USC University of Southern California
USC Roski Eye Institute
Keck Medicine of USC

**Health System Marketing & Communications** • 2011 N. Soto St., SST-2830, Los Angeles, California 90032
Tel 323.442.2830 • Fax 323.442.2832 • keckmedicine.org

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# The future is now: USC Roski Eye Institute scientists present latest research at the ARVO 2018 annual meeting

*From engineering nanophotoswitches and lipid nanoparticles to mapping the part of the brain responsible for visual processing, research focuses on forging new and innovative ways to restore vision and prevent vision loss*

**Contact:** Cynthia Smith at (323) 442-3811 or cynthia.smith@med.usc.edu

LOS ANGELES – What do nanophotoswitches, lipid nanoparticles and mapping the brain have in common? They are among the future-forward areas of vision research being investigated by USC Roski Eye Institute scientists, who will present the latest developments in their work at the ARVO 2018 annual meeting April 29 through May 3 in Honolulu, Hawaii. Following are highlights from the more than 100 USC Roski Eye Institute papers and posters being presented at the meeting.

## Engineering a nano-based therapy to restore vision

USC Roski Eye Institute scientists are looking to a new type of prosthetic to help restore vision: iridium pyridine–based nanophotoswitches. When injected into the eyes of blind rats, the nanophotoswitches elicited a light response, suggesting that they mimicked photoreceptors, the light-sensing cells in the eye. Lan Yue, PhD, assistant professor of research ophthalmology at the Keck School of Medicine of USC, will present the research on May 2, from 9–9:15 a.m.

## Creating a roadmap of the brain's visual processing center

Vision researchers at USC are using brain mapping technology and advanced retinal imaging to understand brain-eye connections in blinding diseases. By combining multimodal MRI with retinal imaging, the researchers were able to identify structural and functional differences in the brain's central visual pathway in patients with optic nerve disease and outer retinal disease. Vivek Patel, MD, associate professor of clinical ophthalmology at the Keck School, will present the research on April 30, from 3:30–3:45 p.m.

## Monitoring patients with diabetic retinopathy

Many patients with diabetes develop diabetic retinopathy, which can progress to vision loss and blindness if left untreated. Using a large insurance claims database, USC Roski Eye Institute researchers have found that approximately one-quarter of patients with mild-moderate diabetic retinopathy progressed to vision-threatening

diabetic retinopathy within five years. The study highlights the need for proper screening and early intervention in patients with diabetic retinopathy. Andrew Moshfeghi, MD, MBA, associate professor of clinical ophthalmology at the Keck School, will present the research on May 1, from 8:15–8:30 a.m.

**Using lipid nanoparticles to deliver gene therapy**
A team of investigators led by Hossein Ameri, MD, PhD, assistant professor of clinical ophthalmology at the Keck School, has developed a novel gene editing delivery mechanism to stop retinitis pigmentosa, a hereditary disease that can cause permanent vision loss. The team has successfully used lipid nanoparticles to deliver CRISPR-Cas9 gene editing technology in vitro to silence the most common gene associated with retinitis pigmentosa. Amirmohsen Arbabi, MD, will present the research on April 29, from 8:15–10 a.m.

**Identifying genetic markers for glaucoma in ethnic populations**
USC Roski Eye Institute epidemiologists are exploring genome-wide association studies to find genes associated with primary open-angle glaucoma in Mexican Americans and Chinese Americans. They have identified different genes in each group that impact retinal nerve fiber layer thinning, an important early sign of primary open-angle glaucoma. Xuejuan Jiang, PhD, assistant professor of research ophthalmology and preventive medicine at the Keck School, will present the research on April 29, from 4–4:15 p.m.

For a comprehensive list of USC Roski Eye Institute presentations at the meeting, visit http://eye.keckmedicine.org/arvo-2018-sneak-peek/.

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**About the USC Roski Eye Institute**
The USC Roski Eye Institute, part of the Keck Medicine of USC university-based medical enterprise, has been a leader in scientific research and innovative clinical treatments for more than 40 years. Ranked No. 2 in National Eye Institute (NEI) research grants for academically based ophthalmology departments and nationally ranked in *U.S. News & World Report*'s annual "Best Hospitals" issue for more than 24 years, the USC Roski Eye Institute is headquartered in Los Angeles with clinics in Arcadia, Beverly Hills and Pasadena. Faculty physicians are also the exclusive ophthalmic doctors affiliated with Los Angeles County + USC Medical Center (LAC+USC) and Children's Hospital Los Angeles (CHLA).

For more information, go to eye.keckmedicine.org.