

SHINE the LIGHT

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RESEARCH

Leading the way to improved vision



Vladimir Kefalov, PhD

When Vladimir Kefalov's children were little, they would hear him talk excitedly about his research and would ask him, "Did you cure blindness today, Daddy?"

Not yet, he would tell them. But as the new vice chair of research at the Gavin Herbert Eye Institute

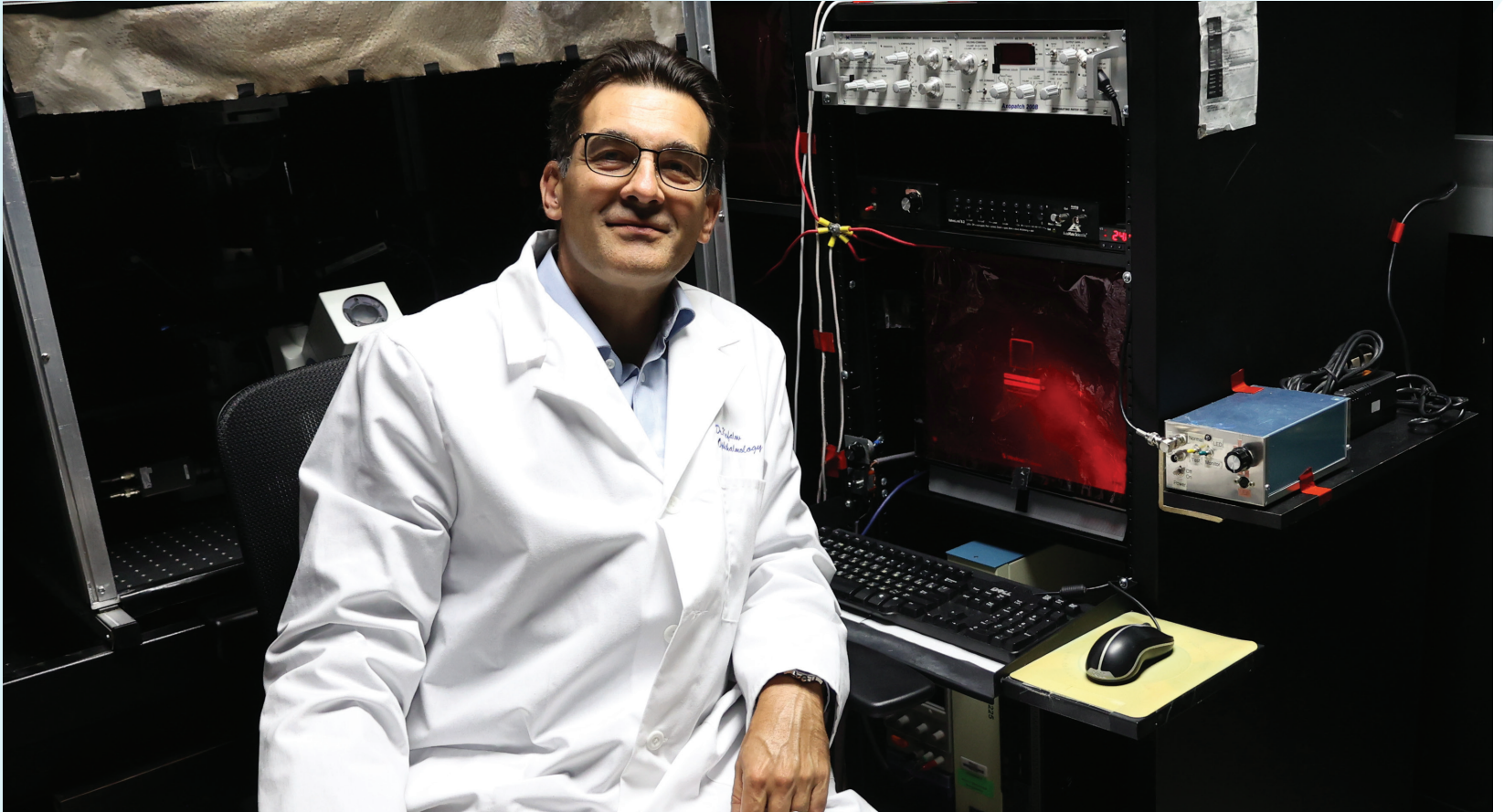
(GHEI), Kefalov is leading research initiatives that may well produce exciting discoveries and promising vision treatments. He holds dual appointments as a professor in the UCI School of Medicine's departments of Ophthalmology and Physiology & Biophysics.

Kefalov, who is originally from Bulgaria, first pursued his passion for physics, earning both a bachelor's degree and master's degree in that field. But his interest took a turn during those years.

