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Wilmer magazine is published by the
Wilmer Eye Institute Development Office
c/o The Fund for Johns Hopkins Medicine
750 E. Pratt St., 17th Floor
Baltimore, MD 21202

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Wilmer Eye
Institute



Wilmer

ANNUAL REPORT
2020

A Year Like No Other

In a rapid response to COVID-19, Wilmer researchers and clinician-scientists tackled pandemic-related conditions and launched new lines of research while continuing to work toward solving the most debilitating threats to vision.

#1 + #1

BEST OVERALL PROGRAM

BEST RESEARCH PROGRAM

=

the Winning Formula

2020 *Ophthalmology Times*



In addition to a year of great resilience, this year was also one of recognition of the Wilmer Eye Institute, which was named the Best Overall Ophthalmology Program in the country by *Ophthalmology Times* — as well as the Best Research Program. If you are familiar with Wilmer, you know that our founder, Dr. Wilmer, was convinced that excellence in research was not an end in itself, but rather a key ingredient allowing us to provide better care for our patients and be better teachers to our students. The stories in these pages illustrate the wisdom of Dr. Wilmer's insight.

This issue also highlights how our teams of researchers and physician-scientists approach unraveling the mysteries of blinding eye diseases, such as dry age-related macular degeneration, retinitis pigmentosa and diabetic retinopathy, in creative ways that are yielding tangible results toward new treatments for patients. A former chief resident and a former fellow, both now faculty members, demonstrate Wilmer's facility for developing leaders by their winning impressive awards in their respective specialties. Finally, the story of one man, exemplary of so many patients treated here, shows how the combined expertise of Wilmer doctors can transform a patient's life through skill and compassion.

With gratitude for your continued support, everyone at Wilmer wishes you health and happiness in the new year and throughout 2021.

Regards,

PETER J. McDONNELL, Director

As I See It...

Dear friends and colleagues,

The year 2020 was one of exceptional resilience. At the beginning of this new year, we at Wilmer wish to express our appreciation for those who supported us during the last one. We are grateful for the trust of our patients; our doctors, nurses, technicians and staff have worked hard to earn it. The steadfastness of our donors has inspired us to redouble our efforts to treat patients, educate future leaders and make progress in finding treatments and cures for eye diseases.

As one example, the newly established J. Willard Marriott, Jr. Professorship of Ophthalmology will allow its inaugural recipient, Peter Gehlbach, to continue his groundbreaking partnership with the Whiting School of Engineering in the field of robotic retinal surgery.



The mission of the Wilmer Eye Institute, Johns Hopkins Medicine is to transform medical outcomes in the field of ophthalmology through collaboration and innovation, resulting in compassionate, leading-edge, patient-informed care.

With an unwavering dedication to our founding vision, Wilmer offers:

- A human approach to patient care
- A breadth of leading solutions
- A deep investment in research
- An ability to produce leaders in the field of ophthalmology

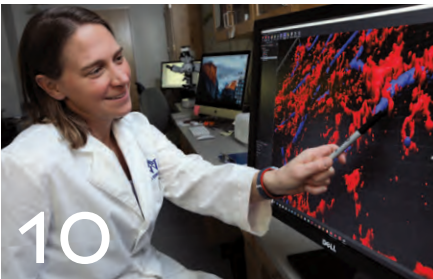
Collaborative and purpose-driven, the Wilmer Eye Institute understands the critical importance of sight, an essential part of the human condition.



To explore more of the Wilmer World, open the camera on your phone, point it at the square to the left, and click the pop up link. This is a QR code that will take you to Wilmer's website.

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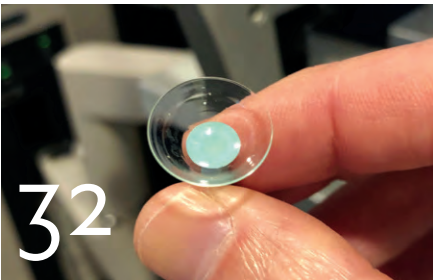
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ON THE COVER: A human choroid with blood vessels stained, showing wet macular degeneration. Read more about research aimed at improving outcomes for this sight-robbing condition on p. 10.

COVID-19: Lessons Learned in the Clinic



The unprecedented circumstances of the COVID-19 pandemic have required quick thinking and effective solutions to keep Wilmer patients and staff members safe during clinic visits. Those leading the charge include patient service coordinators, clinicians and clinic managers, whose jobs transformed overnight.

“We all had one goal in mind, and that’s to make sure that we are taking care of our patients as well as taking care of our team,” says **Percy Jones**, manager of the Wilmer Columbia clinic.

We all had one goal in mind, and that's to make sure that we are taking care of our patients as well as taking care of our team.

— PERCY JONES, MANAGER OF THE WILMER COLUMBIA CLINIC

The pandemic offered an opportunity to rethink the entire workflow of the clinics and examine the patient experience in minute detail, he says.

“Without doing major construction, we literally had to redesign the office,” which in the Columbia clinic involved installing acrylic barriers at the front desk, marking the floor and roping off chairs to ensure physical distancing and lower density. “It was a challenge, but it also had us work together as a team because it couldn't just be one person trying to figure this out,” says Jones.

The stress caused by the pandemic inspired **Davette Gray**, manager of the Wilmer Green Spring Station clinic, to brainstorm ways to boost the morale of her staff. Even this entailed adjusting to the pandemic environment. For example, Gray has always found that food cheers people, but she could not bring in treats to the clinic. “Instead of having food, this time, we all got together, and everyone brought in a recipe and we made a little cookbook,” says Gray.

While the physical changes made to the clinic may be reversed once the pandemic abates, some adjustments to the patient experience could prove long lasting.

In mid-March, Johns Hopkins Medicine restructured how care was delivered across the organization. “At the beginning of the pandemic, we were encouraged to look at the schedules ahead of time to determine the urgency of the patients — if they actually physically needed to come into the office,” says Jones. This triage process was a collaborative effort between ophthalmic technicians, optometrists and ophthalmologists.

“The triage is much stronger [now],” says **Donna Vierheller**, assistant administrator at the East Baltimore location for Wilmer, who oversees the management of all 10 clinics at East Baltimore.

According to Vierheller, doctors have become more accurate when determining how many patients they can see on a clinic day based on how much time they will likely spend in the exam room. This knowledge, paired with a stronger triage process, means Wilmer has been able to accommodate 90 percent or more (depending on the specialty) of the pre-pandemic patient load while still meeting the new requirements for physical spacing and reduced density.

Another important change in the clinic workflow is something called

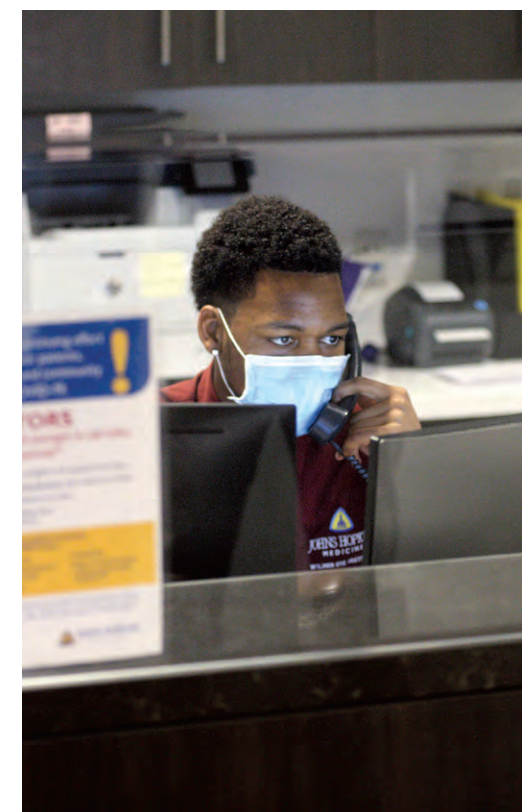
“pre-charting,” says Vierheller. To reduce the length of in-person interactions, some patient information (such as medical history) can be gathered over the phone before the appointment, rather than in person. “We wanted to be able to call the patients a day ahead of their visit and basically start the exam,” Vierheller says.

A final change has involved patient communication. A patient now receives a notification to do a COVID-19 screening. A button appears post-screening that allows the patient to complete an e-check-in. Gray says this has “transformed” the patient experience because when they arrive, “within a few minutes, the technician is calling them because — guess what? — they already went online.”

She believes patients will continue using e-check-ins even when no longer prompted to do COVID-19 screenings because it makes the patient visit much faster.

The challenges of the COVID-19 pandemic have affected everyone across the world in all aspects of life. The way Wilmer staff members have met those challenges has impressed all three clinic managers.

“My team here is absolutely amazing. They're resilient. They're hardworking,” says Gray. “I'm truly humbled by this entire experience and how everyone just came together to make things happen. And we're still doing that.” ●



In an exam room and at the front desk of Wilmer's Bethesda clinic

COVID-19 Research Roundup



Casey Keuthan
Postdoctoral Fellow

COVID-19 on the Mind

In early March 2020, **Casey Keuthan, Ph.D.**, joined the lab of **Don Zack, M.D., Ph.D.**, Wilmer's Guerrieri Professor of Genetic Engineering and Molecular Ophthalmology, to study stem cell-based therapies for preserving and regenerating the optic nerve. Two weeks later, the lab shut down because of COVID-19. During the pause in his lab's research, Zack asked his researchers if they would be interested in helping out with any COVID-19 projects that had recently started in other labs. Keuthan said yes.

