomasy and staff looking at the eyeball of a dog during an exam.
Photo By: Robert Warren

One of the most common diseases where these cells die prematurely is called Fuchs endothelial corneal dystrophy (FECD). This disease is one of the most common reasons that corneal transplants are performed in the United States. In a >$3 million grant from the National Institutes of Health, Dr. Sara Thomasy from UC Davis and Dr. Pantelis Rompolas from University of Pennsylvania will use innovative live imaging approaches, cutting-edge genetic tools, and mRNA technology to investigate the regenerative potential of the corneal endothelium and test a novel therapy for Fuchs' endothelial corneal dystrophy (FECD) using relevant animal models.

In this study, we will perform a preclinical trial in client-owned dogs with a similar disease to FECD called corneal endothelial dystrophy (CED). The Comparative Ophthalmology and Vision Science Lab run by Drs. Sara Thomasy and Brian Leonard at the School of Veterinary Medicine have studied this disease extensively and have published how predisposed breeds with CED such as Boston Terriers and German Shorthaired Pointers could be used to study new FECD therapies. Dr. Thomasy has also led pre-clinical trials of ROCK inhibitors (a class of medications that promote endothelial regeneration) such as ripasudil and netarsudil in dogs with CED and shown that ripasudil may be superior to netarsudil at delaying disease progression. In another project, Drs. Rompolas and Thomasy will optimize an mRNA treatment designed to boost corneal endothelial regeneration initially in mouse models of FECD before testing the best one in dogs with CED.

This research aligns with the mission of the National Eye Institute and its Strategic Plan for Regenerative Medicine approaches to treat ocular disease. Hopefully, we will help to unravel the secrets behind why the corneal endothelium is so stubborn about regeneration so that we can increase the cell density and improve their health with a single injection in the eye rather than the corneal transplants that are currently needed for FECD and other corneal endothelial degenerative diseases.

This is yet another example of how the Department of Ophthalmology and the School of Veterinary Medicine are working together to find a greater understanding of and new treatments for difficult eye disease. •

Dr. Sara Thomasy performing an eye exam on a dog.
Photo By: Robert Warren

Animal Medications for Human Diseases

BY IVAN SCHWAB, M.D.

Some creatures are magnificent chemists indeed. The seemingly harmless cone snail (Conus geographic) harbors a surprisingly deadly mix of toxins (called consomatin) to subdue and kill their prey of small fish. At least small enough that the snail can eat them. Such a toxic mixture can and will kill a human under certain circumstances. Yet, such a toxic cocktail has the potential for use in human diseases.

The deadly elixir contains insulin-like bioactive chemicals that disrupt glucose homeostasis—essentially glucose control. This weaponized molecule was recently discovered in the marine cone snail of the South Indo-Pacific. Such a mixture of chemicals will also yield other bioactive compounds that could well replace insulin for the control of diabetes. A related marine cone snail provides us with a non-narcotic pain reliever called Ziconotide, sold under the brand name Prialt. A magnificent chemist indeed.

Insulin itself was derived from the pancreas of pigs and cows. Although insulin is now made synthetically, the original molecule was discovered in animals. Other agents, derived from the saliva of the Gila monster of the Southwest of North America, have been described for the treatment of diabetes. There are other medications such as thyroid extract that have been discovered in pigs and brought to the bedside to cure human diseases.

Animal Medications for Human Ocular Diseases

The human eye has benefitted from animal-derived compounds as well; animalia is rich with potential treatments for eye disease.

For example, topical brimonidine is derived from the black mamba venom and is useful for the treatment of glaucoma. Although synthetically produced now, this drug illustrates that snake venom may have health benefits.

There are other ocular pharmaceutical agents from animal sources. Another example is Aflibercept (Eylea.) This drug is used for retinal edema especially in diabetic retinopathy and is derived from mouse and human cells combined.

Although derived from a fungus, Restasis (cyclosporin) was initially used for the dry eye of the Georgia Bulldog mascot. It proved a success and the idea was successfully transferred to humans. It is now a prominent treatment for dry eye in humans.

Roosters and their combs have gotten into the act as well. Hyaluronic acid is derived from the comb of these boisterous creatures. This compound is quite viscous and is used in intraocular often preventing intraocular damage. This compound is also used in some patients for the damage and pain of systemic arthritis.

THE CONE SNAIL CONATINS INSULIN-LIKE BIOACTIVE CHEMICALS THAT CONTROL GLUCOSE.

Cone Snail

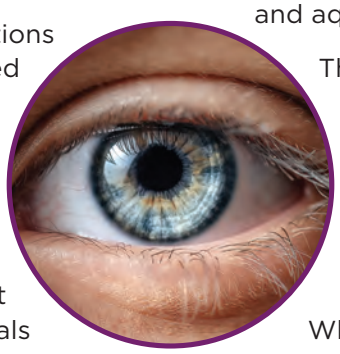
> OTHER AGENTS, DERIVED FROM THE SALIVA OF THE GILA MONSTER OF THE SOUTHWEST OF NORTH AMERICA, HAVE BEEN DESCRIBED FOR THE TREATMENT OF DIABETES.

Gila Monster

Proposal for a Chair in Comparative Ocular Physiology and Optics of the Eye

There is no model for such a chair, since few universities have the resources including a medical school, a school of veterinary medicine, and a primate center affording clinician scientists at UC Davis to complete vanguard research. Such investigation will be aimed at understanding and discovering innovative treatments for humans and other animals. In other words, the investigation of such a scholar will "go both ways" in treating animals and humans.

While some ocular diseases and conditions have been managed with animal-derived compounds, ocular diseases have been relatively untouched with such advances. It is a wide-open field.



We are proposing a Chair in Ocular Comparative Physiology and Optics to study and understand the different ocular physiology and optics of animals as compared to humans. The research efforts from such an endowed chair will contribute to the recognition and management of human or other animal diseases. The candidate for the chair will be well-versed with animal diseases and scientific methodology.

Laboratory space will provide the tools to answer the molecular questions that will likely arise with this work. If more exotic equipment is required, the candidate will have access to other investigators and their equipment. The University of California, Davis has a remarkable array of investigator and laboratory equipment including, as mentioned above, the rare combination of a Veterinary School, a Medical School, a Nursing School, a primate center, aquaculture facilities, and the Bodega Bay Marine Coastal and Marine Institute. The research disciplines present on the main campus are substantial and include most areas of study especially relating to agriculture and aquaculture.

The candidate for this endowed chair will be primarily supported by grants combined with the chair. Highly expensive and innovative equipment will be provided by the chair or participating departments on an as needed basis.

While the investigations may be quite basic in nature, it is understood that the research will be devoted to "bench to bedside" projects. In other words, this research will be directed toward the maturation of new successful treatments for all species—from laboratory animals to pets to humans. We will bring the best minds of both human and veterinary medicine together for the discovery of new treatments for disabling eye disease. •

SUPRACHOROIDAL SPACE: THE NEXT FRONTIER

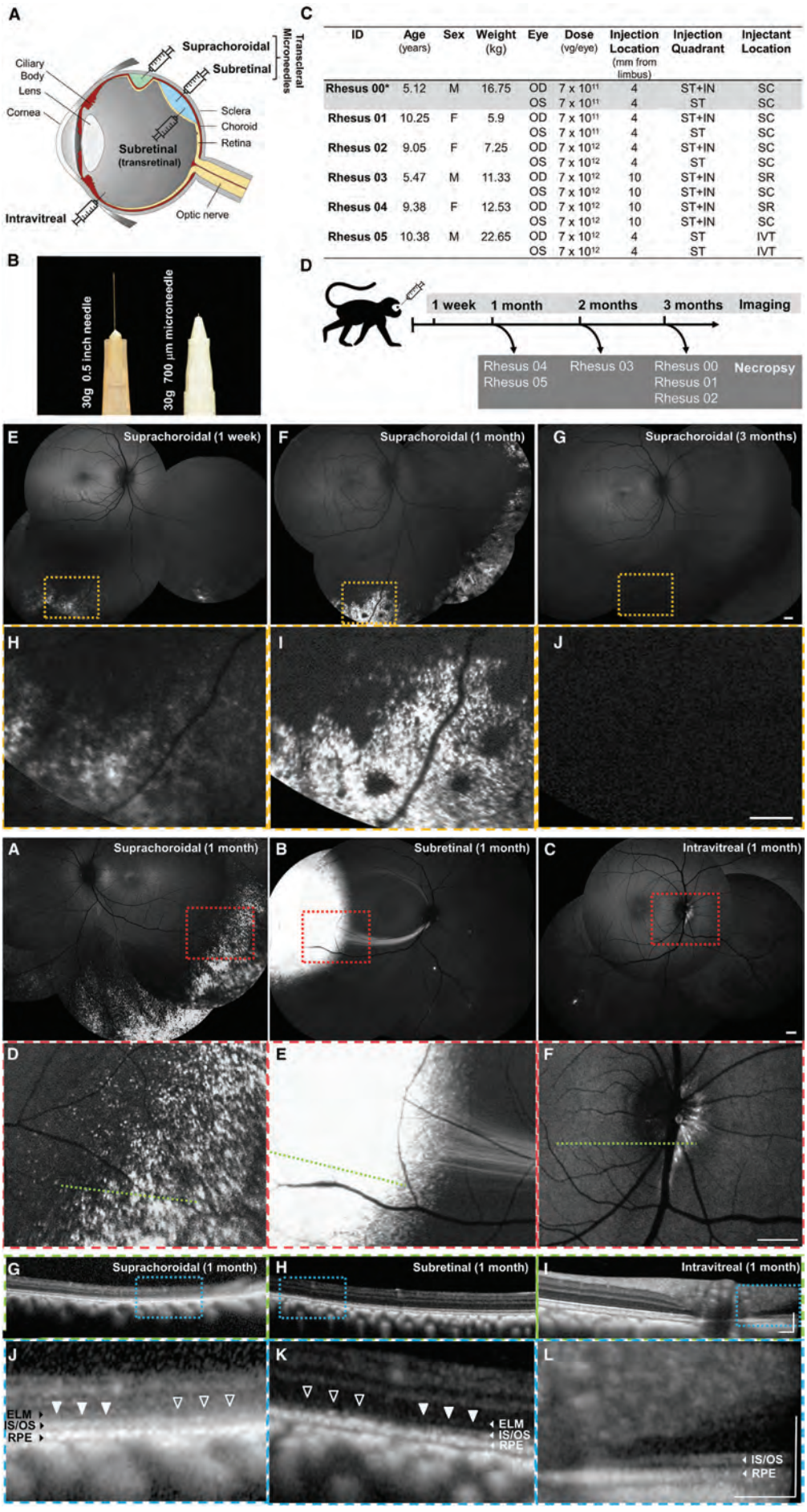
UC Davis is pioneering the use of suprachoroidal microneedles for drug and gene delivery which can transform how eye diseases can be treated in the future.

