

USC Eye Institute

Keck Medicine of USC

up close

Winter Newsletter

2016

INSIDE

1-2 AWARDS & HONORS

USC Eye Institute Receives Top Accolades

3-5 RESEARCH FOCUS

Improving Retinal Implant Images

Rising Childhood Myopia

Collagen Crosslinking

6 TEAM FOCUS

Partnering with Eyesthetica

Karen Morgan, MD, Joins USC Eye Institute

7 EDUCATION FOCUS

Residents and Fellows

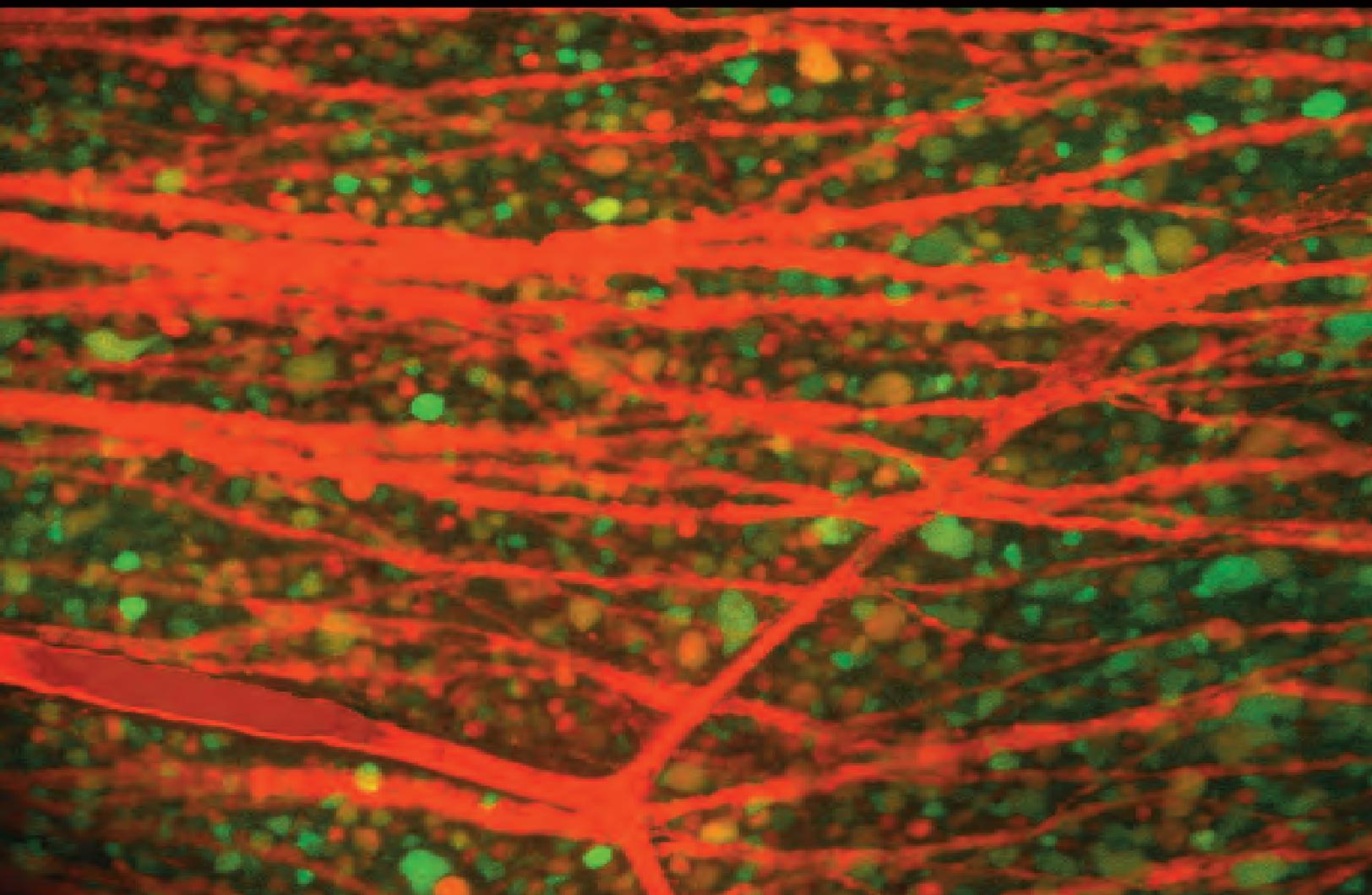
8 CLINICAL FOCUS

A Granddaughter's Wish

9 GLOBAL FOCUS

PBS Documentary on Sight

Virtual Care Clinic



Message from the Chair



As we move toward spring, the USC Eye Institute enters a new phase of innovation and discovery, bringing new talent, new initiatives and a renewed commitment to finding cures for blindness. Our clinicians and researchers have come together to provide cutting-edge treatments through our translational research program, a world-class education for the leaders of tomorrow and compassionate and personalized patient care.