She went to work in the lab of **C. Korin Bullen, Ph.D.**, who was spearheading a multidisciplinary project "to see if the SARS-CoV-2 virus could potentially infect neurons," says Keuthan. Their work involved infecting 3D organoid cultures — referred to as "mini-brains" — with the virus, collecting the cultures after a certain amount of time and testing the cells for the presence (and if present, the amount) of the virus.

"We did find that the mini-brains could be infected with the virus. This was some of the first evidence that neurons could potentially be directly affected by the virus itself," says Keuthan. They also demonstrated that "not only can it get in, but it can also proliferate and continue to make more copies of itself." The research team published the results of the experiment in the October 2020 issue of the peer-reviewed journal *ALTEX* — *Alternatives to Animal Experimentation*.

Keuthan points out that COVID-19 is so new that any information about how it works in the body is helpful. "There have been many reports about neurological symptoms that are associated with patients who have COVID-19," says Keuthan.

"We don't know the long-term effects of the virus in the neurons. And in terms of developing drugs that will treat the virus, this might be important to know because a lot of drugs might not be able to cross the blood-brain barrier or the blood-retina barrier as easily as others could," says Keuthan.

"If you're trying to design therapies for these patients, it would be useful to know that the virus could be [in the brain]. We may want to think of some options that we could use to treat it in those [brain] cells as well."



Bonnielin Swenor
Associate Professor of
Ophthalmology

Filling the Gap for People with Disabilities

Bonnielin Swenor, Ph.D., M.P.H., an associate professor of ophthalmology at Wilmer, created — and now serves as the director of — the Johns Hopkins University Disability Health Research Center to maximize the health, equity and participation of people with disabilities.

When COVID-19 arrived, she observed how public health efforts targeting the general population seemed to miss people with disabilities. Approximately 61 million Americans have a disability, equating to one out of four adults, and disability is most common among older adults, occurring in more than 40 percent of Americans 65 and older — a high-risk group for COVID-19.

To gain a fuller picture of the experience of people with disabilities during the pandemic, her team launched a research project.

"Our qualitative study examines the impact of COVID on people with vision impairment as well as other types of disabilities," says Swenor. "This [involves] doing focus group interviews with individuals from across the country and aims to understand how COVID-19 has impacted their lives across multiple dimensions, including health care utilization, transportation, if they feel that any of their local or national policies have differentially impacted them.

"The strength of this type of study — a qualitative study — is that it gets the individual's perspective and takes a person-centered approach to research," says Swenor. "A qualitative study is intended to create hypotheses." She will launch "deeper quantitative work based on the results of this initial study.

"The goal of this work is to fill what is a really gaping hole in natural disaster and emergency response policies, which often ignore this group of individuals. And so at the end, our hope is to not only publish a paper but also to create a policy brief to help spark more immediate change to fill that gap," says Swenor.

COVID-19 RESEARCH ROUNDUP



Elia Duh
Professor of
Ophthalmology

Surface Deep: SARS-CoV-2 and the Eye

When reports about COVID-19 began surfacing, **Elia Duh, M.D.**, and **Lingli Zhou, M.D.**, began to notice anecdotal accounts from doctors in China who had become infected despite wearing a mask. They wondered if the infections could have occurred through the eyes.

To answer this question, they needed to determine “whether the ocular surface cells possess the critical elements that would allow viral infection by SARS-CoV-2,” says Duh.

Those critical elements include receptors. “In order for the virus to infect the ocular surface, then it needs a gateway,” says Zhou. “A receptor is like a gateway for the virus to enter our body.”



Lingli Zhou
Research Fellow

From existing research, Duh and Zhou knew the receptor that SARS-CoV-2 needs in order to access the body: the protein ACE2. After the virus binds to ACE2, a cellular protein called TMPRSS2 facilitates virus entry into the cell. The researchers set out to discover whether these two proteins exist on the ocular surface.

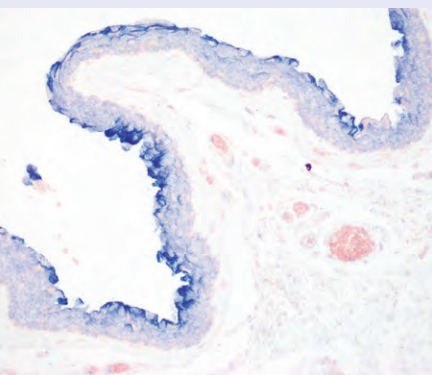
Duh and Zhou acquired specimens from Wilmer colleagues **Charles Eberhart, M.D., Ph.D.**, and **Uri Soiberman, M.D.** “That was very valuable for us,” says Duh. “They also gave us important feedback and ideas as we were developing the research.”

Eberhart also provided critical expertise in the analyses. “My expertise lay in interpreting the immunostains in the various kinds of cells,” says Eberhart. Immunostaining, he explains, is a “tool that lets us recognize and, to some degree, quantify where proteins exist in these cells on the ocular surface.”

“We found those two proteins exist in the ocular surface, and that means the virus could enter the ocular surface through those two proteins,” says Zhou. This experiment is the first step. Just because the virus can enter using these proteins does not mean that it does. The next step is to see if the virus does enter the ocular surface and infect those tissues.

Still, the rapidity of answering the first question surprised all of the researchers. “Within two weeks, we did the bulk of the work. In the third week, we cleaned it up and wrote the paper. The whole thing was a month beginning to end,” says Eberhart. The paper was published in the peer-reviewed journal *The Ocular Surface* in October 2020.

Duh credits the speed to the enthusiasm of colleagues in contributing to the project. “One of the big strengths here at Wilmer is that we have a collection of expertise and a strong spirit of collaboration,” says Duh.



An immunostaining image showing the ACE2 receptor, in blue, on the surface of the human conjunctiva



Megan Collins
Assistant Professor of
Ophthalmology

Equitable School Reopenings

Megan Collins, M.D., M.P.H., a Wilmer pediatric ophthalmologist, spent the majority of the last year focused on a topic that had been on no one’s mind at the beginning of 2020: school reopenings.

Collins is the co-principal investigator of Vision for Baltimore, a public-private research partnership designed to provide all Baltimore City Public Schools’ students with vision care, including glasses if needed, and to evaluate the impact of eyeglasses on academic performance. Prior to the COVID-19 pandemic, Collins also co-founded, and now co-directs, the Johns Hopkins Consortium for School-Based Health Solutions. A collaboration between Johns Hopkins’ schools of medicine, education, public health and nursing, the consortium develops and improves the delivery of school-based health care programs.

Both Vision for Baltimore and the consortium have built health care delivery services around physical school buildings, so when the pandemic caused schools to close, Collins and her colleagues had to think quickly about how to continue to provide services that children needed.

The consortium is putting together policies and guidance that schools and school systems can follow to plan how to open safely.

“The consortium is squarely in the middle of how you develop pathways forward, both from developing the testing and contact tracing infrastructure as well as the communication and engagement,” says Collins.

In the wake of school closures last spring, Collins and her consortium partners were well situated to begin conversations with stakeholders about a corollary to school closures and reopenings: equity.

The consortium discusses “this is how you test, this is how you trace,” says Collins. “How you implement that is entirely dependent on what resources and infrastructure you have within a community.” To address this challenge, members of the consortium teamed up with additional faculty members from the schools of public health, education and medicine, and the Johns Hopkins Berman Institute of Bioethics to create the eSchool+ Initiative.

“We recognized that all children are negatively impacted by school closures, but kids from low-income and disadvantaged backgrounds are going to suffer disproportionately,” says Collins.

“eSchool+ is working on guidance about how do you think about these different populations, how do you think about supporting English-language learners, children with special education needs, children of color, children from low-income families?” says Collins.

Migrating Cells and Their Path of Destruction

From left,
Malia Edwards and
Gerard Lutty



Müller cells are a type of glial cell found in the retina. These cells have been something of an overlooked middle child of eye research for a long time, says Wilmer's **Malia Edwards, Ph.D.**, a recently appointed assistant professor who is exploring the glial cell's role in perpetuating age-related macular degeneration (AMD), the leading cause of blindness in those 50 and older.

Müller cells were once thought to play only a structural support role in the eye — the glue that holds everything together, Edwards notes. But she has been investigating the tendency of the glia to migrate out of the retina to other areas of the eye.

“Müller cells, which are usually very linear, start to lose that linear shape in AMD and begin to extend and migrate out of the retina, making these unusual membranes on top of and below the retina,” Edwards explains. She believes that the mechanisms stimulating glial changes may also play a role in retinitis pigmentosa and diabetic retinopathy.

