Gayle and Edward Roski made a transformative $25 million gift in 2016 to endow and name the USC Roski Eye Institute, further advancing the institute’s position as one of the nation’s leading centers for advanced vision care, research and education.

“Our gratitude to the Roski family is profound. With this gift, we will continue to make progress toward our most ambitious goal — eliminating blindness.”

Rohit Varma, MD, MPH, Director, USC Roski Eye Institute
INSIGHT is the driving force behind everything we do at the USC Roski Eye Institute.

Insight begins with envisioning a future without blindness.

Insight grows by learning from each courageous patient.

Insight deepens through continual discovery and invention.

Insight triumphs when we come together to preserve vision.

Insight renews as each new generation seeks and serves.

INSIGHT 2016 provides a glimpse into the accomplishments of our 41st year.

We are deeply indebted to the patients, families, philanthropists, physicians, scientists, researchers, caregivers, residents, technicians, entrepreneurs, administrators, managers, and countless others who join us in our mission to eliminate blindness. All of you make the USC Roski Eye Institute everything it is, and everything it will be.

With gratitude,

Rohit Varma, MD, MPH
Dean, Keck School of Medicine of USC
May S. and John Hooval Dean’s Chair in Medicine
Grace and Emery Beardsley Chair in Ophthalmology
Director, USC Roski Eye Institute

(Opposite page, from left) Rohit Varma, Edward P. Roski Jr., Gayle Garner Roski, Robert Day, Niki Nikias, USC President C.L. Max Nikias, and Mark Humayun give the USC “Fight On” sign.
VISION IS OUR MISSION
PRESERVE. PROTECT. RESTORE.

Fulfillment of our mission is best expressed in the remarkable triumphs of our patients. Please read their stories in the pages ahead.

PRESERVE
The USC Roski Eye Institute diagnoses, treats and manages the most complex eye conditions, from in utero to advanced age.

PROTECT
The USC Roski Eye Institute leads major research in the epidemiology of eye disease to help prevent blindness.

RESTORE
The USC Roski Eye Institute integrates and applies emerging technologies to develop new methods to restore sight to the blind.
World’s 100 Most Influential People in Ophthalmology

Awarded by The Ophthalmologist

Nation’s Best Hospitals for Ophthalmology 2016-17
Nationally Top Ranked Ophthalmology Program

2016 AAO LIFE ACHIEVEMENT HONOR AWARD

Rohit Varma, MD, MPH, director, USC Roski Eye Institute, was presented with the award at the 2016 American Academy of Ophthalmology conference in Chicago.

#2 IN RESEARCH FUNDING 2016
by the National Eye Institute

BEST DOCTORS IN AMERICA® 2015-16
Four USC Roski Eye Institute faculty named among the best
National Medal of Technology and Innovation
The nation’s highest honor for technology achievement

President Barack Obama and National Medal recipient Mark S. Humayun, MD, PhD, co-director of the USC Roski Eye Institute and director of the USC Institute for Biomedical Therapeutics.

SUPER DOCTORS OF SOUTHERN CALIFORNIA 2016
13 USC Roski Eye Institute faculty named among the best

#9
U.S. Ophthalmology Residency Program 2016
*by Doximity*

NEW TEXTBOOKS FROM USC ROSKI EYE INSTITUTE FACULTY 2016

IN SIGHT

Patient Care

The USC Roski Eye Institute is dedicated to managing or curing eye conditions by applying the most advanced knowledge, skills, technologies and methods.
HIGHLY SPECIALIZED CARE FOR ADULTS AND CHILDREN

The USC Roski Eye Institute treats the full spectrum of eye conditions — from the most common to the most complex.

CATARACTS

CORNEA AND EXTERNAL DISEASES
Blepharitis, Bullous Keratopathy, Chalazia/Styes, Conjunctivitis, Corneal Dystrophies, Fuchs Endothelial Dystrophy, Corneal Infection, Corneal Scarring, Dry Eye Syndrome, Herpes Keratitis, Keratoconus, Pterygium, Ocular Rosacea

GLAUCOMA
Angle Closure Glaucoma, Open-Angle Glaucoma, Congenital and Childhood Glaucoma, Pseudoexfoliation Glaucoma, Glaucoma Secondary to Eye Trauma, Neovascular Glaucoma, Normal Tension Glaucoma, Pigment Dispersion Glaucoma, Uveitic Glaucoma

LASER VISION CORRECTION
Anisometropia, Astigmatism, Hyperopia, Keratoconus, Myopia, Presbyopia

NEURO-OPTHALMOLOGY AND ADULT STRABISMUS
Blepharospasm, Double Vision, Hemifacial Spasm, Idiopathic Intracranial Hypertension, Optic Neuropathy, Papilledema, Stroke, Temporal Arteritis, Thyroid Eye Disease, Visual Field Defects

OCULAR ONCOLOGY
Anterior Segment and Iris Tumors, Basal Cell Carcinoma, Conjunctival Tumors, Conjunctivitis Melanoma, Lid Tumors, Lymphoma, Melanoma, Metastatic Lesions, Ocular Surface Squamous Neoplasia, Optic Nerve Lesions, Orbital Lesions, Sebaceous Cell Carcinoma of the Lid, Squamous Cell Carcinoma, Vascular Lesions, Uveal Lesions

OCULOFACIAL PLASTIC SURGERY

OPHTHALMIC MOLECULAR AND IMMUNOPATHOLOGY

PEDIATRIC OPHTHALMOLOGY

SPECIALTY CONTACT LENSES AND PROSE

uveitis and ocular inflammation

Chorioretinitis, Herpetic Uveitis, HLA-B27 Iridocyclitis, Ocular Tuberculosis, Toxoplasmosis, Vogt-Koyanagi-Harada Disease

VITREORETINAL SURGERY AND RETINAL DISEASE
Age-related Macular Degeneration (Wet and Dry), Central Serous Chorioretinopathy, Diabetic Macular Edema, Diabetic Retinopathy, Macular Hole, Macular Pucker, Posterior Vitreous Detachment, Retinal Detachment, Retinal Tears, Retinal Vein Occlusion, Retinitis Pigmentosa
Legally blind for most of her life, Jessica Marquez began the battle to save her vision as a young child. An extreme sensitivity to light and poor eyesight led to a diagnosis of glaucoma and cloudy corneas in both eyes. Over the years, treatment for Jessica’s condition included surgeries and setbacks that took a further toll on her vision.

