



# SightLine

■ Spring 2015

Wilmer Eye Institute at Johns Hopkins



## In the Genes

By working together to investigate new treatments for inherited eye diseases, senior and junior researchers at Wilmer are ensuring continuity in their legacy of discovery.



Dear Wilmer Friends and Family,

In July, the Wilmer Eye Institute will celebrate its 90th birthday. Dr. William Holland Wilmer started us on a marathon course to alleviate human suffering from eye disease, predicated on the strategy that the most progress would be made by putting together patients, expert clinicians, great scientists and stellar young students. Our mission is as important today as it was then, with a recent survey of the

American public revealing that fear of blindness is the No. 1 health concern in the United States, ahead of cancer, dementia and AIDS.

Following Dr. Wilmer's prescription, Wilmer finds itself in the homestretch toward the end of its first century in a remarkably healthy position. With 144 full-time faculty; 1,000 of the most dedicated nurses, technicians and staff; 40 endowed professorships; the most brilliant young trainees; facilities that are second to none in the world in size (greater than 500,000 square feet) and functionality; and active collaborations around the world, Wilmer has never had a greater scope and global reach.

What makes it seem as though we are now in a sprint is the dramatic growth we've seen at Wilmer. Experiencing the demographic tidal wave of the baby-boom generation, Wilmer's clinical practice will once again go through double-digit percentage growth this year as patients travel here from every state, as well as from 84 foreign countries. In the realm of discovery, you will read about studies of gene therapy and stem cells to treat patients with disease. These therapies have moved from the laboratory to our patients. The so-called retina chip was conceived by Wilmer faculty years ago, and today they are inserting these now Food and Drug Administration-approved devices into patients here in Baltimore and at the King Khaled Eye Specialist Hospital in Saudi Arabia, the first hospital in the Middle East to provide this technology. In a dramatic demonstration of scientific acceleration, the light-sensing "retina in a dish" developed under the leadership of Maria Valeria Canto-Soler, Ph.D., promises that before long, we will have the ability to literally replace the eye in patients who are blind.

As Wilmer enters the final decade of its first century, those of us who work here today enjoy the benefits of the wisdom and work of those who came before us—the marathon—plus the exhilaration of the incredibly rapid pace of biomedical innovation—the sprint—and the almost daily increase in our ability to improve the lives of those the world over.

Peter J. McDonnell, M.D.  
William Holland Wilmer Professor and Director

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James Handa in surgery

## ‘Bionic Eye’ Brings Sight to the Blind

**E**lias “Louie” Konstantopoulos loves his morning routine. He ambles to the driveway and picks up the newspaper for his wife. Some days, he counts the cars that pass. Though it sounds like any pedestrian American morning, it is anything but mundane because Konstantopoulos has been blind since 1998. Retinitis pigmentosa robbed him of his sight.

The fact that Konstantopoulos can complete his routine without assistance is nothing short of a miracle. It was made possible by an operation at the Wilmer Eye Institute in June 2009, in which an artificial retinal implant was inserted in his eye.

The implant brings science fiction to life—a true “bionic eye.” Konstantopoulos sports a pair of dark glasses fitted with a camera and a belt-pack computer that beam signals to a grid of electrodes at the back of his eye. The electrodes stimulate cells in his retina and optic nerve, which carries the signals from his retina to his brain. Each electrode in the implant’s modest 60-pixel array can convey about a dozen shades of gray.

The implant allows Konstantopoulos to discern the edge of his sidewalk against a dark green lawn. He can make out the white newspaper against the driveway blacktop. He can watch the blur of cars that pass. He can see again.

“The patient sees dots of light in various shades of gray that allow him to see,” explains **Gislin Dagnelie, Ph.D.**, an associate professor at Wilmer and the associate director of the Lions Vision Research and Rehabilitation Center.

Since clinical trials of the implant first began in 2007, Dagnelie has been the principal investigator, and he has

been instrumental in both the selection of patients and in their ongoing rehabilitation. Last year, the Food and Drug Administration approved the device. To date, 100 or so people worldwide have had it implanted.

“Patient selection is really critical to success. Louie is an engineer and very astute, but he’s still learning. Early on, he could see the cars, but that was about all. Now he can tell a light car from a dark one,” says **James Handa, M.D.**, the Robert Bond Welch, M.D., Professor of Ophthalmology at Wilmer and the surgeon who implanted the device in Konstantopoulos’ eye.

Dagnelie oversees Konstantopoulos’ “brain training,” teaching him how to recognize the images being transmitted to his retina. “He can see shapes, shadows, the contrast between dark and light colors, and has some depth perception. A far cry from the total blackness that was his world for years,” Dagnelie says.

The company that makes the implant is now working on a version with 240 pixels—four times the resolution of the current model—but Dagnelie cautions patience. It will take time. “There is a lot of research remaining to learn how to talk to the retina. It’s really very early for this technology,” he says.

In the meantime, Handa is emboldened by the results. He tells of a woman in Los Angeles who, thanks to the implant, took in the moon over the Pacific Ocean and watched the moonbeams dance on the crashing waves below for the first time in 30 years.

