

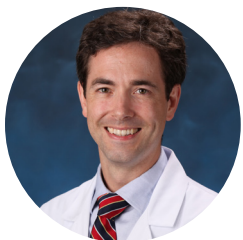
SHINE the LIGHT

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RESEARCH

Ahead of the curve



Dr. Andrew Browne

For years now, Gavin Herbert Eye Institute (GHEI) has been at the forefront of diagnosing and treating eye disease.

Now its diagnostic work is reaching a whole new level: using the eye as a window to the body, to see signs of physical ailments afflicting completely different organs. Work on next-generation eye imaging at GHEI's Center for Translational Vision Research also promises far more sophisticated diagnostics.

"The eye is the only part of the body where there is the ability to look through a perfectly clear lens at small blood vessels and neurological tissue," said Andrew Browne, MD, PhD, a GHEI ophthalmologist and biomedical engineer.

That's important, he explained, because blood flows through every organ in the body and the ability for blood to flow is affected by many diseases. Signs of inflammation or infection can be seen in the blood vessels of the eye, offering clues to things that have gone wrong elsewhere.

Modern eye imaging easily reveals diabetic eye disease, for example.

"Diabetes can cause blindness because it affects how the body handles sugar, and high sugar levels can damage blood vessels everywhere in the body including in the eye," Browne said. "It is not uncommon for ophthalmologists to diagnose diabetes based on findings in the eyes. Unfortunately, if someone has severe diabetic eye disease, there is a higher risk of them having serious kidney disease as well."



Inflammation caused by the autoimmune disease lupus can also affect the blood vessels of the eye. And by looking at neurological tissue in the eye, doctors may be able to detect signs of Alzheimer's disease.

"Alzheimer's disease affects neurons in the brain," Browne said. "The accumulation of waste products in the brain results from neurons not working properly, resulting in neuron death. We can very precisely measure the amount of, and detect loss of, neurological tissue in the eye associated with Alzheimers."

The ability to visualize tissue damage through imaging may increase exponentially with a new technology under development called two-photon imaging, which has been used in basic sciences for decades, Browne said. Internationally known vision researcher Krzysztof Palczewski, PhD, professor and Irving H. Leopold Chair of Ophthalmology at GHEI, and his team have developed a two-photon microscope that can be used with animals. The Center for Translational Vision Research, led by Palczewski, is now adapting it for imaging the human eye.

"Two-photon microscopes are very sophisticated and can look at living tissues and see their structure with much higher resolution," Browne said. "More importantly, two-photon imaging can see how well the tissue is functioning. This is achieved by shining very sophisticated high-frequency pulses of invisible light at the tissue and observing how the tissue glows."

Glows?

"Many chemicals are responsible for vision and a good number of them glow," Browne explained. "When they are present or absent inside the cell, that glow tells you how well the cells can function.

It will be a huge advancement in diagnostics," he said.

"This is next-generation imaging. You could compare it to the tricorder in Star Trek, it's that much of a step ahead."

MESSAGE FROM THE CHAIR

Despite the pandemic that has created so much havoc all around us, remarkable achievements have occurred at Gavin Herbert Eye Institute in recent months.

I'm thrilled to announce that our Center for Translational Vision Research has been named a provisional Organized Research Unit at UC Irvine. UCI Vice Chancellor for Research Pramod Khargonekar was instrumental in making this happen. Now we can begin the work to make it a full-fledged organized research unit at the university.

This prestigious designation recognizes interdisciplinary research at the university and eventually leads to both guaranteed funding and pathways to other sources of funding.

Another important development is a \$2 million gift from the Allergan Foundation to establish another endowed chair for GHEI, our fourth. We will have more information about this wonderful gift to the institute in coming months.

Of course, we all are thinking about COVID-19 these days. It's gratifying to note that two of our faculty are involved in significant research on this health threat.

Lbachir Benmohamed, PhD, professor and director of the Laboratory of Cellular and Molecular Immunology, is a vaccine expert who is working on the development of a possible vaccine against the novel coronavirus, formally named SARS-CoV-2. He has received a \$100,000 Fast Track Award from the Mercatus Fund for this work, as well as a \$60,000 GHEI grant, with more grant applications underway.