Jessica eventually came to the USC Roski Eye Institute in hopes that her vision could be saved. A team of corneal, retinal and glaucoma specialists examined Jessica and developed a comprehensive plan to maximize the efficiency of treatment while reducing further trauma to her eyes. Her eye pressure is now under control and her eyesight has been preserved.

Despite having very little vision and enduring more than 40 eye surgeries, Jessica has achieved remarkable success. With her parent’s loving support, she kept her eyes on the future. She excelled in school, eventually earning a master’s degree and becoming a professor who teaches public speaking at Orange Coast College. “Education is power,” Jessica says. “Don’t let anything stand in your way.”

Growing up with severe vision problems, Jessica never thought of herself as different.

Legally blind for most of her life, Jessica Marquez began the battle to save her vision as a young child. An extreme sensitivity to light and poor eyesight led to a diagnosis of glaucoma and cloudy corneas in both eyes. Over the years, treatment for Jessica’s condition included surgeries and setbacks that took a further toll on her vision.

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“I found great hope in the atmosphere here because I always feel like I am part of the family.”

Jessica Marquez
REVOLUTIONIZING
GLAUCOMA SURGERY

Approved this year by the FDA, the new XEN® Glaucoma Treatment System redefines surgical intervention for glaucoma through the innovative application of a permanent, flexible implant that drains eye fluid to reduce intraocular pressure.

Developed by USC alumnus and entrepreneur Ron Bache, '91 with scientific support from Rohit Varma, MD, MPH, the XEN gel stent was proven in large clinical trials to be effective with minimal side effects. Surgical implantation with a specially developed injector applicator simplifies and standardizes the procedure for optimal results that are easily replicated.

This revolutionary intervention has great potential to preserve vision for the nearly 80 billion people worldwide who are estimated to have or who will develop glaucoma by 2020.

The XEN® Glaucoma Treatment System reduces intraocular eye pressure with a tiny flexible stent that is implanted using an injector applicator.
Approved this year by the FDA, corneal cross-linking (CXL) is an innovative procedure that provides effective treatment for keratoconus, an eye disease that destroys vision by distorting the cornea into a cone shape.

In the clinic, J. Bradley Randleman, MD, was a principal investigator for two FDA-sponsored U.S. clinical trials demonstrating that CXL can stabilize the cornea and halt the progression of the disease. In the field, Farhad Hafezi, MD, PhD, is leading a clinical study on the incidence of keratoconus in Saudi Arabia, where the disease is believed to be more prevalent.

Together, these USC Roski USC Eye Institute researchers are working to overcome a disease that is the leading cause of severe visual impairment among children and adults worldwide.
Keratoconus

OCULAR HISTORY
Good vision in left eye with contact lens after corneal transplant 10 years ago. Poor vision in right eye from keratoconus. Contact lens intolerant.

TREATMENT
Underwent corneal cross-linking (CXL), a new treatment for keratoconus that stops the progression of the disease and can partially reverse some of the corneal changes.

OUTCOME
In the healing phase and doing well.

Adam Lyons

With his cornea changing shape from keratoconus, Adam’s vision in his right eye worsened and he was no longer able to wear a contact lens. Jonathan Song, MD, examined Adam and recommended an innovative procedure called corneal cross-linking (CXL). The USC Roski Eye Institute is the first site in the Los Angeles region to have the approved device and offer CXL treatment.

CXL, recently approved by the FDA for use in the United States, is the first and only treatment that can actually halt the progression of keratoconus, and in some cases can partially reverse it. J. Bradley Randleman, MD, performed the procedure on Adam, which consists of dispersing riboflavin eye drops for 30 minutes followed by another 30 minutes of exposure to ultraviolet light.

The procedure was effective in helping to reshape the cornea. Adam’s eye is healing well and his vision is improving.

Adam enjoys travel and outdoor activities with his family.

Image of the cornea during CXL treatment. The green glow of the cornea results from the yellow riboflavin drops fluorescing under the blue ultraviolet light.

J. Bradley Randleman, MD, left, performed the CXL procedure on Adam’s right eye. Jonathan Song, MD, previously performed a corneal transplant on his left eye.
“I’ve been in good hands throughout my exams, the corneal transplant and the new corneal cross-linking treatment.”

Adam Lyons
EVALUATING FITNESS-TRACKING EYEWEAR

Imagine if eyeglasses could provide an edge in improving overall health. An innovative product that seamlessly integrates fitness-tracking technology into an optical frame is being distributed through the USC Roski Eye Institute as part of a pilot study.

The fashion-forward eyeglasses measure a wearer’s steps, calories burned, distance traveled and activity, and connect wirelessly to track progress through an accompanying smartphone application.

Gloria Chiu, OD, FAAO, FSLS, who leads the study’s eye care team, believes the eyeglasses will provide more reliable and consistent tracking than wristbands that are subject to vigorous hand movement or not being worn. The result is better vision and better fitness.

“The result is better vision and better fitness.”

The eyeglasses, developed by VSP Global in partnership with the USC Center for Body Computing, are shown here with a clear temple that reveals the hidden accelerometer, magnetometer and gyroscope that provide biometric measurement.
LAUNCHING THE RETINAL DEGENERATION CENTER

Children and adults who inherit retinitis pigmentosa (RP) and similar conditions now have greater resources to help preserve their sight. The new Retinal Degeneration Center at the USC Roski Eye Institute combines clinical care and research to deliver a full spectrum of specialized care for these rare and potentially blinding diseases.

Through comprehensive ophthalmic electrophysiology testing, specialists diagnose RP, cone dystrophy, Usher syndrome, Stargardt disease, Best disease, choroideremia and achromatopsia, and then develop effective personalized treatment plans.