BY ABRAHAM HANG, M.D.
& GLENN YIU, M.D., PH.D.

Retinal diseases such as age-related macular degeneration (AMD) and diabetic retinopathy are often treated with drug injections into the eye. However, these drugs are not long-lasting and leak out over time, requiring repeated injections to maintain their therapeutic effect. Recently, tiny microneedles, less than 1 mm in length, have been used to deliver drugs into the suprachoroidal space—a sliver of space within the eye wall that allows drugs to be retained for a longer duration. Suprachoroidal injections of a triamcinolone steroid suspension (Xipere®) have already been approved by the FDA for patients with uveitis with macular edema, and this treatment is now offered by retina and uveitis specialists at the UC Davis Eye Center.

Clearside Biomedical's SCS Microinjector

Recent research at UC Davis is pioneering the use of gene therapy as a more effective treatment for retinal diseases. At its core, gene therapy involves the manipulation of genes in cells, either by inserting new genes or turning off existing ones. Gene therapies can address a wide variety of eye conditions, from common disorders like AMD and diabetic retinopathy to rarer inherited retinal conditions. The first gene therapy approved in the United States was voretigene neparvovec (Luxturna®), which is used to treat a form of Leber's congenital amaurosis, an inherited retina disease that causes severe vision loss. Newer gene therapies under development include ABBV-RGX-314, which can continuously produce drugs to treat AMD and diabetic eye disorders. This "biofactory" concept allows a patient to receive lifelong treatment from just a single injection, although the delivery requires a surgical procedure.



ID	Age (years)	Sex	Weight (kg)	Eye	Dose (vg/eye)	Injection Location (mm from limbus)	Injection Quadrant	Injectant Location
Rhesus 00*	5.12	M	16.75	OD	7×10^{11}	4	ST+IN	SC
				OS	7×10^{11}	4	ST	SC
Rhesus 01	10.25	F	5.9	OD	7×10^{11}	4	ST+IN	SC
				OS	7×10^{11}	4	ST	SC
Rhesus 02	9.05	F	7.25	OD	7×10^{12}	4	ST+IN	SC
				OS	7×10^{12}	4	ST	SC
Rhesus 03	5.47	M	11.33	OD	7×10^{12}	10	ST+IN	SR
				OS	7×10^{12}	10	ST+IN	SC
Rhesus 04	9.38	F	12.53	OD	7×10^{12}	10	ST+IN	SR
				OS	7×10^{12}	10	ST+IN	SC
Rhesus 05	10.38	M	22.65	OD	7×10^{12}	4	ST	IVT
				OS	7×10^{12}	4	ST	IVT

Figure 1

Experimental Design and In Vivo GFP Transgene Expression in Rhesus Macaque Eyes after Suprachoroidal Injection of AAV8

Figure 2

In Vivo GFP Transgene Expression after Suprachoroidal, Subretinal, and Intravitreal Injections of AAV8 in Rhesus Macaques

(A) Diagram of a primate eye showing different modes of AAV delivery, including intravitreal, subretinal (transretinal), and suprachoroidal or subretinal injections using transscleral microneedles. (B) Photograph comparing a standard 30-gauge needle with the transscleral microneedle used in this study. (C) Table outlining study animals and eyes, demographics, AAV8 dose, location and quadrant of injections, and the anatomic location of the injectant. *Rhesus 00 was found to have pre-existing AAV-neutralizing antibodies and was subsequently excluded. (D) Schematic of time points for ocular imaging and necropsy of study animals. (E–G) Scanning laser ophthalmoscopy (SLO) montages and (H–J) magnified views of the yellow-dashed boxes in (E–G) showing GFP expression at 1 week (E and H), 1 month (F and I), and 3 months (G and J) after AAV injections. Scale bars, 1 mm. F, female; M, male; OD, right eye; OS, left eye; IN, inferonasal; IVT, intravitreal; SC, suprachoroidal; SR, subretinal; ST, superotemporal; vg, viral genomes.

Dr. Glenn Yiu, a retinal specialist and Professor of Ophthalmology at UC Davis, has been at the forefront of developing suprachoroidal microneedles for use in gene therapy. Dr. Yiu and his team were the first to demonstrate that the suprachoroidal space could be imaged using "enhanced depth" imaging optical coherence tomography (EDI-OCT),1 and they measured its expansion after microneedle injections into this space.2 In 2018, Dr. Yiu received a pilot grant from the California National Primate Research Center (CNPRC) to study the use of suprachoroidal microneedles to deliver gene therapy vectors—viral capsid proteins used to introduce genes into the eye—using rhesus monkeys. Their results, published in 20203 and supported by a separate study at Johns Hopkins by Peter Campochiaro, MD,4 revealed that suprachoroidal gene therapy can be achieved with a simple, in-office procedure without the need for surgical delivery, and may provide better biodistribution and effect.

(A–C) Scanning laser ophthalmoscopy (SLO) montages and (D–F) magnified views of the red-dashed boxes in (A)–(C) showing different patterns of GFP expression after suprachoroidal (A and D), subretinal (B and E), and intravitreal (C and F) AAV injections. (G–I) Spectral domain-optical coherence tomography (SD-OCT) scans across the green dashed lines in (D)–(F), with (J–L) magnified views of the blue-dashed boxes in (G)–(I), showing impact on external limiting membrane (ELM), photoreceptor inner segment/outer segment junction (IS/OS), and retinal pigment epithelium (RPE) after suprachoroidal (G and J), subretinal (H and K), and intravitreal (I and L) AAV injections. ELM and IS/OS disruptions were seen in areas of greatest GFP transduction (open arrowheads) compared with adjacent areas with less transduction (closed arrowheads). Scale bars, 1 mm (A–F), 0.2 mm (G–L). ELM, external limiting membrane; IS/OS, inner segment/outer segment junction; RPE, retinal pigment epithelium.

Based on the work of Dr. Yiu and others, suprachoroidal delivery of ABBV-RGX-314 using microneedles is now being investigated in two ongoing clinical trials (AAVIATE and ALTITUDE) for the treatment of wet AMD and diabetic retinopathy. These trials could potentially provide a one-time, in-office procedure for treating common retinal diseases that affect millions of people in the United States alone. Dr. Yiu's pioneering work on microneedles for suprachoroidal gene delivery and CRISPR-based gene therapy5 recently earned him the Carl Camras Translational Award by the Association for Research in Vision and Ophthalmology (ARVO) Foundation in 2024, paving the way for further research and collaboration. UC Davis is also currently enrolling patients with wet AMD to participate in the ASCENT trial for the ABBV-RGX-314 gene therapy. •

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Vision Neuroscientist Appointed Interim Director for Center for Neuroscience

BY KIMBERLY CUMMINGS

Marie Burns is an accomplished vision scientist, leader and mentor

Marie Burns, Ph.D., has been appointed interim director of the Center for Neuroscience (CNS), effective July 1, 2024. Burns is a professor in the departments of Ophthalmology and Vision Science and Cell Biology and Human Anatomy in the UC Davis School of Medicine.

Burns succeeds A. Kimberley McAllister, Ph.D., who served as the center's director since 2016. McAllister is departing UC Davis to begin a new position as vice provost for research, scholarly inquiry and creative activity at Wake Forest University.

An accomplished vision scientist, leader and mentor

Burns is a highly respected and active member of the UC Davis neuroscience community, and a CNS core faculty member since 2001. She brings a wealth of leadership experience and a distinguished career in vision neuroscience research to her new role. Burns served as the inaugural director of the UC Davis Center for Vision Science from 2007 to 2012 and has been the director of the NIH Vision Science T32 Training Program since 2017.

"Marie's dedication to mentoring trainees and fostering an inclusive, collaborative research environment has been a hallmark of her career at UC Davis," said Mark Winey, dean of the College of Biological Sciences. "Her leadership acumen and longstanding commitment to advancing neuroscience research make Marie an excellent fit for this interim role."

A third generation "eye doc," Burns received her Ph.D. in neurobiology from Duke University and completed her postdoctoral training at Stanford University.

Vision scientists Kaitryn Ronning (left) and Marie Burns (UC Davis)

"I am motivated by personal connections, family members and friends affected by glaucoma and age-related macular degeneration," Burns said. "I believe the work I do will directly impact the quality of care and treatment options within my parents' lifetimes."

Her research focuses on photoreceptors in the retina—the rods and cones in our eyes that detect light—in health and disease. The Burns Lab uses innovative approaches to study photoreceptor signaling and interactions between photoreceptors and the immune cells of the retina in vivo(in a living organism).

"Bridging a uniquely broad range of research topics and approaches, the Center for Neuroscience has been a national leader in multi-disciplinary neuroscience research for decades. I'm honored to step into the role of interim director during this transition," Burns said. "Together with the incredible faculty, trainees and staff at CNS, we will continue to advance the center's mission, building on the strong foundation established over the past 30 years."

A decade of dramatic growth, innovation and discovery

McAllister, who begins her appointment at Wake Forest this fall, is a cellular and molecular neuroscientist specializing in synapse biology and neuroimmunology.

She has dual appointments in the Department of Neurology in the School of Medicine and the Department of Neurobiology, Physiology and Behavior in the College of Biological Sciences.

Center for Neuroscience faculty, trainees and staff in 2022.

Over nearly 25 years at UC Davis, McAllister has trained ten pre-doctoral and 13 post-doctoral fellows and more than 60 undergraduates and 13 postbaccalaureate students. She has been a CNS core faculty member since 2000.

From 2014 to 2016, McAllister served as the center's associate director. In 2016, she became the first woman named director of the center. As director, McAllister oversaw significant growth in the center's research funding, training programs and philanthropic support. She was pivotal in fostering collaborations and interdisciplinary initiatives within the broad neuroscience community across campus.

"Kim's tenure as CNS director has been marked by numerous significant achievements and contributions to our community, and to the broader community of neuroscientists at UC Davis," Winey said. "Her legacy, which is one of achievement and innovation, of collaborative, interdisciplinary partnerships across our campus, will be enduring."

During her tenure as director, McAllister expanded three research areas critical to the future of neuroscience discoveries: computational neuroscience, systems neuroscience and the field of neuroengineering.

She also recruited seven CNS core faculty members and greatly expanded NeuroFest, the center's annual outreach event held each March during Brain Awareness Week. This event, which welcomes hundreds of visitors each year, has strengthened the center's mission of engaging the public in neuroscience research. McAllister was also instrumental in creating the CNS Director's Circle, a special recognition program for donors who support ground-breaking research, outreach events and training fellowships at the center.

McAllister is also the founding director of the UC Davis Learning, Memory, and Plasticity (LaMP) T32 Training Program, Co-Director of the UC Davis Conte Center and Co-Champion of the Emerging Health Threats Grand Challenge.

