



# VISIONS

Koret Vision Institute + Beckman Vision Center + Department of Ophthalmology + Francis I. Proctor Foundation    **Fall 2013 + Annual Report**    University of California, San Francisco + That Man May See

## Focal Point



Dear Friends,

This fall issue of Visions includes our Annual Report for That Man May See. Your continuing generosity strengthens our mission: preserving and restoring sight for present and future generations through the integration of compassionate care, innovative research, and inspired teaching. Examples of how we live this mission are showcased in these pages.

This summer we welcomed a new class of residents and fellows. They stand among the most accomplished nationally, and we share some of their stories with you in this issue. We feature faculty collaborations across the spectrum of UCSF’s medical disciplines: improved delivery of drugs for macular degeneration, treatments for vision loss caused by diabetes, and innovative ways to help glaucoma patients. At the forefront of eye and brain research, two UCSF scientists are investigating links between diseases of dementia and the retina. In these and so many other areas, breakthroughs toward new therapies are made possible by your support.

We especially thank the de Benedetti family for decades of leadership in helping us combat the most challenging corneal disorders. As we embark on new ventures to reduce the burden of blindness for all, we thank you for the confidence and support expressed in your investments.

Sincerely,

Stephen D. McLeod, MD  
Theresa M. and Wayne M. Caygill, MD, Endowed Chair Professor and Chairman



## UCSF Duo Drives Innovation Transforming AMD Treatment

How do we help patients with chronic retinal disease live the best lives possible? With this question in mind, retinal specialist **Robert Bhisitkul, MD, PhD**, provides patient care to those coping with age-related macular degeneration (AMD) and researches novel therapies. Bioengineer **Tejal Desai, PhD**, develops implantable micro- and nanoscale devices to meet urgent medical needs. These scientists have united to deliver better quality of life for patients with AMD and other eye diseases.

“For many patients, treatment of chronic retinal disease never ends,” says Dr. Bhisitkul. “They need more efficient, less burdensome solutions that won’t drive up health care costs.”

**Revolutionary Delivery**  
These senior researchers are developing a radical way to provide drug therapy inside the eye. Their combined expertise has coalesced in prototypes for long-lasting, more effective drug delivery.

Continued on page 2



Dr. Jay Stewart

## Diabetes Epidemic Leading Cause of Blindness

In the United States, diabetes has spiraled into an epidemic over the past three decades. Now the disease has become our nation’s leading cause of blindness among working-age adults.

UCSF clinician scientists see the evidence every week as they work to help patients with diabetic retinopathy. Retinal Director **Daniel Schwartz,**

**MD**, leads a renowned team that includes **Robert Bhisitkul, MD, PhD**; **Eugene de Juan Jr., MD**; **Jacque Duncan, MD**; and **Jay Stewart, MD**.

More than half of those who have diabetes mellitus for 10 years or more develop diabetic retinopathy. People with diabetes Type I and Type II are at risk.

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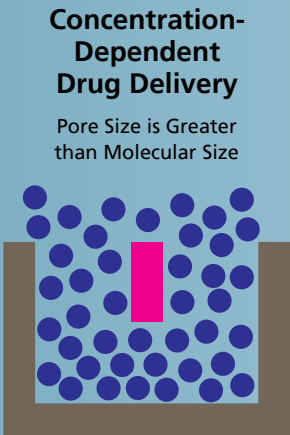
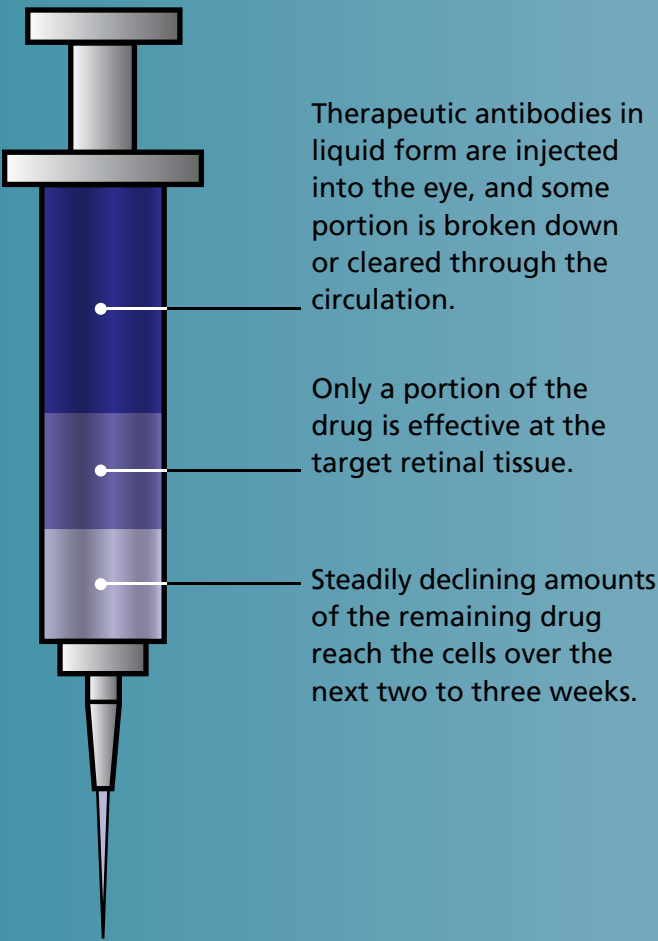


12 New Ophthalmology Residents



# TREATING MACULAR DEGENERATION

## CURRENT TREATMENT MODEL



- WHY PROGRESS IS NEEDED
- On average, patients receive 7.7 injections per year.
  - Frequent injections increase risks of infection, retinal detachment, and cataracts.
  - Bio-availability is limited by drug degradation and dispersion to nontarget cells.
  - Drug is concentrated to compensate for dispersion, increasing toxicity.
  - Peaks and troughs in dosage lead to poorer outcomes.

## Transforming AMD Treatment

Continued from page 1

“Patients need more efficient, less burdensome solutions that won’t drive up health care costs.”  
– Dr. Robert Bhisitkul

Although millions of retinal patients benefit from recently approved drugs (such as Lucentis, Avastin, and Eylea) that slow retinal disease, these potent drugs must be injected into the eye, often monthly. Chemically unstable, the drugs quickly decline in effectiveness. These frequent eye injections, which can be required for years, are difficult and uncomfortable for patients and carry some risks of serious eye infection.

Now imagine an injection that provides up to a year’s worth of therapy. The dream moves closer to reality as the research duo, supported by **Daniel Bernards, PhD; Thais Mendes, MD;** and several postdoctoral scientists, refines the device and advances toward clinical trials.

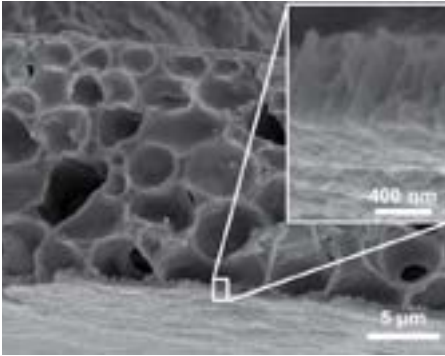
**The Device that Nano Built**  
Nanoscale devices can interact with biomolecules, cells, and drugs at the molecular scale, opening the way for more precise, less invasive treatment.

Dr. Desai’s lab team builds on silicon chip methods to develop biomedical technologies for a wide array of patient needs.

In collaboration with Dr. Bhisitkul, the bioengineers have created an ocular drug delivery device so small that it fits inside a hypodermic needle. The nanopores in its surface enable unprecedented control and longevity of drug delivery to specific cells inside the eye.

To create the nanoporous thin film, the team first fabricates a metal mold with millions of tiny spikes, each about the size of a single drug molecule. To this mold they apply a heated liquid polymer. After the polymer solidifies, they dissolve the metal mold with a chemical process that preserves the porous nanomembrane. The drug pellet is encapsulated between two thin-film membranes, protecting it from breakdown and maintaining its activity.