As we enter our 41st year, we are humbled by our honors and recognition. We would like to congratulate Argus inventor and USC Eye Institute Co-director Mark Humayun, MD, PhD, who was the 2016 recipient of the National Medal of Innovation and Technology. This accomplishment underscores the importance of a multidisciplinary approach in our relentless pursuit of developing transformative therapies for the most challenging eye diseases.

In this edition of Up Close, the USC Eye Institute looks back on our recent work, some of which includes improving image sharpness in the Argus II retinal implant, discovering clusterin as a promising new treatment for dry eye and highlights from the largest multi-year study of pediatric eye diseases that found a significant increased burden of myopia among American pre-school children. While we take pride in our accomplishments, we also look to the future, as dozens of promising technologies, diagnostics and treatments bring us closer to our goal to end blindness.

A handwritten signature in white ink, appearing to read "Rohit Varma".

Rohit Varma, MD, MPH
Director, USC Eye Institute



Mark Humayun, MD, PhD, (left) and Rohit Varma, MD, MPH, (right) with USC Trustee Helene Galen at the USC Eye Institute/USC Associates Beverly Hills Open House.

Awards & Honors

USC EYE INSTITUTE FACULTY RECEIVE TOP ACCOLADES

Congratulations to Mark S. Humayun, MD, PhD, co-director of the USC Eye Institute and director of the USC Institute for Biomedical Therapeutics, for receiving the National Medal of Technology and Innovation, the nation's highest award for technology achievement. Bestowed by President Barack Obama, the award recognizes Humayun for his lifelong dedication to bridging medical science and engineering to restore sight. He holds more than 100 issued patents and patent applications, most in the area of bioimplants for ophthalmology, and is a member of the U.S. National Academy of Medicine and the National Academy of Engineering. Humayun's Argus II is the only FDA-approved retinal prosthesis that allows people with certain blinding diseases to regain sight.



"I am very honored to receive the National Medal of Technology and Innovation. Medical breakthroughs come after long periods of research and development and I am grateful to have been and continue to be surrounded by very talented individuals."

—Mark S. Humayun, MD, PhD



USC Eye Institute Director Rohit Varma presents formal recognition of named chair to Charles Manger III.



The Manger family with their chair declaration.



From left, Rohit Varma, chair holder Jonathan Song (seated), Dean Carmen Puliafito and Charles Manger III.

On February 20, the USC Eye Institute faculty gathered at the California Club to honor Dr. and Mrs. Charles C. Manger III for their generous support. The Mangers gave a gift to create the Charles C. Manger Chair in Corneal Laser Surgery. Jonathan Song, MD, associate professor of clinical ophthalmology and director of the Cornea Service, was installed as the chair holder.

Keck School of Medicine Dean Carmen A. Puliafito, MD, MBA, and USC Eye Institute Director Rohit Varma, MD, MPH, delivered the opening remarks to welcome and thank the Mangers for their generosity. Dr. Manger spoke about the importance of his family and friends and also about his long family history at the University of Southern California.

Awards & Honors

USC EYE INSTITUTE FACULTY RECEIVE TOP ACCOLADES

Congratulations to USC Eye Institute Director Rohit Varma, MD, MPH, for being elected president of the clinical chairs of the Keck School of Medicine, a critical position that also serves as president of USC Care Medical Group.

“The role of the USC Care president is critical to achieving a high caliber, thriving physician practice within the Keck Medical Center of USC,” said Thomas E. Jackiewicz, MPH, senior vice president and CEO of Keck Medicine of USC. “As president, Dr. Varma will coalesce the achievements of our practice into the greater USC academic and research communities, and collaborate with leadership across the health care enterprise.”



Thomas E. Jackiewicz, (right) welcomes Rohit Varma as USC Care president.

THE NATIONAL ALLIANCE FOR EYE AND VISION RESEARCH

USC Eye Institute faculty Amir H. Kashani, MD, PhD, and John Whalen, PhD, were selected to represent USC at the National Alliance for Eye and Vision Research 2015. They met with officials on Capitol Hill to discuss USC's current advances in vision research.



Left to right, Jack Whalen, PhD, with Deputy Director of NEI Belinda Seto, PhD and RPB President Brian F. Hofland, PhD at AEVR.