"I found a job as a technician in a group working on the psychophysics of vision," he said. The possibilities intrigued him but the work seemed too abstract. He decided to pursue a doctorate. "I got into a graduate program at Boston University in cellular biophysics and joined a lab studying photoreceptor function."

After earning his PhD, Kefalov did postdoctoral training at Johns Hopkins University then started his own research lab in 2005 at Washington University in St. Louis, Mo. Now at GHEI, he and two of his researchers who joined him from Missouri are continuing to investigate the functions of photoreceptor cells and how they may lead to treatments for retinitis pigmentosa.

Since arriving in June, Kefalov has found himself inspired by the institute's emphasis on translational work to help patients as well as the entrepreneurial spirit of its faculty.



Kefalov in his lab.

Kefalov also is excited by Orange County's wealth of private enterprises in the field of eye health, including pharmaceutical, equipment and device companies.

"We're working actively to stimulate more interaction between our faculty and the businesses here," he says. "There's a lot of potential for synergies and cooperation."

One of the key questions Kefalov's research seeks to understand is the molecular mechanisms that control the function of photoreceptors, the cells in the retina that convert light into electric signals sent to the brain.

"We want to know how adaptation to light and darkness occurs in those cells," he said. "They have to adjust very quickly. And in many blinding disorders, the function of these cells is compromised."

Kefalov's work has involved recording electrical responses in the photoreceptors of individual cells in genetically modified mice. "We can expose the cell to light, then study its response to that light," he said. "We want to know how it responds to genetic manipulation. In this way, we can try to understand how various mutations may affect the function of

"Seeing the patients reminds us what we are here for."

photoreceptors and cause blindness. Then we may work to develop treatments."

Retinitis pigmentosa, a group of eye diseases that can lead to blindness, can be caused by mutations in hundreds of different genes, which makes it all the more complicated to treat. Kefalov's goal is to develop a therapy that is independent of individual genes. His group recently identified a transcription factor that, when mutated, shows great promise in preserving the function of photoreceptors that would otherwise degenerate due to retinitis pigmentosa.

Kefalov's parents never quite understood his passion for the sciences. Both worked in the humanities and were disappointed in his choice. Instead, he is fueled by the support of his wife, a real estate agent, and his children, who are now young adults. In turn, he supports them in their quest for careers in music, business and medicine. His eldest aims to become a general practitioner serving a small community in need of doctors.

MESSAGE FROM THE CHAIR

The challenges presented by the COVID-19 pandemic have been formidable. But at GHEI, we have been able to advance our goals — from pursuing the most sophisticated research to providing underserved children with eye care — thanks in large part to the generosity of donors who want to give the gift of sight to others.

A recent \$2 million gift from the Allergan Foundation will allow us to recruit a major retina researcher for a new chair in ophthalmology.

Our Eye Mobile for Children, which costs more than \$400,000 a year to operate, is completely funded by donors. It travels from school to school in underserved areas of Orange County, bringing eye exams, glasses and other services to young children. Improper, uncorrected vision is a major contributor to problems they encounter in school.

In July, Laura Khouri and Michael Hayde offered a generous challenge for the Eye Mobile Program. Their \$225,000 gift will be matched dollar-for-dollar if met by Dec. 31, 2021. Challenge gifts are a fantastic opportunity to raise awareness and support of this high-impact community program.

Khouri and Hayde made another generous gift to establish a keratoconus program that will give underserved patients access to our novel corneal crosslinking treatment, which can preserve vision and prevent the possibility of future blindness.

We are grateful to our auxiliary support group, the Visionaires, which is comprised of community members who support the eye mobile and other GHEI initiatives.

Seed funds from donors also allowed one of our notable researchers, Lbachir BenMohamed, PhD, to work on a vaccine to combat future coronaviruses and variants of COVID-19, and even some forms of the common cold. We are in the third coronavirus pandemic of this century, and there will be more of them if a pan-coronavirus vaccine is not found. The donor funds that kickstarted BenMohamed's research led to his receiving a grant from the National Institutes of Health (NIH) for a full-scale research project.

The NIH continues to be a major source of support for GHEI. We are among the top 15 ophthalmology departments in the nation in grant awards from the NIH's National Eye Institute.

Generous donations also enabled us to launch GHEI's Center for Translational Vision Research, where world-renowned scientist Krzysztof Palczewski, PhD, and his team are studying retinal disease pathways, with a focus on photoreceptors, to cure blindness associated with retinal diseases.

Our donors know their money supports groundbreaking vision research to end blinding diseases as well as top-notch eye care, and that is a testament to the excellence of our researchers and clinicians.