“That was a moving experience,” he says. ■

—*Andy Myers*



# Innovations Strengthen Residency Training Program

When **Divya Sriku-  
maran, M.D.**, be-  
came program di-  
rector of Wilmer's  
residency program

in 2012, it was like stepping onto a moving bus: Big changes—both internal and external—were sweeping the program. So the assistant professor of ophthalmology grabbed the wheel and began to steer the residency in which she herself had trained years earlier.

The changes were both quantitative and qualitative, and they would result in a more engaging program, happier residents and better patient care, Srikuaran says. On the numbers side, Wilmer's program was shifting from seven residents a year down to five as it ended an affiliation with an outside hospital. Meanwhile, the Accreditation Council for Graduate Medical Education had reduced the number of hours that residents may work per week and per shift, in an effort to address fatigue as a cause of medical errors.

The council also had introduced significant programmatic changes.

Previously, residency programs were required to demonstrate only that specific training objectives were included. Now, they must also show that results are being achieved; a set of milestones requires residents to reach certain levels of knowledge and skill as they move through the program, with assessments every six months to measure their progress.

The changes caused Srikuaran and her team to begin restructuring. They revamped the curriculum to suit the smaller number of residents, shifting schedules to balance patient needs with training requirements and making better use of precious time with faculty. For example, many lectures are now recorded so that residents can view them independently and spend face-to-face time interacting with the faculty. Wilmer hired a physician assistant to provide extra coverage in the emergency room and inpatient wards to assist residents, allowing the residents to spend more time in the operating room and pursue other educational opportunities. Last December, the team assessed residents



against the new milestones for the first time—the first step in ensuring they are providing what residents need to learn, and that individual residents are meeting expectations.

Because a residency program is central to a department as a whole, the changes are expected to reverberate beyond the program itself. “A strong residency program definitely makes the whole department shine,” Srikumaran says.

The results are in and show that Wilmer’s changes are already bearing fruit. Residents are logging more time side by side with faculty—the heart of a resident’s experience—allowing faculty to better help them set individual goals and to mentor them along that path. Residents also enjoy more of the spontaneous moments with their mentors that help form professional values and identities. “These opportunities come through off-the-cuff interactions; you can’t force that chemistry,” Srikumaran says.

A clinical competency committee of four or five faculty members reviews residents’ assessments to

measure their progress against the milestones and determine whether they have developed the skills to take on additional responsibilities. For example, first-year residents practice microsurgical techniques in the low-pressure, simulated setting of a practice lab. The work is done under faculty supervision using a stepwise curriculum. Once the residents demonstrate competence, they progress to performing supervised surgery on patients.


Srikumaran has had plenty of help planning and implementing the innovations. One change began before her arrival, when associate professor of ophthalmology **Pradeep Ramulu, M.D., Ph.D.**, piloted a new approach to didactics, introducing case-based teaching scenarios immediately following Grand Rounds in lieu of the traditional lecture format. **Nick Mahoney, M.D.**, assistant professor of ophthalmology and newly appointed associate program director, has organized the milestone assessment process and is currently creating a website to house all resident education

**Residency program leaders Fasika Woreta, Divya Srikumaran and Nick Mahoney, center, with Wilmer residents and faculty.**

materials in one place. Assistant professor of ophthalmology and newly appointed associate program director **Fasika Woreta, M.D., M.P.H.**, supervises the cornea and cataract curriculum—the cornerstone of ophthalmology training. Also, **Shameema Sikder, M.D.**, assistant professor of ophthalmology, worked to develop the microsurgical curriculum and will lead the new Center of Excellence in Surgical Innovation and Education, which promises to offer even more opportunities for surgical simulation and training.

The changes have received financial support from Raymond Nichols, chair and CEO of asset management firm BSC America, who was impressed when he learned of Srikumaran’s work. “I saw what she was doing, and I thought it was something I wanted to allocate funds to and help out,” Nichols says. ■

—Rachel Wallace



# Start Me Up

Thanks to a thriving “ecosystem of innovation,” Wilmer entrepreneurs are more quickly moving their discoveries from the lab to the marketplace.

People at Wilmer refer to themselves as many things—doctors and scientists, engineers and administrators, staff and residents—but these days a growing number are adopting an altogether different title: entrepreneur.

“The ideas flowing out of Wilmer have the power to change lives, and Johns Hopkins is trying to help more of these new discoveries and inventions become products with the potential to transform patients’ lives,” says Christy Wyskiel, a veteran life sciences investor who has recently taken up the mantle as senior adviser for enterprise development to Johns Hopkins University President Ronald J. Daniels. She’s the driving force behind Johns Hopkins Technology Ventures ([ventures.jhu.edu](http://ventures.jhu.edu)).

Wyskiel’s job is to see that more of the transformational ideas pouring out of Wilmer and other areas at Johns Hopkins ascend to commercial viability, and that more faculty, staff and residents become leaders in businesses—as well as in their chosen medical fields.

One such company that Wyskiel was familiar with before she came to Johns Hopkins is GrayBug, started by **Justin Hanes, Ph.D.**, a chemical and biomedical engineer at Wilmer. Hanes has developed promising new nanoscale drug delivery technologies to treat glaucoma, age-related macular degeneration and other eye diseases. GrayBug is developing new ways to deliver existing drugs, many of which must currently be injected directly into the eye on an all-too-regular basis.