**Transforming Ocular Medicine**  
Motivated to improve quality of life for millions of patients, Drs. Bhisitkul and Desai see the potential of their new device to transform treatment for many eye disorders. The team is also



The structure of the nanoporous thin film membrane is made visible by an electron microscope.

### Age-Related Macular Degeneration A Real-Life Story

An 80-year-old man with mobility issues and AMD is trying to save his remaining sight. His daughter takes a day from work to drive him to his retinal specialist, three hours away. After battling traffic and parking, the two make their way to the clinic for his exam and intraocular injection. The pain is manageable and short in duration, but the man is exhausted by the day’s efforts. He repeats this regimen every month.

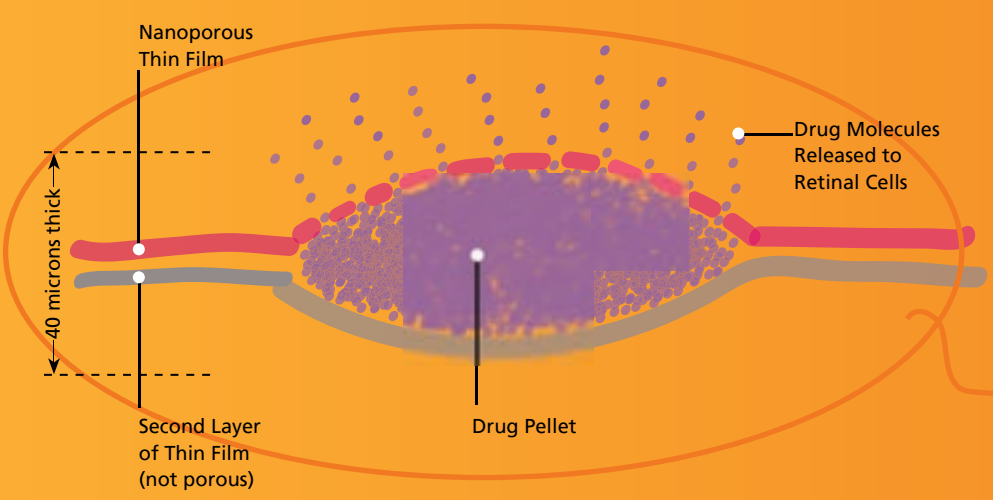
If his retinal specialist could insert a nanodevice that delivers therapeutic antibodies to the retina for six months or a year, the difficulties surrounding treatment would shrink. Quality of life would go up.

testing their device to hold medicines for elevated intraocular pressure and inflammation of the eye. In a few years, patients with conditions ranging from uveitis to glaucoma may benefit from new adaptations of this groundbreaking work.

Seed funding for initial investigation was provided by That Man May See. Continuing research support comes from the National Institutes of Health; University of California, Office of the President; Research to Prevent Blindness; the Lisa and John Pritzker Family Fund; Nancy and Tim Müller; and the Coulter Foundation. ●

Health care costs for America’s seniors are shared by the nation through Medicare and other programs. Rates of AMD are skyrocketing as the US population ages and lives longer. The drug delivery device designed by Drs. Bhisitkul and Desai will reduce the number of treatments each patient requires as well as toxic exposure and pharmaceutical waste.

NOVEL NANOSCALE TREATMENT MODEL

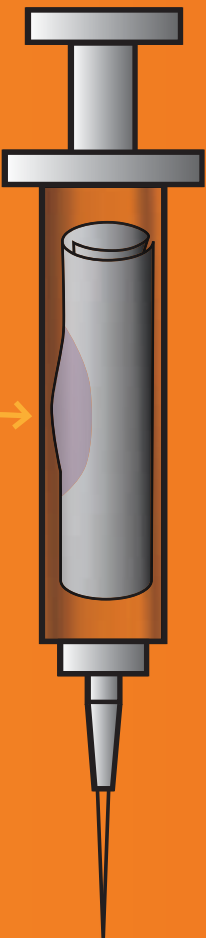


The thin film’s nanopores hinder uncontrolled drug release.

Its structure is designed to deliver medicine at a precise, steady rate month after month.

Almost 100% of the drug payload reaches targeted cells.

The flexible polymer rolls up like a scroll to fit inside a syringe.



HOW PATIENTS WILL BENEFIT

- Patients need only one or two injections per year, reducing risk, pain, and appointment time.
- Precise, ongoing dosage improves patient outcomes.
- Greater convenience boosts patient compliance.
- Efficient use of pharmaceuticals reduces costs.
- Device biodegrades over time.

“Single File”  
Constrained  
Delivery

Pore Size Matches  
Molecule Size



UCSF Partners on a New Path

Dr. Robert Bhisitkul

With nearly two decades of experience caring for those with retinal diseases, **Robert Bhisitkul, MD, PhD**, has deep compassion for patients. He currently leads clinical trials for retinal vein occlusion, a novel surgical radiation probe for AMD patients. He previously led clinical trials that introduced wet AMD patients to Avastin and Lucentis. A professor in the Department of Ophthalmology, Dr. Bhisitkul holds a doctorate from the Yale University Graduate Program in Neurosciences and a medical degree from Stanford University.

Dr. Tejal Desai

A bioengineer by training, **Tejal Desai, PhD**, investigates cellular integration and tissue engineering, biomimetic architectures for functional biomaterials, and therapeutic drug targeting and delivery. A professor in the Department of Bioengineering and Therapeutic Sciences, she also chairs the UC Joint Graduate Group in San Francisco and Berkeley Bioengineering, directs the UCSF Masters in Translational Medicine Program, and serves on the executive committees of the UC Graduate Program in Medical Education and the Institute for Quantitative Biomedical Sciences, or QB3, a collaboration among UCSF, UC Berkeley, and UC Santa Cruz.



Diabetes – Leading Cause of Blindness

Continued from page 1

As in glaucoma and macular degeneration, damage inside the eye takes place before it is noticeable. Annual screening is the best way to identify the disease early and prevent vision loss.

Why the Eye?

The eye’s delicate blood vessels are especially vulnerable to high blood pressure, high cholesterol, and poor circulation. Excess blood sugar weakens vessel walls, causing leaks. Poor circulation leads to blocked vessels, triggering faulty blood vessels to grow in the retina and vitreous humour – the clear, gel-like mass that fills the eye. Untreated, these conditions lead to loss of sight.

The good news, according to Dr. Stewart, is that patients have some control. “Health improvements due to changes in diet, exercise, and (not) smoking are as effective for retinopathy as for diabetes generally,” he says.

Crisis Management

When retired UCSF neurosurgery nurse Mary Kane was diagnosed with diabetes

two years ago, she never imagined how quickly or severely it could harm her sight. “I appreciated Dr. Stewart from my first appointment,” she says. “He told me, ‘We’ll start treating you today.’ Through several adjustments to my therapy, he really earned my trust, explaining each choice I had to make.”

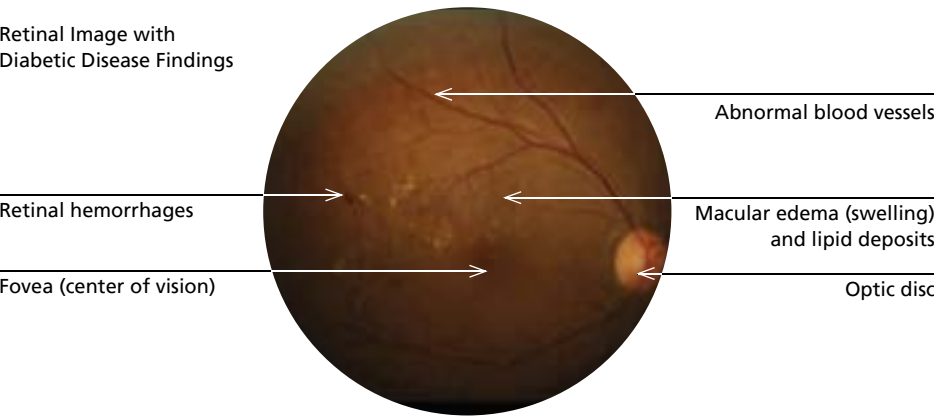
Patients who consult an ophthalmologist when vision blurs or they see spots are often in crisis on day one. If blood has caused swelling near the retina’s sweet spot of concentrated rods and cones (the macula), the world gets very blurry. This is called macular edema.