"Serving as the director of the Center for Neuroscience for the past eight years has been one of the greatest honors of my life," McAllister said. "I am immensely grateful for my UC Davis colleagues and proud of all we have accomplished together." •

About the Center for Neuroscience

Established in 1992, CNS is the interdisciplinary hub for neuroscience research and training at UC Davis. CNS faculty are leaders in cell/molecular, computational, cognitive, development and systems neuroscience and conduct leading-edge research across a wide range of neuroscience approaches and subfields. We are committed to training the next generation of neuroscientists and engaging the public in neuroscience research. Our commitment to diversity, equity, and inclusion permeates and elevates every aspect of our community.

LIGHTS, RETINAL CAMERAS, ACTION!

BY GLENN YIU, M.D., PH.D.
& LAUREN GUAJARDO, O.D.

UC Davis is expanding remote diabetic eye screening to underserved communities, and partnering with other UC campuses to improve eye care access for Californians statewide.

Diabetic retinopathy (DR) is the leading cause of blindness in adults. **Yet, fewer than 50% of the 3.2 million Californians with diabetes undergo annual eye screening as recommended by the American Diabetes Association (ADA).** In 2018, Dr. Glenn Yiu, a retinal specialist and Professor of Ophthalmology at UC Davis, partnered with the Department of Internal Medicine to launch a teleretinal screening program at the UC Davis Midtown clinic. The plan was to deploy a single retinal camera in this primary care clinic so that eye images can be remotely reviewed by an ophthalmologist. A report is then sent back to the referring provider to determine if the patient has disease requiring an in-person eye care referral, or just follow-up routinely for annual screening. From a patient standpoint, teleretinal screening can save time and travel expenses, which can be significant for underserved or vulnerable populations. This simple concept of a remote "point-of-care" eye screening program has been shown to reduce costs, improve DR screening rates, and enhance eye care access.[1,2] However, the journey to get there was much more challenging.

The initial grant funding in 2018 came from the Collaborative for Diagnostic Innovation and the CITRIS/Banatao Institute, which helped purchase a retinal camera and support for an imaging technician to operate it. However, the team also needed to educate the primary care physicians, train nurses to identify patients who needed screening, develop software workflows for electronic documentation, and bill for the services. Reimbursements were a major challenge, as telehealth was relatively new at the time, and some insurance payors including Medicare did not consistently cover these services. Using national insurance claims data from the OptumLabs Data Warehouse, Dr. Yiu's team showed that insurance payments for teleretinal exams has declined over the past decade, with disproportionate impact on vulnerable populations such as the elderly, women, and blacks.[3] Although the program screened more than 500 patients and increased DR screening rates at the Midtown clinic by more than 15% in that first year, teleophthalmology utilization slowly declined after the grant funding ran out.

Then in 2020, the COVID19 lockdown occurred. With many in-person clinics closed, awareness about telehealth and remote eye care returned to the forefront.[4] The team had just published a cost analysis study indicating that despite low insurance reimbursements, teleretinal screening can provide financial benefits due to quality-based incentive payments and revenue from more ophthalmology referrals.[5] Additionally, through Dr. Yiu's advocacy efforts working with health policy experts at the American Academy of Ophthalmology (AAO), improvements were

made in 2021 to the teleretinal billing codes. These changes led the UC Davis Health system to agree to an expansion of the teleophthalmology program to sex locations, which eventually helped UC Davis improve DR screening rates from below national median (46%) to the top quartile of benchmarks (>65%), surpassing all other UC health campuses including UCLA, UCSD, UCSF, and UC Irvine.

"Our efforts now are to expand teleretinal screening to underserved communities," said Dr. Yiu. With a grant from the Lions Club International Foundation, Dr. Yiu is teaming with Dr. Marcela Estrada, a pediatric ophthalmologist at UC Davis, to provide eye screening to children and patients from student-run community clinics such as Clinica Tepati and Paul Hom Asian Clinic. Dr. Yiu co-directs the eye clinic at Paul Hom with Dr. Michele Lim, where students, housestaff, and volunteer faculty work closely to provide free eye care for the local Asian community near UC Davis. As a participating site in the National Eye Institute-sponsored I-TRUST study (https://clinicaltrials.gov/ct2/show/NCT05254535) led by UC Davis Alumnus Dr. Yao Liu, the team will also provide teleophthalmology services to the Communicare network of Federally Qualified Health Centers (FQHC) in Yolo County. Today, these efforts are supported by a team of UC Davis optometrists including Jonathon Ross, Brooke Chang, Marcia Nearing, and Lauren Guajardo, who help perform image gradings for the teleretinal screenings. "The success of our program has been due in large part to the efforts of our excellent team of optometrists," said Dr. Yiu, "This project is a good example where ophthalmologists and optometrists can partner together to promote this important cause of expanding eye care to the underserved."

This year, with support from a $2 million grant from the UC Office of the President's Multicampus Research Program and Initiatives, Dr. Yiu will be leading a multi-campus effort to expand teleretinal screening across four major UC health systems (https://health.ucdavis.edu/news/headlines/uc-davis-health-leads-2m-program-to-improve-eye-care-for-people-with-diabetes/2023/01). In partnership with medical centers at UC San Diego, UC San Francisco, and UC Los Angeles, the Collaborative UC Teleophthalmology Initiative (CUTI) will employ bioinformatics, implementation science, and public health experts across the four UC health campuses to address barriers and challenges to expanding remote retinal screening to more Californians across the state.

"The success of our program has been due in large part to the efforts of our excellent team of optometrists."

There are still more exciting opportunities ahead. UC Davis is now partnering with Digital Diagnostics to deploy an artificial intelligence (AI)-driven diagnostic platform to enable automated point-of-care diabetic eye screening. Rather than waiting for a human ophthalmologist or optometrist to read the fundus photographs and send back the result after a few days, the LumineticsCore system uses AI to provide instantaneous feedback to the ordering physician, so they can discuss any DR diagnosis with the patient and even help schedule an in-person eye specialist referral on the spot if needed. As Director of Teleophthalmology, Dr. Yiu will be leading these efforts. "I'm hopeful that increasing awareness and improving technologies, along with the strong passion of our team of providers, will continue to expand teleretinal services and improve eye care access to patients across California." •

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EARLY-STAGE TRIAL FINDS STEM CELL THERAPY FOR RETINITIS PIGMENTOSA IS SAFE

BY JOSH BAXT


Susanna Park, M.D., Ph.D.

A team of UC Davis Health researchers has shown that CD34+ stem cells can be safely administered into retinitis pigmentosa (RP) patients' eyes and may offer therapeutic benefits. The phase 1 trial also confirmed that these specialized cells can be readily isolated from the patient's own bone marrow. The study was published in the American Academy of Ophthalmology journal, Ophthalmology Science.

"It was a small study, and we wanted to show we could effectively isolate the CD34+ cells from bone marrow, inject them safely and perhaps see some visual benefits," said Susanna Park, M.D., Ph.D., professor in the Department of Ophthalmology and Vision Science and first author on the paper. "We found the treatment is safe, and four of the seven patients showed measurable improvements in vision."

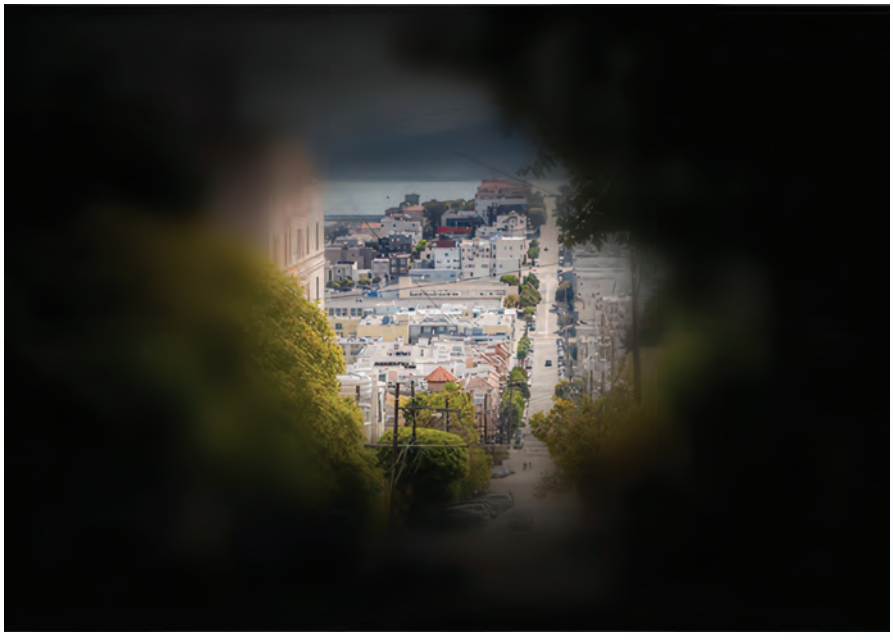
A disease with diverse roots

RP is caused by as many as 100 different genetic mutations. As retinal cells die off, people lose peripheral vision and the ability to see in low light, ultimately progressing to complete blindness.

Because RP genetics are so complex, correcting the root cause is challenging. One existing gene therapy for RP is only effective in the 1% of RP patients who have that specific mutation. Other gene therapies are in development; however, each one could help only a small group of patients with RP.

Seeing this disease diversity, the UC Davis team took a different, mutation-agnostic approach. Rather than trying to correct the underlying genetic anomaly, they began investigating whether stem cells could regenerate retinal tissue and vision.

CD34+ stem cells are particularly promising because they home in on damaged tissues to repair them. These regenerative cells have been tested in cardiovascular diseases and have shown significant benefits. Previous UC Davis studies, in both animal models and patients, have shown this approach could


Retinitis pigmentosa can cause people to lose their peripheral vision.

improve RP and possibly other retinal conditions.

"We believe the CD34+ cells find the degenerating retina, grab onto it and could generate molecular changes to reduce the degeneration," Park said. "We showed some preservation of retinal function using these stem cells in one of our animal models of RP."

A safe and possibly effective therapy

Researchers recruited seven people with RP, who had lost most of their peripheral vision. They used a sterile, good manufacturing practices laboratory at the UC Davis Institute for Regenerative Cures to isolate CD34+ cells from bone marrow obtained from each participant. Study participants received a single stem cell injection in one of their affected eyes.

The study showed the therapy was well tolerated: One patient had a minor complication, which corrected itself within 24 hours. Overall, the stem cell isolation process produced safe, high-quality cells.

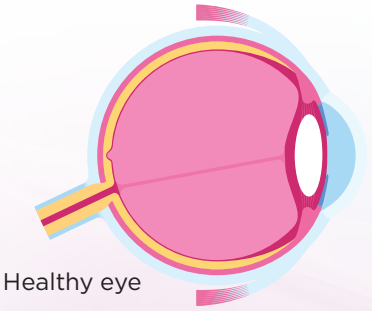
"The most important result is that we were able to isolate the CD34+ cells of high quality for eye injection," Park explained. "Around 90% of the isolated cells were viable, and there were no infections or other serious adverse effects after cell injection in the eye."