Jack Whalen, PhD, Amir Kashani, MD, PhD, and other AEVR awardees with Mr. Rick Patrick, Healthcare Legislative Staffer for Senator Dianne Feinstein.

BEST DOCTORS IN AMERICA® 2015-2016

We are proud to announce that four of our doctors have been selected as Best Doctors in America. The Best Doctor distinction recognizes approximately 5% of U.S. doctors from whom other doctors would seek care.

SUPER DOCTORS

Five of the USC Eye Institute physicians were honored this year as Super Doctor Rising stars 2016. Congratulations to our fellow colleagues for this recognition! Super Doctors recognizes outstanding physicians in their subspecialties based on peer recognition and professional achievement.



ANDREW MOSHFEGHI, MD, MBA RECEIVES BEST PAPER AWARD FROM ASRS

The Special Projects Committee of the American Academy of Ophthalmology 2015 selected the best papers from various subspecialty meetings. Moshfeghi's paper "The Impact of Cataract Surgery on Patients with Diabetic Macular Edema Receiving Ranibizumab" was selected from the American Society of Retina Specialists.

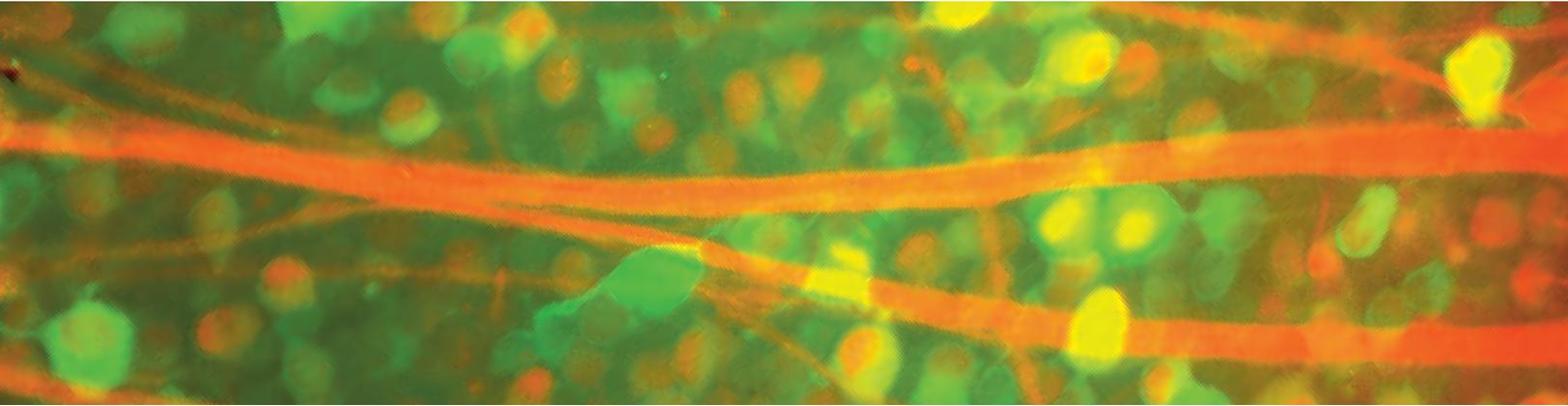
GRACE RICHTER, MD, MPH, RECEIVES MAPS AWARD

Richter was selected by the American Glaucoma Society to receive a Mentoring for the Advancement of Physician Scientists (MAPS) award of \$10,000. The MAPS award is given to clinicians at early stages of their academic careers to facilitate their glaucoma research interests.



Research Focus

USC EYE INSTITUTE RESEARCHERS DISCOVER A WAY TO IMPROVE IMAGE SHARPNESS FOR BLIND PEOPLE WITH RETINAL IMPLANTS



Retinal implants that deliver longer pulses of electrical current may noticeably improve image sharpness for individuals who have lost their sight due to retinitis pigmentosa, according to a study from the USC Eye Institute and USC Viterbi School of Engineering.

WHAT IS RETINITIS PIGMENTOSA (RP)?

Affecting more than 1.5 million people worldwide, RP is a group of inherited retinal degenerative diseases that can lead to blindness and is characterized by loss of the light sensing cells known as photoreceptors.

WHAT IS ARGUS II?

Often referred to as the bionic eye, Argus II is the world's first FDA-approved retinal prosthesis to give people who are otherwise blinded by RP the ability to see light.

HOW DOES ARGUS II WORK?