Specialists can lower the risk of severe vision loss from this dangerous swelling by 50 to 60 percent with laser treatment. The surgeon cauterizes unhealthy areas of the retina to reduce abnormal blood vessel growth. This can keep dangerously weak blood vessels from forming, and it minimizes retinal scarring. Unfortunately, it does little to reverse vision damage.

Restoring Visual Acuity

Recently developed “biological” drugs can restore some sight by reducing the swelling that distorts the macula.

Retinal Image with Diabetic Disease Findings



Specialists often inject these drugs into the eye before laser cauterization, hoping to “lock in” a better quality of sight. Success can require multiple treatments over weeks, months, or even longer. The UCSF retinal team wants to shorten the time that patients are unable to drive, read, or work without major accommodation.

Dr. Stewart conducts clinical research on macular edema, using state-of-the-art optical coherence tomography to monitor and compare changes in each patient’s retina and vitreous. His analysis of how various treatments affect ocular biology, symptoms, and vision helps shape best treatment practices.

By approaching difficult cases creatively, Dr. Stewart has brought some dangerous

eye conditions under control. Cases are often referred to UCSF because they resist treatment, making hard-hitting approaches necessary.

Surgery Staves Off Blindness

Without laser intervention, weak new blood vessels eventually proliferate. Sometimes laser treatment fails to stop their growth. Faulty vessels can cause retinal hemorrhages or detachment, opacity, or glaucoma.

A vitrectomy can restore transparency to the eye. Surgeons remove leaked blood and lipids and replace the natural vitreous with saline solution. UCSF’s **Alexander Irvine, MD**, recently retired, helped pioneer this surgery in the 1960s. More recently, Dr. de Juan Jr. developed a technique, now used around the world, that makes the procedure safer and faster.

Screening Saves Sight

Early damage from diabetic retinopathy is reversible, and early treatment is less invasive. Yet few diabetes patients follow through with annual eye screenings. They may be preoccupied with their primary diabetes care and other commitments. Their primary

IN THE UNITED STATES

Who Has Diabetes?

25.8 million residents  
(8% of population)

26% of residents 65 and older

(US Centers for Disease Control and Prevention, 2011)

Who Has Diabetic Retinopathy?

1.9 million new diagnoses in 2010

Nearly 33% of those with diabetes

Recent Gifts to That Man May See

Thank you for your generous contributions and pledges for vision research, teaching, patient care, and community outreach received between July 1, 2013, and November 12, 2013.

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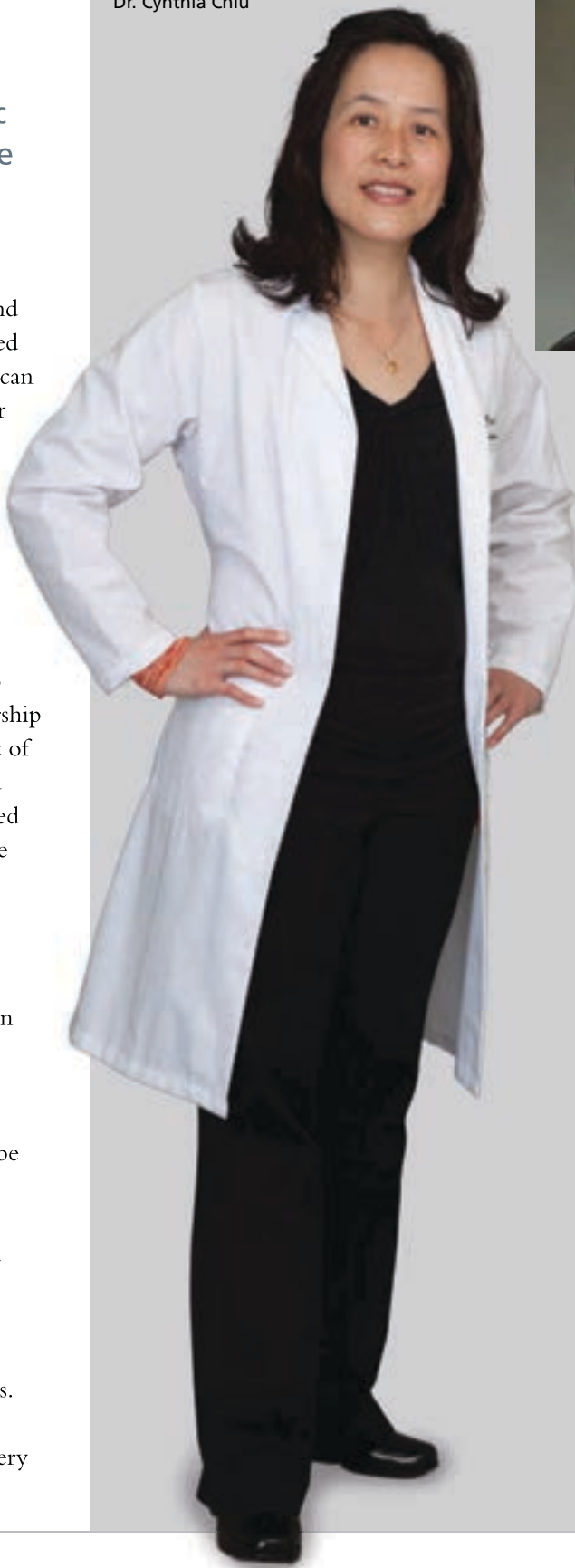
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Dr. Cynthia Chiu



## Early detection and treatment for diabetic retinopathy can reduce associated vision loss by 90 percent.

care doctors may not track or remind them. Patients who undergo repeated screenings without disease findings can think – falsely – that they will never develop retinopathy.

Health care specialists are implementing new strategies to increase early detection. UCSF’s electronic health records system now sends automated screening reminders to UCSF physicians who care for diabetes patients. In partnership with the San Francisco Department of Public Health, UCSF is launching a city-wide screening program targeted to low-income diabetes patients (see sidebar).

### International Tidal Wave

In developing nations, changes in traditional lifestyles and the adoption of processed foods are fueling new diabetes epidemics. With enormous populations at risk, blindness from diabetic retinopathy is expected to be catastrophic.

In the United States, a sophisticated health care delivery system, greater access to ophthalmologists, and public health initiatives will help stem a terrible tide of new blindness. Widespread, early, and repeated screening for diabetes patients at every income level is key. ●

Ophthalmic technician Jim Larson uses a fundus camera to image a patient’s retina at San Francisco General Hospital.

## Outreach Screening in San Francisco

**Cynthia Chiu, MD,** leads a new diabetic retinopathy screening program for low-income patients in San Francisco. Based at San Francisco General Hospital and Trauma Center, the Proposition 1D public health initiative will reduce vision loss caused by diabetes.

Dr. Chiu hopes to reach 5,000 diabetes patients annually. “From our initial work with 100 adults, we’ve identified 10 with severe retinopathy and referred them for treatment. We have also identified numerous patients at risk for other retinal diseases,” she says. “Although some are elderly, many are raising families and working. It’s vital that we provide this safety net.”

Some diabetes patients face extra obstacles in getting to the doctor – language barriers, lack of transportation, child care, insurance, and inflexible work hours. At San Francisco General Hospital and Trauma Center, inability to pay and legal status are not barriers to care.

### Telemedicine Makes It Easy

Annual screenings are a must, because early detection and treatment can reduce vision loss by 90 percent. Patients are tested at San Francisco General Hospital and the 12 community clinics run by the San Francisco Department of Public Health.