While this phase 1 study focused mainly on safety, most participants felt their vision had improved, and objective eye tests confirmed this. The UC Davis team plans to pursue a larger safety and efficacy trial in the future.

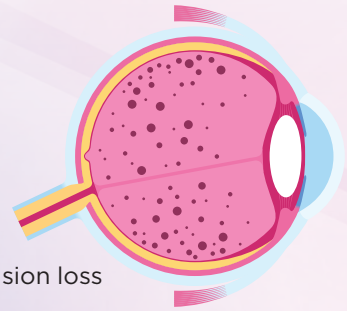
"After a decade of collaborative studies testing the human CD34+ cells in mouse models of retinal degeneration, it is very promising to see their safety and potential efficacy in patients who have enrolled in the clinical trial," said Jan Nolta, coauthor on this study. Nolta is the director of the Stem Cell Program and the UC Davis Gene Therapy Center in the Institute for Regenerative Cures at UC Davis Health. •

"We believe the CD34+ cells find the degenerating retina, grab onto it and could generate molecular changes to reduce the degeneration,"

Retinitis Pigmentosa



Healthy eye



Vision loss

Other authors included: Gerhard Bauer, Brian Fury, Mehrdad Abedi, Nicholas Perotti and Dane Colead-Bergum.

The study was funded through: Retina Society Research Award; Cures within Reach Grant; Barbara A. & Alan M. Roth, MD Endowed Chair from University of California, Davis.

Surgery May Benefit Macular Edema from Coats Disease

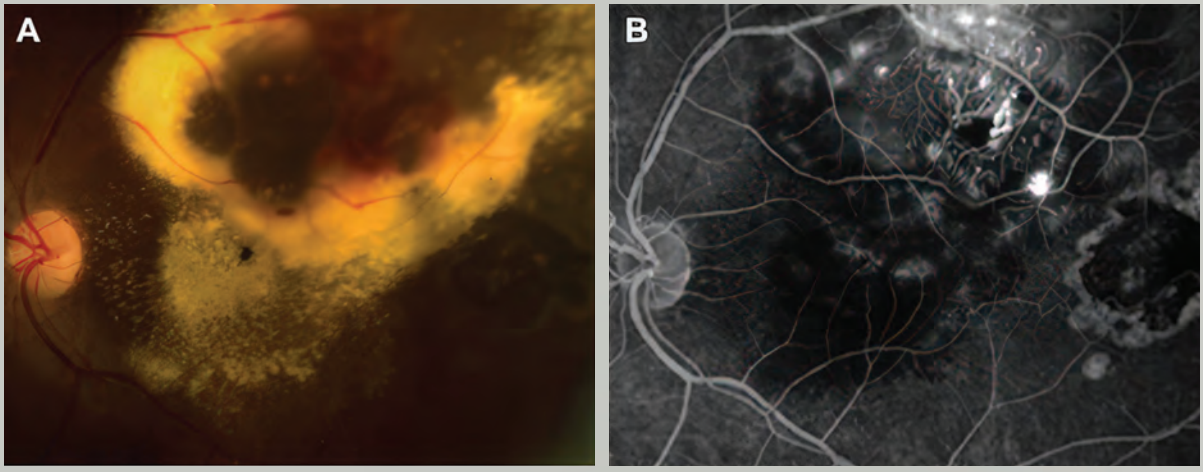
BY LISA HOWARD

Earlier surgical intervention for advanced cases may result in better vision

Surgical drainage of large macular cysts in a patient with Coats disease resulted in an immediate resolution of edema and a gradual resolution of lipid exudates over one year. However, visual recovery was limited due to the chronic nature of the condition. Earlier surgical intervention, in some cases, may allow for visual rehabilitation.

Those findings come from a new case study by ophthalmologists at the UC Davis Ernest E. Tschannen Eye Center published in the Journal of VitreoRetinal Diseases.

"For some patients with macular Coats disease that does not improve with standard treatments like laser injections and intraocular injections, surgically draining the large cysts may be a viable alternative," said Glenn Yiu, first author of the paper and a professor and board-certified vitreoretinal specialist and surgeon at UC Davis.



Large macular cysts and lipid exudates (left) and large leaking aurysms and telangiectasias (right) in a patient with Coat's disease.

Coats disease characterized by abnormal blood vessels

Coats disease is a rare, idiopathic eye disorder characterized by abnormal development of blood vessels in the retina. It is usually diagnosed in childhood. The progressive disease occurs three times more frequently in males than females and generally presents in only one eye. Early symptoms can include decreased visual acuity, strabismus and leukocoria, where the eye's pupil reflects white, grayish or yellowish instead of red.

Patients with Coats disease can present with large amounts of cystoid edema and lipid exudates in the retina, which can severely impair vision if they develop in the macula—the central part of the retina needed for reading or recognizing faces.

"For some patients with macular Coats disease that does not improve with standard treatments like laser injections and intraocular injections, surgically draining the large cysts may be a viable alternative."

—Glenn Yiu, professor, Department of Ophthalmology and Vision Sciences

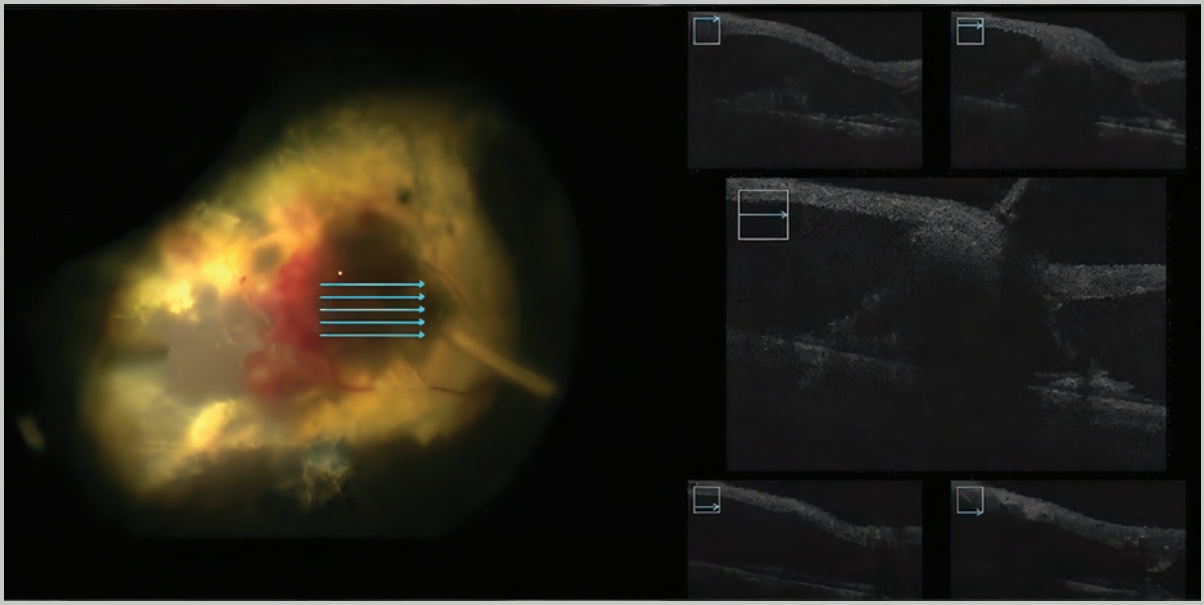
Photo provided by iStock

Large macular cystoid spaces

A 30-year-old man with Coats disease was referred to the Eye Center at UC Davis Health. He was diagnosed with the disease at age 9 and initially received multiple rounds of laser photocoagulation to eliminate the abnormal vessels and leaking aneurysms. His left eye had become blurrier over several years as the macular edema and exudates progressively worsened.

At the time of his referral, the vision in his affected eye was 20/400, with large macular cysts seen on fundus examination and optical coherence tomography (OCT). OCT is a type of imaging retinal specialists commonly use to see the retina in cross-section and detect microscopic pathologic changes.

Using fluorescein angiography to visualize retinal blood flow, Yiu also noticed active leakage from these telangiectasias and aneurysms. The patient was initially treated with additional laser photocoagulation and multiple rounds of anti-vascular endothelial growth factor (anti-VEGF) injections to stop the leakage, but without success.



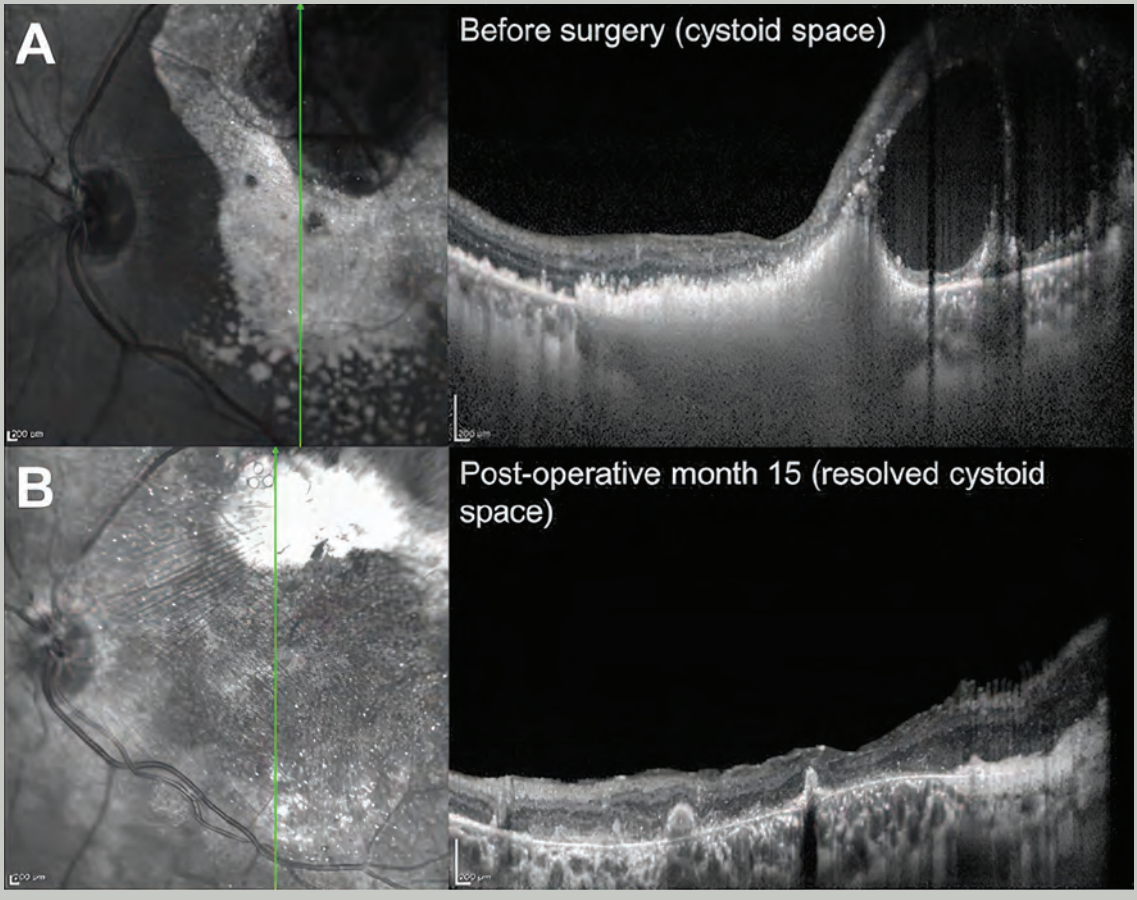
A small opening in the retina was created over the large cysts by endodiathermy. The contents were aspirated using a 25-gauge soft-tipped cannula, with visible extrusion of the yellow lipid exudates through the retinotomy. To watch the video, please visit: https://health.ucdavis.edu/eye-center/news/headlines/surgery-may-benefit-macular-edema-from-coats-disease/2024/06