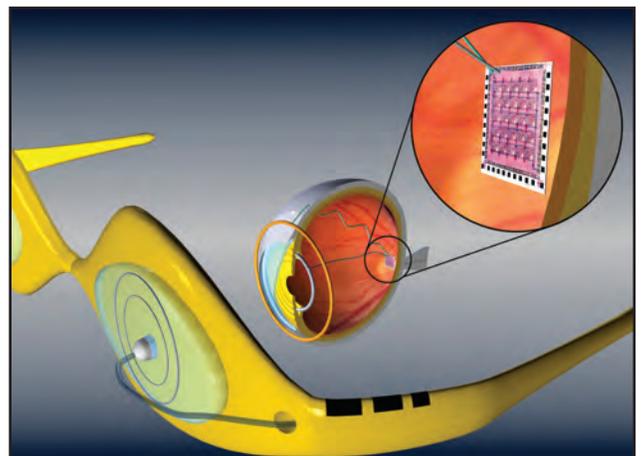
The ophthalmic device consists of an eyeglass-mounted camera that transforms images from the camera into wirelessly transmitted electronic signals, while a 60-electrode retinal stimulator relays these signals to the retina via small electrical impulses. Signals are passed to the brain via the optic nerve and processed into a visual picture.

WHAT CAN PATIENTS SEE WITH THE DEVICE?

Argus II retinal implants have provided an unprecedented degree of sight and have enabled blind individuals to detect motion and locate large objects. However, because the implants may unintentionally stimulate axons in the retina, patients sometimes see large oblong shapes of light that reduce the quality of their vision.

HOW CAN PATIENTS SEE MORE CLEARLY?

Mark Humayun, MD, PhD, James Weiland, PhD and Andrew Weitz, PhD, along with other USC researchers, found that axon stimulation can be avoided by increasing the duration of electrical impulses by a factor of 50. This allows visualization of distinct focal spots of light needed for patients with retinal implants to see more clearly.



Graphical representation of the Argus II retinal prosthesis system

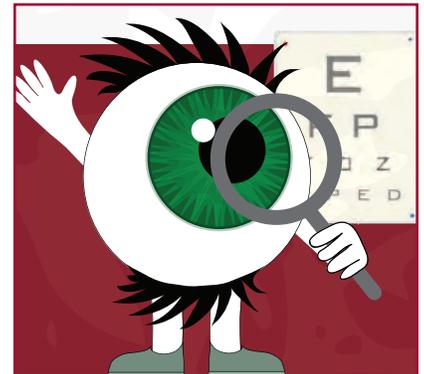
“This is a huge step forward in helping restore sight to people with retinitis pigmentosa. Being able to create focused spots of light is important. Think of each light spot as a pixel in an image. By arranging many light spots into the shape of an object, we can generate sharp images of that object. For people with retinal implants, being able to see more clearly has a big impact on their ability to recognize objects and navigate their environments.”

—Andrew Weitz, PhD, Assistant Professor of Research, USC Eye Institute



Research Focus

INCIDENCE OF CHILDHOOD MYOPIA ON THE RISE



MEPEDS, the largest study of childhood eye diseases undertaken in the U.S. confirms that the incidence of childhood myopia among American children has more than doubled over the last 50 years. The findings echo a troubling trend among adults and children in Asia, where 90 percent or more of the population have been diagnosed with myopia, up from 10 to 20 percent 60 years ago.

MULTI-ETHNIC PEDIATRIC EYE DISEASE STUDY (MEPEDS)

MEPEDS is the first major pediatric eye study in the nation with more than 9,000 comprehensive free eye exams conducted by researchers and clinicians at the USC Eye Institute on African-American, Asian-American, Hispanics/Latinos, and Non-Hispanic White preschool children ages 6 to 72 months from 2003-2011. MEPEDS is funded by the National Eye Institute through the National Institutes of Health.

OBJECTIVE

To improve the understanding of the magnitude of ocular disease on children in America, through identifying the prevalence of certain eye conditions, associations and risk factors.

CHILDRENS VISION AT RISK: SIGNIFICANT FINDINGS

MEPEDS data found the prevalence of myopia (nearsightedness) to be highest in African-American children as compared to Asian and Hispanic children with the lowest frequency occurring in Non-Hispanic

INFLUENCING HEALTH POLICY IN AMERICA

By collecting data in large epidemiological studies such as MEPEDS and understanding the risk factors, physicians can help create guidelines for screening and intervention, which may lead to preventive eye care and early treatment that is crucial to ensuring healthy vision in children today and in the future.

To date, data from MEPEDS have generated more than 20 peer-reviewed papers on the prevalence of childhood eye diseases, including myopia, hyperopia (farsightedness), amblyopia (“lazy eye”) and strabismus (abnormal alignment of the eyes).