Hanes and two other co-founders from Wilmer, **Peter Campochiaro, M.D.**, and **Peter McDonnell, M.D.**, have generated \$5 million in startup funding for GrayBug.

“GrayBug’s technology acts like a time-release mechanism with the potential for reducing the shots to



It can take a village to raise a company, and FastForward is an important part of our village.

— Jordan Green, Ph.D.

once every four to six months or even less frequently,” Hanes says. “GrayBug and companies like it are products of the ecosystem of innovation at Wilmer and the emphasis President Daniels has placed on entrepreneurship.”

The startup culture is alive and well throughout Wilmer, from the most nascent ideas to the more mature. Among the programs established at Johns Hopkins to foster entrepreneurship is FastForward, a technology accelerator that gives emerging technologies a much-needed commercial boost.

“It can take a village to raise a company, and FastForward is an important part of our village,” says **Jordan Green, Ph.D.**, an associate professor of biomedical engineering at Wilmer and one of the co-founders of AsclepiX Therapeutics LLC, which moved into FastForward last year.

AsclepiX was founded by Green and **Aleksander Popel, Ph.D.**, professor of biomedical engineering, to commercialize their research with Campochiaro on new peptide-based therapies to treat conditions ranging from degenerative eye diseases to cancer.

AsclepiX drugs and their delivery systems block the activity of growth factors that cause new blood vessels to form, reduce fluid leakage and enable the regression of abnormal vessels in the eye.

A second FastForward facility, FastForward East, opened recently in the Rangos Building in the Science + Technology Park at Johns Hopkins, near the school of medicine. It provides startups with lab and office space, and, perhaps more importantly, offers mentorship and business advice that are often out of reach of most startups.

“FastForward helped AsclepiX Therapeutics obtain physical space, including chemistry and biology wet lab space, for our full-time researchers to work,” Green says.

**Jennifer Elisseeff, Ph.D.**, a biomedical engineer at

Wilmer and also an entrepreneur, has seen a dramatic shift in the startup spirit at Johns Hopkins since she started her first venture in 2004. Her company, Aegeria, is partnering with other companies to develop technologies and is working in collaboration with the Armed Forces Institute of Regenerative Medicine on craniofacial reconstruction.

Aegeria has been making headlines, for instance, using tissue regeneration to develop bioadhesive “glues” and membranes to heal traumatic eye injuries without scarring or tissue rejection.

“Wilmer is bustling with innovative ideas, a young faculty and a competitive environment, and the university is preparing soil for these companies to grow. It’s a real cultural change,” Elisseeff says. She served on the

Innovation Committee that generated a report describing what a robust ecosystem around Johns Hopkins could look like.

Says Wyskiel: “A great idea in the lab is only an idea until it can help the people who need it. They have to become products first. Our mission at Wilmer, and at Johns Hopkins as a whole, is to see more of these ideas reach commercial success so we can change lives.” ■

—Andrew Meyers



“Johns Hopkins is trying to help more of these new discoveries and inventions become products with the potential to transform patients’ lives,” says **Christy Wyskiel**.



# Changing Lives in Africa

By Joan Katherine  
Cramer



**Karun Arora** graduated from The Johns Hopkins University in 2010 with honors, a degree in biophysics—and a dream. He had an obvious passion for scientific research, but he wanted to take it out of the lab and make a direct and lasting difference in the lives of as many people as possible.

Last summer, thanks to a gift from Roberta Heath and the sponsorship of mentor **David S. Friedman, M.D., Ph.D.**, who runs the Dana Center for Preventive Ophthalmology at Wilmer, Arora spent 45 days in sub-Saharan Africa living that dream. He was there with a team of doctors from the Dana Center and from India's Aravind Eye Hospital—the largest eye hospital in the world—as part of an ambitious project funded by the Conrad N. Hilton Foundation. The project's goal: to promote affordable, high-quality cataract surgery in a region with limited access to this essential vision care.

"It was a life-changing experience," says Arora, now a second-year medical student at Johns Hopkins who chose to delay medical school for nearly three years so he could work as a researcher in Friedman's clinic. "My job was to travel to the five participating cataract surgery centers in four countries—Ethiopia, Kenya, Nigeria and Zambia—and collect data that will show us over time how well things are working, while Dr. Friedman and the team were observing and assessing the systems."

The Hilton Cataract Initiative is the brainchild of Dana Center founding director **Alfred Sommer, M.D., M.P.H.**, who is also dean emeritus of the Johns Hopkins Bloomberg School of Public Health. For many years, he wanted to do something about the dearth of cataract surgeries—only about 10 percent of what is needed—in sub-Saharan Africa. When the project began to come together with a

2011 Hilton Foundation grant to explore the issue, Sommer enlisted Friedman—who is well known for his international work; see *SightLine*, Spring 2014—to coordinate the Dana Center's role in the collaboration with Aravind and the African surgical centers.

The major obstacle to providing cataract surgery in the region is financial: the relatively high cost of medical training, equipment and infrastructure. But it can also be a matter of getting people to trust the surgical procedure and the surgeon.