Those membranes have several consequences in both the wet and dry forms of AMD. In the wet form, Edwards has shown that the glia develop into a membrane atop the retina over the diseased area with choroidal

neovascularization. Importantly, these membranes are not visible to clinicians. Interestingly, the glia also appear to express a protein, VEGF, that is blocked to treat wet AMD. Edwards theorizes that the glial cells, therefore, might bind the treatment before it has a chance to reach its target. This could contribute to differences in treatment efficacy between patients. Understanding how and why these membranes form could help improve treatment of wet AMD and, potentially, other conditions with similar membranes.

In dry AMD, Edwards has noted that the glia also appear to extend and migrate to form similar membranes on the underside of the retina, between the retina and the layer immediately behind the retina. Known as the choroid, this layer of tissue provides nutrients and oxygen to the outer retina.

That avenue of research has been perhaps Edwards' most promising and a focus of much of her decadelong research partnership with her mentor-turned-collaborator **Gerard Lutty, Ph.D.**, one of the world's foremost experts on the study of the choroid.

"We basically split the eye in half. He takes the choroid, I take the retinas, and we are able to see how changes in the choroid and the retina affect one another," Edwards explains.

"In their migration under the retina in dry AMD, the Müller cells are likely releasing chemicals that communicate with the choroid that prevent the blood vessels from growing and seems to make the choroidal blood vessels die," Lutty says. "Regardless, it's a destructive process to the retina and choroid."

Stem cells offer a potentially sight-saving treatment option for dry AMD, but the Müller membranes may form a wall-like structure, potentially blocking stem cell transplants and drug therapies from reaching their intended targets, Edwards says.

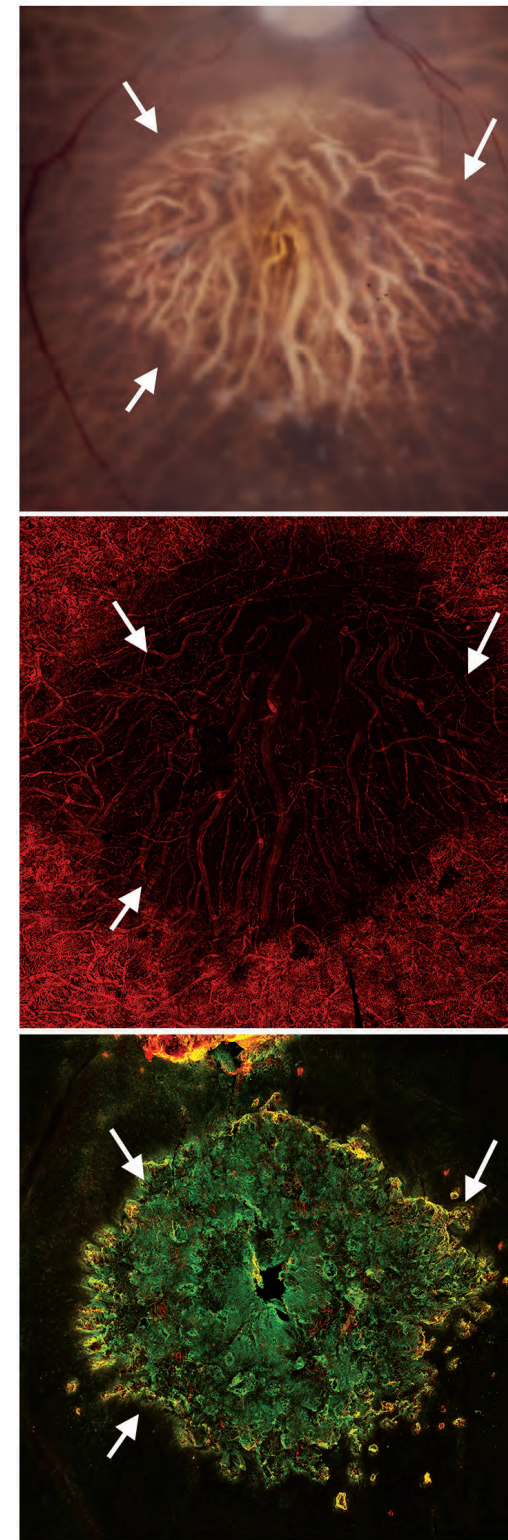
The collaboration between Edwards and Lutty began in 2009, when Edwards joined Lutty's lab as a postdoctoral researcher. As Edwards' career ascended, she began to establish her own independent research and now has her own lab — right next to Lutty's in the Robert H. and Clarice Smith Building at Wilmer. It's a professional progression

all mentors hope for, Lutty says. The collaboration remains as close as ever.

"We share lab space. We share thought processes. We share tissue. And we are still working together as a wonderful team," Lutty says.

Philanthropy has played a key role in their partnership. Lutty is the G. Edward and G. Britton Durell Professor of Ophthalmology, a professorship established and endowed by the Altsheler-Durell Foundation, a family foundation chaired by David Durell. The Durells' gift has allowed Edwards and Lutty to purchase camera equipment and tools for creating animal models that are not covered through their grants from the National Institutes of Health.

"The Durells have been exceedingly good to us, and their philanthropy has advanced our work," Lutty says. "We are deeply grateful to them for their generosity and support through the years." ●



An eye with dry AMD demonstrates how Edwards and Lutty share the eye. The top image is similar to a fundus photograph of the eye. The middle image shows the choroid with the blood vessels stained. The bottom image is the corresponding retina stained with glial cells labeled. The glial cells create a large membrane in the diseased area. In all images, the diseased area is within the arrows.

Toward Earlier Diagnosis of Diabetic Retinopathy

Diabetic retinopathy is one of the most prevalent, and most vexing, of ophthalmological diseases. That is precisely why Wilmer's **Mira Sachdeva, M.D, Ph.D.**, has focused her research skills upon this blinding condition that affects more than 100 million people worldwide. Sachdeva, a former chief resident at Wilmer and now an assistant professor, studies how the retinopathy begins in the early stages of diabetes.

"Diabetic retinopathy is classically considered a disease of the blood vessels in the retina, but we are interested in how diabetes damages retinal nerves as well," Sachdeva says of her approach. "There's more and more evidence that patients with diabetes demonstrate retinal thinning and loss of nerve tissue long before we see any damage to the blood vessels, so the earliest harmful effects of diabetes on the retina may occur before a patient is even diagnosed with diabetic retinopathy."

Sachdeva is using the very latest medical imaging technology to study the changes

in nerves and blood vessels in diabetic retinopathy. These imaging techniques provide an unprecedented view into the eye, where she aims to track retinal thinning and changes in the nerves and blood vessels over long periods of time in patients, starting in early diabetes.

Such knowledge, Sachdeva says, raises the possibility of earlier diagnosis, and potentially earlier interventions, that could reduce or stop progression of the disease. These studies complement Sachdeva's work in the lab investigating exactly how the retina's cells are affected in diabetes.

Though Sachdeva has been thinking about these various approaches since the outset of her career, there's only so much she can tackle at once. Like all young researchers, Sachdeva continues to face the hurdles of getting her lab staffed, equipped, and up and running, all while juggling her clinical responsibilities.

"Getting equipment that I need, the infrastructure, the personnel are big challenges," she says. "And then there are the mouse models and cell lines that must be developed. These are essential for any research to begin."

These logistical and financial barriers can often delay a promising research career for years. But Sachdeva's ideas showed enough promise that she was awarded early-career investigator funding from both the National Eye Institute and Research to Prevent Blindness to support her lab research.

Building a clinical research arm studying diabetic retinopathy in patients requires even more demands on time and funding. Based on her innovative research proposal, Sachdeva recently earned a Clinical Scientist Development Award from the Doris Duke Charitable Foundation, a three-year stipend specifically to fund the transition to independent clinical research. She was one of just 17 awardees nationally this year. Sachdeva has also been helped by gifts from The Robert P. and Arlene R. Kogod Family Foundation, which recognized her potential from the beginning of her faculty appointment at Wilmer. She says such funding has proved foundational in getting her research career off the ground. ●

Above: "The Doris Duke Foundation award and the Kogods' generosity have propelled my career and are allowing me to pursue newer avenues of research. Thanks to them, I'm excited about the possibilities," says Mira Sachdeva.





Peter
Campochiaro

NAC Attacks Retinitis Pigmentosa

Contrary to popular perception, retinitis pigmentosa (RP) is not a disease caused by a single genetic defect; it is a condition caused by many different genetic defects. The common thread is that each of the genetic defects kill “rod” photoreceptors in the retina — which make up 95 percent of the retina’s light-sensitive cells — leaving the other 5 percent, the “cones,” virtually untouched.

Thanks to those remaining cones, patients with RP are able to see early in the disease but have reduced vision at night and in low-light settings. However, over time, cones gradually die, resulting in constriction of the visual field and causing tunnel vision and eventual blindness. A major contributor to cone damage and death is oxidative stress. There is no cure and not a single drug on the market offering hope, but **Peter Campochiaro, M.D.**, Wilmer’s George S. and Dolores Doré Eccles Professor of Ophthalmology and Neuroscience, is about to change that.