Photos of patient retinas are uploaded to the Web. UCSF ophthalmologists “read” the retinal images at San Francisco General Hospital’s new Diabetic Retinopathy Reading Center. They look for signs of retinal hemorrhages, cholesterol deposits, swelling, and other retinal disorders. Patients identified with severe retinal disease are referred to San Francisco General Hospital’s ophthalmology clinic.

This major initiative, backed by ophthalmology services at the county hospital, will help thousands of diabetes patients keep their sight as well as their independence.

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# Two Families Bring Hope for Others



The de Benedetti family at home: Nina and John with daughters Grace (left) and Natalie

“I know firsthand how breakthrough research and expert care can change people’s lives.”

– John de Benedetti

The de Benedetti family wants to ensure that future generations enjoy lifetimes of healthy vision. The de Benedetti Family Fund for Vision Research at UCSF provides hope by funding leading-edge research now.

When John de Benedetti and his wife Nina Srejovic first became involved with That Man May See, daughter Natalie was just three and Grace was about to be born. Their commitment to vision research stems from John’s own childhood experience. When he was 11, Stevens-Johnson Syndrome took away his sight. The challenging syndrome attacks skin and mucous membranes, including those in the front of the eye. Scar tissue left John able to distinguish only light and dark. He has been a patient at UCSF ever since and has served on That Man May See’s board for the past 17 years.

### Novel Corneal Treatments

“The experts in the Department of Ophthalmology have improved my limited sight through various therapies, successfully restoring some very useful vision for me,” explains John. “I know firsthand how breakthrough research and expert care can change people’s lives. The UCSF team inspires us to generate awareness and support for their innovative work.” UCSF corneal specialist **David Hwang, MD, FACS**, cites meaningful gains in John’s vision and his ability to function independently following advanced surgical procedures.

“We deeply appreciate the de Benedetti family’s continuing support for research that may one day solve the mystery of John’s underlying condition,” says Dr. Hwang. “We are working to develop treatments that more fully and permanently restore sight for conditions like his.”

### Family Legacy of Caring

Grace is a student at Katherine Delmar Burke School, and volunteers as a teacher’s aide at Lafayette Elementary School. Natalie goes to University High School. Natalie spent her school practicum volunteering in UCSF’s Visual Center for the Child, a new facility for which John helped raise funds. Natalie worked alongside pediatric ophthalmologists as they cared for babies and children. The de Benedetti family also helped to build a state-of-the-art vision clinic for vulnerable babies and children at San Francisco General Hospital and Trauma Center.

“I have always been determined to stay positive and give back to others,” says John, who holds a degree in human biology from Stanford University and a master’s degree in business from Northwestern University. John is president and chief executive officer of the California Center for Sleep Disorders.

“It is a real joy to support impressive doctors who share my passion for saving vision and lives,” says John. ●

## The Dohertys

“My doctors are all so different, but they share one goal – to help me!” says Emma Doherty. Spunky, smart, and determined, Emma knows the Francis I. Proctor Foundation and the Department of Ophthalmology better than most. In treatment since the age of one, she grew up in the care of more than 35 UCSF faculty clinicians, residents, and fellows.

Emma’s condition, known as neurotrophic keratopathy, is characterized by a lack of nerve sensitivity in the eye. One of her corneas (the transparent layer covering the front of the eye) has become bumpy and hazy with frequent episodes of ulceration, leading to redness, tearing, infections, and dramatically blurred sight. Clinical interventions over the years have saved Emma from potential blindness.

“I feel grateful for so many reasons,” says Emma. “It’s important to accept every opportunity like this one – because you’ll find out that these doctors can help you so much.”

“The PROSE device provides a smooth surface to help Emma see better,” explains Dr. Lee. “Sometimes we have four to six devices manufactured for one patient, getting just the right fit. It’s pretty high tech.”

### Removing Barriers to Treatment

Dr. Lee describes a certain “wow” factor in treating patients who desperately need this highly specialized care. PROSE has effectively improved sight and eased the pain and discomfort of patients with a wide range of complex corneal conditions. Yet more than half of UCSF patients referred for PROSE lack the financial resources for the treatment.

“My doctors are all so different, but they share one goal – to help me!”

– Emma Doherty



Emma Doherty (right) with Dr. Nancy Lee, head of the PROSE Clinic

### New Solution for Emma

Nancy Lee, OD, works with corneal patients at the UCSF PROSE Clinic, located inside the Proctor Medical Clinic. She recently fitted Emma, now 15, for a PROSE (Prosthetic Replacement of the Ocular Surface Ecosystem) device. This highly customized, transparent cup fits over the front of the eye and holds a reservoir of fluid against the cornea. The innovative technology moisturizes and protects Emma’s eye, lowering risks of further corneal damage and scarring.

Emma’s parents, Leslie and Sean Doherty, are deeply moved by how PROSE treatment improves the lives of patients. The Dohertys and their extended family are expressing their concern for others by establishing a fund to ensure that those in need of PROSE lenses will not be turned away. Matching funds are being sought to help the neediest corneal patients benefit from PROSE treatment. ●

To learn more about ways to support corneal research at UCSF, contact That Man May See at 415.476.4016 or rydark@vision.ucsf.edu



## Dear Friends of That Man May See,

As a stakeholder in our cause of saving and restoring sight, you are receiving this annual report to see firsthand the impact of our work.

First and foremost, we are grateful for your financial support of our cause. Through That Man May See, you fund the dedicated vision science faculty of the University of California, San Francisco. You help us pursue leading-edge eye research aimed at medical breakthroughs and cures that enhance quality of life for all, including improved eye care in third-world countries around the globe.

Our innovative and collaborative clinician researchers and basic scientists are passionate about finding new solutions for the most challenging eye conditions. Examples of these collaborations are featured in this issue of *Visions* magazine. In a very real way, you provide leveraging power that leads to better outcomes for patients.

Thank you for investing in patient care, research, and training of the next generation of leaders in ophthalmology. That Man May See appreciates you, and we can't thank you enough.

Sincerely,

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Tatiana Goldstein  
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Tamara Gunawardana  
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Gayle Schwartz  
Carol W. Schwarz  
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Star Zagofsky  
Tara Zagofsky  
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\*Deceased  
◇ Annuity for future gift

**Endowed Education Funds**  
*Education funds provide permanent funding for academic lectures.*  
George and Rosalie Hearst Fellowship in Ophthalmology\*  
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**General Endowed Funds**  
*These endowments are applied wherever the need is greatest.*  
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\* UC Regents endowments.  
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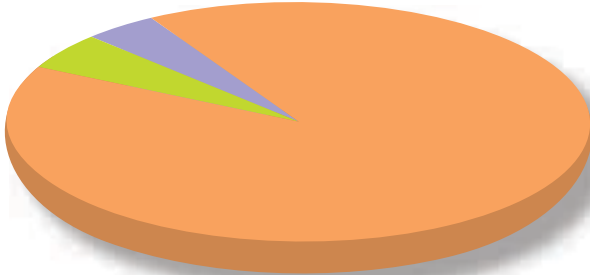
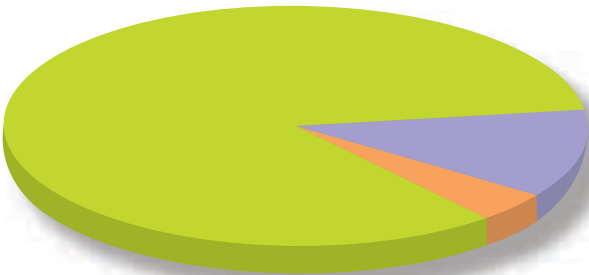
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*†Deceased during 2012–2013*

## Fundraising Review: That Man May See Generated Funds



Sources of Funds	Direct to TMMS	Via Other UCSF Entities*	Total	%	Application of Funds	Actual	%
Donations and new pledges from Individuals, including bequests and trusts	\$2,365,834	\$52,943	\$2,418,777	84%	Research, Education, Patient Care and Community Services***	\$6,125,765	91%
Donations and new pledges from Corporations and Foundations	\$262,311	\$99,000	\$361,311	12%	Fundraising	\$357,092	5%
Earnings on Deposited Funds**	\$114,162		\$114,162	4%	Management and Administration	\$256,517	4%
Total Revenue	\$2,742,307	\$151,943	\$2,894,250	100%	Total Expenses	\$6,739,374	100%

\*Board of Regents and UCSF Foundation  
\*\* Includes fee reimbursements from UCSF  
\*\*\* Includes funds raised in prior years



Dr. Ying Han

# Protecting a Neural Network

The last movie that glaucoma specialist **Ying Han, MD, PhD**, attended was *Avatar* in 2009. Like that film’s Dr. Grace Augustine, Dr. Han chooses to protect a precious biological neural network, though not on the exoplanetary moon of Pandora.