Surgical drainage and laser photocoagulation

After extensive discussions with the patient, ophthalmologists decided to attempt surgical drainage as a last resort. Yiu and his team performed a pars plana vitrectomy (PPV) to remove the vitreous. Then, using intraoperative OCT imaging for guidance, they created a retinal opening called a retinotomy, and successfully drain the large cysts and lipid exudates using a microscope aspiration cannula. They sealed the retinal opening and treated all the aneurysms with intraocular laser photocoagulation, or endolaser."

They performed intraoperative OCT again to confirm the complete removal of the fluid at the completion of the case.

Postoperative OCT images captured one month after the surgery showed no fluid recurrence in the eye and some reduction in subfoveal exudates. After one year, the lipid exudates had disappeared as well, although the patient's vision remained unchanged at 20/400.



Optical coherence tomography B-scan (right panels) and corresponding infrared reflectance images (left panels) before surgery and after 15 months.

"This case shows the possibility of surgically draining large macular cysts in cases of advanced Coats disease refractory to medical intervention," said co-author Abraham Hang, M.D., a fourth-year resident in the UC Davis Department of Ophthalmology and Vision Science.

The authors note that based on the resolution of the macular fluid and exudates after surgery, perhaps earlier surgical intervention could have resulted in better vision outcomes. "Chronic macular fluid and especially lipid exudates are very toxic to the retina," Yiu noted.

However, they caution that potential complications related to intraocular surgery should be carefully considered, and optimal care with conventional laser photocoagulation and intravitreal injections should be prioritized.

"Careful consideration of the surgical risks must be weighed against the potential benefit of treating the macular fluid and exudates in a timely manner," Yiu said. •

Celebration of the Century:

ERNEST TSCHANNEN TURNS 100

Members of the UC Davis Eye Center gathered recently to celebrate the milestone birthday of Ernest E. Tschannen, who turned 100 on February 16.

Ernest Tschannen in front of a 100 balloon sculpture.

Swiss-born Tschannen developed vision-threatening eye disease later in life and was referred to Dr. Michele Lim, a glaucoma specialist who serves as vice chair and medical director at the UC Davis Eye Center. Grateful for the surgery that preserved his sight, Ernest began making modest gifts in appreciation.

The relationship blossomed as he learned more about the Eye Center's remarkable work. His growing commitment over the years resulted in transformational contributions to support the Department of Ophthalmology & Vision Science, as well as the initial funding to build the award-winning, state-of-the-art Ernest E. Tschannen Eye Institute building that opened two years ago.

"Ernest understands how fortunate he has been in his life, and even at 100, he wants to continue inspiring others to give back and help people regain their vision," said Department of Ophthalmology & Vision Science Chair and Professor Dr. Mark Mannis.

Tschannen's life is an inspiration to many, and he lives each day with gratitude and joy. He attributes his longevity to a healthy diet and active lifestyle, and he still makes time for daily hikes.

"Take advantage of every minute you have," he shared with the group during the celebratory weekend.

Tschannen continues to live by that adage, inspiring optimism and gratitude throughout the community.

From left to right: Rebecca Subbotin, Brian Casey, Mark Mannis, M.D., Michele Lim, M.D., Ernest Tschannen, Oksana Prikhodko, and Sheena Summers.

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EVENTS UPDATES

May 3-5,2024: Dr. Mark Mannis was honored as the keynote speaker during the Napa Eye 2024 Symposium in Napa, California, for his steadfast dedication and service to the UC Davis Eye Center. As department chair for more than 20 years, Dr. Mannis has led the UC Davis Eye Center to new heights and his impact on teaching, research, and patient care is immeasurable. Under his leadership, the Eye Center has advanced technology and pioneering research. The depth and breadth of faculty and researcher expertise that has come to fruition under his leadership provides world-class eye care and offers hope for sight restoration to patients and their families. Among Dr. Mannis' many accomplishments, he opened the Ernest E. Tschannen Eye Institute Building which expanded the department's capacity for research and enhanced the ability to provide high-quality vision care to the community and beyond. As an educator, Dr. Mannis' mentorship and guidance has launched many careers. Cornea fellows that trained under him came together to celebrate Dr. Mannis' legacy at Mannis Mania.

If you are interested in joining to establish a permanent endowed professorship in his name in honor of these exceptional achievements, please contact Sheena Summers by emailing smlennie@ucdavis.edu for more details.

From left to right: Dr. John Keltner, Ernest Tschannen, and Oksana Prikhodko

May 2024: The Center for Comparative Ophthalmology at the UC Davis School of Veterinary Medicine and the UC Davis Eye Center hosted the Veterinary Medicine Grand Rounds lecture at the Sacramento Zoom. School of Veterinary Medicine and UC Davis Eye Center faculty, residents and fellows performed eye exams on multiple reptiles and toured with zoo. If you are interested in attending future grand rounds meetings, please visit: https://health.ucdavis.edu/eyecenter/cme/index.html

Samuel Feldman, M.D. with a giraffe

June 22, 2024: The UC Davis Eye Center hosted the annual Resident, Fellow, & Alumni Research Symposium at the Hilton Sacramento Arden West hotel, where 3rd-year and 4th-year residents and fellows presented their ophthalmology research projects to community members and ophthalmologists. During the program, Dr. Mary O'Hara was presented the Byron Demorest Lecture award. Dr. Evan "Jake" Waxman was presented with the Alumnus of the Year award.

Evan "Jake" Waxman, M.D. and Mark Mannis, M.D., F.A.C.S.

Mary O'Hara, M.D. and Nandini Gandhi, M.D.

September 12, 2024: The 2024 J. William Kohl, M.D. Summer Research Scholarship presentations were hosted at the UC Davis Eye Center on Thursday, September 12. Thanks to the ongoing support of Mrs. Ann Kohl and the Kohl family, the J. William Kohl Summer Research Scholarship for medical students continues to be an essential source of inspiration and hope in UC Davis Eye Center's endeavor to promote young scholars to pursue careers in ophthalmology. This program was inspired by Ann's late husband, Bill Kohl, M.D., who was one of the founding members of the UC Davis Department of Ophthalmology & Vision Science, as well as a champion for encouraging medical students to pursue ophthalmology as a specialty. Thank you to the Kohl family for their continued support to this wonderful program!

October 19, 2024: The Department of Ophthalmology & Vision Science hosted the annual Alumni, Volunteer Clinical Faculty, & Friends Reception at the American Academy of Ophthalmology in Chicago, Illinois. We look forward to hosting our alumni, VCF, and friends at this year's reception, which will be held at the Hyatt Regency Orlando in Orlando, Florida on Saturday, October 19th, 2025.

October 24, 2024: The UC Davis Eye Center celebrated the Burns family, who received the Ernest E. Tschannen Visionary Award and Medal, in recognition of their steadfast contributions to the advancement of vision care and research. Inspired by their daughter Claire, a patient at the Eye Center for many years, the Burns' philanthropy has launched innovative, early-stage cornea research projects that will ultimately impact how clinicians identify, treat, and heal injuries and diseases of the cornea. Past recipients of the award include Ernest E. Tschannen, Dr. Michael Schermer, Dr. Lars Berglund, Dr. Robert Miller, and Ted and Melza Barr. Thank you to the Burns family - your unwavering dedication to this department continues to have a lasting and meaningful impact on the lives of the patients we serve.

From left to right: Emily Burns, Jeremy Burns, Jeremy Brett, Louis Burns, William Burns and Claire Burns (not pictured).

Past Ernest E. Tschannen Visionary Award recipients celebrate with the Burns family. From left to right: Lars Berglund, M.D., Ph.D., Karen Burns, Louis Burns, Robert Miller, M.D., Ted Barr, and Melza Barr.

October 25, 2024: A delegation of women from the Native Daughters of the Golden West Children's Foundation visited the Eye Center to celebrate the impact of their recent $6,000 grant to improve our pediatric waiting room and clinic spaces. The grant helps to create an enriching, stress-free, and fun area for children undergoing treatment and eye dilation. Receiving treatment in a medical facility can be a frightening experience for children. Their generosity was instrumental in creating a more welcoming and positive experience for over 4,300 children who receive treatment annually at the UC Davis Eye Center—many of whom come from low-income backgrounds in the Sacramento Region. This grant will continue to make a difference by giving children treated at UC Davis a sense of belonging, relieving patient and caregiver stress, and better-preparing patients for their appointments.

January 10, 2025: The Center for Vision Science hosted their annual vision symposium at the Education building on the UC Davis Health campus in Sacramento, California. The keynote speaker was Pantelis Rompolas, Ph.D., Associate Professor, in the Department of Dermatology at Perelman School of Medicine, University of Pennsylvania. Rompolas presented on "Decoding Cellular Dynamics in Corneal Physiology and Disease: A Systems Approach." The John L. Keltner, M.D., Lecturer was Bevin R. Conway, Ph.D., Senior Investigator in the Department of Sensation, Cognition, and Action Section at the National Eye Institute in Washington, District of Columbia. Conway presented on "Principles of Neuroscience in Color."