In 2021, he will begin a phase III trial of a drug he has been investigating for years, known as N-acetylcysteine — NAC for short — that reduces oxidative stress and thereby provides some protection for cones. A phase III trial is the penultimate stage of drug approval. If this stage is successful, Campochiaro and colleagues will have delivered the first drug treatment for retinitis pigmentosa. He called the phase II trial Fight RP. Phase III has been dubbed NAC Attack.

“In an initial clinical trial, NAC caused some short-term improvement in cone function. The next trial will determine if long-term treatment can prevent cones from dying and prevent progressive loss of visual field. That research will require four years of testing, so there’s work ahead,” Campochiaro says. NAC is already approved by the U.S. Food and Drug Administration (FDA) for treating another condition, which accelerates the approval process, as the drug is already shown to be safe, he notes.

RP is a genetic disease that gets handed down generation to generation, like some perverse lottery. So far, science has identified more than 50 genes involved in the various forms of retinitis pigmentosa. For scientists intent on developing effective gene therapies, it is necessary to pick those genes off one by one — a long, laborious process. NAC has the potential to help all RP patients, regardless of their specific genetic mutations.

While the eyes’ cones are initially spared in RP, Campochiaro explains,

“Peter has a gift for the simple solutions. I’m excited for my daughter because the science is proceeding faster than our best-case scenario. We’re grateful to have Peter on our side.”

— MARC SUMERLIN

they gradually degenerate, resulting in progressive shrinking of the field of vision. With nine-tenths of its light-sensitive rod cells dead, the retina no longer utilizes as much oxygen, resulting in excessively high oxygen in the retina. All that excess oxygen produces toxic byproducts that attack the cones, causing critical components to oxidize. The damage builds up over time until the cone is no longer able to function and dies.

“The cones die in a particular pattern, starting with the cones in the periphery of the retina and progressing toward the center, resulting in constriction of

peripheral vision until it is like looking through a tunnel,” he says. The hope is that NAC will preserve the cones and prevent the visual field from shrinking.

Over the years, Campochiaro’s NAC research has been propelled by the faithful support of philanthropists.

“In the earliest days of new research, the support of donors is critical. The National Institutes of Health [NIH] only wants to fund projects it has a strong idea will work,” Campochiaro says. “Philanthropy is the only way early studies can get off the ground.”

Marc Sumerlin knows this paradigm well. He’s been supporting Campochiaro’s research since his daughter was diagnosed with RP five years ago. Sumerlin views Campochiaro as a leader in RP on the global stage. For Sumerlin, the most promising aspect of the NAC study is the fact that NAC is already FDA-approved and therefore deemed safe to use. Too often, he’s seen a promising drug trial start only to be swallowed in the fundraising “Valley of Death,” where initial research is promising but not



Marc Sumerlin and his daughter, Quinn

advanced enough to get NIH or big grants, and the project dies.

“Peter has a gift for the simple solutions,” Sumerlin explains of his high hopes for NAC. “I’m excited for my daughter because the science is proceeding faster than our best-case scenario. We’re grateful to have Peter on our side.”

Another donor is Jonathan Wallace. It was a combined gift from him, his wife, and his brother and sister-in-law that got the NAC study started several years ago. To Wallace, the pace of the research has been inspiring.

“To have a drug in phase III this fast is incredible. The decisions Peter made and the groundwork he laid back then have led to a significant result in a very short time,” Wallace says. “It’s just thrilling to be a part of it.” ●

HOW TO SUPPORT THE WILMER EYE INSTITUTE

Your donations directly impact the Wilmer Eye Institute’s mission to transform medical outcomes in the field of ophthalmology through collaboration and innovation, resulting in compassionate, leading-edge, patient-informed care.

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The image at right shows improvement in microperimetry, a test of visual fields, in a patient who received six months of treatment with NAC in the Fight RP study.

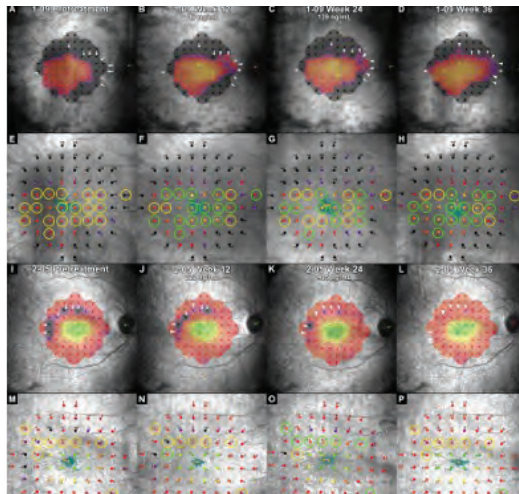




Photo provided by Arpasi-Photography

A Testament to Teamwork

For John Feldmann, deterioration of his eyesight began at the young age of 45, when dry macular degeneration began its assault. By 55, both eyes began clouding with cataracts. It was a family friend who referred Feldmann to Wilmer, where he came under the care of **Neil Bressler, M.D.**, Wilmer’s James P. Gills Professor of Ophthalmology, some 16 years ago.

At that point, Feldmann’s retinal condition appeared to be accounting for most of his decreased vision. So Bressler made the call to monitor the macular degeneration and leave the cataracts alone, since cataract surgery was unlikely to improve his vision at that time.

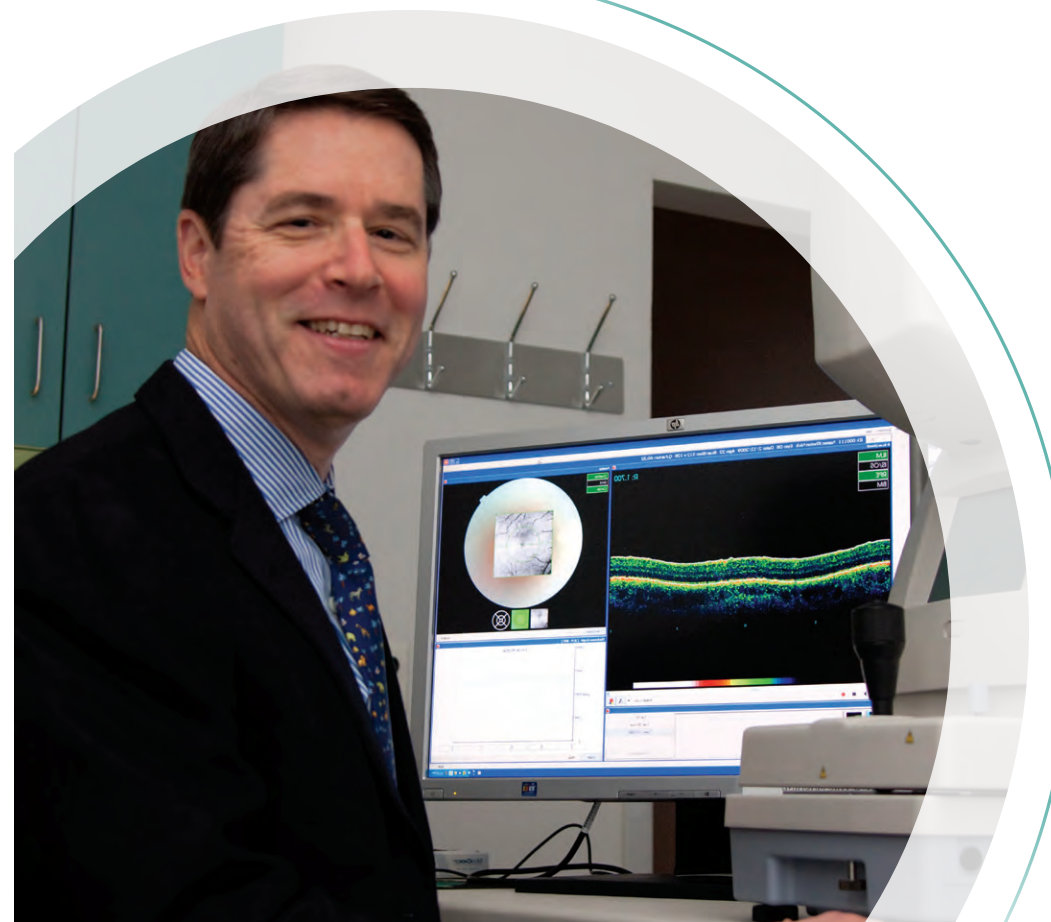
“A decade ago, some ophthalmologists were fearful that cataract surgery might lead to worsening of the macular degeneration,” Bressler says of the decision to hold off on removing the cataracts.

Feldmann was examined and sent home with a then-new home monitoring system, a preferential hyperacuity perimetry system, that allowed his caregivers at Wilmer to keep daily tabs on his condition.

One day, as part of his daily monitoring, Feldmann’s doctors noticed a problem. The monitoring suggested the dry macular degeneration in his left eye had suddenly changed to the wet form of the disease. This was a serious turn. The wet form can lead to rapid vision loss wherein areas of the retina die, never to return. So the Wilmer team initiated treatment for the wet form of his macular degeneration.

By this point in his life, Feldmann, an underwriting manager by profession, was unable to read and therefore unable to do his work. “I’d planned to work until 70, but that didn’t happen,” he says of the dreams he had to let go. “Your sight is something you take for granted, but it can disappear.”