Consider the experience of Daniel Oira Kiage, a distinguished professor of ophthalmology at Aga Khan University Hospital in Nairobi. He was so inspired by the Hilton Cataract Initiative that he decided to open a surgery center in his native Kisii, an underserved town of some 200,000 people in southwestern Kenya. He developed an eye hospital using screening outreach camps modeled on those run by the Aravind Eye Hospital.

In sub-Saharan Africa, about 90 percent of patients who need cataract surgery **fail to receive it.**



**Kenya:** Friedman, Arora and a senior member of the Aravind Eye Hospital preparing for a screening camp, above left; patients await treatment at an outreach center, above center. A well-regarded local woman offers counsel on the benefits of cataract surgery, above right.

My job was to travel to the five participating cataract surgery centers in four countries—Ethiopia, Kenya, Nigeria and Zambia.  
—Karun Arora

But many of the people who clearly needed surgery refused to have it. One of the highlights of Friedman’s visit to Kenya occurred when he and the team enlisted the support of an obviously well-regarded local woman, who was willing to explain the surgery to her neighbors who needed it. Her endorsement of both the surgery and of Kiage’s qualifications resulted in a high acceptance rate and led to changes in counseling at the camps. “It was moving and eye-opening,” says Arora.

“It was interesting how different the challenges were in different centers,” he further notes. “In Kenya, Dr. Kiage has top-of-the-line equipment but needs to make the surgery affordable enough and/or build enough goodwill to create the volume necessary to sustain his operation. In Ethiopia, Dr. Gezahgn Fitsum Bekele is doing a huge volume of surgeries, but there is no regional supplier of equipment and no one to repair the equipment when it breaks down. Additionally, all of the sites are being transitioned to an electronic medical record system being provided by Aravind so that better records can be kept and progress tracked over time. So Aravind—and there is a lot of exchange going on—has sent staff to the sites to provide particular expertise, such as setting up the electronic medical record system and training the local staff to use it, and has brought some of the local staff members to Aravind to train them for various





**Nigeria:** A mobile clinic, right center



**Zambia:** A surgeon at work, below right



roles, depending on the individual needs of the different centers.”

Founded in India in 1976 with just 11 beds, Aravind has largely fulfilled its mission of making eye care universally available in that country, subsidizing free services for the poor by charging more to people who can afford it. Friedman has been deeply moved by Aravind’s philosophy and management approach, which includes a gentle, unrushed administrative style, putting the patient’s experience first and using data to monitor effectiveness.

Arora, who was born in India and raised in Hungary, says Aravind has “contributed to changing the face of cataract surgery in India.” He explains: “One of their innovations is to set up camps in the community where they screen people and then bus those who need treatment to the hospital, where they pay only what they can afford. It’s the model they’re hoping to adapt and apply in Africa.”

Arora fell in love with ophthalmology when, as an undergraduate, he shadowed an ophthalmologist and saw how many people the doctor was able to help quickly and profoundly in a day’s work. When Arora graduated, he wrote to Friedman, he says, “because he represents everything I want to become. He has been an extraordinary mentor, more like a father figure.”

For his part, Friedman says he recruited Arora because



**Ethiopia:** Patient who presented to the clinic with makeshift glasses, a good illustration of the need for vision services in the region, left; staff using newly implemented electronic medical record to register patients, right.

I had heard that it is difficult sometimes to get funding to support projects involving medical students, and this seemed like a great opportunity to help two people in the early stages of their careers.

—Roberta Heath

he knew he could trust and rely on him as an effective liaison to the hospitals. “He has been with me for three years doing clinical research and has published 15 scientific papers on his own, which is tremendous,” Friedman says.

Friedman believes that one of his most important jobs is mentoring young people. In addition to taking Arora to Africa, he wanted to enlist the help of a new member of the faculty, cornea specialist **Fasika Woreta, M.D., M.P.H.**, an assistant professor of ophthalmology who is of Ethiopian ancestry.

To help fund these efforts, he turned to Roberta Heath, who was director of patient care services at the Johns Hopkins Outpatient Center for 13 years and is a veteran nurse surveyor for the Joint Commission International. Heath is a friend and patient of Friedman’s who wanted to support his work. “I had heard that it is difficult sometimes to get funding to support projects involving medical students, and this seemed like a great opportunity to help two people in the early stages of their careers,” she says. “After the trip, I had lunch with Karun and Fasika to hear them talk about their experience and was just blown away. It made me feel so good that I’ve decided to do it again this year.”

Arora says he can’t say enough good things about the experience. “I learned so much—that science is incredibly collaborative, that I can combine all of my interests, that together we can have an impact. I am very grateful and hope to do it again, once I get through the next couple of years of medical school.” ■

# Chairs Around the World

Wilmer trainees are making their marks at prestigious eye institutes.

The Wilmer Eye Institute has advanced the field of ophthalmology by treating patients, training doctors and conducting research for 90 years. This tradition of excellence has a serendipitous benefit—it creates world leaders in ophthalmology. There are currently 109 Wilmer-trained leaders in ophthalmology around the world. Wilmer would like to congratulate Drs. Braunstein and Golnik on their recent appointments.