The center also conducts clinical and basic science research into gene therapy, stem cell–based therapies and retinal prosthesis, including the Argus II retinal prosthesis for advanced stages of RP. The result is better care today and more possibilities for tomorrow.
Providing Ophthalmic Pathology Expertise

The USC Roski Eye Institute Ophthalmic Molecular and Immuno-Pathology laboratory, one of the few in the country, continues to expand. It excels in the study of delicate, often minute tissue samples, and provides an important resource for clinicians, educators and researchers.

An eye pathology fellowship was inaugurated in 2016 with the appointment of fellow Lei-Chi Wang, MD, an investigator from Taiwan, and a new eye pathology rotation delivers more robust diagnostic training.

The laboratory also added a medical examiner to support forensic investigations. In child abuse cases, for example, analysis of retinal bleeding can determine whether abuse is recent or recurring.

In its scope and size, the pathology laboratory is growing to meet increasing needs.
SAVING SIGHT VIRTUALLY ANYWHERE

The USC Roski Eye Institute is using virtual reality, artificial intelligence and wearable sensors to provide on-demand, 24/7, global access to expert eye care and information. This is made possible by becoming the first clinical partner in the Virtual Care Clinic program being developed by the USC Center for Body Computing.

Using a smartphone or tablet, patients can interact with “virtual doctor” avatars of USC Roski Eye Institute specialists, watch videos explaining diagnosis and use wearable sensors to track response to medication or treatments. On-demand eye care will not only increase convenience for patients, but will also provide access to the highest levels of ophthalmology expertise and care where it is currently unavailable.
Research

The USC Roski Eye Institute improves lives through scientific discovery and technical innovation that results in new treatments that overcome visual impairment and blindness.
HONORING A PASSION FOR INNOVATION

As a child, Mark S. Humayun decided to dedicate his life to studying ophthalmology after helplessly watching his grandmother go blind. Decades later, he received the nation’s highest technology award for leadership in bridging medicine and engineering to help restore eyesight.

Humayun is best known for his role in developing Argus II, the only FDA-approved retinal prosthesis system that enables people with certain blinding diseases to regain some useful vision. Beyond pursuing further refinement of the artificial retina, Humayun is leading a multi-university consortium to develop a stem cell implant for age-related macular degeneration.

"The knowledge produced by these Americans today will carry our country’s legacy of innovation forward and continue to help countless others around the world."

President Barack Obama on the recipients of the National Medal of Technology and Innovation
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EXPLORING THE BRAIN’S ROLE IN BLINDNESS

By understanding how the brain responds to low vision and blindness, USC Roski Eye Institute researchers strive to understand in unprecedented detail, the structural and functional connections of the visual brain.

A $4 million, four-year study funded by the National Institutes of Health will build upon the brain mapping techniques developed for the Human Connectome Project. Our team of researchers will recruit more than 100 patients with macular degeneration, retinitis pigmentosa and various optic nerve disorders, in their efforts to study how individual brains adapt to visual disorders over time.

Deeper understanding of the visual brain holds great promise for future innovations. If differences in the central visual pathways behind the retina and optic nerve caused by eye disorders can be observed earlier, treatments to preserve vision can be developed sooner.

Collaborating on study are Hossein Ameri, MD, PhD, Amir Kashani, MD, PhD, Andrew Moshfeghi, MD, MBA, Vivek Patel, MD, and James Weiland, PhD.

Figure 1: Cortical thickness (medial view of the cortices).

Figure 2: Cortical response (fMRI) to light (medial view of the cortices).

IN MEMORIAM
BOSCO TJAN, PhD

Bosco Tjan, PhD, professor of psychology at the USC Dornsife College of Letters, Arts and Sciences and co-director of USC Dana and David Dornsife’s Cognitive Neuroimaging Center, died tragically Dec. 2, 2016.

Tjan was a world-renowned expert in the field of vision loss research and was principal investigator in the study to discover how the brain reacts to blindness.

During a tribute service on USC University Park Campus, he was remembered as an insightful and generous colleague, an outstanding teacher, a prolific researcher and an exceptional collaborator.

He is survived by his wife and son.
“The doctors worked with skill and earned my confidence, and now I can see clearly again.”

Mark Sweeney
Mark Sweeney

Fuchs Dystrophy and Cataracts

OCULAR HISTORY
Vision loss from Fuchs dystrophy and cataracts caused difficulty with driving and enjoying activities.

TREATMENT
Combined Descemet’s Membrane Endothelial Keratoplasty (DMEK) and cataract surgery.

OUTCOME
Complete restoration of vision one month after each surgery.

Now that his vision has been restored, Mark has returned to outdoor activities and attending concerts with renewed excitement.

A continuing blur in his right eye led Mark Sweeney to contact the USC Roski Eye Institute. Karen Morgan, MD, examined Mark and determined that he had Fuchs dystrophy, a swelling and clouding of the cornea. She began conservative treatment with eye drops, but then determined that a more invasive approach was needed. J. Martin Heur, MD, PhD, recommended combined DMEK and cataract surgery. The procedure was successful, and within one month the vision in Mark’s right eye not only was clear, but also corrected so he would not need glasses. His vision began blurring in his left eye, so Mark was excited and confident to have Heur repeat the procedure so he would have sharp vision in both eyes. Mark was delighted to get back to playing golf and seeing all the details at concerts at the Hollywood Bowl —without wearing glasses. “I can finally see clearly,” Mark says. “It’s truly amazing.”

Karen Morgan, MD, and J. Martin Heur, MD, PhD, worked together to restore and improve vision in both eyes for Mark.
Sarah Hamm-Alvarez (center) is surrounded by her research team (from left to right) Zhen Meng, Srikanth Janga, Maria Edman and Christina Fu.

“**Our discovery will help diagnose and treat Sjögren’s syndrome.**”

**DETECTING DISEASE WITH TEARDROPS**

*By discovering a biomarker in teardrops,* Sarah Hamm-Alvarez, PhD, and her research team may advance treatment of Sjögren’s syndrome. The disease can have devastating effects as immune cells attack mucous membrane and fluid-secreting glands. It starts with dryness in the eyes and mouth, but eventually progresses to damage major organs. No single test exists to confirm Sjögren’s syndrome, so diagnosis can take years.