“While research shows there is a genetic component, the rapid incidence of myopia in the matter of a few decades, particularly among Asians suggests that close work & use of mobile devices and screens on a daily basis, combined with a lack of outdoor activities and sunlight, may be the real culprit behind these dramatic increases. More research is needed to uncover how environmental and behavioral factors may affect the development and progression of eye disease.”

—Rohit Varma, MD, MPH, principal investigator, MEPEDS





Research Focus

CORNEAL CROSS-LINKING (CXL) FOR THE TREATMENT OF KERATOCONUS

An emerging treatment for keratoconus is corneal cross-linking (CXL), which uses a combination of ultraviolet-A light irradiation and application of riboflavin (vitamin B2) eye drops to stabilize the cornea. At the forefront of advancing CXL treatment for keratoconus is Farhad Hafezi, MD, PhD, adjunct clinical professor of ophthalmology at the USC Eye Institute and professor of ophthalmology at the University of Geneva, Switzerland.

Keratoconus occurs when the cornea (the clear, dome-shaped front surface of the eye) thins and gradually bulges outward into a cone shape. A cone-shaped cornea causes blurred vision and may cause sensitivity to light and glare, problems with night vision and sudden worsening or clouding of vision. This may lead to reduced vision that cannot be corrected with eyeglasses.

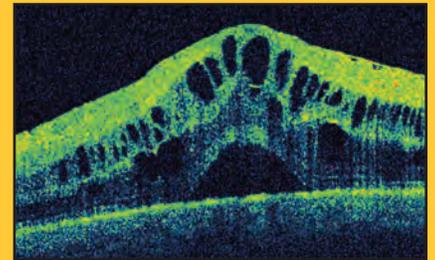


Farhad Hafezi performing CXL procedure

When compared to the two main causes of blindness—cataract and glaucoma—keratoconus affects a small portion of the general population. On a global level, keratoconus is the leading cause for severe visual impairment in children and adolescents. Research has also identified that people with Down Syndrome are at a much higher risk. Early keratoconus has been greatly under-diagnosed in this group, Hafezi said, attributing it to the possibility of poor communication or compliance during visual acuity tests.

Hafezi is spearheading a clinical study in Saudi Arabia to better understand the prevalence of keratoconus among Saudi children and adolescents. Current data suggests that keratoconus has a higher incident rate in Middle Eastern countries. The study, in collaboration with Light for Sight Foundation, Salus University, Pennsylvania and King Saud University, Saudi Arabia, plans to enroll more than 1,500 patients. Results are expected by summer 2017. CXL treatment for keratoconus has been approved for use in the European Community since 2005, and in more than 100 countries worldwide. CXL is currently not approved by the US Food and Drug Administration, although it is slated for approval in 2016.

DIABETES EYE RESEARCH



A study led by USC Eye Institute investigators found that *ranibizumab* can save the sight of thousands of working-age individuals suffering from diabetic eye disease, with better outcomes than standard treatments.

NOVEL TREATMENT FOR DRY EYE



USC ophthalmologist J. Martin Heur, MD, and USC professor Elizabeth Fini, PhD were co-authors of a study to first report that the *clusterin* protein can be used as a novel treatment for dry eye. The pre-clinical results indicated that clusterin could also potentially be used for other corneal disorders that cause damage to the ocular surface barrier.



Team Focus

PARTNERING WITH EYESTHETICA



David B. Samimi, MD, Steven C. Dresner, MD, Michael A. Burnstine, MD, Melanie Ho Erb, MD

The even-year fellowship under the leadership of Dr. Michael Burnstine, adjunct professor of ophthalmology will dovetail with the odd-year ASOPRS fellowship under the direction of Dr. Steven Dresner, adjunct professor of ophthalmology. The joint USC Eye Institute-Eyesthetica fellowship program will be further augmenting by training under the mentorship of USC Eye Institute physicians Sandy Zhang-Nunes, MD, assistant professor of clinical ophthalmology and Jonathan Kim, MD, associate professor of clinical ophthalmology. In addition to training residents at LAC+USC Medical Center Department of Ophthalmology, Drs. Burnstine, Dresner, Erb and Samimi participate in the USC Oculoplastics Journal Club.

For more information visit:
usceye.org/oculoplastics-fellowship

USC Eye Institute residents and fellows have the opportunity to train with surgeons from Eyesthetica. As a part of this collaboration, the USC Eye Institute and Eyesthetica have established an American Society of Ophthalmic and Reconstructive Surgery (ASOPRS) fellowship, which will educate future oculo-facial plastic surgeons in state-of-the-art functional eye plastic surgery and cosmetic facial surgery, and provide a combination of academic and private practice experience.