**Richard Braunstein, M.D.,** former cornea fellow, has been appointed executive director of the Manhattan Eye, Ear & Throat Hospital, and vice president of ophthalmology at North Shore LIJ Health Systems.



**Karl Golnik, M.D.,** is now the interim chairman of the Department of Ophthalmology at the University of Cincinnati. He is a former neuro-ophthalmology fellow.

# In the Genes



By working together to investigate new treatments for inherited eye diseases, senior and junior researchers at Wilmer are ensuring continuity in their legacy of discovery.

By Andrew Myers  
Illustration by Selçuk Demirel  
Photos by Justin Tsuculas

**For those suffering from the most crippling eye diseases,** it is no mystery that such disorders often tend to run in families. Fortunately, knowledge can also be handed down from generation to generation, but within a different sort of lineage—that of the remarkable research family of the Wilmer Eye Institute.

Wilmer is at the vanguard of research into the genetic roots of many eye diseases, through initiatives that pair senior researchers with junior colleagues who are their intellectual and scientific heirs as well as partners and who will, in turn, pass down their knowledge of these diseases to a new generation.

The recent advent of rapid DNA sequencing technologies and advances in computing power have spurred a new generation of researchers intent on discovering the genetic causes at the heart of so many diseases and, perhaps someday, curing them. In that remarkable promise rests the hope of every parent, every sibling and every child of someone with a genetic eye disease.

When **Hendrik Scholl, M.D.**, the Dr. Frieda Derdyn Bambas Professor of Ophthalmology, came to Wilmer five years ago to lead genetic research into inherited retinal degeneration, there were almost 150 faculty members, but none were focused on the genetics of those diseases. The tools available were rudimentary and mostly diagnostic, not therapeutic. The field was still in its nascence.

“Today, however, we have much

better tools and even some therapies. Drug, gene and stem cell treatments are now available. And we’re starting to test them. It’s an exciting time for the field of genetic eye disease,” Scholl says.

As the demands of his research grew, Scholl soon realized that it was too much for one clinician-scientist working alone. Wilmer was fortunate

to recruit an assistant professor, **Syed Shah, M.D.**, in July 2014. With the imminent addition of yet another assistant professor, **Mandeep Jassal, M.D., M.P.H.**, Wilmer added to the mix an expert in stem cell therapies.

Shah, a retinal specialist and surgeon, is starting clinical trials of treatments and gathering baseline data

**Shukti Chakravarti and Walter Stark are investigating genetic links to keratoconus together.**



through visual neurophysiological testing of the retina, such as electroretinography and visual field testing.

“Gene therapy trials are not like average pharmaceutical trials; they are much more complicated. We have extensive testing protocols and need to deliver the gene underneath the retina in a surgical procedure, and that’s where Dr. Shah’s surgical expertise is particularly helpful,” Scholl says.

While finding patients is one challenge, getting them tested efficiently is another. To help, Scholl’s team has enlisted the McKusick-Nathans Institute of Genetic Medicine to create a joint clinic where patients can be seen by a gene specialist and an eye specialist in the same day. “It’s a real accomplishment,” Scholl explains.

They also have established a biobank, where an extra sample of each patient’s blood is stored for future research. Scholl’s genetic research has been supported in part by private gifts. Jonathan and Jacqueline

Wallace and Robert and Kathleen Wallace generously support Scholl’s genetic research focused on retinitis pigmentosa, with the goal of one day developing a treatment.

Last but not least, the team is about to offer clinical trials of gene therapies for two different diseases: Usher syndrome, the most prevalent inherited form of blindness and deafness, and Stargardt disease, a debilitating retinal disease that often starts in childhood.