Protecting Precious Sight

Back on Earth, most of Dr. Han’s patients are 55 or older and face irreversible vision loss. “I love my work,” says Dr. Han. “The satisfaction I feel when I can save patients’ sight is hard to express.”

To help future patients avoid vision loss, she is assessing a new visual field test that can be taken wherever there is an Internet connection. Results for the online test, conducted by patients themselves, are nearly as accurate as conventional screenings

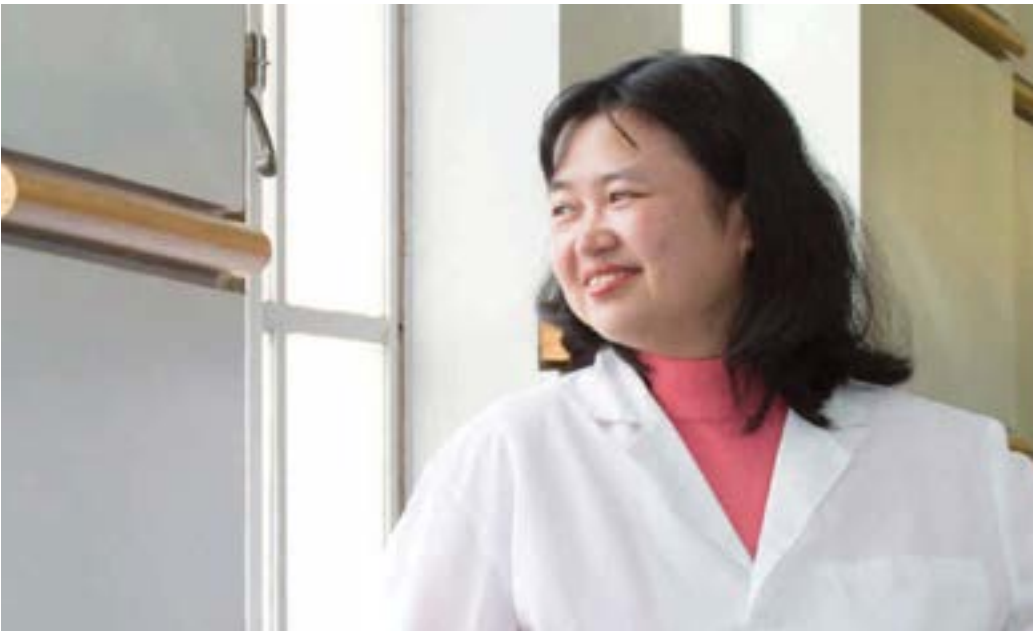
When the Shield Weakens

The cornea is a clear window and also a shield that protects the front of the eye. Ophthalmologists use the cornea to measure intraocular pressure. Elevated pressure can indicate glaucoma, but diseased or damaged corneas do not provide accurate readings.

Dr. Han has found an easy means to determine eye pressure for these patients. Clinicians can now measure pressure on the white covering of the eye (sclera) and use her formula to determine corneal pressure, leading to better-informed treatment.

Overcoming Treatment Hurdles

Medicated eye drops, alone or combined with laser procedures, can control elevated eye pressure and halt vision loss. Side effects include



Dr. Han recently discovered that using the laser to create a longer channel in the front of the eye improves the rate that fluid can drain, doing a better job of decreasing pressure. This should reduce the medication needs of many patients.

Embedded Mission

The needs of Dr. Han’s diverse patients add urgency to her research. She provides glaucoma care at UCSF, San Francisco Veteran’s Administration Medical Center, and San Francisco General Hospital and Trauma Center.

Like popular films, successful investigations lead to sequels. Dr. Han’s commitments to clinical research, leading-edge patient care, and her own young children make it unlikely she will line up for the next American blockbuster. If she isn’t home with her family, she will probably be busy protecting a very special biosphere – the human eye. ●

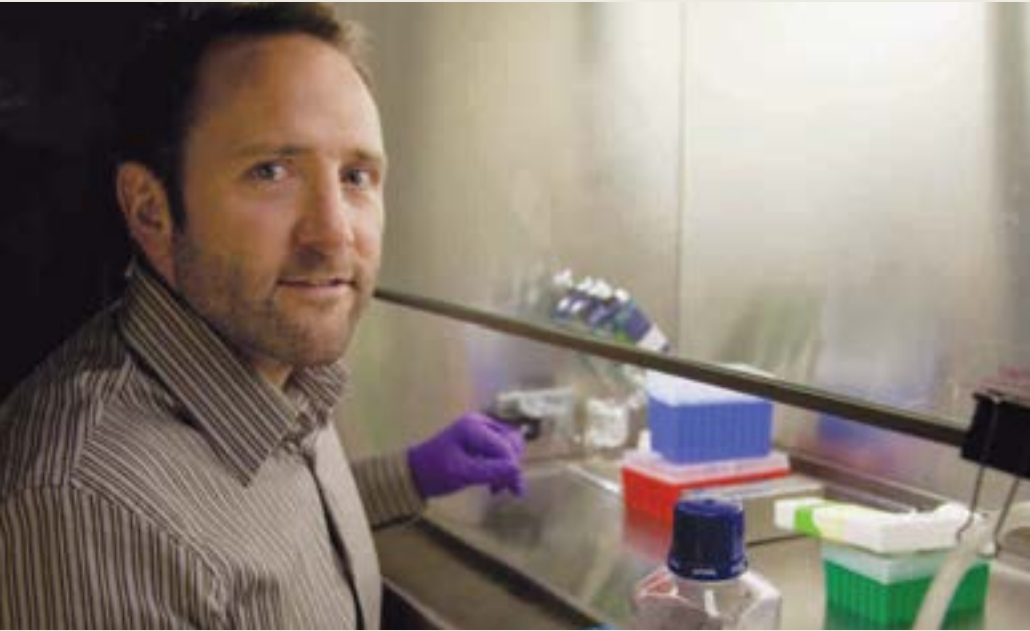
“The satisfaction I feel when I can save patients’ sight is hard to express.”  
– Dr. Ying Han

by ophthalmologists. The Web-based glaucoma screening test is already on a screen near you (<http://www.keeptoyoursight.org/peristat.php>), and researchers continue to refine it.

ocular irritation, burning, itching, and inflammation. Over time, these tiny drops affect the whole body and can lead to slowed heart rate, depression, kidney stones, and other dangerous conditions.

Dr. Doug Gould

# Using Zebrafish to Thwart Childhood Blindness



“We are watching embryonic eye development live, something not previously possible.”  
– Dr. Doug Gould

The tiny zebrafish now plays a major role in understanding the causes of pediatric glaucoma. Geneticist **Doug Gould, PhD**, uses the vertebrate to identify flawed genes that underlie the disease. The fish’s easily manipulated genome and rapid development make it ideal for this purpose.

In fetuses and children with anterior segment dysgenesis, the eye forms improperly, impairing fluid drainage and increasing pressure – symptoms of glaucoma. Vision loss can be present at birth or start in adolescence. This glaucoma is particularly resistant to conventional treatments. Although two

genes have been identified as causes, they explain only half of all cases.

“We study DNA from young patients around the world with anterior segment dysgenesis,” says Dr. Gould, “as well as many, many zebrafish.” Before the team can confidently declare that a particular defect causes anterior segment dysgenesis, they must carry out three painstaking steps.