USC Eye Institute Oculoplastics journal club residents and fellows are joined by Eyesthetica ophthalmologists.



Newly recruited Dr. Karen Morgan, clinical professor of ophthalmology flanked by USC Eye Director Rohit Varma and Co-director Mark Humayun

USC EYE INSTITUTE NEW FACULTY MEMBER

USC Eye Institute's depth, breadth and expertise throughout the spectrum of eye care continues to expand with our newest recruit.

We are pleased to welcome Karen Morgan, MD, clinical professor of ophthalmology and medical director of the USC Eye Institute Pasadena Clinic. Dr. Morgan is a comprehensive ophthalmologist and evaluates and manages patients with cataracts, refractive errors, glaucoma, macular degeneration and other types of retinal disease. She earned her medical school degree from the Keck School of Medicine of USC and completed internship training at LAC+USC Medical Center. Her residency training was completed at the Bascom Palmer Eye Institute, University of Miami.



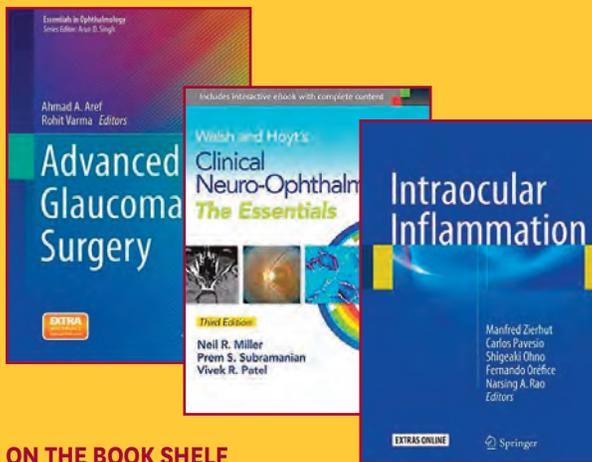
Education Focus

2ND YEAR OPHTHALMOLOGY RESIDENT PHILIP STOREY, MD, MPH FEATURED IN MEDSCAPE

USC second-year resident, Philip Storey, MD, MPH, was recently featured in an article in *Medscape*, for his study evaluating the impact of physician communication on diabetic examination adherence. Published in *Retina* in January 2016, Storey and his colleagues found that written communications between ophthalmologists and primary care physicians resulted in significant improvement in adherence to recommendations for follow-up diabetic eye exams.

1ST YEAR RESIDENT ANANTH SASTRY AWARDED FELLOWSHIP

USC Eye Institute first-year resident Ananth Sastry, MD, was awarded the 2016 Starr E. Shulman MPA Fellowship by the California Academy of Eye Physicians and Surgeons (CAEPS). The fellowship comes with \$1000 so Sastry can participate and represent USC this spring in the Advocacy Ambassador Program (AAP). AAP gives residents and fellows exposure to vital issues in ophthalmology and participation in meetings that CAEPS advocates hold with national legislators during Congressional Advocacy Day and the Mid-Year Forum in Washington, D.C.



ON THE BOOK SHELF

Academic physicians are called on to write chapters for medical textbooks, or to be part of an editorial team or perhaps write their own book. Textbooks provide insight into various areas of study and represent the crucial work being done by clinicians and researchers in their specialties. As part of the advancement of the field of ophthalmology, new publications edited by USC Eye Institute faculty members are *Advanced Glaucoma Surgery*, Rohit Varma, MD, MPH, *Clinical Neuro-Ophthalmology*, Vivek R. Patel, MD, and *Intraocular Inflammation*, Narsing Rao, MD.



The USC Eye Institute welcomed Drs. Joan O'Brien & Arun Singh for inaugural USC Ocular Oncology conference. Many thanks to the speakers and moderators who made the conference a great success this past January!

USC Eye Institute senior residents are highly sought after upon graduation. USC Eye faculty members, students, staff and supporters congratulate the class of 2016 on this year's fellowship match.

MICA BERGMAN, MD, PHD
Orbit/oculoplastics Fellowship (ASOPRS), USC Eye Institute

LILANGI EDIRIWICKREMA, MD, MS
Neuro-ophthalmology Fellowship, Wilmer Eye Institute

ESTHER LEE KIM, MD
Vitreoretinal Fellowship, MEEI/Harvard Medical School

SUN YOUNG LEE, MD, PHD
Vitreoretinal Fellowship, University of Iowa

BENJAMIN XU, MD, PHD
Glaucoma Fellowship, UC San Diego

DAGNY ZHU, MD
Cornea Fellowship, Bascom Palmer Eye Institute

USC Eye Institute attracts the best applicants from across the country for its ophthalmology residency. We welcome six new outstanding physicians who matched in 2017 to our residency program.