Feldmann could no longer drive, but he did manage to play golf with help from his ever-patient friends and by frequenting a course he had played for years.



On the previous page: John Feldmann (center) and his family

On the left: Neil Bressler

Feldmann next turned to vision rehabilitation for help, going to see **Judith Goldstein, O.D.**, Wilmer's chief of the Lions Vision Research and Rehabilitation Center. She immediately began working with him to enhance his function using his available vision. Goldstein assisted Feldmann in a number of ways. She prescribed a hand magnifier with which he could spot-read his mail. She recommended an Amazon Echo that allows him to use voice command to surf the internet to get the news, weather and other updates. There was also a big-button touch-tone phone that allows him to call his family and friends.

One type of visual assistive equipment in particular transformed Feldmann's life. It was a pair of telescopic lenses that allowed him to sit next to his wife on a couch and watch TV instead of standing two feet from the screen.

"John is a great patient. He is motivated and worked hard to find his new normal," Goldstein says. "It's a big challenge for each patient, and that's why progress depends on the individual. His lived experiences inspired him to join and take a leadership role in the Lions Club."

While the wet form of his macular degeneration remained stable, eventually, Feldmann's vision continued its decline because of worsening cataracts. It got to the point where even the process of counting fingers on his doctor's hand was nearly impossible. It was time to consider removing his worsening cataracts.

At that point, Bressler says he looked to mounting evidence to conclude that removing the cataracts would not exacerbate Feldmann's macular degeneration.

For the cataract surgery, Bressler referred Feldmann to **Ashley Behrens, M.D.**, Wilmer's KKESH/Wilmer Professor of International Ophthalmology, chief of the Division of Comprehensive Ophthalmology and a veteran cataract surgeon. Behrens recalls that first consultation with Feldmann.

"He was in pretty rough shape. He was using a cane, and his wife was actually guiding him into the clinic," Behrens remembers. He told Feldmann not to expect miracles from the cataract surgery. They would remove the cataracts on separate surgeries, one eye at a time.

They started with the good eye, to help realize the greatest benefit to Feldmann's eyesight.

That cataract was so thick that a lot of ultrasound energy had to be used during the procedure, says Feldmann, who was awake and alert during the surgery. The usually 15-minute operation took almost 30 minutes to complete. The outcome was "incredible," according to Feldmann. The vision in that eye prior to surgery was 20/300. After the procedure, the sight was 20/40. Due to that success, the surgeon moved forward with surgery on the other eye.

"Before the surgeries, I could only see shadows," says Feldmann. "Afterward, I'm sitting there in the operating chair.

It was amazing. I could see Dr. Behrens. I said, 'Oh my goodness. I can see you.'"

Suddenly, at 71 years of age, after more than a decade of steadily declining vision, giving up reading, giving up his job, giving up his driving privileges, John Feldmann could see again. His vision improved to 20/40 and, with corrective glasses, that number improved to 20/25. Good enough, Feldmann says, that he was able to make out the stunned expressions on the faces of the employees at the Department of Motor Vehicles when he applied for and received his new driver's license.

"I can't tell you the joy. I have a whole new life," Feldmann says. "It's a testament to what teamwork can really do. I'm forever grateful to Wilmer and doctors Bressler, Goldstein and Behrens." ●



Judith Goldstein
Chief of the Lions Vision Research and Rehabilitation Center



Ashley Behrens
Chief of the Division of Comprehensive Ophthalmology

A 'Forever Contribution'



The thin layers and fine structures of the retina have given it the distinction of being one of the most difficult parts of the human body for surgical intervention. That challenge has not deterred Wilmer's **Peter Gehlbach, M.D., Ph.D.** In fact, it has motivated him to the point that he has dedicated the last 12 years of his professional life to collaborating with engineers at the Johns Hopkins Whiting School of Engineering to invent and develop robotic approaches to retinal surgery. The research team now refers to its exceedingly productive collaboration as "The Whiting-Wilmer Bridge."

"There are so many brilliant minds and dedicated scientists at Whiting," Gehlbach says. "Their technical skill, matched with our clinical understanding of what's actually needed in the operating theater, has been a truly productive pairing. This enduring relationship has led to some exciting and high-impact work together."

Gehlbach humbly acknowledges a continuous stream of collaborative grant funding, numerous patents, peer-reviewed papers, and national and international talks. His pride is most evident when discussing the influence of this collaboration on the many promising young engineering researchers who will now contribute their knowledge and skills to improving retinal surgery. "At some point, we became an internationally recognized team that has changed the future," he says.

Even before that partnership began, however, Gehlbach had made a name for himself by inventing the gastrointestinal chemical pacemaker — for treating patients after surgery who suffer from nerve-based intestinal blockage. After earning his M.D. and then his Ph.D. at the University of Minnesota in cell and integrative physiology (where he identified a role for iron in reperfusion injury to the retina), he completed a residency in ophthalmology at Washington University before moving on to a retina fellowship at the Casey Eye Institute. It was there that he secured institutional research board approval for testing a new method of screening for certain retinopathies using a "wide-field camera." On arriving at Wilmer, Gehlbach was the recipient of a National Institutes of Health K08 award, Knights Templar Eye Foundation

On the previous spread: Peter Gehlbach and student engineers from the Whiting School of Engineering

Right: J.W. "Bill" Marriott Jr. and his wife, Donna



Grant and Research to Prevent Blindness Career Development Award for work in the areas of gene therapy and angiogenesis/anti-angiogenesis.

Recently, Gehlbach's stature was solidified when he became the inaugural recipient of the recently endowed J. Willard Marriott, Jr. Professorship of Ophthalmology, established by the hotelier J.W. "Bill" Marriott Jr. The endowment was years in the making, built through a number of gifts by Marriott, his family, the J. Willard and Alice S. Marriott Foundation, and other contributors. Gehlbach plans to deploy the funds into his academic mission.

As a permanent endowment, the professorship will support future generations of Wilmer researchers as they pursue their best ideas. Gehlbach notes: "It is in this 'forever contribution'

that I am personally most pleased, and all of us at Wilmer are beholden to Bill Marriott and his family for this honor."

The endowment will cover many aspects of the J. Willard Marriott, Jr. Professor's work, including partial support of salary, buying that critical piece of equipment or affording that much-needed resource to advance research. It also allows for the strengthening of collaborative bridges with the Whiting School and other research programs. In that regard, Gehlbach says, the word "important" does not begin to describe the critical role that an endowed professorship plays for a research-focused institution like Wilmer.

"Professorships are the backbone, the ballast, that get us through the lean times — the COVID-19 times — providing flexibility and

allowing our creativity, ingenuity, inventiveness and inspiration to continue uninterrupted," he says.

These are the precise qualities that Bill Marriott hoped to support through his endowment.

"Dr. Gehlbach is a brilliant surgeon and scientist. What makes him especially unique is his secondary appointment at the Whiting School of Engineering," Marriott says. "My family and I are indebted to Dr. Gehlbach and proud that our professorship will support his work. Collaboration is at the heart of discovery and innovation, and it has been a privilege to play a part in ensuring that robotics and retinal microsurgeries continue to develop hand in glove." ●

THE PROMISE OF ROBOTIC SURGERY

The human eye is composed of very delicate structures. The exceedingly fragile retina is the thickness of only two human hairs. A retinal blood vessel, carrying precious oxygen and nutrients, might be the width of just a single hair. A retinal scar that distorts vision may be only half that, and the über-delicate internal limiting membrane is just one-twentieth the thickness of a hair.

And yet, a retinal surgeon must consistently peel away these layers, one by one without error, to repair a damaged retina. Surgically speaking, it's not for the faint of heart. Only the most skilled surgeons even attempt these surgeries, and it is physically impossible for many surgeons to perform surgery on this scale.

In recent years, robotic surgery has begun to empower surgeries that were once unimaginable.

For example, the Intuitive da Vinci Si Surgical System allows a surgeon, peering into an advanced 3D microscope and manipulating the surgical equivalent of joysticks, to "teleoperate" on a patient from across the room.

In the eye, where movements take place on the scale of one-millionth of a meter (a micron), robotic surgery holds particular promise.

While robotic surgical technology is remarkable, there is one thing that robots are decidedly not: They are not yet surgeons. At present, they might better be described as surgical assistants — assistants that make it possible for human surgeons to undertake procedures never before imagined possible. Surgical robots can see in three dimensions. Their gyroscopes sense the finest of movements. Their force sensors allow them to feel forces that are smaller than a human can detect. They have become invaluable tools in the operating room, and their potential to influence the future of microsurgery is virtually limitless.



‘I Love to Teach’

There was a degree of incongruity in two awards that Wilmer’s **Nick Mahoney, M.D.**, received in 2019 from the same organization. He was lauded with both a career achievement award and a Rising Star Award from the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS).

“It’s a bit ironic. I’m only 38 years old, hardly at the beginning or the end of my career,” Mahoney says with a laugh.

His specialization is oculoplastic surgery — plastic surgery in and around the eye. It’s a subspecialty that arose out of the battlefields of World War II, when soldiers needed surgeries to repair wounds to the tissues surrounding their eyes. Today, an oculoplastic surgeon is more likely to see a recovering cancer patient than a war-wounded veteran, but the need is the same.