“Our discovery will help diagnose and treat Sjögren’s syndrome more effectively, particularly the dry-eye side effect of the disease,” said Hamm-Alvarez. The promise of a simple tear-based test has the potential to improve life for the four million people in the U.S. who have Sjögren’s syndrome. Nine out of 10 patients are women who would be protected from the dire consequences of the disease.
SEEING WITH THE BRAIN — WITHOUT EYES

Electrical stimulation of the visual neurons could enable the blind to see again—without using their eyes. Cortical visual implants use the brain to “see” by capturing images on a video camera built into specialty eyeglasses and relaying them to electrodes implanted in the visual cortex. A major challenge is to precisely stimulate target nerve cells to provide accurate vision. Andrew Weitz, PhD, and his research team developed a novel imaging technique to map the patterns of cells activated by electrical stimulation. They then identified stimulus waveform shapes that enable precise stimulation of nerve cells in the retina for retinal implants. Now the team is developing waveforms for the visual cortex. By enabling precise control of patterns of neurons stimulated by cortical visual implants, they hope to restore accurate vision to people who have lost their eyes.
REVERSING BLINDNESS WITH ULTRASOUND

What if blindness could be reversed without surgery. Current methods for restoring sight from lost retinal receptor cells involve implanting devices to stimulate surviving retinal neurons.

Ultrasound waves are known to stimulate sight-giving retinal neurons. Using ultrasound to restore sight would require a specialized device to deliver ultrasound waves and the ability to map stimulation patterns. USC Roski Eye Institute researchers Mark Humayun, MD, PhD, and Qifa Zhou, PhD, are taking on these challenges.

Their goal is to develop ultrasonic single-element transducer/phased arrays for retinal stimulation, and design an optimal stimulation paradigm to produce controllable, consistent retinal responses with high spatiotemporal resolution — and provide in vivo validation.

Ultrasound therapies hold the promise of ending blindness on a scale far beyond current methods.
Accelerating Progress through Collaboration

The USC Roski Eye Institute works closely with many individual researchers and organizations to advance vision science and clinical ophthalmology. We gratefully acknowledge colleagues for their efforts in 2016.

### INDIVIDUALS

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#### Cross-Linking and Refractive Surgical Outcomes

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<th>COLLABORATOR</th>
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<tbody>
<tr>
<td>William J. Dupps, MD, PhD</td>
<td>USC (Biomedical Engineering)</td>
</tr>
<tr>
<td>Farhad Hafezi, MD, PhD</td>
<td>The USC Roski Eye Institute and Eliza Institute, Switzerland</td>
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<tr>
<td>Marcony Santhiao, MD, PhD</td>
<td>University of Sao Paulo, Brazil and Federal University of Rio de Janeiro</td>
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<tr>
<td>Giuliano Scarcelli, PhD</td>
<td>University of Maryland Fischell School of Engineering, MD</td>
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#### Human Connectome Project

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<tr>
<td>James T. Becker, PhD</td>
<td>University of Pittsburgh, PA</td>
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<tr>
<td>Adam L. Boxer, MD, PhD</td>
<td>USCF Memory and Aging Center</td>
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<tr>
<td>Kyle Chard, PhD</td>
<td>University of Chicago, IL</td>
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<tr>
<td>Kristi Clark, PhD</td>
<td>USC (Neurology)</td>
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<tr>
<td>Eric Deutsch, PhD</td>
<td>Institute for Systems Biology, WA</td>
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<tr>
<td>Ivo Dinov, PhD</td>
<td>University of Michigan, MI</td>
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<tr>
<td>James Duncan, PhD</td>
<td>Yale University, CT</td>
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<tr>
<td>Jerome Engel, MD</td>
<td>UCLA David Geffen School of Medicine</td>
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<tr>
<td>Ian Foster, PhD</td>
<td>University of Chicago, IL</td>
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<tr>
<td>Giovanni Frisoni, MD</td>
<td>IRCCS Fatebenefratelli, Italy</td>
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<tr>
<td>Gustavo Glusman, PhD</td>
<td>Institute for Systems Biology, WA</td>
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<tr>
<td>Dana Goldman, PhD</td>
<td>USC (Schaeffer Center for Health Policy and Economics)</td>
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<tr>
<td>Gerig Guido, PhD</td>
<td>University of Utah, UT</td>
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<tr>
<td>Susan Hayflick, MD</td>
<td>Oregon Health &amp; Science University, OR</td>
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<tr>
<td>Scott Holland, PhD</td>
<td>Cincinnati Children's Research Foundation, OH</td>
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<tr>
<td>Leroy Hood, MD, PhD</td>
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<td>John Van Horn, PhD</td>
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<td>Carl Kesselman, PhD</td>
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<tr>
<td>Richard Leahy, PhD</td>
<td>USC (Electrical Engineering)</td>
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<tr>
<td>Robert Scott Mackin, PhD</td>
<td>UCSF School of Medicine</td>
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<td>Geoffrey T. Manley, MD, PhD</td>
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<tr>
<td>Tom Nichols, PhD</td>
<td>University of Warwick, United Kingdom</td>
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<tr>
<td>Yuki Y. Palesch, PhD</td>
<td>Medical University of South Carolina, SC</td>
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<tr>
<td>Nathan Price, PhD</td>
<td>Institute for Systems Biology, WA</td>
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<tr>
<td>Bruce Rosen, MD, PhD</td>
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<td>Howard Rosen, MD</td>
<td>USCF Memory and Aging Center</td>
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### Imaging Initiative