- Jennifer Danesh, MD: UCLA School of Medicine
- Yong (Andy) Han, MD: Yale School of Medicine
- Tiffany Ho, MD: Keck School of Medicine of USC
- Hadi Kakkour, MD, MS: Miller School of Medicine of U of Miami
- Ravi Shah, MD: Baylor College of Medicine
- Jing (Meghan) Shan, MD, PhD: Harvard Medical School



Clinical Focus



Ronni Bergman with her granddaughter, Sammi

GRANDDAUGHTER'S

When 10-year-old Sammi Bergman's teacher asked her to write about a gift she might want to give someone for the holiday season, she decided to wish for a cure to save her grandmother's vision. Sammi has a special relationship with her grandmother, Ronni Bergman, who was diagnosed with glaucoma in 1994. Currently, Ronni is under the care of Rohit Varma, MD, MPH, professor of ophthalmology at the USC Eye Institute, and has undergone surgery to treat her condition.

Sammi and Ronni enjoy taking special trips together or shopping and going to the salon. Sammi is aware that her grandmother must carry special eye drops and use them on a regular basis to control her glaucoma.

Sammi's hope for a medication to cure her grandmother's glaucoma has sparked an interest in becoming a pharmacologist when she grows up so she can invent the treatment. Until then, Sammi and Ronni are confident in the care and therapies given by the compassionate team at the USC Eye Institute.

"Dr. Varma and the USC Eye Institute team have gone above and beyond. I have received excellent care from Dr. Varma and his staff who are always available to answer any question that I may have as I continue to get the support and care I need."

—Ronni Bergman

Gift Giving

By Sammi Bergman

Ever had a problem with your eye? My grandmother sure has. She has glaucoma which is pressure on her optic nerve. So this holiday season my wish is for her to have a medication that gets rid of her glaucoma completely! I want my grandma to have this because she had 3 surgeries in the past few months. So what this gift is its eye drops and you put 3 in your eye and then your vision will increase and in a few days you will no longer have glaucoma.

Like I said before, this is a gift for my grandma. My grandmother has had glaucoma for a while. Also she has so many eye drops you can't keep count. Another thing is glaucoma looks so uncomfortable and no one likes being uncomfortable.

Having this medicine could also benefit her even more. For instance, she won't have to take this backpack that she has for her eye drops everywhere that she goes. She won't have to put in 6 different kinds of eye drops every hour on the hour. One other benefit she will have is that my grandma won't have to go to her eye appointments so often at a doctor's office so far from where she lives. This gift may benefit me a little too. You see, waiting in the waiting room when my grandma is with her ophthalmologist is so boring. (Especially when your phone dies.)

Unfortunately I can't get this for my grandma. The reason why I can't get this for her is because it doesn't exist! Even though it doesn't exist yet it will when I become a pharmacologist. What I mean is I will invent it and then I will buy some especially for her.

To sum it all up my grandmother has glaucoma and has had it for a few months. So I want to give her the gift of a medication that will completely get rid of it. But since that doesn't exist I want to make it. Having this will benefit her a lot for many reasons. Happy Holidays to all, and to all a good night.



Global Focus

USC EYE INSTITUTE EXPERTS FEATURED IN PBS DOCUMENTARY: “SIGHT: THE STORY OF VISION”



Both Rohit Varma, MD, MPH, director of the USC Eye Institute and Mark Humayun, MD, PhD, co-director of the USC Eye Institute, will be featured interviews in the upcoming PBS documentary, “SIGHT: The Story of Vision.”

Narrated by **Sir Elton John**, the documentary was filmed over the past two years on six continents and tells the journey of humanity that discovered the science, technology and medicine that allows us to understand how sight works, cure eye diseases and correct vision.

In addition to the documentary, there is an accompanying online educational content being prepared called “Second Screen.” USC Eye Institute ophthalmologist Lisa Olmos de Koo, MD, MBA, and her Argus II patient, Terry Byland—the only person in the world to have an Argus implant in each eye—were interviewed for the online presentation.

The USC Eye Institute will co-host a special broadcasting event in Los Angeles when the documentary airs on PBS later this year.