Mahoney scored his ironic double recognition in part because he has brought fresh thinking to ophthalmology with various computer-assisted learning tools. One key tool is the website learn.wilmer.jhu.edu, a comprehensive collection of ophthalmic training materials, including videotaped lectures, text-based materials, tests and quizzes. It’s a resource that he implemented and currently manages that allows Wilmer faculty members, trainees and medical

students to self-pace their learning and revisit materials as time allows.

“I love to teach,” Mahoney says. “Wherever I’ve been in my career — resident, fellow, faculty member — it always seems I’m teaching those at the stage of their careers that I just completed.”

His facility for teaching is quickly gaining recognition. Mahoney has won awards for excellence in teaching three times since first coming to the Johns Hopkins University School of Medicine in 2010 to complete a fellowship. He is also author of more than 30 chapters in leading medical textbooks and of numerous peer-reviewed research articles. Recently, he received an Outstanding Contribution Award from ASOPRS for his role in creating a 50-year retrospective on achievements in oculoplastic surgery — for which he recorded interviews with 50 oculoplastic surgeons. And in 2020, he achieved a key milestone in an academic medical career: promotion from assistant to associate professor.

On the previous spread: Nick Mahoney in front of the dome of the Billings Administration Building on the Johns Hopkins medical campus

Mahoney has also tapped into the power of technology to advance his subspecialty, oculoplastic surgery. He uses computer-assisted surgical techniques, and he has published multiple protocols for designing virtual surgical implants and analyzing volumetric outcomes after surgery.

He has also developed an iOS app that allows an oculoplastic surgeon-in-training to learn how to optimally resect wounds near the eye. He calls the app FlapCon and explains that — among other things — it allows plastic surgeons to plan ways to close wounds by manipulating geometric shapes. Mahoney has won recognition from the ASOPRS and the American College of Mohs Surgery for his work on FlapCon.

Some of the programming for FlapCon was done with funding assistance from a Johns Hopkins Discovery Award grant; he's even done some of the programming himself. When Mahoney considered potential future directions for expanding FlapCon, he saw an opportunity to partner with the Biomedical Engineering Design Team program at the Johns Hopkins Whiting School of Engineering.

The program brings together design teams to partner with faculty members throughout the university who have the vision to imagine new tools that solve engineering challenges but who lack the technical skill, product design experience or time to turn their novel idea into a powerful tool.

Mahoney guided a team of undergraduate engineering students in the work, along with faculty member Nicholas Durr, Ph.D., co-director of the undergraduate Design Team program and assistant professor in the Department of Biomedical Engineering.

Mahoney says the student team he collaborated with exceeded expectations. What began as a simple tool to better plan wound closures now includes algorithms that estimate skin tension, mechanical stress in the muscle and connective tissue, and how blood flow will be restored to the tissue.

“Each of these physiological dimensions leads to more seamless surgeries,” Mahoney says.

As an example, he points out that future directions of FlapCon will help surgeons avoid an adverse outcome known as an ectropion, in which all or part of the eyelid turns outward, leaving the eyelid's inner surface exposed. FlapCon proactively alerts the user to problematic reconstructions.

“It sort of says, ‘Hey, this suture is creating stress. That could be dangerous,’” he explains of FlapCon.

All of this work takes time and money to develop. Mahoney says he could not achieve so much without the financial support he has received from donors who see promise in his work and in educating tomorrow's surgeons.

“I love to teach. Wherever I've been in my career — resident, fellow, faculty member — it always seems I'm teaching those at the stage of their careers that I just completed.”

— NICK MAHONEY

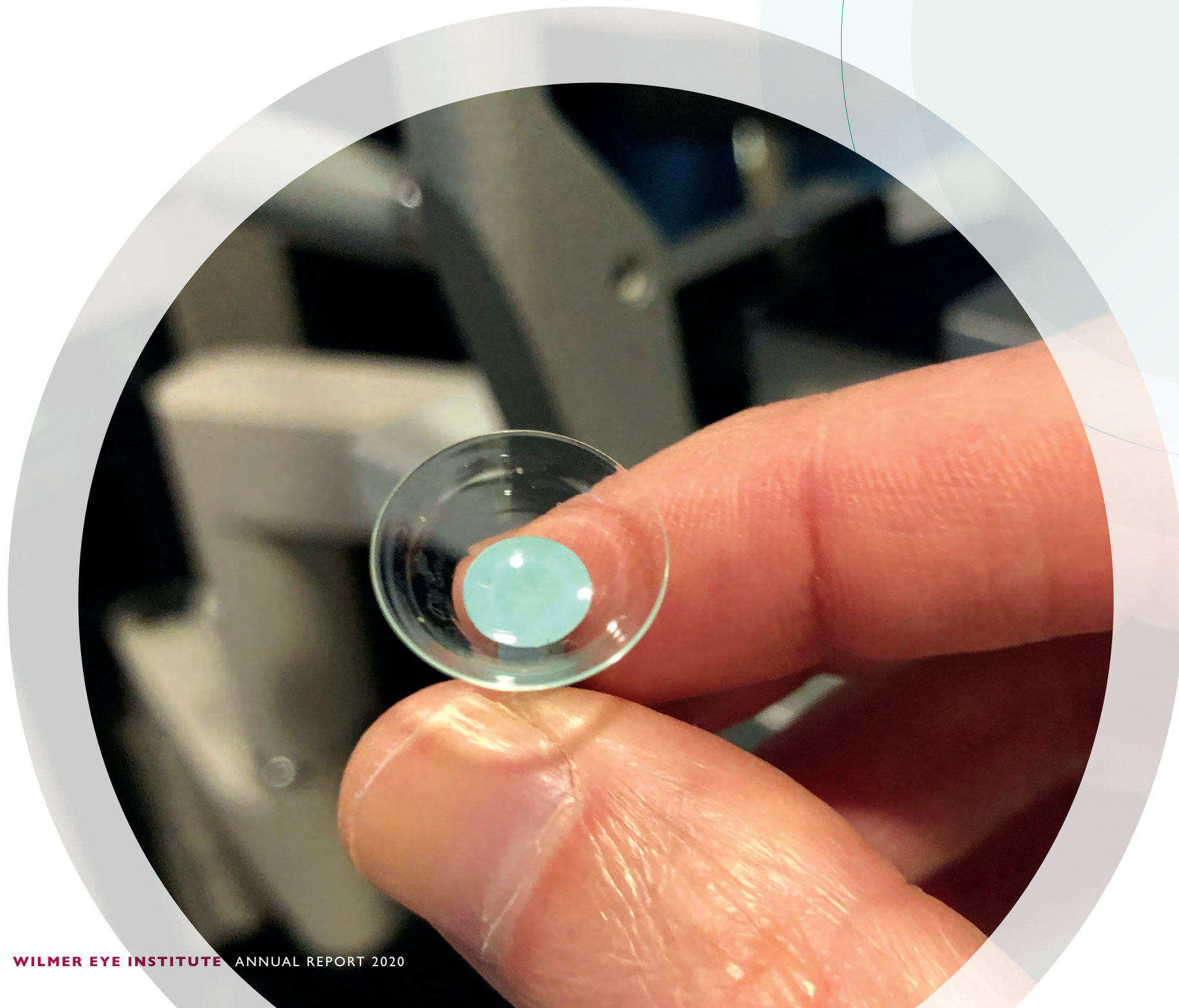
One donor who wishes to remain anonymous says her reasons for supporting Mahoney run deep: “My husband has dementia. Understanding what he needs can be a challenge. Dr. Mahoney is such a compassionate doctor, he was able to figure it out and help,” the donor says. “We want to help train more doctors to be just like him.”

For his part, Mahoney deflects the praise, chalking his success up to the remarkable Johns Hopkins milieu where so many talented people are gathered and share a sense of common purpose. “There's just such commitment to learning and teaching at Wilmer and Johns Hopkins,” he says. “It's hard not to be inspired in this place.” ●



A screenshot from the FlapCon app, which allows surgeons to practice and plan how they will close wounds. The app includes algorithms that estimate skin tension, mechanical stress in the muscle and connective tissue, and how blood flow will be restored to the tissue.

Sharing the Magic



There are people in this world whose dry eye is so severe they cannot open their eyes from the pain. A similar fate afflicts those with severe scarring of the cornea or keratoconus — a condition that deforms the eye and destroys vision.

“They come into your office with two pairs of sunglasses and a visor hat, because bright lights cause extreme pain. It’s hard even to examine them, they are in so much pain,” says Wilmer optometrist **Anisa Gire, O.D.** She is an expert in a surprisingly little-known device known as PROSE — prosthetic replacement of the ocular surface ecosystem. PROSE helps these patients when nothing else will. The devices are made of a gas-permeable material and act like a protective, transparent shield over the damaged eye, floating on a thin layer of saline. They are typically inserted daily and removed nightly.