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<tr>
<td>Antonio Capone, MD</td>
<td>Oakland University, MI</td>
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<tr>
<td>Xiaoyi Gao, PhD</td>
<td>University of Illinois at Chicago, IL</td>
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<tr>
<td>James Gauderman, PhD</td>
<td>USC (Preventive Medicine)</td>
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<tr>
<td>Joanne Katz, ScD</td>
<td>Johns Hopkins University, MD</td>
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<tr>
<td>Ronald Klein, MD, MPH</td>
<td>University of Wisconsin-Madison, WI</td>
</tr>
<tr>
<td>Roberta McKeown-Cowdin, PhD</td>
<td>USC (Preventive Medicine)</td>
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<tr>
<td>Joan M. O’Brien, MD</td>
<td>University of Pennsylvania, PA</td>
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<tr>
<td>Jeremy Rotter, PhD</td>
<td>Los Angeles Biomedical Institute, CA</td>
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<tr>
<td>Kristina Tarczyn-Hornoch, MD</td>
<td>Seattle Children’s Hospital, WA</td>
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<tr>
<td>Tien Wong, MD, PhD</td>
<td>National University of Singapore</td>
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#### Ocular Epidemiology

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<tr>
<td>Stanley Azen, PhD</td>
<td>USC (Preventive Medicine)</td>
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<td>University of Illinois at Chicago, IL</td>
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#### Regenerative Medicine for Blinding Eye Diseases

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<tr>
<td>Larry A. Couture, PhD</td>
<td>City of Hope, CA</td>
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<tr>
<td>Dennis Clegg, PhD</td>
<td>UCSF Center for Stem Cell Biology and Engineering</td>
</tr>
<tr>
<td>Lincoln V. Johnson, PhD</td>
<td>UCSF Center for the Study of Macular Degeneration</td>
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#### Population Health

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<tr>
<td>Dana Goldman, PhD</td>
<td>USC (School of Pharmacy), USC (Sol Price School of Public Policy)</td>
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<tr>
<td>Anupam Jena, MD, PhD</td>
<td>Harvard University, MA</td>
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<tr>
<td>Geoffrey Manley, MD, PhD</td>
<td>UCSF School of Medicine</td>
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<tr>
<td>Mike Ménchine, MD</td>
<td>USC (Department of Emergency Medicine)</td>
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#### Sjögren's Syndrome

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<tr>
<td>Daniel Arkfeld, MD</td>
<td>USC (Department of Medicine)</td>
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<tr>
<td>Stratos Christianakis, MD</td>
<td>USC (Department of Medicine)</td>
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<tr>
<td>Stan Louie, PhD</td>
<td>USC (School of Pharmacy)</td>
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<tr>
<td>Curtis Okamoto, PhD</td>
<td>USC (School of Pharmacy)</td>
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<tr>
<td>J. Andrew Mackay, PhD</td>
<td>USC (School of Pharmacy)</td>
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<tr>
<td>Wendy Mack, PhD</td>
<td>USC (Department of Preventive Medicine)</td>
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<tr>
<td>Kathleen Rodger, PhD</td>
<td>USC (School of Pharmacy)</td>
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<tr>
<td>William Stohl, MD, PhD</td>
<td>USC (Department of Medicine)</td>
</tr>
<tr>
<td>Driss Zouhri, PhD</td>
<td>Tufts University School of Dentistry, MA</td>
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</table>
Choroidal Melanoma

OCULAR HISTORY
Diagnosed with a choroidal melanoma after continuous retinal issues, detachments and bleeding.

TREATMENT
Patient decided to undergo plaque brachytherapy (radiation implant) to save the eye, regardless of impact on vision.

OUTCOME
Cancer controlled. Tumor regressing. No observable metastatic disease. Left eye preserved with vision loss.

Arnold enjoys playing with his grandchildren, Olivia and Colin.

Losing an eye to cancer was a real possibility for Arnold Michels. After a long and complicated history of retinal issues, detachments and bleeding in his left eye, he finally learned why: he had choroidal melanoma — eye cancer.

As an avid outdoorsman and photographer, Arnold first thought that he would have to abandon his passion for hiking and introducing children to nature as a volunteer. Without vision, he could not navigate the terrain.

After five difficult surgeries on his eye, Arnold came to the USC Roski Eye Institute with a specific goal. Already blind in his left eye, he wanted to avoid its removal. To achieve this goal, surgeons performed a long, complex surgery in which they implanted a device that would precisely target the tumor with radiation.

The procedure was a success. Arnold’s cancer is under control, the tumor is shrinking and he has no sign of metastatic disease. Best of all, he is delighted to still have his left eye. “They went above and beyond all my expectations,” Arnold says.
“They went above and beyond all my expectations.”

Arnold Michels
SERVING THE UNDERSERVED AT LAC+USC

The USC Roski Eye Institute is the exclusive provider of vision care at the LAC+USC Medical Center, the hub of a Los Angeles County health system that serves 10 million people. This presents multiple opportunities to provide a wide array of complex, clinical care that profoundly enhances people’s lives.

Recycle Vision
Recycle Vision, started by USC’s Jesse Berry, MD, collects used eyeglasses and logs prescriptions. They then match prescriptions and give eyeglasses to patients who otherwise might not afford them.

55%
Eyeglass Prescriptions Not Filled
67%
Patients Concerned about Cost
300+
Pairs of Used Eyeglasses Provided

USC Roski Eye Institute residents, shown with ophthalmologist Jesse Berry, MD, follow patients longitudinally throughout their residencies at LAC+USC for an exceptional clinical and personal experience.

The 600-bed Los Angeles County + USC Medical Center is one of the largest public hospitals in the country and one of the premier academic teaching hospitals in the nation.

LAC+USC Ophthalmology
200 Patients per day
10 Surgeries per day
5 Ophthalmology subspecialties
Vulnerable patients will benefit from greater access to eye care as new studies are launched and new healthcare policies are adopted.

IMPROVING ACCESS, QUALITY AND EFFICIENCY

The USC Roski Eye Institute is at the heart of USC’s latest efforts to tackle the challenges of healthcare system reform.

The newly established Keck-Schaeffer Initiative for Population Health Policy is led by Seth Seabury, PhD, associate professor in the USC Department of Ophthalmology and associate professor of research in the Leonard D. Schaeffer Center for Health Policy and Economics. Its mission is to identify evidence-based policies that improve access to care for underserved populations and increase the value of the services provided.

This collaboration between the Keck School of Medicine of USC and the USC Schaeffer Center will be the catalyst for new research and educational studies for improving population health and healthcare delivery.

“

We will strive to use cutting-edge research to help improve the health of vulnerable populations.”