In fact, two of our senior faculty — Jeremiah Tao, MD, and newly hired Donny Suh, MD — were inducted this year into the American Ophthalmological Society. The oldest and most prestigious U.S. ophthalmology society, it was founded in 1865 and membership is by invitation only. Invitees are asked to write an extensive thesis on their research that must be approved prior to admission.

In this issue of Shine the Light, read about Suh's plans to expand our Eye Mobile program and about the extraordinary life of our new distinguished retina researcher, Vladimir, Kefalov, PhD.

Finally, I want to acknowledge the volunteer clinical faculty who help train our residents at UCI Medical Center and the VA Long Beach Healthcare System. Of particular note, Dr. Arlene Gwon is retiring after 46 years of service. We are grateful to her and all our volunteer faculty members for their dedication to teaching our residents over the years.



A handwritten signature in black ink that reads "Baruch D. Kuppermann". The signature is written in a cursive, flowing style.

Baruch D. Kuppermann, MD, PhD

*Director, Gavin Herbert Eye Institute
Chair, Department of Ophthalmology*

Thank you to our donors

Thank you to all our donors, with special appreciation to those who have made contributions of \$5,000 or more in support of our research, educational and community programs from July 1, 2020–June 30, 2021

AbbVie Inc.	Hecho en Mexico, LLC	In loving memory of Lila D. Nelson, by her three daughters
AbbVie Foundation	Herbert Family Foundation	The Nicholas Endowment
American Endowment Foundation	G. Herbert Inc.	Thomas Nielsen
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Avedro Inc.	M. Cristina Kenney, MD, PhD & Anthony Nesburn, MD	Research to Prevent Blindness
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Joanne Birtcher	Jantana & Baruch Kuppermann, MD, PhD	The Foundation for Retinal Regeneration
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To make a gift to the Gavin Herbert Eye Institute, please contact Amber Harness, associate director of development, at aharness@uci.edu or 949-824-9021.

Faculty members

Cataracts, Cornea, External Disease and Refractive Surgery

Marjan Farid, MD
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Sumit (Sam) Garg, MD
Vice Chair, Clinical Ophthalmology
Sanjay Kedhar, MD
Olivia Lee, MD
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Ken Y. Lin, MD, PhD
Sameh Mosaed, MD

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Vivek Patel, MD

Oculoplastics

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Jeremiah Tao, MD

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Kailey A. Marshall, OD
Linda Shi, OD

Annabelle Storch, OD
Kimberly Walker, OD
Justin Wong, OD

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Mohammad Riazi, MD
Donny Suh, MD

Retina and Vitreous

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Baruch D. Kuppermann, MD, PhD
Chair, Department of Ophthalmology
Stephanie Y. Lu, MD
Mitul C. Mehta, MD
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Jing Yang, MD, PhD

Uveitis

Sanjay Kedhar, MD
Olivia Lee, MD



One man's vision for children

Richard "Sandy" Quinn had struggled with his vision for decades before coming to the Gavin Herbert Eye Institute (GHEI). The former marketing director for Walt Disney World in Florida had been diagnosed with diabetes in 1971. Less than 10 years later, after moving to Northern California, he started seeing little black spots called floaters. They're a sign of diabetic retinopathy and require treatment with lasers.

When Quinn moved to Orange County, he knew that he needed top-notch eye care. He'd already essentially lost the vision in one eye. He consulted Gavin Herbert, whom he knew through their association on the Richard Nixon Foundation board. The eye industry pioneer guided him to Dr. Roger Steinert, the late founding director of the eye institute.

When Quinn needed cataract surgery in 2014, he was treated by GHEI specialist Dr. Sam Garg. "I couldn't believe the difference in my vision," he said.

For his ongoing care, Quinn sees Dr. Baruch Kuppermann, director of the eye institute. After years of being treated

by many fine eye doctors, Quinn remains especially impressed by the care he has received at GHEI.

"Dr. Kuppermann is very focused on the care of his individual patients. I saw this long before I considered making any donations," Quinn said. "He was singularly interested in my eyesight and answering any questions. He has this great enthusiasm for eye care."

So when Quinn, who lives in the city of Orange, started writing his will, he decided to include the eye institute.

"I wanted it dedicated to the care of young people," he said. His \$2 million bequest aims to create a chair in pediatric ophthalmology as well as help the institute's eye mobile, which provides care for underserved children across Orange County.

"I love the eye mobile," Quinn said. "Imagine how much good that does, traveling to neighborhoods in need and having youngsters be examined and given glasses or treatments or advice."



Understanding children's vision needs

Dr. Donny W. Suh, Gavin Herbert Eye Institute's new chief of pediatric ophthalmology, understands the needs of underserved children because of his own childhood experiences.

"I grew up in Korea with my mom and a brother," he said. "Many of my friends had eye problems that needed medical attention, including me. Fortunately, I met great people, amazing people, along the way who helped me and gave me hope. I learned that there are many people who care about others."