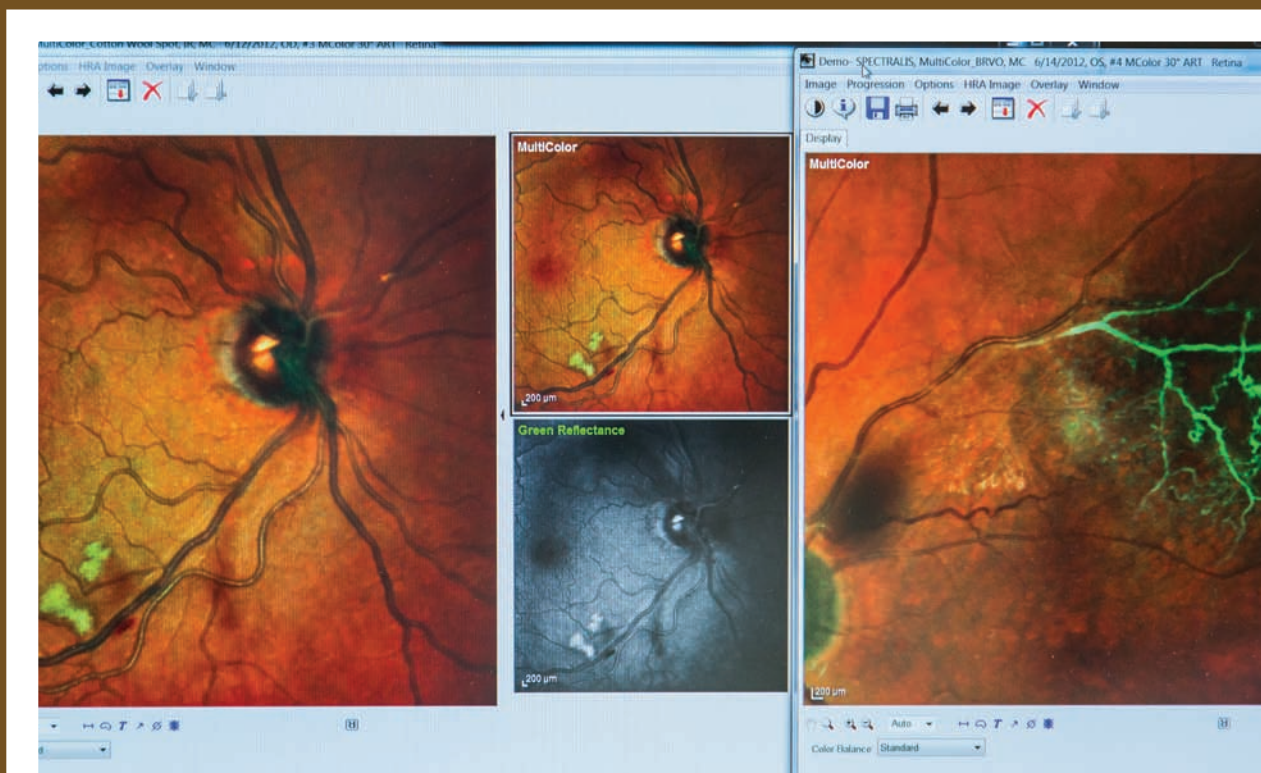
Genetic research is not restricted to the retina, of course. Renowned eye surgeon **Walter Stark, M.D.**, the T. Boone Pickens Professor of Ophthalmology and the chief of cornea, cataract and external eye diseases at Wilmer, has partnered with **Shukti Chakravarti, Ph.D.**, a professor of medicine at Wilmer, to explore the genetic links of keratoconus, a chronic degenerative thinning of the cornea that forces it into a conical shape and causes severe astigmatism.

We are getting to know the causes of keratoconus. It’s all in the genes.

—Walter Stark

Contact lenses and other procedures can stave off the effect, but many people suffering from keratoconus will eventually have to endure corneal transplants or suffer with reduced vision. Though there are many theorized causes of the disease, one fact is inescapable: One in six sufferers has a familial tie to a relative who also has the same disease.

“We’re sequencing patient DNA to investigate what genes could be at fault and culturing cells from discarded patient corneas to determine





what biochemical changes those genes are causing in the eye to ultimately develop strategies for therapeutic interventions,” Chakravarti says.

“We are getting to know the causes of keratoconus,” says Stark. “It’s all in the genes. The research and therapeutic potentials are exciting. We’re lucky to have a leading molecular geneticist of Dr. Chakravarti’s skill on the case.”

In yet another genetic research direction, pathologist **Charles Eberhart, M.D., Ph.D.**, and ophthalmologist **Mary Aronow, M.D.**, both of Wilmer, are collaborating to explore the genetics of uveal melanoma, the most common primary ocular malignancy in adults and a frequent cause of the spread of cancer to other organs.

“Even though we have better than 90 percent success in treating the primary eye tumor, more than half of patients will develop metastases,” Aronow explains. “We are improving our understanding of why this occurs

in some individuals and how we can prevent it.”

Helping their cause is the fact that much is already known about the genetics of uveal melanoma. The vast majority of these tumors have a mutation in the genes GNAQ and GNA11. Eberhart and Aronow are exploiting these known biomarkers to track the growth and spread of tumors. Their collaboration has been supported in part by gifts from from the Richard J. Moriarty Charitable Fund and the ABB Foundation.

“You can use these genes to detect the tumors earlier or even to gauge the efficacy of new drugs,” Eberhart says, noting that when the tumor cells die, their DNA enter the bloodstream, where today’s next-generation sequencers detected them. “If those mutations are present, there has to be a tumor somewhere. If you try a new treatment and find a measurable change in the level of mutated genes circulating in the bloodstream, we believe it will help to