“It’s instantaneous impact. You put these devices on and it’s like magic. Patients just sit up, and they can take off their sunglasses and their hats and they can go outside. The pain is gone,” Gire says. Even after years of working with PROSE, she is almost as surprised by the transformation as her patients. Not every person will have such astonishing results, which is why specially trained doctors are the key to success. Their experience allows them to carefully select which patients are good candidates.

Left, a scleral lens

Wilmer is just one of 14 eye clinics in the country equipped and trained to administer PROSE. Gire trained with the product’s inventor before coming to Wilmer and is now one of three PROSE-qualified optometrists at Wilmer.

Michelle Hessen, O.D., is another provider who specializes in PROSE and other types of scleral lenses. The lenses are custom-fitted to a patient’s eyes, filled with saline and placed onto the surface of the eye, where they hold fluid against the eye throughout the day. The saline relieves dry eye, and for patients with deformations or injuries, the fluid fills in the surface irregularities, and the lens creates a new smooth surface that protects the eye and improves vision.

“They’re able to go back to their daily activities and have significantly better quality of life,” Hessen says.

Another Wilmer optometrist, **Jeremy Goldman, O.D.**, specializes in what is known as “medically necessary” contact lenses. These are specialized lenses custom-made for people whose glasses are not effective, often due to

“It’s instantaneous impact. You put these devices on and it’s like magic. Patients just sit up, and they can take off their sunglasses and their hats and they can go outside. The pain is gone.”

— ANISA GIRE

corneal imperfections. Scleral lenses, such as the PROSE lens, fall into this category, along with several other types of specialized, custom-designed lenses.

“For many of these people, glasses are not helpful,” Goldman says. “These rigid, gas-permeable contact lenses focus light in a way that the patient’s own cornea can’t, because it has been misshapen or injured from surgery or disease.” The lenses become, in effect, the artificial surface of the eye.

So why aren’t devices like PROSE, and the lenses that Goldman prescribes, better known? Possibly because of their cost. PROSE runs just over \$5,500 per eye. The lenses that Goldman prescribes cost significantly less, but the cost is still prohibitive for many of his patients. While some insurance plans will cover the cost of these devices, Medicare and Medicaid do not. Low-income and

elderly people on fixed incomes who are most in need of these transformative products are often unable to afford them.

So all three optometrists have developed fundraising approaches to purchase the products for those who cannot afford them.

Goldman calls his program G-SLAM — the Goldman Specialty Lens Assistance Method. It’s a pay-it-forward model in which patients who can afford to make a gift are encouraged to do so, to help those less fortunate to afford the lenses.

Sharon Morris is one of those donors. She came to see Goldman after nearly two years in bed, trying to protect a delicate corneal transplant that left her unable to close her eyelids. She was unable to drive, unable to work, unable to do much of anything. Goldman prescribed scleral lenses for her. Since she began wearing the specialized lenses, she has gotten her life back: She can once again drive and work.

Morris became a donor and was eager to contribute to G-SLAM, where her gifts are helping people afford specialized lenses that are not covered by their insurance plans. “Dr. Goldman is such a perfectionist in everything he does. More people should know about him,” Morris says. “It’s like giving people the miracle of sight.”

Debbie Colson is a patient of Gire’s. A lawyer by profession, she suffers from keratoconus, for which she

received corneal transplants in both eyes, one in 1982 and the other in 1998. After the surgeries, Colson tried using hard contact lenses but experienced constant discomfort that made it difficult for her to travel for work, among other problems. She’d almost given up when she came to see Gire, who fit her with scleral lenses.

“Not everyone is as patient and knowledgeable as Dr. Gire. She saved my vision by fitting me with the scleral lenses when I could not tolerate a standard hard lens,” says Colson, who now serves on Wilmer’s Board of Governors and has become a donor to a special fund that helps less fortunate patients afford sight-saving scleral

and PROSE devices. Colson says it’s a small token of appreciation for the difference Wilmer made in her life.

“I couldn’t do what I do without my medically necessary contact lenses,” Colson says. ●



Anisa Gire
Wilmer Optometrist



Jeremy Goldman
Wilmer Optometrist



Michelle Hessen
Wilmer Optometrist

Visionary Philanthropy for Rare Inherited Conditions

Mandeep Singh, M.D., Ph.D., works at the cutting edge of research, using the very latest tools and knowledge of genetic medicine to explore, and hopefully someday solve, enduring problems in ophthalmology. Some of the inherited retinal conditions he researches are so rare that no other scientists in the world are studying them. The work is exacting and time-consuming, requiring the latest lab equipment, patience and, of course, funding to make it happen.

Of the resources at Singh's disposal, the most cherished is people — the sort of highly skilled, creative and detail-oriented young collaborators who will likely have their own labs someday, once they begin attracting the grant funding that fuels most of American medical research. These scientists are difficult to attract and retain, Singh says. In that regard, philanthropy is critical to his high-risk, high-reward explorations.

The Christopher and Christine Hekimian family is among Singh's most generous benefactors. Christopher Hekimian suffers from an extremely rare inherited genetic disorder that is slowly reducing his vision. "It's peering through a slowly shrinking doughnut hole — a small

area of focus surrounded by a wide band of complete blindness," Hekimian says. "It's so rare that they told me I'd have to fund research myself."

For Singh, identifying the exact gene or genes responsible for Hekimian's condition is the first step to a possible cure. Once he finds those genes, Singh can focus on the biochemical mechanisms of the disease, opening avenues for potential drugs to treat the disease or possibly even stem cell approaches that hold the promise of a cure.

Hekimian's eye disease is just one among several genetic conditions that Singh is exploring simultaneously. To speed the scientist's work, Hekimian

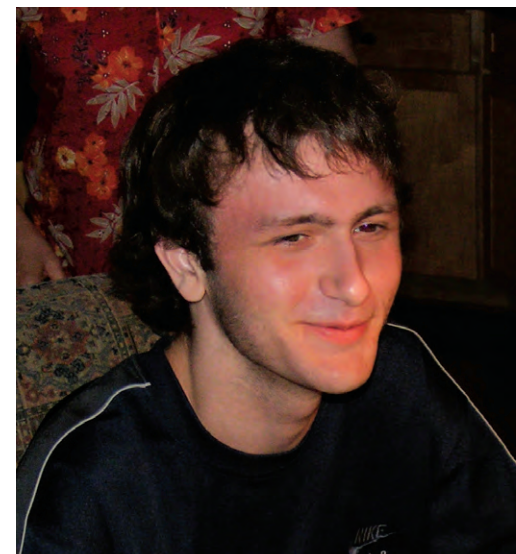
has funded a research position in Singh's lab, the Joseph Albert Hekimian Fellow, a position currently held by **Kanza Aziz, M.D.**, whom Singh describes as "a star." The donation was made in remembrance of Hekimian's son, Joseph, a promising engineering student with a deep love of science who died in 2016 at age 26. Without the support from the Joseph Albert Hekimian Research Fellowship, Singh says he likely would be unable to pursue research into Christopher Hekimian's condition.

Together, Singh and Aziz are working to improve knowledge of genetic eye diseases to serve more families, like the Hekimians, whose inherited conditions often span generations. There are hundreds of genes that might be responsible for any particular disease and a high likelihood that a combination of genes is at work, exponentially complicating the researchers' quest. In that regard, Aziz's contributions have greatly amplified Singh's capabilities in gene discovery and identification,



which could help speed possible treatments down the road.

"The Hekimians' generosity has really catapulted our work to the next level," Singh says. "It gives us the security of getting the right people on board for the right length of time to see projects through to the end. I think Joseph Hekimian would be honored by what we're doing in his memory right now." ●



Above: Mandeep Singh

From left, Joseph Hekimian and Kanza Aziz, the Joseph Albert Hekimian Fellow

Parsing Proteins and Closing Holes



Right: Sharon Solomon at the Maryland State House

For some eye conditions, like detached retina, the name is literal. For others, like floaters, the descriptions are more figurative. For the condition known as idiopathic macular hole, it is a bit of both. First, there is an actual hole in the fovea, the anatomic center of the macula and the precise spot in the eye where fine detail is resolved. Then, there is a hole in the figurative sense of the condition's effect on the patient's vision.

"With a macular hole, the defect in central vision precludes seeing the thing that you're trying hardest to focus on," says **Sharon Solomon, M.D.**, Wilmer's Katharine M. Graham Professor of Ophthalmology and an eye surgeon who is an expert in idiopathic macular holes.

How exactly do macular holes affect reading vision? "Imagine reading the word 'T-H-E' one letter at a time," she says. "For those with macular holes, the 'T' will be distorted or missing altogether as the object of focus, like it fell into a hole."

The problem can be corrected with surgery, but the recovery is intensive, requiring the patient to lie face down for up to a week. "And when we say, 'face down,' we mean your face is parallel to the floor, except when you come up to eat. That's 24 hours per day for a good five to seven days," says Solomon.

No one knows exactly what causes idiopathic macular holes or why the prevalence is so much higher in women. Solomon has collaborated with scientists at Wilmer to find out.

Colleagues **Richard Semba, M.D., M.P.H.**, Wilmer's W. Richard Green Professor of Ophthalmology, and **Pingbo Zhang, Ph.D.**, world experts in the field of proteomics (the study of proteins in living organisms), have helped Solomon elevate this translational research from an idea to a reality.