HONORS & AWARDS

2024: The Association for Research in Vision and Ophthalmology (ARVO) Foundation awarded **Glenn Yiu, M.D., Ph.D.,** the 2024 Carl Camras Translational Research Award. The $12,000 award is granted annually to young investigators working in areas of translational research. The intent is to recognize early-career researchers who have exhibited excellence in research, and also their fundamental scientific discoveries, concepts and novel technologies which have led to, or have the promise of leading to, clinical application. A retinal specialist and clinician-scientist, Yiu is currently a professor of ophthalmology at the University of California, Davis. He leads a translational research program studying age-related macular degeneration (AMD) and other retinal diseases, with a focus on ocular imaging technologies, gene editing and delivery, and animal models of retinal disease. Yiu reported the first use of CRISPR-based genome editing as a treatment strategy for wet AMD, discovered the use of microneedles for suprachoroidal gene delivery, and pioneered important studies on drusen evolution and other retinal disease models in rhesus monkeys. Yiu also serves as director of tele-ophthalmology at UC Davis, where he has pioneered a teleretinal screening program to expand eye screening among diabetic patients in California. Supported by the ARVO Foundation, this award honors Dr. Carl Camras, who is highly respected for his work as a glaucoma specialist and a research scientist. "I am humbled and honored to receive the Carl Camras Translational Research Award," says Yiu. "Dr. Camras embodied the ideals of a clinician-scientist who can leverage his knowledge and compassion as a physician to develop novel therapies as a translational researcher. His breakthrough work in prostaglandin analogues and its impact on glaucoma patients worldwide reminds me of the importance of curiosity, perseverance, and empathy in bringing about new treatments and technologies. This award will inspire me to continue making greater impact on the lives of patients with retinal diseases."

March 2024: Dr. James Brandt was the AGS Lecture (Annual meeting keynote) at the American Glaucoma Society.

May 2024: Dr. Lily Koo Lin who was awarded American's Most Honored Professionals Top 5% from American Registry in 2024.

Bonnie Quiroz, M.D.

June 2024: Congratulations to Resident Alum **Bonnie Quiroz, M.D., '06,** who works at Kaiser Permanente North Valley, was awarded the 2024 Sidney R. Garfield Exceptional Contribution Award for Enterprise Eye Care Imaging Modernization along with Gregg Gayre, M.D. from Kaiser Permanente San Rafael. The award was established by the Board of Directors of The Permanente Medical Group in 2000 to recognize physicians who are instrumental in the development and dissemination of ideas and programs that have a significant impact on patients, colleagues, and the broader community.

July 2024: In FY24 Q4, 208 UC Davis Health doctors received the Diamond Doc Award for

their patient care. Scoring within the 90th percentile or higher on patient surveys, the award honors physicians who showed careful listening, clear explanations, and respectful partnerships. The physicians from the Eye Center that won this award in Q4 were **Jeffrey Caspar, M.D., Rebecca Chen, M.D., Jennifer Li, M.D., Mark Mannis, M.D., and Ala Moshiri, M.D., Ph.D.**

Dr. Ala Moshiri and Dr. Sara Thomasy

July 2024: This year, six research teams won the 2nd annual Reaching Across the Causeway award. The award recognizes and supports exceptional collaboration among researchers in the Schools of Medicine and Veterinary Medicine. Each team will get a one-year support of up to $50,000. The funding goes to help in the planning, preparation and submission of applications for research grants. The medical and veterinary schools co-fund this award, supporting four team projects. This year, UC Davis Comprehensive Cancer Center and the Clinical and Translational Science Center (CTSC) joined to fund two more projects. Each winning team has at least one School of Medicine and one School of Veterinary Medicine co-principal investigator. One of the four teams funded by the schools included **Sara Thomasy, DVM and Ala Moshiri, M.D., Ph.D.** Thomasy is a professor in the Department of Surgical and Radiological Sciences and the Department of Ophthalmology & Vision Science. Moshiri is a professor of ophthalmology and vision science. The study will test the sight-restoring potential of an optogenetic treatment on dogs. It will also facilitate the treatment's translation from preclinical models to human clinical trials for patients with retinal diseases. Congratulations Dr. Thomasy and Dr. Moshiri!

September 2024: Congratulations to **Parisa Emami, M.D., M.P.H.,** who was awarded a grant of $526,300 from Regeneron as the PI for an investigator initiated study called "Biomarkers of response to treatment among AMD patients receiving anti-VEGF-injection."

October 2024: 150 UC Davis Health doctors received the Diamond Doc Award for their patient care. Scoring within the 90th percentile or higher on patient surveys, the award honors physicians who showed careful listening, clear explanations, and respectful partnerships. The physicians from the Eye Center that won this award in Q1 were **Jeffrey Caspar, M.D., Parisa Emami, M.D., M.P.H., and Ala Moshiri, M.D., Ph.D.**

December 2024: Parisa Emami, M.D., M.P.H., was the final One to Watch of 2024 from Retina Today. She is an associate professor of ophthalmology and the director of the Uveitis Service at the Tschannen Eye Institute at the University of California, Davis.

December 2024: Barbara Arnold, M.D., a volunteer clinical faculty member of the UC Davis Eye Center, was awarded the Bernice Z Brown, M.D. Honorary Lecture Award. Dr. Arnold was one of the AAO executive committee members that organized and advocated for women ophthalmologists to become recognized participants in AAO programs. She was also the Women in Ophthalmology (WIO) president who created the first WIO Summer Symposium in 1998. This program has now grown into a highly desirable program for scientific presentations, networking and personal development programs. Wellness opportunities (including watercolor instruction) have become part of the summer program.

January 2025: Glenn Yiu, M.D., Ph.D., gave a talk at Hawaiian Eye on one of his gene therapy trials and won the award Speaker of the day! Congratulations!

January 2025: Jack Werner, Ph.D. will be the Leverhulme Trust visiting professor at Oxford University from Feb.1 to Oct. 31, 2025. During the eight weeks of the Trinity term, he will organize a course on retinal imaging. Thanks to the generosity of an Eye Center donor, **Drs. Ravi Jonnal and Robert Zawadzki** will also

join Dr. Werner in Oxford to participate in a workshop on adaptive optics and OCT. This prestigious visiting professorship will pave the way for future collaborations between Oxford and the UC Davis Eye Center.

January 2025: 136 UC Davis Health doctors received the Diamond Doc Award for their patient care. Scoring within the 90th percentile or higher on patient surveys, the award honors physicians who showed careful listening, clear explanations, and respectful partnerships. **Jeffrey Caspar, M.D.** from the Eye Center was awarded this honor.

Dr. Glenn Yiu presenting at the Vail Vitecomy meeting.

February 2025: Glenn Yiu, M.D., Ph.D., returned from the exclusive Vail Vitrectomy meeting, where he presented on lessons learned in subretinal delivery of retinal gene therapies. This invitation-only conference is a think tank that gathers top thought leaders in retinal surgery to showcase innovative surgical concepts, instrumentation, and techniques.

February 2025: Yin Allison Liu, M.D., Ph.D., has been inducted as a Fellow of the North American Neuro-Ophthalmology Society (NANOS). In order to become a Fellow of NANOS, a physician must be board certified in their specialty, have a chief interest and specialty training in Neuro-Ophthalmology, be an active member of NANOS, and demonstrate special achievement in clinical Neuro-Ophthalmology. Dr. Yin Allison Liu's induction as a NANOS Fellow affirms her substantial contribution to Neuro-Ophthalmology and is a great honor.

UC Davis Eye Center faculty and staff celebrating with Christine Xu

March 2025: Christine Xu, M.D. a third-year resident, was a winner in the 2025 American River College Concerto Completition. She performed the Schumann Piano Concerto in A Minor with her husband conducting the American River College Orchestra. Her UC Davis Ophthalmology colleagues were in attendance to cheer her on.

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*Deceased

Gifts of $1,000 or more

Cherlyn Adams
Teanakia Afolabi
Larre and Thomas Allen
American Academy of Neurology
Henry Go, M.D.* and Barbara Arnold, M.D.
Jacque and Wayne Bartholomew
Holly and Douglas Beernink, M.D.
Karen and James Brandt, M.D.
Verne Brandt
Kristin Calcagno
Scott Campbell
Floria and Paul Chung
Karen and Jack Clark
Michael and Mary Ann Delleney, R.N., B.S.N., M.B.A.
Hardev and Bhupinder Dhillon
Jennie Doo
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Saima and Aamir Farooqui, Ph.D.
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Martha Krebs
Yao Liu, M.D.
Marilyn Livingston
Ching Hua Lu
Edward Lyman
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Hideki Mochizuki, M.D.
Ala Moshiri, M.D., Ph.D. and Naseem Arfai, D.D.S.
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Dona and Gary Novack, Ph.D.
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Anna Orlowski and John Grubbs
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David Smart and Suzanne Shenfil
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Jenny and Ernie Takahashi, O.D.
Colleen and Ronald Tamaru, M.D.
Ernest Tark, III, M.D.
Francie Teitelbaum
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Manuela and Charles Watson
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Christine and Bruce Anderson, M.D.
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Constance Battisti
Elizabeth Bianco, R.N.
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Michael Burns
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Emily and Stephen Gross
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Muller Properties
Catherine Okamoto
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Paul Russell, Ph.D.
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Rick Stannard, II
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Darle and Robert Tilly, D.D.S.
Barbara Tschudin
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May-Ling Wang
Lucille Whitten
Roberto Wing, M.D.
Valerie Wing Broadman, O.D.

If we have inadvertently omitted or incorrectly listed your name, please accept our apology and contact us at 916.224.7794 or rhheath@ucdavis.edu.

We will correct our records immediately.

*Deceased


UCDAVIS
HEALTH
Eye Center


YOUR VISION IS OUR MISSION.
We put your vision first,
so you can see life at its best.

A Vision For the Future: Grateful Patient's Gift Supports Eye Health

BY COURTNEY TOMPKINS

Inspired by the excellent care she received at the UC Davis Eye Center, retired health care consultant Bonnie Dale is giving a portion of her estate to improve vision health for adults and children around the world.

The Bonnie Dale Fund for Advancements in Glaucoma in Memory of Elise Dale Fong will support glaucoma research and treatment, with a particular focus on the work of Dr. James Brandt and his team.

"The work they're doing at UC Davis will be a game-changer for people like me, and even more so for future generations," Dale said. "It will save vision and change lives."

Brandt, an ophthalmologist and glaucoma specialist who holds the Daryl and Opal Geweke Endowed Chair in Glaucoma, has been Dale's eye doctor since she was diagnosed with advanced glaucoma nearly 20 years ago.

He said Dale's gift will support research for children and adults living with glaucoma — a chronic eye disease that can lead to vision loss and blindness — and could lead to improved diagnosis and treatment for patients in the future.

"Bonnie's generosity will have a transformative impact on our work," Brandt said. "Her gift will help us develop early-stage data that is often crucial to advancing our research."

Bonnie Dale having vision tested.

"The work they're doing at UC Davis will be a game-changer for people like me, and even more so for future generations. It will save vision and change lives."

Legacy of support and compassion

In 2009, Dale began supporting Brandt's research with modest gifts each year to the Eye Center. But their connection grew even deeper during her daughter's devastating breast cancer diagnosis in 2019.

When Dale's daughter, Elise Dale Fong, passed away the following year, Dale recalls how Brandt and his staff showed compassion to her during the most difficult moments of her life.