This led him to write a book called "Catching a Star: My Story of Hope," with all the proceeds going to vision care for underserved children. While working in Omaha, Neb., he was inspired to bring help and hope to children through a mobile eye clinic, a collaborative effort with community leaders. By linking medical expertise with community support, the Omaha clinic became a huge success, bringing vital vision care to needy youngsters.

"Childhood is a critical time for vision development," Suh said. "Nearly 80% of what a child learns in school is presented visually, making good vision very important for children's successful development. In terms of fine motor skills, interactive skills and social skills, good vision can make a huge impact."

He's seen the results when kids are fitted with their first prescription glasses.

One child told him, "I didn't know the trees have so many leaves," he recalled. "They also became more engaged with school activities and sports, and exhibited a palpable new sense of hope and a new enthusiasm for life."

When Suh considered joining GHEI, its Eye Mobile for Children program immediately caught his attention. The program, which began providing services in 2015, now offers vision screening to about 5,000 children a year at elementary schools and some preschools in Orange County.

UCI Health Eye Mobile

Six years of quality eye care for children

Why is clear vision important for kids? Young children with undiagnosed vision problems can have difficulty perceiving the world around them and fall behind in school.

The UCI Health Eye Mobile for Children offers vision checks to needy children who lack access to such care. It travels to Orange County elementary schools, Head Start programs and community centers.

20,574 Kids screened by the UCI Health Eye Mobile for Children Program since 2015

2015 —————> 2021

4,078
Children given a comprehensive eye exam

2,822
Children given prescription glasses

377
High-risk children who received sub specialty referrals

78
Schools visited in Orange County



2019 Angel Light Academy Above and Beyond Honoree for excellence in community leadership and service

We know good vision is critical to the success of school-age children. The eye mobile program's mission is to provide vision screenings, and prescription glasses when needed, to help ensure that young children in Orange County have their best shot at success.

Donny Suh, MD
Chief, Pediatric Ophthalmology at UCI Health

Our Approach

The Eye Mobile for Children is a model public health program that addresses the barriers to vision care faced by underserved young children. Our mission is accomplished at no cost to families.



INTERVENTION, OUTREACH, EDUCATION
We provide early childhood vision care and information about eye health to families and teachers.



FOLLOW-UP CALLS
We check back with parents and teachers of all children screened who need glasses.

6

5

1

VISION SCREENING

We use handheld devices for vision screening at locations across Orange County.



2

EYE MOBILE EYE EXAMS
When children are referred for glasses, an optometrist performs an eye exam with dilation.



3

DELIVERY of GLASSES
A child who needs glasses receives them at no cost to their families.



4

EYE CARE REFERRALS

Children needing specialty care are referred to a pediatric ophthalmologist



6 steps
to better vision

UCI Health Gavin Herbert Eye Institute

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EVENTS

Community lectures

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Registration is easy. Access the registration form using this QR Code or register at:

www.uci.edu/lectureRSVP.html
949-824-7243

Cataracts and Glaucoma

Jan. 11, 2022 | 7–8 p.m.

Cataracts: the current state of cataract surgery. Current options and the patient journey
Marjan Farid, MD; Sumit (Sam) Garg, MD

Oculoplastics

Feb. 1, 2022 | 7–8 p.m.

Sags and Bags
Lilangi S. Ediriwickrema, MD

Dry Eyes

Mar. 8, 2022 | 7–8 p.m.

Eye drops and procedures to treat your dry eyes
Olivia Lee, MD; Matthew W. Wade, MD

AMD

April 5, 2022 | 7–8 p.m.

Age-related macular degeneration: Changes in vision and long-term prevention
Andrew W. Browne, MD, PhD

Neuro-ophthalmology

May 10, 2022 | 7–8 p.m.

Seeing Double
Vivek Patel, MD

Pediatrics

June 7, 2022 | 7–8 p.m.

Progressive myopia: why does my child's prescription change frequently
Donny Suh, MD

LASIK Surgery Seminars

Feb. 10, 2022 | 6:30 – 7:30 p.m.

March 10, 2022 | 6:30 – 7:30 p.m.

Medicine in Our Backyard

Newport Beach Public Library Foundation

Jan. 24, 2022 | 6:30 – 7:30 p.m.

Glaucoma vs neurological disease – diagnosis and management: What it means for me as the patient.
Vivek Patel, MD, Austin Fox, MD

Register at

nbplf.foundation/programs/medicine-in-our-backyard

CLINIC LOCATIONS

Irvine

850 Health Sciences Road
Irvine, CA 92617

To make an appointment, call 949-824-2020

Orange

101 The City Drive South, Pav. 2, Bldg. 30A
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