Seth Seabury, PhD
Preserving Sight

The USC Roski Eye Institute champions preventive care, engages in partnerships and inspires philanthropy in our mission to eliminate visual impairment and blindness.
Chandrasekhar Sankurathri, MD, visiting professor of ophthalmology, has dedicated his life to saving the vision of people who would otherwise go blind.

In 1989, he established the nonprofit Sankurathri Foundation as a memorial to his wife, son and daughter who were killed in an Air India terrorist bombing on July 23, 1985. The mission was to “empower the poor through better education, eye care and timely help to the needy.” His mission expanded in 1993 with the opening of the Srikiran Institute of Ophthalmology, named after his son. The eye hospital provides accessible and affordable services to all “irrespective of race, religion, caste, age, sex and other socioeconomic factors.”

From conducting preventive screenings to providing complex procedures, often without charge, the hospital is improving the lives of people in rural India.

Chandrasekhar Sankurathri, MD; cataract patients on post-op day one; 3rd-year resident Philip Storey, MD, MPH, examines a patient; Storey and USC Assistant Professor Jesse Berry, MD, during a rotation in India.

PRESERVING VISION

In its 23 years, the nonprofit Srikiran Institute of Ophthalmology has achieved an impressive record of service:

2,360 screening camps for adults
1,073 screening camps for children
2,170,855 outpatient visits
208,577 surgeries
SHEADING LIGHT TO PREVENT BLINDNESS

New National Eye Institute studies led by Rohit Varma, MD, MPH, suggest that vision screening for refractive error and early eye disease may reduce or prevent a high proportion of individuals from experiencing unnecessary vision loss and blindness. These findings will guide clinical care and health policy designed to protect and preserve the vision of all Americans.

VISUAL IMPAIRMENT AND BLINDNESS IN THE UNITED STATES, 2015-2050

THE NUMBER OF CASES IS EXPECTED TO DOUBLE BY 2050 *

VISUAL IMPAIRMENT AND BLINDNESS BY GENDER, 2015-2050

BURDEN OF BLINDNESS AND VISUAL IMPAIRMENT AMONG WOMEN IS HIGHER AND EXPECTED TO INCREASE *
VISUAL IMPAIRMENT AND BLINDNESS BY RACIAL/ETHNIC GROUPS, 2015-2050

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<tr>
<td>Non-Hispanic White</td>
<td>2.3 Million</td>
<td>3.9 Million</td>
<td>700K</td>
<td>1.1 Million</td>
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<tr>
<td>African American</td>
<td>500K</td>
<td>1.1 Million</td>
<td>200K</td>
<td>500K</td>
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<tr>
<td>Latino</td>
<td>300K</td>
<td>1.4 Million</td>
<td>100K</td>
<td>400K</td>
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<tr>
<td>Asian and Other</td>
<td>100K</td>
<td>500K</td>
<td>20K</td>
<td>50K</td>
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The largest burden will be among non-Hispanic whites and is expected to increase among other groups *

Two studies on additional populations provide major insights

The largest U.S. epidemiological studies ever conducted on Chinese Americans and Latinos were published in 2016 by the USC Roski Eye Institute.

Chinese American Eye Study

Key Findings

- Greater prevalence of neovascular (wet) age-related macular degeneration
- Three times higher prevalence of visual impairment among those with type II diabetes than those without diabetes

Los Angeles Latino Eye Study

Key Findings

- Significantly lower quality of life for those with severe age-related macular degeneration in one or both eyes
- Less access and utilization of health care may contribute to quality of life decline

* For complete findings please refer to: Visual Impairment and Blindness in Adults in the United States: Demographic and Geographic Variations from 2015 to 2050. JAMA Ophthalmol. PMID: 27197072.
Gayle and Edward Roski took a bold step in 2016 to improve vision and end blindness. They made a landmark $25 million gift to endow and name the USC Gayle and Edward Roski Eye Institute at Keck Medicine of USC.

Their generosity was inspired by personal experiences and deep concern for others. After Gayle Garner Roski, a plein-air watercolorist, received cataract treatment at the USC Eye Institute, her ability to see color and light values improved dramatically. To help others fully enjoy the gift of sight, they decided to make a major gift.

Their exceptional support will enable the USC Roski Eye Institute to continue its powerful influence on vision care, research and education around the world.
Clinical Education

The USC Roski Eye Institute equips and emboldens generations of clinician-scientists who revolutionize the diagnosis and treatment of eye conditions and diseases.
ADVANCING OPHTHALMIC TECHNICIAN EDUCATION

The USC Roski Eye Institute established a new Ophthalmic Technician Education Program (OTEP), joining only 14 centers nationwide offering this specialized training.

OTEP is a certificate program that integrates core academic knowledge with clinical and occupational skill mastery. It includes classroom and clinical experiences that prepare graduates to assist ophthalmologists in the prevention, detection and treatment of vision impairments in private practice offices, hospitals and community-based clinics. OTEP students have clinical rotations at the USC Roski Eye Institute, LAC-USC Medical Center and Children’s Hospital Los Angeles.

The U.S. Department of Labor projects a 21 percent increase in ophthalmic medical positions by 2021. The new program is designed to help meet this urgent need.
SHARPENING SKILLS FOR OCULOFACIAL SURGEONS WORLDWIDE

The USC oculofacial surgical skills course brought together renowned faculty, fellows, and residents in oculoplastics, ophthalmology, ENT, and plastic surgery to learn from each other. American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS) fellows from around the United States, as well as visiting scholars from around the world participated. After brief lectures, expert faculty rotated between fully equipped surgical stations that included surgical oculoplastic instruments, an endoscope, a drill, ultrasonic aspirator, plating material and a fresh cadaver head. Attendees learned new approaches and practiced valuable skills that will improve patient care.

Participants from all over the world came together to share valuable skills.
“The PROSE procedure was a game changer. My eyes are no longer miserable all the time.”

Jeremy Falk
Stevens-Johnson Syndrome

**OCULAR HISTORY**
Developed Stevens-Johnson Syndrome after taking Bactrim to treat an infection, resulting in eye pain, dryness, light sensitivity and irritation.