As she performed surgery and observed the abnormal interaction that the vitreous gel — the transparent colloid that fills the back of the eye — has with the retina, Solomon theorized that perhaps it is the proteins in the vitreous gel that can predispose the patient to developing this blinding condition.

Solomon and the Semba lab embarked on a pilot study to learn how the vitreous of eyes with idiopathic macular holes differs from the vitreous of eyes with normal retinas.

"There are thousands of proteins in the vitreous," Solomon says. "Any combination of them could affect a biological pathway that results in the formation of idiopathic macular holes."



Richard Semba
Professor of Ophthalmology



Pingbo Zhang
Assistant Professor of Ophthalmology

Solomon, Semba and Zhang are the first to identify and publish data demonstrating that there are clusters of proteins that are upregulated or downregulated in the vitreous of eyes with idiopathic macular holes compared with eyes with normal retinas. This research has caught the attention of the National Eye Institute (NEI), as there is now the potential to identify the pathophysiology of this disease process and to possibly develop a marker for disease and a nonsurgical therapeutic intervention.

Solomon is now the national protocol chair of an NEI-sponsored study coordinated by the Jaeb Center for Health Research that plans to narrow the list of likely protein candidates while simultaneously establishing a vitreous biobank for future research.

One patient with particular interest in this research was known for a time by the rather intriguing alias “Patient 007.” Long since self-identified, Marie-Christine Aquarone, a marine scientist, earned the moniker as one of the first to donate her vitreous to Solomon’s study. She has had two holes repaired by Solomon — a macular hole in her right eye in 2013 and a lamellar hole in her left in September 2020.

“Dr. Solomon is truly unique in the medical field, a real gem,” Aquarone says of her decision to choose Solomon as her surgeon and to join the scientist’s important study. “She combines so many great qualities: a doctor who is kind, efficient and thorough, with a great bedside manner, a great researcher, terrific surgeon and excellent teacher.”

“Too often, as a clinician, you have ideas on how to fix things, or at least make them better, but you don't have the time, resources or support to get the job done. Donors make it all possible.”

— SHARON SOLOMON

Another key aspect to realizing translational research like this is funding. For that, Solomon has had the good fortune to enjoy the support of longtime patients, including Thomas O’Neil and Steven Koren.

O’Neil was driving to work about five years ago when his vision suddenly blurred. He had a detached retina. Solomon saw the distressed O’Neil immediately. “She took one look and said she could save my vision ... if we operate tonight,” O’Neil recalls. An operating room was booked for 10 p.m. At 1 a.m., Solomon completed the surgery that saved O’Neil’s sight.

“I was just very grateful and wanted to express that sentiment with a substantial gift to Wilmer in her name,” O’Neil says.

Like O’Neil, the Korens have become grateful patients of Solomon’s —

impressed by her deft clinical skills and bedside manner. One day during a routine visit, the conversation turned to her research. “It didn’t really matter what she was studying; we wanted to help,” says Steven Koren. “We have total confidence in Sharon Solomon.” Gifts like those from the O’Neils, Korens and others allow Solomon the freedom to pursue her research ideas unencumbered by the traditional restrictions of having to first present preliminary data to acquire funding.

“Too often, as a clinician, you have ideas on how to fix things, or at least make them better, but you don’t have the time, resources or support to get the job done,” Solomon says. “Donors make it all possible.” ●



From top to bottom:
Steven and Beverly Koren,
Marie-Christine Aquarone,
and Thomas and Pam O’Neil

Residents

2020–2021



Meleha Ahmad



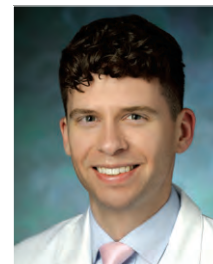
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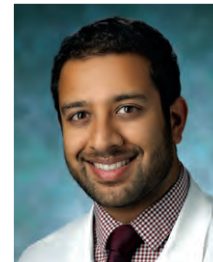
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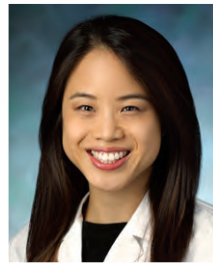
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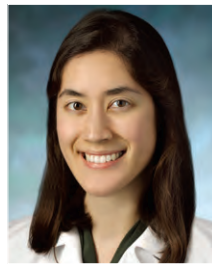
Jacob Light



Ravi Pandit
ASSISTANT CHIEF
OF SERVICE



Ariel Chen



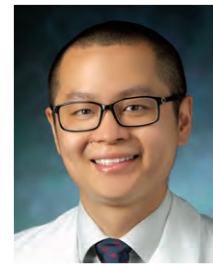
Angela Gauthier



Adrianna Jensen



Jasdeep Sabharwal



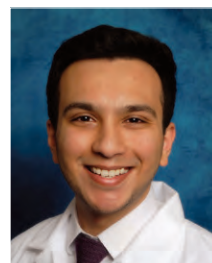
Bo Wang



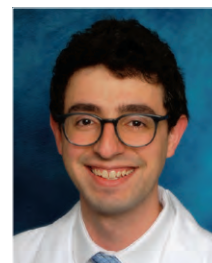
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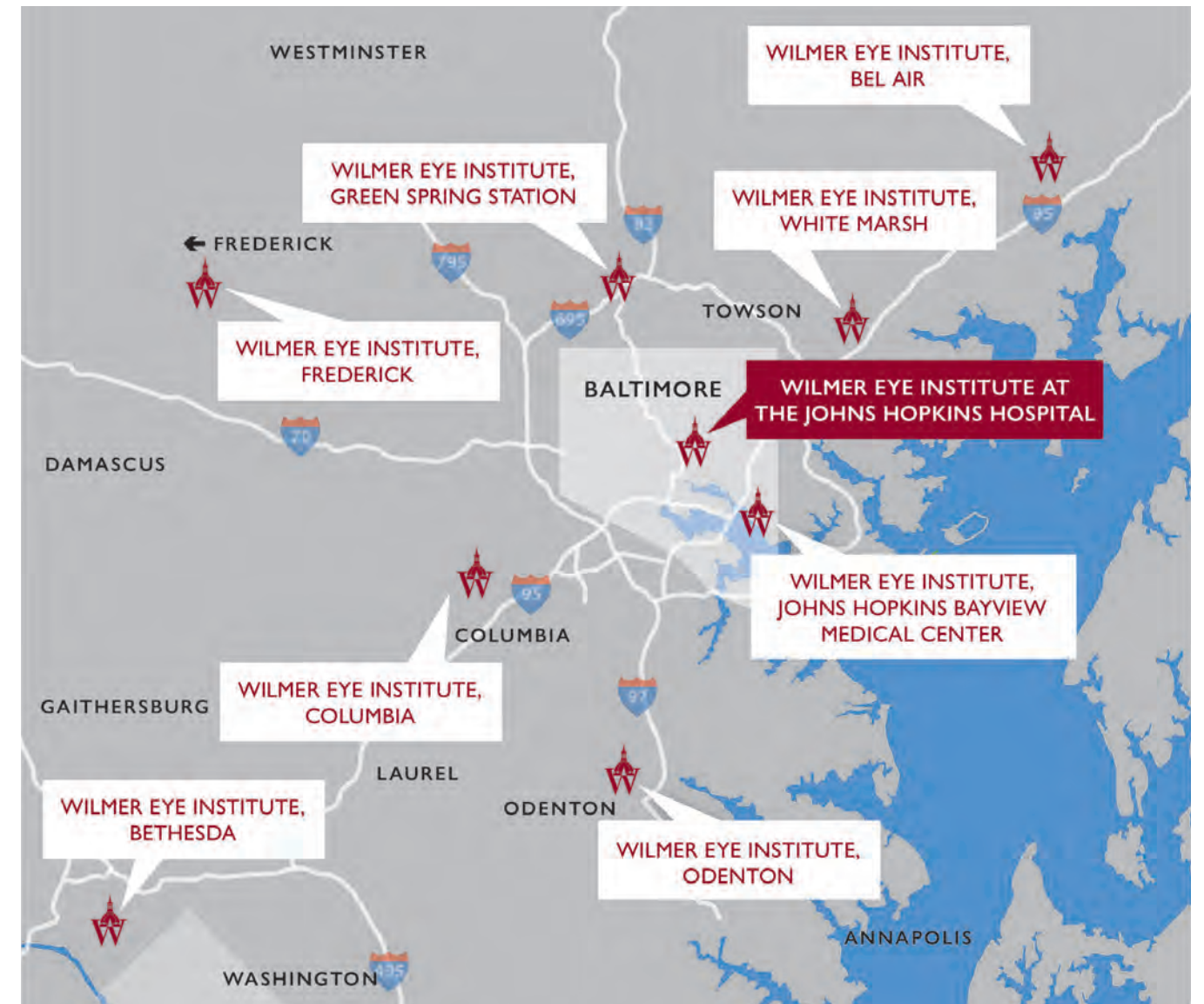
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