New-School Tools

First, the scientists use “next-generation” gene sequencing to analyze the entire genome of each study patient. The team identifies possible genetic mutations by applying

computational approaches to the huge data set. According to Dr. Gould, next-generation sequencing speeds the process by quickly giving near-complete genetic information on the patients – something only recently made possible.

Next, they employ a powerful new gene-editing technique to make the same mutation in the genome of a single-celled fish embryo. The fish grow from single-celled organisms to having eyes in less than two days.

“We are watching embryonic eye development live,” remarks Dr. Gould, “something not previously possible. By fluorescently color coding the cell types, we clarify what we are seeing.”

Finally, to find out how common these flaws are among patients, the team will

screen more patients for the genetic defects that harmed the fish. If a large percentage of the children share a defect, Dr. Gould can confirm that it causes their glaucoma.

Swimming with Possibility

Solving the riddle of genetic defects for pediatric glaucoma will lead Dr. Gould to a new investigation. Findings will also stimulate research into whether the same genetic defect contributes to age-related glaucoma, a leading cause of vision loss worldwide.

As the Gould research team tackles therapeutic approaches to target the genetic culprits, zebrafish will continue their starring role.

*The Gould laboratory receives funding from the National Eye Institute, Research to Prevent Blindness, and That Man May See.* ●



# In Memoriam

That Man May See has lost special friends.



**Jeannik Méquet-Littlefield  
Philanthropic Leader**  
Jeannik Littlefield provided generous support to That Man May See over three decades for programs to save and restore sight. Her thoughtful gifts sustained significant research in the Department of Ophthalmology and at the Francis I. Proctor Foundation for Research in Ophthalmology.

Born in Paris, Jeannik came to the United States as a foreign exchange student in 1939. In 1943 she joined the war effort as a translator for the French Air Mission in Washington, DC. There she met her future husband, Edmund Wattis Littlefield. Jeannik spoke several languages and traveled the world, always mindful of charity’s role to sustain healthy communities. Her gifts throughout the Bay Area for the arts, education, and research left a remarkable legacy.

**James Prince Livingston – Past Chair of Board of Directors**  
James “Jim” Livingston generously supported the goals of UCSF Ophthalmology, serving as board chair of That Man May See in the 1980s. Recognized with many honors, Jim used his leadership and passion to raise funds for the causes he cared deeply about. He served on the UCSF Foundation’s board of directors as well. Rich in family and friends, he was also successful in business.

A graduate of UC Berkeley, Jim established Livingston Oxygen & Equipment Company in Modesto. By his retirement, the company he founded with a single store and five employees had grown to 350 branches nationwide and more than 8,000 employees. He also started Hospital Pulmonary Services, a provider of skilled respiratory therapy technicians and equipment, which he merged with National Medical Enterprises (now Tenet Healthcare) in 1969. Jim served nearly three decades with National Medical Enterprises, retiring in 1997.

**Dr. Chandler Dawson – A Giant in His Field**  
Chandler “Chan” Dawson, MD, served as director of UCSF’s Francis I. Proctor Foundation for Research in Ophthalmology from 1984 to 1995. Through his mentorship and teaching, Chan became a respected father figure to one generation of researchers and grandfather to the next. Chan published the classic description of the clinical course of epidemic keratoconjunctivitis, identified intact herpes virions in the corneal stroma by electron microscopy, and was the principal force behind the Herpetic Eye Disease Studies, which demonstrated the usefulness of topical corticosteroids and oral acyclovir for treatment of herpes simplex eye disease.

This specialist’s major contributions to research on ocular chlamydia and trachoma were made in collaboration with major figures in his field, including Drs. Ernest Jawetz, Philips Thygeson, Jack Whitcher, Hugh Taylor, and Julius Schachter, as well as younger trachoma researchers. Chan will be remembered for his keen observations, historical perspective, and humble manner.

**Dr. Sam Aronson – Scientific Pioneer and Mentor**  
Born in Pittsburgh, Pennsylvania, Samuel B. Aronson, MD, studied at Yale, Oxford, and the University of Pittsburgh. He came to San Francisco as a UCSF resident and stayed for 55 years, establishing an ophthalmology program at San Francisco General Hospital and Trauma Center. An early advocate for using steroids to treat eye diseases, he authored many papers and a seminal textbook on ocular inflammation and consulted on ocular drugs and devices.

Sam influenced many of the residents and faculty at UCSF Ophthalmology throughout the years. He also played important leadership roles in the Frederick C. Cordes Eye Society for alumni of UCSF Ophthalmology education programs. A great reader, hiker, traveler, and Asian food enthusiast, Sam is well remembered for his offbeat sense of humor, sage advice, and quiet kindness.

## Save the Dates: Cordes Events

*Frederick C. Cordes Eye Society  
for alumni of UCSF Ophthalmology residency and fellowship programs  
For more information, please contact Molly Boyland, Esq., at (415) 476-4016  
or boylanm@vision.ucsf.edu.*

<b>2013</b>
American Academy of Ophthalmology – Cocktail Reception Le Pavillon Hotel, New Orleans <b>Sunday, November 17, 2013</b> 6:00 – 8:00 p.m.
<b>2014</b>
Annual Scientific Meeting The City Club of San Francisco <b>Friday, April 11, 2014</b> 7:30 a.m. – 5:00 p.m.
<b>2014</b>
Annual Scientific Meeting – Cocktail Reception The City Club of San Francisco <b>Friday, April 11, 2014</b> 5:30 – 7:00 p.m.



## Welcome First-Year Residents

<b>Christopher M. Aderman, MD</b> <b>Birthplace</b> Waterville, Maine <b>College</b> Bowdoin College: Biochemistry <b>Medical School</b> Harvard Medical School <b>Internship</b> Beth Israel Deaconess Medical Center, Boston	<b>Ferhina S. Ali, MD, MPH</b> <b>Birthplace</b> Brooklyn, New York <b>College</b> University of Rochester: Neuroscience <b>Graduate School</b> Johns Hopkins University, Bloomberg School <b>MD</b> Johns Hopkins University <b>Internship</b> California Pacific Medical Center
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## Leaders of Tomorrow Clinical Fellows 2013-2014



<b>ARMIN R. AFSHAR, MD, MBA</b> Vitreoretinal Fellow	
<b>Mentors</b>	Robert Bhisitkul, MD, PhD Jay Stewart, MD Daniel Schwartz, MD Eugene de Juan Jr., MD Jacque Duncan, MD
<b>Birthplace MD Internship Residency</b>	Chicago, Illinois University of Illinois, Chicago St. Francis Hospital, Chicago University of Chicago, Pritzker School of Medicine