"The entire Eye Center staff went above and beyond to support me in ways I never imagined," Dale said, describing the homecooked meals, thoughtful notes and phone calls she received.

It was this extraordinary support combined with her desire to make a meaningful impact that led Dale to establish the fund in her daughter's memory, so her legacy could live on through others.

"I couldn't be more thrilled about the opportunity to support this kind of research," she said. "It's going to make a difference for future generations, and that's something I'm proud to be a part of."

Saving sight on the horizon

UC Davis Health is a world leader in vision science and research. Its longstanding partnership with Orbis International is just one of the ways Brandt uses his expertise to help improve eye health around the world.

"Bonnie's generosity will have a transformative impact on our work. Her gift will help us develop early-stage data that is often crucial to advancing our research."

Each year, Brandt visits developing nations in Africa, Asia and Latin America to perform pediatric eye surgeries and teach local clinicians new treatment techniques. And he does this all aboard the Orbis Flying Eye Hospital — a traveling hospital equipped with classrooms, laboratories and a fully functioning operating room.

He is one of only a few dozen childhood glaucoma specialists in the nation, and recently helped found the North American Pediatric Glaucoma Society.

"My involvement in this work in the developing world has been focused on teaching basic management to these kids because often their glaucoma is missed — if it's detected and treated properly early on, these kids can have normal vision for the rest of their life," said Brandt.

It's this combination of world-class care and cutting-edge research that Dale is happy to support. As a member of the Eye Center Advisory Council, she believes that every medical specialty benefits from philanthropy, particularly in advancing knowledge that will shape the future of health care.

"Research is important because it's not just about helping today — it's about what can be done for the future," she said. "It's our responsibility to support that." •

Orbis Flying Eye Hospital Plane at the airport.

UC Davis Professor James Brandt, M.D. (left) and Yao Liu, M.D. (right) volunteer for Orbis.

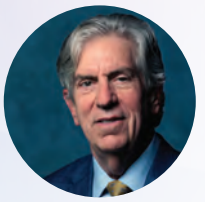
LEADERSHIP

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

James D. Brandt, M.D.
Daryl and Opal Geweke Endowed Chair in Glaucoma
Vice Chair of International Programs & New Technology
Professor, Glaucoma
Director, Glaucoma Service
Director, Glaucoma Fellowship

Paul A. Sieving, M.D., Ph.D.
Neil and MJ Kelly Presidential Chair in Vitreoretinal Science
Distinguished Professor
Research Director
Center for Ocular Regenerative Therapy
Retinal and Macular Dystrophy

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



Gary D. Novack, Ph.D.
Vice Chair of Collaborative Research
Professor

Nandini G. Gandhi, M.D.
Byron Demorest Endowed Chair in Pediatric Ophthalmology
Director, Residency Program
Professor, Pediatric Ophthalmology and Adult Strabismus
Director, Pediatric Ophthalmology and Adult Strabismus

CLINICAL FACULTY

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

Marcela M. Estrada, M.D.
Assistant Professor, Pediatric Ophthalmology and Adult Strabismus

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

Parisa Emami, M.D., M.P.H.
Director, Ocular Inflammation and Uveitis
Associate Professor, Retina
Associate Professor, Ocular Inflammation and Uveitis

Benjamin Jastrzembski, M.D.
Assistant Professor, Pediatric Ophthalmology and Adult Strabismus

Esther S. Kim, M.D.
Professor Emeritus, Comprehensive Ophthalmology and Ophthalmic Pathology

CLINICAL FACULTY, CONTINUED

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

Y. Allison Liu, M.D., Ph.D.
Associate Professor, Ophthalmology, Neuro-Ophthalmology and Neurological Surgery

Mathew Margolis, M.D.
Assistant Professor, Cornea and External Disease

Kareem Moussa, M.D.
Associate Professor, Retina

Susanna S. Park, M.D., Ph.D.
Barbara A. & Alan M. Roth, M.D., Endowed Chair
in Discovery, Education and Patient Care in Vision Science
Director, Retina Fellowship
Professor, Retina

Glenn Yiu, M.D., Ph.D.
Professor,
Retina
Director, Tele Medicine

Lily K. Lin, M.D., F.A.C.S.
Director, Surgical Services
Professor, Ophthalmic Plastic and Orbital Surgery

Jeffrey H. Ma, M.D.
Comprehensive Ophthalmology
Ocular Surface Disease
Assistant Professor, Comprehensive Ophthalmology and Ocular Surface Disease
Director, Medical Student Education
Director, Optometric Services

Ala Moshiri, M.D., Ph.D.
Professor, Retina and Vitreoretinal Surgery

Andrew Nelson, M.D.
Assistant Professor, Comprehensive Ophthalmology and Ophthalmic Pathology

Ivan R. Schwab, M.D.
Professor Emeritus
Cornea, External Disease, and Uveitis

SCHOOL OF MEDICINE LEADERSHIP

Cameron Blount
Chief Administrative Officer

Jennifer Harter
Ambulatory Care
Administration Manager

VETERANS AFFAIRS NORTHERN CALIFORNIA HEALTH CARE SYSTEM

David Chu, M.D.
Interim Chief, Eye Care Services
Veterans Affairs
Comprehensive and
Cataract Surgery
Veterans Affairs,
East Bay Division

Jocelyn Kim-Dunlavey, M.D.
Comprehensive Ophthalmologist
Sacramento Veterans Affairs Medical Center

Parisa Emami, M.D., M.P.H.
Director, Ocular Inflammation
and Uveitis
Associate Professor, Retina,
Ocular Inflammation and Uveitis

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

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

Michael Yen, M.D.
Comprehensive and Cataract Surgery
Veterans Affairs, East Bay Division

Yue (Carrie) Zhao, M.D.
Glaucoma
Veterans Affairs, East Bay Division

OPTOMETRISTS

Brooke S. Chang, O.D.
Optometrist

Lauren Guajardo, O.D.
Optometrist

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

Rachel Sather, O.D.
Optometrist

Hai Tong, O.D.
Optometrist

Tina Zeng, O.D.
Optometrist

Ernest Chang, O.D.
Optometrist

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

Kaaryn Pederson-Vanbuskirk,
O.D., F.A.A.O.
Optometry Department Manager

Larisa Johnson Tong, O.D., F.A.A.O.
Optometrist

Jenny Truong, O.D.
Optometrist

ORTHOPTIST

Tania Usner, B. Med. Sci.
Orthoptist

VISION SCIENTISTS

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

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

Brian Leonard, DVM
Associate Professor
Comparative Ophthalmology

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

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

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

John S. Werner, Ph.D.
Distinguished Professor Emeritus,
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, Ophthalmology and Dermatology,
Institute for Regenerative Cures
Research Interests:
Electrically stimulating cell migration in corneal wound healing and neuron regeneration

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

Ravi S. Jonnal, Ph.D.
Associate Professor
Research Interests:
Retinal imaging, adaptive optics, optical coherence tomography

Nicholas Marsh-Armstrong, Ph.D.
Daryl and Opal Geweke Endowed Chair in Glaucoma Research
Research Interests:
Basic cellular, molecular and developmental biology of retinal ganglion cells relevant to glaucoma

Gary D. Novack, Ph.D.
Vice Chair for Collaborative Research
Pharmacology and Opthalmology
Research Interests:
Development of new therapeutics, patient adherence and performance, regulatory affairs

Paul A. Sieving, M.D., Ph.D.
Neil and MJ Kelly Presidential Chair in Vitreoretinal Science
Distinguished Professor
Research Director
Center for Ocular Regenerative Therapy
Retinal and Macular Dystrophy

Sara Thomasy, D.V.M., Ph.D., D.A.C.V.O.
Professor of Comparative Ophthalmology
Research Interests: Corneal wound healing, glaucoma, ocular pharmacology, antiviral therapy for FHV-1, large animal models of ophthalmic disease

Robert J. Zawadzki, Ph.D.
Professor,
Advanced Retinal Imaging

FELLOWS

Tessmin “Tess” Ahmad, M.D.
Clinical Glaucoma Fellow 2025

Mark McAllister, M.D.
Clinical Retina Fellow 2025

Jennifer P. Tingley, M.D.
Clinical Retina Fellow 2025

Bohan Xing, M.D.
Clinical Cornea Fellow 202

Team photo of the Murphy, Russell, Leonard and Thomasy Comparative Ophthalmology and Vision Science Laboratory.

RESIDENTS

Abraham Hang, M.D.
Fourth Year Resident 2025

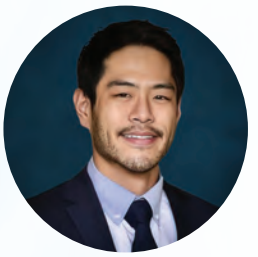
Joo Yeon Jung, M.D.
Fourth Year Resident 2025

Ketaki Panse, M.D.
Fourth Year Resident 2025

Manpreet Tiwana, M.D.
Fourth Year Resident 2025

Pelin Celiker, M.D.
Third Year Resident 2026

John Mark, M.D.
Third Year Resident 2026



Andy Shao, M.D.
Third Year Resident 2026

Christine Xu, M.D.
Third Year Resident 2026

Neda Dastgheyb, M.D.
Second Year Resident 2027

Christopher Kaler, M.D.
Second Year Resident 2027

Michael Nguyen, M.D.
Second Year Resident 2027

Alexander Rusakevich, M.D.
Second Year Resident 2027

Aparna Ajjarapu, M.D..
First Year Resident 2028

Ivan Copado, M.D., M.P.H.
First Year Resident 2028

Rachna Goli, M.D.
First Year Resident 2028

Ixaviion Wright, M.D.
First Year Resident 2028

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

Harinder Chahal, M.D.
Assistant Clinical Professor

David Chu, M.D.
Assistant Clinical Professor

Charles Cooper, M.D.
Clinical Professor

Joseph Giovannini, M.D.
Clinical Instructor

Tyrone Glover, M.D.
Clinical Professor

J. Christopher 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

Michael Merkley, M.D.
Clinical Instructor

Robert Miller, M.D.
Clinical Professor

Gary Novack, Ph.D.
Clinical Professor

Sang Oh, M.D.
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

David Telander, M.D., Ph.D.
Clinical Instructor

Tiffany Wong, M.D.
Assistant Clinical Professor

Michael Yen, M.D.
Assistant Clinical Professor

*Deceased

FACULTY RETIREMENTS

It is with mixed emotions that we announce the retirement of two of our long-standing faculty members from the UC Davis Eye Center.

Paul FitzGerald, Ph.D.

Paul FitzGerald, Ph.D., a native of San Francisco, completed his bachelor's degree in Physiology and Anatomy at the University of California, Berkeley in 1974. He then completed his Ph.D. in the Department of Cell Biology and Anatomy at the University of California, Los Angeles in 1982. Afterward, he completed his postdoctoral training at Harvard Medical School in the Department of Neurobiology from 1982 to 1984.