USC EYE INSTITUTE FIRST TO PARTNER WITH VIRTUAL CARE CLINIC

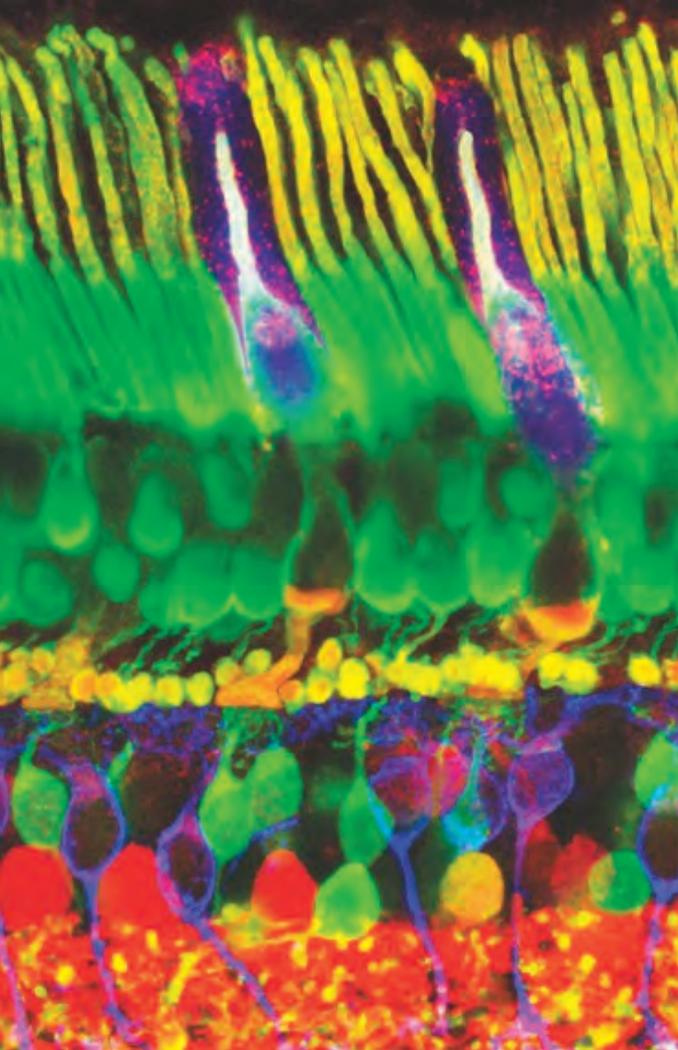
The USC Eye Institute will be one of the first clinical services to embrace an innovative digital health initiative—the Virtual Care Clinic (VCC)—debuting at Keck Medicine of USC later this year. This unique digital health care model is created by the USC Center for Body Computing to provide on-demand expert medical care through borderless, integrated solutions that do not always require the patient and physician to be present in the same place.

Experts at the USC Eye Institute will be able to deliver continuous care, monitoring and evidence-based information for people accessing the VCC. The VCC will use mobile smartphone digital health tools and patient data gathering, artificial intelligence and “virtual doctors” created by the same USC Institute of Creative Technologies team that works with the Department of Defense and provided virtual human special effects for the blockbuster movie, *Avatar*.

To care and treat patients regardless of their location, USC ophthalmologists will employ mobile apps, wearables, augmented and virtual reality platforms, artificial intelligence and predictive analytics that are developed by the VCC.

For additional information about the VCC, visit <http://www.uscbodycomputing.org/virtual-care-clinic>





USC Eye Institute

Keck Medicine of USC

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USCEye.org



Save the Date

41ST ANNIVERSARY SYMPOSIUM

FRIDAY, JUNE 17, 2016

Steven S. Koblak Education & Visitor Center Rothenberg Hall
The Huntington Library, Art Collections & Botanical Gardens

Presiding Officer: Rohit Varma, MD, MPH

Moderator: Gerald Chader, PhD

USC EYE INSTITUTE AT ARVO

2016 ARVO Imaging in the Eye Conference

April 30, 2016

Seattle, Washington

GRAND ROUNDS

Every Tuesday, 5:30pm

HC4 6th Floor Conference Room 6536

SPECIALTY CONFERENCES

Saturdays, 8:00am-12:00pm

Aresty Auditorium, Harlyne J. Norris Research Tower
(Kenneth Norris, Jr. Comprehensive Cancer Center & Hospital)

- September 10, 2016 — Pediatric Ophthalmology
- December 10, 2016 — Retina & Uveitis
- March 18, 2017 — Neuro-Ophthalmology & Oculoplastics
- April 8, 2017 — Glaucoma

ANNUAL USC OCULAR ONCOLOGY CONFERENCE

Saturday, November 5, 2016, 8:00am-12:00pm

Aresty Auditorium, Harlyne J. Norris Research Tower
(Kenneth Norris, Jr. Comprehensive Cancer Center & Hospital)