**TREATMENT**
Received custom-designed PROSE (prosthetic replacement of the ocular surface ecosystem) scleral devices.

**OUTCOME**
Improved comfort, vision and quality of life.

Extreme light sensitivity and sore, bloodshot eyes made life difficult for Jeremy Falk, an independent businessman, distance runner and self-proclaimed “power nerd.” A terrible reaction to an antibiotic left him with chronic, severe dry eyes. After years of seeking relief, he finally found it at the USC Roski Eye Institute.

To compensate for the lack of tears, Gloria Chiu, OD, FAAO, FSLS, initiated Boston Sight® PROSE (prosthetic replacement of the ocular system) treatment, available at only 12 sites nationwide. Now Jeremy’s eyes are protected and kept moist by a set of made-to-specification removable scleral devices that cover the entire outer surface of his eyes.

Initially, Jeremy was anxious about placing the lenses on his eyes. After some training, coaching and practice, he mastered the process. “Dr. Chiu was patient, gentle, professional and no nonsense,” Jeremy says. “She changed my life.”

Jeremy’s eyes are much better, and life has returned to normal. Armed with his “rock ‘n roll eyeball kit,” he faces the world with greater confidence and a brighter outlook.
A FORMER USC RESIDENT RETURNS TO USC ROSKI EYE INSTITUTE WITH INSIGHTS FOR SUCCESS.

On Career Choice

“I took a biochemistry class at Francisco Bravo Medical Magnet High School, taught by USC’s Dr. Cocozza, that focused on the chemistry behind ophthalmology. I knew from that point that ophthalmology was what I wanted to do.”

On Residency Training

“My advice is to find a program that is best suited to your individual needs. If you’re looking for strong clinical and surgical training, and to be an innovative leader, then USC is the place for you.”

“USC has one of the most challenging ophthalmology residency programs in the country, hands down. I left the program so confident, so prepared to take on any challenge that came my way.”

On USC Faculty

“A very strong teaching component with LAC+USC Medical Center allows faculty to play a big role in the training and mentorship of residents and fellows.”

Sahar Bedrood, MD, PhD
Assistant Professor of Clinical Ophthalmology

MEDICAL SCHOOL/ MD/PHD
Keck School of Medicine of USC

OPHTHALMOLOGY RESIDENCY
LAC+USC Medical Center

GLAUCOMA FELLOWSHIP
The Johns Hopkins Wilmer Eye Institute

RESEARCH
• Structural characteristics of the optic nerve lamina cribrosa
• Glaucoma disruption of patients’ daily functional ability

PROFESSIONAL ORGANIZATIONS
• American Glaucoma Society
• American Society of Cataract and Refractive Surgery
• Los Angeles Society of Ophthalmology
• Society of Heed Fellows

AWARDS
• Society of Heed Fellows Fellowship Award
• National Eye Institute ARVO Award
• P.E.O. Scholar Award
• Order of the Arete
• Remarkable Women of USC Award
CELEBRATING ADVANCEMENTS IN OPHTHALMOLOGY

Nearly 400 ophthalmologists and optometrists attended the USC Roski Eye Institute 41st Anniversary Symposium at the Huntington Library in Pasadena. The event’s distinguished speakers provided presentations on every subspecialty of ophthalmology.

USC Roski Eye Institute faculty members at the 41st Anniversary Symposium.

41ST Anniversary Symposium Distinguished Ophthalmologists

Nisa Acharya, MD
Director, Uveitis Service and Uveitis Fellowship, F.I. Proctor Foundation and Professor of Ophthalmology, University of California, San Francisco

Pravin U. Dugel, MD
Clinical Professor, USC Roski Eye Institute, Keck School of Medicine of USC, Managing Partner, Retinal Consultants of Arizona and Founding Member, Spectra Eye Institute

Jonathan M. Holmes, MD
Joseph E. and Rose Marie Green Professor of Visual Sciences and Professor of Ophthalmology and Former Chair, Department of Ophthalmology, College of Medicine, Mayo Clinic

Mark S. Humayun, MD, PhD
Cornelius J. Pings Chair in Biomedical Sciences, Professor of Ophthalmology, Biomedical Engineering and Cell and Neurobiology, Director of the USC Institute for Biomedical Therapeutics and Co-Director of the USC Roski Eye Institute, Keck School of Medicine of USC

Sean Ianchulev, MD, MPH
Chief Medical Officer and Vice President, Medical Affairs and Business Development, Transcend Medical

Guy G. Massry, MD
Clinical Professor of Ophthalmology, Keck School of Medicine of USC

Neil R. Miller, MD
Frank B. Walsh Professor of Neuro-Ophthalmology and Professor of Ophthalmology, Neurology and Neurosurgery, Johns Hopkins Medical Institutions

J. Bradley Randleman, MD
Professor of Ophthalmology and Director of Cornea, External Disease and Refractive Surgery, USC Roski Eye Institute, Keck School of Medicine of USC

J. Timothy Stout, MD, PhD, MBA
Director, Cullen Eye Institute and Chair, Department of Ophthalmology, Baylor College of Medicine

Young Hee Yoon, MD, PhD
Professor of Ophthalmology, Asan Medical Center, University of Ulsan, South Korea

Rohit Varma, MD, MPH, left, presented Neil R. Miller, MD, the Frank B. Walsh Professor of Neuro-Ophthalmology and professor of ophthalmology, neurology, and neurosurgery, Johns Hopkins Medical Institutions, with the USC Roski Eye Institute Laureate Award for 2016.