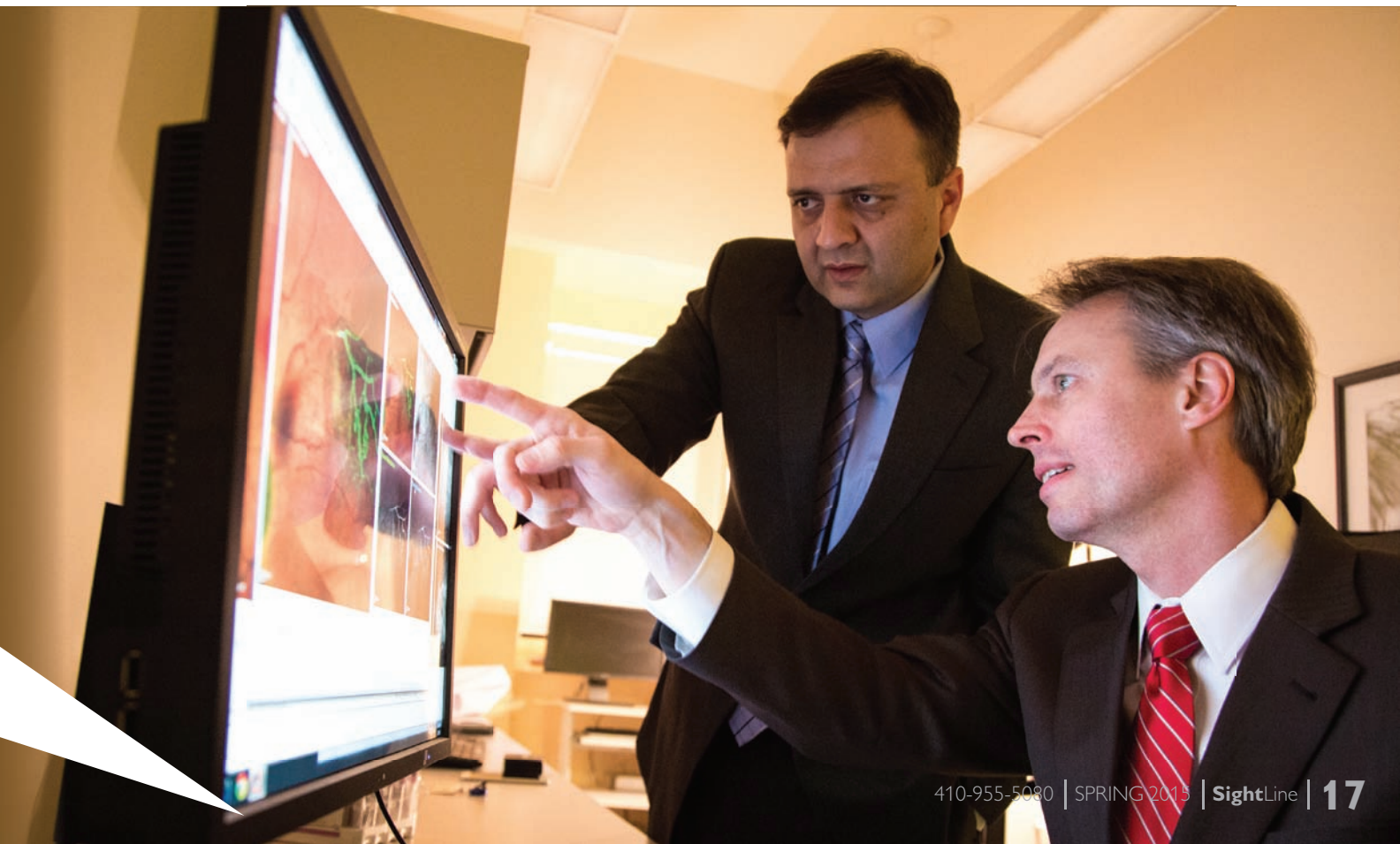
show that the drugs or other therapies are effectively killing tumor cells.”

In the long term, the goals are to understand how the cancer behaves and to head off metastases, which can take five to 10 years to develop.

The two researchers make a great team, Eberhart says. Aronow has expertise in ocular oncology and clinical approaches, while he provides insight into the pathology and genetics.

“It’s fulfilling to be working at the forefront of such an interesting and promising field,” says Aronow. “We look forward to developing new treatments for ocular cancer, and the genetics work all across Wilmer could lead us in some new and exciting directions.” ■

**In his exploration of inherited retinal degeneration, Hendrik Scholl, right, has tapped into the expertise of Syed Shah.**



# Collaborating to Build Better Tools for Microsurgery

The generous support for Wilmer's exceptional faculty, like Peter Gehlbach, allows them to succeed and to drive innovation sooner than would otherwise occur: this year instead of next year, this decade instead of the next decade.

—Peter J. McDonnell, M.D.,  
*Wilmer's director and the William Holland Wilmer Professor of Ophthalmology*

When Bill Marriott, executive chairman and chairman of the board of Marriott International, came to the Wilmer Eye Institute for cataract surgery, he wasn't expecting to learn that scar tissue had formed on his retina. When his cataract surgeon asked him if he was losing his vision, he simply said, "A little bit. It's kind of different." Scar tissue on the retina is a serious diagnosis that can cause irreversible damage and loss of vision, so Marriott decided to have additional surgery to remove the growing scar tissue.

His retina physician was **Peter Gehlbach, M.D., Ph.D.**, who Marriott credits with saving his eyesight. "If I had waited to get treatment for months, I would have lost sight in my left eye," Marriott says. "I feel very blessed."

Wanting to support Gehlbach's work, Marriott sent the medical advisor of his family foundation, the J. Willard and Alice S. Marriott Foundation, to Wilmer. The advisor learned that Gehlbach, an expert in treating vitreoretinal diseases, was collaborating with Johns Hopkins' Whiting School of Engineering to develop tools that help microsurgeons, who use an operating

microscope during surgery. The goal is to help these surgeons identify ultrathin tissue layers that are difficult to see even under the microscope, as well as steady the natural movement in their hands and compensate for patients' inadvertent movements. Marriott was impressed.