M. Cristina Kenney, MD, PhD, professor and director of Mitochondrial Research at GHEI, is evaluating how different ethnic groups might respond to stressors and treatments for COVID-19 by studying specific markers in the mitochondrial genome.

Additional faculty members and students also have won significant awards in recent months.

Philip D. Kiser, PhD, PharmD, an assistant professor of Physiology & Biophysics, received the 2020 Pisart Award for Outstanding Achievements in Vision Science. This is one of the most important awards in ophthalmology.

Prior recipients include some of the most venerated figures in our field. It is an incredible honor.

According to the Lighthouse Guild, which bestows the award, "His innovative scientific approaches and unique knowledge in the field of carotenoid and retinoid research are advancing our understanding of the visual cycle and associated diseases."

Dorota Skowronska-Krawczyk, MSc, PhD, assistant professor of Ophthalmology and Physiology & Biophysics, recently received the BrightFocus Foundation's Macular Degeneration Research award for a project that will characterize the role of lipid metabolism in age-related macular degeneration. In addition, her application received the Elizabeth Anderson Award for outstanding 2020 macular degeneration research proposal.

The Volk Visionary award has gone to our ophthalmology Medical Student Research Team led by Andrew Browne, MD, PhD, assistant professor of Ophthalmology. "Credit should sit squarely on the shoulders of the medical students who go to Panama yearly, although not this year because of COVID-19," Browne said. "Last year, Alex Himstead, Sean Melucci and Janani Prasad took a Volk portable fundus camera to Panama to evaluate the practicality of remote telemedicine in rural underserved areas. They did all of the heavy lifting."

Congratulations to all on their outstanding work and the recognition they have rightly received.



A handwritten signature in black ink that reads "Baruch Kuppermann". The signature is fluid and cursive, with the last name being more prominent.

Baruch D. Kuppermann, MD, PhD

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

Donald S. Minckler, longtime UCI ocular pathology expert, retires



Donald S. Minckler, a renowned expert in glaucoma and the pathology of eye diseases, has retired after serving as the longtime director of the UCI School of Medicine's ocular pathology lab.

Minckler, who joined the faculty of both the departments of Ophthalmology and Pathology in 2006, also served for many years as editor-in-chief of *Ophthalmology*, the journal of the American Academy of Ophthalmology.

"Professor Minckler is a giant in the glaucoma and ocular pathology fields," said Baruch D. Kuppermann, MD, PhD, director of the UCI Health Gavin Herbert Eye Institute and chair of the Department of Ophthalmology. "We are saddened and will miss him tremendously, but we're happy to have benefited from his wisdom all these years."

Much of Minckler's research work centered on the pathophysiology of optic nerve injury in glaucoma and complex glaucoma management. He has published editorials, textbook chapters and more, including 195 peer-reviewed papers.

Minckler earned his medical degree at the University of Oregon. After two years as a U.S. Navy flight surgeon, he completed general and neuropathology training and a residency in ophthalmology at the University of Washington, followed by training in ocular pathology and anatomic pathology at USC and a fellowship in glaucoma at UC San Francisco and Shaffer Associates. Even as a student, he earned a master's degree in biomedical and clinical investigations at USC just before joining UCI.

Minckler has received numerous honors, including the UCI Clinician of the Year award in 2011. He is a longtime member of the Glaucoma Research Society and the American Board of Ophthalmology, for which he served on the board of directors and as chairman.

Kuppermann said it has been a privilege to work with Minckler over the years. "His kindness, gentle spirit, sense of humor and insightfulness are inspiring for all who know him. We wish Professor Minckler a gratifying and long retirement!"

GHEI welcomes Del Valle Estopinal



Dr. Maria Del Valle Estopinal, a specialist in ocular pathology, has been named director of the Ophthalmic Pathology Lab at UCI Health and the UCI School of Medicine.

Del Valle Estopinal, an assistant professor in both the departments of Pathology and Ophthalmology, is an ophthalmologist and board-certified anatomic pathologist with nearly 30 years of medical experience.

Her clinical interests include infectious diseases, eyelid and orbital tumors, and malignant tumors of the ocular surface, eyelid, lacrimal gland and eye socket. She also studies the molecular biology of benign and malignant neoplasms of the eye and adjacent structures.