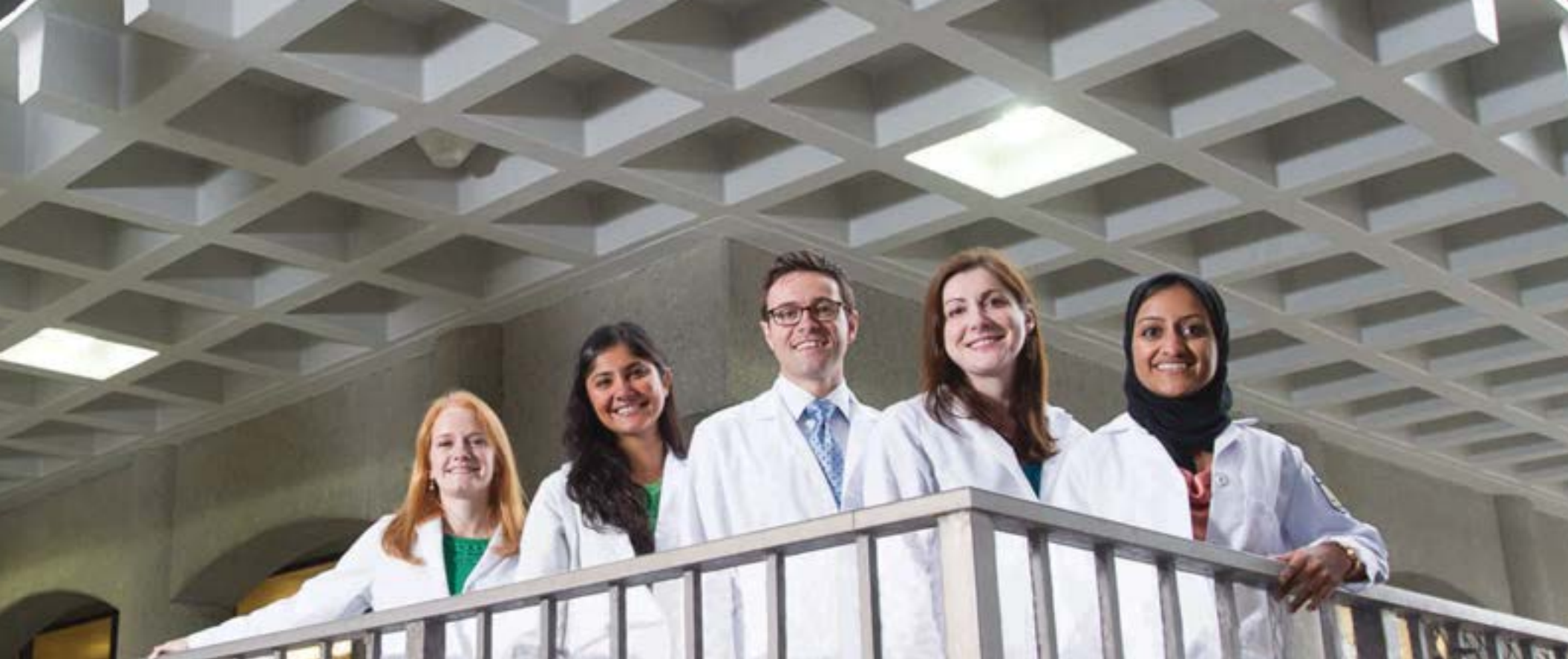


<b>NEIL CHUNGFAT, MD, MENG</b> Fellow in Cornea, External Disease, and Refractive Surgery	
<b>Mentors</b>	Todd Margolis, MD, PhD Thomas Lietman, MD Jeremy Keenan, MD, MPH
<b>Birthplace MD</b>	Potsdam, New York Northwestern University, Feinberg School of Medicine, Chicago
<b>Internship</b>	Cedars-Sinai Medical Center, Los Angeles
<b>Residency</b>	University of Chicago, University of Wisconsin Hospital and Clinics, Madison



<b>LAWSON GRUMBINE, MD</b> Oculoplastics Fellow	
<b>Mentors</b>	Bob Kersten, MD Reza Vagefi, MD
<b>Birthplace MD</b>	Baltimore, Maryland Jefferson Medical College, Philadelphia
<b>Internship</b>	Greater Baltimore Medical Center, Baltimore
<b>Residency</b>	Emory University, Atlanta





**Sarah W. DeParis, MD**  
**Birthplace** Manhasset, Pennsylvania  
**College** University of Virginia:  
Psychology  
**MD** University of Virginia  
**Internship** Reading Health System,  
West Reading, Pennsylvania

**Irina De la Huerta, MD, PhD**  
**Birthplace** Bucharest, Hungary  
**College** Harvard University:  
Chemistry  
**Graduate School** Harvard  
University: Neurobiology  
**MD** Queen’s University, Ontario  
**Internship** Mount Auburn Hospital,  
Cambridge

**Maanasa Indaram, MD**  
**Birthplace** Hyderabad, India  
**College** Duke University:  
Economics and Spanish Studies  
**MD** Duke University  
**Internship** Memorial Sloan  
Kettering Cancer Center,  
New York City

First-year residents (left to right) are  
Drs. Sarah W. DeParis, Maanasa Indaram,  
Christopher M. Aderman, Irina De la Huerta,  
and Ferhina S. Ali.



**CRYSTAL HUNG, MD**  
Glaucoma Fellow  
  
**Mentors** Robert Stamper, MD  
Shan Lin, MD  
Yvonne Ou, MD  
Ying Han, MD, PhD  
**Birthplace** Smithtown, New York  
**MD** Weill Cornell Medical College,  
New York City  
**Internship** Memorial Sloan-Kettering  
Cancer Center,  
New York City  
**Residency** UCLA Jules Stein Eye  
Institute, Los Angeles



**MICHAEL I. SEIDER, MD**  
Ocular Oncology Fellow  
  
**Mentor** Bertil Damato, MD, PhD  
**Birthplace** Los Angeles, California  
**MD** University of Miami  
**Internship** Huntington Hospital/  
University of Southern  
California, Pasadena  
**Residency** UCSF Ophthalmology



**JULIE SCHALLHORN, MD, MS**  
Uveitis Fellow  
  
**Mentors** Nisha Acharya, MD, MS  
Todd Margolis, MD, PhD  
**Birthplace** San Diego, California  
**MD** University of Southern  
California, Los Angeles  
**Internship** Huntington Memorial  
Hospital, General Surgery  
**Residency** UCSF Ophthalmology



**JOE SHEEHAN, MD, MS**  
Cornea, External Disease, and Refractive Surgery Fellow  
  
**Mentors** Todd Margolis, MD, PhD  
Thomas Lietman, MD  
David Hwang, MD, FACS  
Jeremy Keenan, MD, MPH  
Stephen McLeod, MD  
Douglas Holsclaw, MD  
**Birthplace** Fairbanks, Alaska  
**MD** Chicago Medical School,  
Rosalind Franklin University  
of Medicine, North Chicago  
**Internship** Virginia Mason Medical  
Center, Seattle  
**Residency** University of Washington,  
Seattle



# Faculty News

## Dr. David Copenhagen

### Let There Be Light – In Utero

**UCSF** senior researcher **David R. Copenhagen, PhD**, in collaboration with scientists at Cincinnati Children’s Hospital Medical Center, has published surprising findings in the leading journal *Nature* about eye development during pregnancy. Their work shows that the fetus needs light exposure during gestation in order to achieve normal eye development. The light accelerates the maturation of the blood vessels in the eye. They also discovered that the light activates a newly

discovered population of neurons in the embryonic eye that rely on a novel photopigment called *melanopsin*.

Possible implications include the idea that the amount of light a fetus is exposed to in the womb may alter the development of the ocular blood vessels. The team is now directing some of its energies toward testing the possibility that the light exposure during early gestation might affect the severity of a retinal disorder experienced by a significant proportion of prematurely

born children (retinopathy of prematurity).

In a separate career honor, Dr. Copenhagen was recently appointed to the National Eye Institute’s Audacious Goal Scientific Leadership and Oversight Committee. This group is charged with identifying and overseeing development and refinement of an initiative to regenerate neurons and neural connections in the eye and visual system. ●



**Richard L. Abbott, MD**  
**Invited Lecturer:** W. Morton Grant Memorial Lecture, Resident Graduation Day, Tufts University – New England Eye Center, Boston, and the Inaugural B. Thomas Hutchinson Lecture, New England Ophthalmological Society meeting, Boston

These lectures dealt with topics related to reducing medical error and improving the quality of patient care.



**Doug Gould, PhD**  
**Election:** Genetics Group for the Annual Meeting Program Committee, Association for Research in Vision and Ophthalmology

Founded in 1928, the Association for Research in Vision and Ophthalmology is the largest eye and vision research organization in the world.



**Robert Kersten, MD**  
**Invited Lecturer:** Keynote Address, “Diagnosis and management of patients with orbital trauma and traumatic visual loss,” German Society of Maxillo-Facial Surgeons, Essen, Germany



**Shan Lin, MD**  
**Publication:** Qiu M, Wang SY, Singh K, **Lin SC**. “Association between myopia and glaucoma in the United States population,” *Investigative Ophthalmology & Visual Science*. 2013 Jan 28;54(1):830-5. doi: 10.1167/iops.12-11158.