He was then appointed as a faculty member at UC Davis on September 1, 1984, in the Department of Cell Biology and Human Anatomy. In 2011, he became a Professor in the Department of Ophthalmology & Vision Science. After serving as Vice Chair in the Department of Cell Biology and Human Anatomy from 2004 to 2007, he then served as Acting Chair from 2007 to 2010. He became the official Chair from 2010 until his retirement on July 1, 2024.

During his career, he published over 81 peer-reviewed articles. He presented over 46 academic lectures, both domestic and international. Paul was awarded 9 research awards and 16 teaching awards. He also receieved the first UC Davis Eye Center Legacy Award for his dedication and 40 years of service to UC Davis.

Paul will be remembered for his research and collaboration. We wish him all the best in retirement.

Paul Sieving, M.D., Ph.D. (left) and Mark Mannis, M.D., F.A.C.S. (right), presenting Paul FitzGerald (center) with the UC Davis Eye Center Legacy Award for his dedication and 40 years of service to UC Davis.

FACULTY RETIREMENTS

Esther Kim, M.D

Esther Kim, M.D., went to Occidental College in Los Angeles, California, studying chemistry from 1982 to 1986. She then went on to complete her Doctor of Medicine degree at the University of California, Davis from 1986 to 1990.

She completed an internship in Internal Medicine at the University of California, Los Angeles at the Sepulveda Veteran's Hospital from 1990 to 1991. Dr. Kim came back to UC Davis to complete her residency from 1991 to 1994. After completing her residency, she became a Chief Resident in during her Post-Graduate training. From 2014 to 2015, she decided to complete a fellowship in Ocular Pathology at the University of California, San Francisco. After completing her fellowship, she began her appointment as a faculty member at the UC Davis Eye Center in September 1995. Dr. Kim published over 37 peer-reviewed articles, presented over 20 academic lectures, both domestic and international, and was awarded 7 teaching awards during her tenure at UC Davis. Dr. Kim trained over 39 residents throughout her career. We wish her all the best in retirement.

Mark Mannis, M.D., F.A.C.S., presenting Esther Kim, M.D. with flowers.

FACULTY UPDATES

Mathew Margolis, M.D.

Mathew Margolis, M.D., joined the UC Daivs Eye Center as an Assistant Professor in Cornea and External Disease. Dr. Margolis is a California native who completed his undergraduate training in Biochemistry at UCLA while working as a research associate and clinical trial coordinator at The Jules Stein Eye Institute. He received his medical degree from The Washington University School of Medicine in St. Louis and subsequently completed his ophthalmology residency at the Illinois Eye and Ear Infirmary, part of the University of Illinois in Chicago. He then returned to California to complete a fellowship in Cornea, External Diseases, and Refractive Surgery at Stanford University. During this time, he concurrently acted as a Heed Ophthalmic Foundation Fellow for his past and current Ophthalmic research efforts, which have varied from bench and translational research, to work on NEI sponsored nation-wide clinical trials. In his free time, you will find him outdoors enjoying the California sun with his wife and two labrador retrievers, hiking, biking, or cultivating edible plants, and enjoying the winter snow on the slopes in Tahoe. Dr. Margolis is accepting referrals in cornea, external disease, and refractive surgery.

Andrew Nelson, M.D.

Andrew Nelson, M.D., joined the UC Davis Eye Center as an Assistant Professor in Comprehensive Ophthalmology and Ophthalmic Pathology. Dr. Nelson is a passionate comprehensive ophthalmologist with clinical interests in cataract surgery and ophthalmic pathology. He completed his undergraduate degree in biochemistry at the University of Southern California, where he assisted research in bioengineered pharmaceuticals at the USC School of Pharmacy. He developed his interest in ophthalmology while pursuing his medical degree at the Keck School of Medicine at USC, studying advanced ocular imaging for glaucoma. After completing his preliminary year of residency in Internal Medicine at Olive View at the UCLA Medical Center, he joined the ophthalmology residency program at UC Davis Health. During residency, he focused his research on the epidemiology of traumatic eye injuries. Dr. Nelson will be pursuing a fellowship in Ophthalmic Pathology at Stanford University during his first year as a faculty member at UC Davis. In his free time, you may find him backpacking or fly fishing in the mountains of Northern California. Dr. Nelson is accepting referrals in comprehensive ophthalmology.

Parisa Emami, M.D., M.P.H.

Parisa Emami, M.D., M.P.H., was promoted to Associate Professor on July 1, 2024. Dr. Emami is a vitreoretinal surgeon and uveitis specialist at UC Davis Eye Center. She specializes in both medical and surgical management of various retinal diseases, including macular degeneration, diabetic retinopathy, retinal vascular disease, retinal degeneration, macular hole, epiretinal membrane and uveitis. Dr. Emami's research interests include retinal imaging, pathogenesis and management of ocular inflammation/uveitis. She went to medical school and completed her M.P.H. at the Tehran University of Medical Sciences, in Tehran, Iran in 2009. She completed an internship at Metro West Medical Center at Harvard Medical School from 2012 to 2013. Dr. Emami completed her residency in ophthalmology at Kresge Eye Institute in Detroit, Michigan from 2013 to 2016. After completing her Residency, she went to the University of California, Davis to complete a retina fellowship in Vitreoretinal Surgery from 2016 to 2018. She then completed a second fellowship in Uveitis at the Cole Eye Institute at the Cleveland Clinic Foundation. Dr. Emami was hired at the Northern California Mather Veteran's Affairs Medical Center in 2019. In 2020, she joined the faculty as an Assistant Professor at the University of California, Davis.

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.

To learn more about how to give to the UC Davis Eye Center, contact Sheena Summers at 916-878-9924 or email smlennie@ucdavis.edu today!

Donate today at https://health.ucdavis.edu/eyecenter/giving/index.html

In Memoriam

This year, UC Davis Eye Center lost two dear friends whose vision, dedication, and generosity will always be remembered.

RONALD E. FOLTZ, M.D.

OCTOBER 30, 1942 – JUNE 17, 2024

> "Ronald was an amazing supporter of the UC Davis Health Department of Ophthalmology, as well as a patron of the Sacramento Symphony, among many other medical, charitable, and political organizations."

Ronald E. Foltz, M.D., born October 30, 1942 in Sterling, Illinois, passed away at the age of 81 in Shingle Springs, California. In 1964 Ron graduated from Wheaton College, and went on to earn his medical degree from the University of Illinois, College of Medicine, Chicago in 1968.

Drafted by the United States Navy, he served his country in Bethesda, Maryland and then in Da Nang, Vietnam from 1969 to 1971. While overseas, he exchanged correspondence with a young kindergarten teacher, Marcia Richert. Upon his return they were married on July 3, 1971. They settled on Placerville, California to establish his private practice.

Dr. Foltz served his community as an ophthalmologist for over 40 years. He was an amazing supporter of the UC Davis Health Department of Ophthalmology, as well as a patron of the Sacramento Symphony, among many other medical, charitable, and political organizations. A few of his favorite pastimes were tennis, traveling, and gardening.

He was preceded in death by his wife of 50 years, Marcia (Richert) Foltz, who passed away in 2021. His older sister, Janet Bruce, also preceded him in death. He is survived by his two younger sisters, Carol Thorne and Diane McCallister, and by his four children and four grandchildren.

JAMES BRADFORD RUBEN, M.D.

DECEMBER 21, 1958 – AUGUST 27, 2024

James Bradford Ruben, M.D., a pediatric ophthalmologist who spent 28 years treating children at the Permanente Medical Group, died on August 27 after a long journey with thyroid cancer. He was 65 years old.

Ruben joined Permanente in 1990 and was one of the Sacramento area's first fellowship-trained pediatric ophthalmologists and specialists in the treatment of adults with strabismus—a crossed or misaligned eye. He served as a clinical professor at the University of California at Davis.

Ruben co-authored dozens of peer-reviewed publications and book chapters and served as an investigator for studies related to the treatment of amblyopia. He also co-authored the first US publication on laser surgery for the treatment of eye disease linked to premature birth and was a pioneer in intraocular lens placement for cataract surgery in children.

He served as president of the California Academy of Eye Physicians & Surgeons and as chairman of the pediatric-ophthalmology section of the American Academy of Pediatrics. Ruben is also a former board member of the Permanente Medical Group, the largest physician-run medical group in the United States, and served as a director of the Sacramento Sierra Medical Society.

Ruben was born on Dec. 21, 1958, in Queens, New York. He attended Rye High School in Rye, New York, and received his bachelor's degree in molecular biology from the University of Colorado, where he was elected to Phi Beta Kappa. He graduated from the Washington University School of Medicine in St. Louis. He undertook his internship training in internal medicine at the University of California at Davis, along with his residency in ophthalmology. He received his fellowship training at the University of Iowa.

Ruben was an avid alpine skier, squash player and enjoyed woodworking and gardening. He is survived by his wife, Judi Weinstein-Ruben, a nurse; his sister, Pam Golum; three children, Eric Ruben, Elisa Ruben and Michelle Van Grouw; two grandchildren, Sophia and Lucas Ruben, and his father, Robert J. Ruben.

In lieu of flowers, the family requests donations to the UC Davis Eye Center's Pediatric Ophthalmology Service and Shriners Hospitals for Children.

"The purpose of life is not to be happy. It is to be useful, to be honorable, to be compassionate, to have it make some difference that you have lived and lived well."

- RALPH WALDO EMERSON

Create Your Legacy at the UC Davis Eye Center

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To include UC Davis in your plans, please use our legal name and federal tax ID and please let us know of your gift. Many retirement providers assume no responsibility for letting nonprofits know of your intentions, so your goals may not be honored.

Legal name: UC Davis Foundation
Legal address: 202 Cousteau Place, Ste 185, Davis, CA 95618
UC Davis Foundation Federal tax ID number: 94-6081352

To learn more about this tax-smart way to make an impact at the UC Davis Eye Center, please visit **PlannedGiving.UCDavis.edu/Give-From-Your-Ira**

We can help. We'd be happy to assist you. Please contact Brian Casey at plannedgiving@ucdavis.edu or 530-754-2286.

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DIRECTORY

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CONTRIBUTORS
JOSH BAXT
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BONNIE DALE
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PHOTOGRAPHY
BHUPINDER DHILLON
ROB WARREN
UC DAVIS HEALTH PUBLIC AFFAIRS

GRAPHIC DESIGN
SYMBOLOGY CREATIVE

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UC Davis Eye Center
Ernest E. Tschannen Eye Institute
4860 Y Street, Suite 1E
Sacramento, CA 95817

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

For more information, please contact: Rebecca Subbotin | RHHeath@ucdavis.edu | 916-703-4662

https://health.ucdavis.edu/eyecenter/cme/index.html