She has been an invited speaker at many scientific meetings for the American Academy of Ocular Oncology and Pathology and the Association for Research in Vision and Ophthalmology, among others. She also has published in many ophthalmology and pathology journals.

Del Valle Estopinal earned her medical degree at the Universidad del Norte in Colombia, followed by residencies in ophthalmology at Pontifical Xavierian University in Colombia and in anatomic pathology at University of South Alabama. She also completed fellowships in ophthalmic pathology at Baylor College of Medicine in Texas and oncologic surgical pathology at the MD Anderson Cancer Center, also in Texas.

As a specialist in ophthalmic pathology, she is wholeheartedly committed to educating medical students, residents and fellows at UCI. She is fluent in English and Spanish. She succeeds Dr. Donald S. Minckler, who has retired.



AWARDS AND DESIGNATIONS

Major milestone for GHEI

Center for Translational Vision Research designated a provisional Organized Research Unit

One of the major aims of the Center for Translational Vision Research at Gavin Herbert Eye Institute (GHEI) is bench-to-bedside work, in which basic research and clinical practice inform each other in the development of new tests and therapies that are most useful to patients.

That goal is best reached by another important aspect of the center, according to its leader Krzysztof Palczewski, PhD: creating bridges between traditional silos of departmental research at UC Irvine so that people with different backgrounds can pool and build on each other's expertise.

"Typically, a university is divided into schools and each of these schools has its own department," said Palczewski, professor and Irving H. Leopold Chair of Ophthalmology. "But from time to time, you have these projects or ideas that bridge multiple departments and bring them under one umbrella — in our case vision — as a ruling principle."

The center recently achieved an important new milestone in that regard when it was designated as a provisional Organized Research Unit (ORU) by the UC Irvine Office of Research, with Palczewski serving as director. The pORU status recognizes that the center's collaborative interdisciplinary efforts need a different organizational structure than that of traditional departments. They also receive additional financial support to bolster their programs.

The center has already started a Friday lecture series featuring distinguished speakers who are leaders in fields connected to the vision research, said Dziyana M. Aydin, the center's assistant director. "We held a colloquium that brought international speakers to GHEI for a workshop and brainstorming about collaborating on grants and possibly teaching courses together."

Aydin said they are working on the next phase, becoming an ORU with full, permanent status. Efforts include publishing research papers featuring interdisciplinary authors as well as disseminating the center's work at conferences.

Thank you to our donors

Gifts of \$50,000 and above received since July 2019 to the Irving H. Leopold, MD Endowed Professorship:

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Tips for managing low vision

Low-vision problems caused by macular degeneration, retinitis pigmentosa and various other conditions can't always be resolved, but with the right help, they can be made far more manageable, giving patients a better quality of life.

Optometrist Rebecca L. Kammer, who runs the low-vision service at Gavin Herbert Eye Institute (GHEI), offers the following tips for improving low-vision:

INCREASE THE CONTRAST



For patients with macular degeneration or retinitis pigmentosa, sharper contrasts between light and dark colors improves vision. An example of maximizing contrast would be using a black cutting board to slice a white onion, or opening containers of white pills on a black towel. That way, if some spill, it's easy to spot them.

GET A LIGHTING EVALUATION



Proper lighting is crucial. A light evaluation can determine which spectrum of light works best for each patient. For people with macular degeneration, that usually means bright white light. People with albinism require more subdued lighting. It's also important to reduce glare by pointing light downward and using specially tinted lenses.

SEE A SPECIALIST



A low-vision specialist can open the door to a wide range of possibilities, from the newest devices and technologies to engaging experts to adapting a patient's home in ways to help maximize the person's remaining vision.

KNOW YOUR TOOLS



Explore the available tools with a low-vision specialist. Tools may be as low-tech as a magnifying glass or as cutting-edge as an implanted miniature telescope. To find the best tools for each person, it is important to work with a low-vision specialist.

4 tips for improving low-vision

Kammer said that people who suffer vision loss can also learn ways to maximize their remaining vision. Some patients find that they can see things better glancing off to the side rather than looking at objects directly. A specialist can help you understand where and how to make the best the possible use of your eyesight.

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