Using data from a large US population study, Dr. Lin and his research group demonstrate that US residents with nearsightedness, especially severe nearsightedness, face increased chances of peripheral vision loss consistent with glaucoma. Growing rates of nearsightedness among those of Asian descent suggest a potential epidemic of glaucoma among Asian Americans.



**Todd P. Margolis, MD, PhD**  
**Publication:** Bertke A, Ma A, Margolis TP. “Different mechanisms regulate HSV-1 and HSV-2 productive infection in adult trigeminal neurons,” *Journal of Virology* 87: 6512-16, 2013.

In this article, Dr. Margolis and his team describe molecular mechanisms that regulate the outcome of infection of ganglionic neurons by Herpes simplex type1 and type2. These neurons serve as the reservoir of Herpes simplex virus in the human body for recurrent infections.



**Stephen D. McLeod, MD**  
**Election:** Board of Directors of the American Board of Ophthalmology



**Robert L. Stamper, MD**  
**Invited Lecturer:** “Detecting visual field progression in glaucoma” and “How to perform gonioscopy in the office and operating room,” World Glaucoma Congress, Vancouver

This is the largest meeting devoted exclusively to glaucoma and draws more than 3,000 ophthalmologists and optometrists from around the world. Dr. Stamper’s expertise on these topics helps eye specialists monitor disease progression and diagnose and treat particular forms, especially angle-closure, congenital, and childhood glaucomas.

**Poster Presentation:** “The ability of the Moorfields Motion Displacement Visual Field Test to discriminate moderate to advanced glaucoma,” Association for Research and Vision in Ophthalmology meeting, Seattle

This poster showed that a laptop-based vision screening program can reliably detect moderate to advanced glaucoma. The research, sponsored and supported by the Fortisure Foundation, has important implications for finding glaucoma in resource-challenged parts of the world.

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# That Man May See

## Board Welcomes Dr. Hardy



As president of the Frederick C. Cordes Eye Society (alumni) of the UCSF Department of Ophthalmology, **Robert A. Hardy, MD**, has joined the board of That Man May See.

Dr. Hardy graduated from the University of Illinois and Baylor College of Medicine.

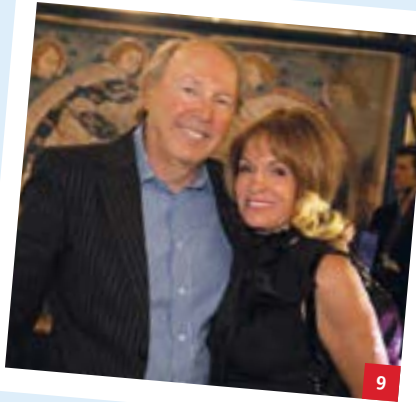
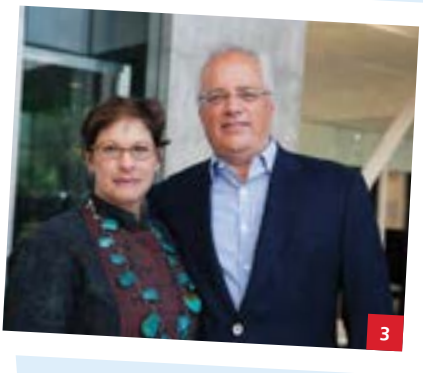
He took residency training and earned board certification in internal medicine at UC Davis and in ophthalmology at UCSF. After a University of Chicago fellowship in the management of diabetic eye diseases, he practiced in Walnut Creek, California, for 20 years.

Dr. Hardy is a clinical professor of ophthalmology at UCSF and serves as an attending physician at the Parnassus campus and San Francisco General Hospital. He is founder of a medical business consulting firm, managing partner of Cragmont Associates, and

financial director of Walnut Creek Senior Living, LLC. He lives with his family in Walnut Creek and is a competitive middle-distance runner, an avid cyclist, and an occasional fly fisherman. ●

 THAT MAN MAY SEE

## SIGHTINGS



An evening at the Computer History Museum celebrated \$14 million in funding to the Proctor Foundation from the Bill & Melinda Gates Foundation.

**1** Board member **Chuck Robel** with **Amy and Mark Garrett**, celebrating support that saves sight and lives.

**2** **Victoria Chang** and **Dr. David Chang** with **Dr. Yared Assefa**, Chief of Ophthalmology at Gondar University in Gondar, Ethiopia, who accomplished part of his advanced training at UCSF's Proctor Foundation.

**3** **Leslie and Sean Doherty** appreciate the dedicated faculty of the Proctor Foundation and Department of Ophthalmology.

**4** **Dr. Tom Lietman** and board member **Dr. Jack Whitcher** enjoy the presentations of their colleagues on research in Ethiopia, India, and Niger.

**5** Board member **Steve Smith** welcomes guests to the museum, where he also serves on the board of directors.

**6** Longtime supporters **Irene and Dan Levine** with **Sue Leiter** and **Beth Clark** enjoy the evening. Sue served on the event's Host Committee.

**7** **Donna Dubinsky** and **Len Shustek**, board chair of the Computer History Museum, also support That Man May See.

**8** **Chris Smith** and **Jack Faraone** participate as guests of board member John Hall.

**9** **Catherine and John Debs** are longtime supporters of the Proctor Foundation's international vision research.

That Man May See is a 501(c)3 public charity. Its mission is to raise funds for the dedicated faculty of UCSF Ophthalmology to make possible breakthroughs in vision research, state-of-the-art patient care, educational opportunities for residents and fellows, and community service.

To make a gift of cash or securities, go to [www.thatmanmaysee.org/donate](http://www.thatmanmaysee.org/donate) or call 415.476.4016 or email [tmms@vision.ucsf.edu](mailto:tmms@vision.ucsf.edu). Checks are payable to That Man May See.

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Annual Report

## The Eye May Predict Dementias

Can an ophthalmologist help find solutions for age-related dementias?

UCSF neuro-ophthalmologist **Ari Green, MD**, and colleague **Michael Ward, MD, PhD**, a neurologist, focus on diseases that involve deterioration of nerve cells. When nerve cells in the eye's retina communicate with the brain via the optic nerve, sight happens. Damaged retinal cells cause vision to fail.

### Imagining New Frontiers

The researchers are intrigued by recent findings that link dementias – also nerve-based disorders – with retinal disease. Dementia patients are prone to retinal cell loss. Mounting evidence shows that glaucoma patients are four times more likely to develop dementia than are others. Patients with low scores on cognitive function tests are more likely to develop age-related macular degeneration.

“The diseases also share a biological feature,” enthuses Dr. Green, “another overlap ripe for investigation.” In Alzheimer's disease, abnormal plaques containing amyloid beta proteins form in the brain. In macular degeneration, abnormal deposits in the eye contain the same proteins.

To find bold new solutions to debilitating diseases,  
scientists must explore uncharted territory.

Are these coincidences of the aging body or a new frontier in neurology? If the preliminary findings of these scientists are promising, multiple lines of inquiry will blossom. “We can imagine that retinal exams would eventually predict dementias' memory loss and disorientation a decade before patients experience them,” says Dr. Ward. Early diagnosis would potentially allow for early intervention.

### Big Payoffs Possible

This team believes that effective dementia treatments will emerge, and they hope to advance that goal. Currently, assessment of promising treatments is based on changes in patient behavior, which is slow and hard to measure. If biological changes in the

retina align with development of plaques in the brain, the retina could be used to gauge short-term effectiveness of innovative drugs.

New therapies for complex eye diseases may also come to light. If the researchers find that age-related macular degeneration and Alzheimer's disease share a common cause, for example, therapies for Alzheimer's disease patients could prove effective in patients with the eye disease.

To find bold new solutions to debilitating diseases, scientists must explore uncharted territory. This duo's spirit of adventure bodes well as they search for answers to devastating nerve disorders.

*That Man May See provided seed funding for this exploratory research. To learn more about supporting leading-edge research, contact That Man May See at (415) 476-4016 or [thatmanmaysee.org](http://thatmanmaysee.org).* ●



Drs. Ari Green (right) and Michael Ward