Preeminent vision experts shared their work with a capacity crowd.
PREPARING AND INSPIRING THE NEXT LEADERS

NEW FULL-TIME FACULTY FOR 2016

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<tr>
<th>Name</th>
<th>Title</th>
<th>Specialty</th>
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<tbody>
<tr>
<td>Sahar Bedrood, MD, PhD</td>
<td>Assistant Professor of Clinical Ophthalmology</td>
<td>Glaucoma</td>
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<tr>
<td>Kent Nguyen, OD, FAAO</td>
<td>Assistant Professor of Clinical Ophthalmology</td>
<td>Comprehensive Eye Care in Primary Care, Ocular Disease, and Contact Lenses</td>
</tr>
<tr>
<td>J. Bradley Randleman, MD</td>
<td>Professor of Clinical Ophthalmology</td>
<td>Corneal and External Diseases and Corneal Cross-Linking</td>
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<tr>
<td>Seth Seabury, PhD</td>
<td>Associate Professor of Research Ophthalmology</td>
<td>Ophthalmology Health Policy and Economics</td>
</tr>
<tr>
<td>Mahnaz Shahidi, PhD</td>
<td>Professor of Ophthalmology</td>
<td>Retinal Imaging</td>
</tr>
<tr>
<td>Lan Yue, PhD</td>
<td>Assistant Professor of Research Ophthalmology</td>
<td>Retinal Prosthesis</td>
</tr>
<tr>
<td>Qifa Zhou, PhD</td>
<td>Professor of Ophthalmology, Biomedical Engineering</td>
<td>Biomedical Engineering Ophthalmic Elastography, Ultrasonic Retinal and Brain Stimulation</td>
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</table>

NEW OPPORTUNITIES FOR 2016

Each year, positions open for six new residents and eight new fellows. Hundreds of outstanding candidates apply to train at the USC Department of Ophthalmology.

VOLUNTARY RESIDENT ROTATION IN INDIA

Residents will complete two-week, on-site comprehensive and subspecialty clinics at the Srikiran Institute of Ophthalmology in rural Andhra Pradesh, India.

NEW FELLOWSHIP IN EYE PATHOLOGY

Fellows have extraordinary learning opportunities at USC’s ophthalmic molecular and immuno-pathology laboratory, one of the few in the United States.

The USC Roski Eye Institute residents and fellow train in four diverse and highly acute clinical and surgical settings: the USC Roski Eye Institute, Children’s Hospital Los Angeles, Los Angeles County Hospital (LAC+USC Medical Center) and Veterans Administration Downtown Los Angeles Medical Center.

usceye.org
HISTORY
• Hispanic female, age 66, presents to the emergency department with worsening blurred vision over several weeks and a one-year history of intermittent binocular diplopia, pulsating left-ear pain and tinnitus.
• PMH: HTN, DM Type 2, Dyslipidemia, Hyperthyroidism.
• ROS negative for headaches, nausea or sudden loss of vision.

EXAM FINDINGS
• BCVA 20/20 OD, 20/30 OS, IOP WNL, no RAPD, Ishihara color plates normal OU.
• Anterior segment exam on slit lamp only notable for 2+ NSC of the lens OU.
• Dilated fundus exam: normal appearing optic nerves with CDR 0.4 without evidence of swelling or atrophy.

DIFFERENTIAL DIAGNOSIS
• Bilaterally swollen optic nerves with near normal function. Elevated intercranial pressure (ICP) would suggest obstruction or abnormality. Normal ICP would suggest diabetic papillopathy, optic perineuritis or hypertensive papillopathy.

ADDITIONAL INVESTIGATIONS
• MRI brain with and without contrast was obtained to better characterize the etiology of the elevated ICP. (See Figures 1 and 2.)

DIAGNOSIS
• Paraganglioma causing compression of the left internal jugular vein.
• Jugular venous obstruction resulted in impaired CSF absorption, leading to elevated ICP.
• Sufficiently compartmentalized CSF pressure may allow some cases of elevated ICP to present without papilledema.

TREATMENT
• Since malignant behavior is only seen in 4% of jugulotympanic paragangliomas, treatment options include observation, surgical resection with preoperative embolization, radiotherapy and radiosurgery.
• Patient was seen eight weeks after initial visit. Stable nature of the symptoms led us to monitor her with dilated fundus exams and Humphrey visual fields at subsequent visits. She is also being followed by neurology and ENT services as an outpatient for possible surgical intervention if symptoms worsen.

THIS CASE ILLUSTRATES THE IMPORTANCE OF THE CEREBRAL VENOUS SYSTEM IN THE REGULATION OF CSF PRESSURE AND NEUROIMAGING FEATURES THAT CAN SUPPORT A SUSPICION OF ELEVATED ICP.
Fellows and Clinical Instructors

The USC Roski Eye Institute offers clinical fellowship training in six subspecialty areas, including cornea and external disease, glaucoma, neuro-ophthalmology, ophthalmic plastic surgery, retina and uveitis.

Informal research fellowships are also awarded by each service and laboratory independently. The USC Roski Eye Institute attracts promising academic ophthalmologists from around the world who spend one or two years participating in research programs. Many return to their home countries where they assume positions of national or international leadership.
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Faculty members at USC Roski Eye Institute discover and disseminate vital information that improves lives by contributing to the advancement of ophthalmology and vision science.


Neuroscientists from around the world have been conducting research on schizophrenia and subcortical brain structures, aiming to better understand the genetic and environmental influences on these conditions. One such study, led by researchers from the University of California and published in the Journal of Neurology, Neurosurgery & Psychiatry, has shed light on the genetic influences on schizophrenia and subcortical brain structures.

The study, titled “NeuroScientist Investigates the Role of Genetic Variation in Schizophrenia and Subcortical Brain Structure,” was led by Dr. Yao Y and co-authors. The researchers used a genome-wide association study (GWAS) approach to identify genetic variants associated with schizophrenia and subcortical brain structures.

The GWAS identified several genetic variants that were significantly associated with schizophrenia and subcortical brain structures. These genetic variants were found to be located in various regions of the genome, including the chromosomal regions 10q25, 16p11.2, and 22q11.2. The researchers also found that these genetic variants were associated with specific subcortical structures, such as the amygdala, hippocampus, and thalamus.

The study’s findings are significant because they provide new insights into the genetic basis of schizophrenia and subcortical brain structures. The researchers hope that their findings will help in the development of new treatment strategies for these conditions.

In conclusion, this study provides valuable insights into the genetic basis of schizophrenia and subcortical brain structures, and it is expected to have a significant impact on our understanding of these conditions. Further research is needed to confirm these findings and to understand the biological mechanisms underlying these genetic influences.

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