"The technology they are working on is really Star Wars kind of stuff," Marriott says. "I think the collaboration part of this is extremely important. I find that when people talk to each other, a lot more gets done than when they're just sitting in a room talking to themselves."

Marriott hopes to encourage that collaboration with a \$1 million financial commitment from the J. Willard and Alice S. Marriott Foundation, a portion of which is being used to support joint research between Wilmer and Whiting. (Another portion of the gift was set up as an endowment, the interest from which will support Gehlbach's research in perpetuity.) The foundation's gift allows Gehlbach to provide support to doctoral engineering students, who can then focus their work on developing tools for ophthalmologists.

"By contributing a small portion to their stipend, tuition and research requirements, we take those newly learned engineering skills and guide these



Bill Marriott



Peter Gehlbach, above center, at work in the robotics lab at Johns Hopkins.

students toward important clinical problems that they may not ever have considered,” Gehlbach says. “In this way, the brightest new engineering minds return the benefit far into the future of vision care.”

For example, engineers who are working on reducing tremor in robots might think their work applies largely

to industry. But finding ways to reduce tremor is also valuable for surgeons. Everyone’s hands naturally quiver. Although trained microsurgions have steadier hands than the average person, that movement still makes it challenging to perform surgery on or around small and fragile targets that can barely be seen under high-powered microscopes. Composed of many thin layers that are easily injured when touched, the retina is one of these targets, which makes removing scar tissue from it—the surgery that Gehlbach performed on Marriott—difficult and sometimes risky.

“We’re developing tools that see those very small structures better than we do,” Gehlbach says. “We are also engineering tools that not only compensate for surgeon hand tremor and patient movement, but also perform micro-robotic tasks with precision that is beyond our own unassisted human ability. When the tools are fully developed, we will be able to more accurately identify surgical targets and remove them with greater precision, with less effort, in shorter times and, importantly, with greater safety.”

Marriott says the foundation’s financial support pays homage to Gehlbach, who he calls a brilliant surgeon and scientist, and his contributions to medicine. “I celebrate his caring, his intensity and his

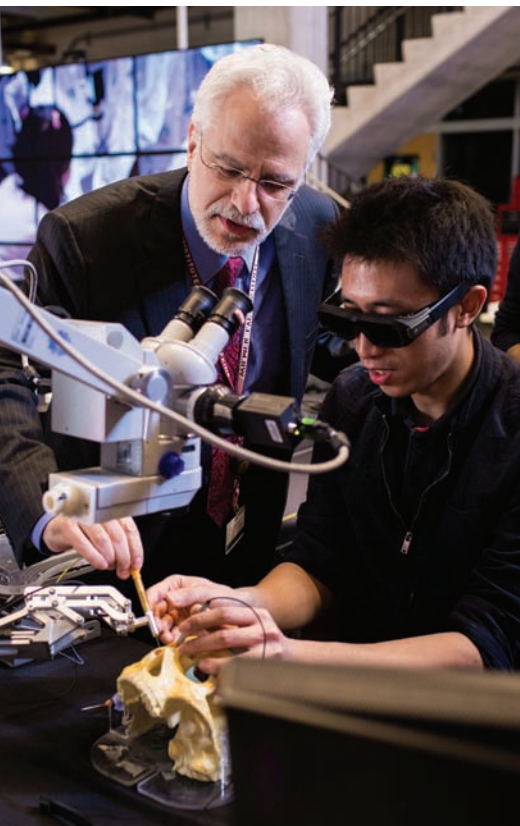
dedication to the improvement of eye surgery through collaborative efforts with computer sciences and engineering,” Marriott adds. ■

—Jennifer Walker

When you assemble the smartest and most dedicated scientists and give them the resources they need, they can change the world. Bill Marriott champions this important work.

—Paul B.

Rothman, M.D.,  
*the Frances Watt Baker, M.D., and Lenox D. Baker Jr., M.D., Dean of the Medical Faculty and CEO of Johns Hopkins Medicine*



Peter Gehlbach and Xingchi He

## Wilmer Residents Association Reception

Chicago, Illinois | Oct. 18, 2014



**Drs. Christian Moon, Mary Beth Aronow, Wen-Hsiang Lee, Howard Ying and Michael Boland**



**Drs. Meraf Wolle, Mira Sachdeva and Farhan Merali**

## The Wilmer Board of Governors Spring Meeting & The Robert H. and Clarice Smith Building 5th Anniversary Celebration

Baltimore, Maryland | Oct. 16, 2014



**Dr. Yassin Daoud, Mrs. Mary Nell Berry and Mr. George Berry**



**Dr. Jennifer Elisseeff, Mrs. Ellen Patz and Ms. Rebecca Stirn**

## Dr. Arnall Patz Endowed Professorship for the Lions Low Vision Center Commemoration

Baltimore, Maryland

Nov. 8, 2014



Lawrence Singerman, M.D., Wilmer director Peter J. McDonnell, M.D., and Richard G. Shugarman, M.D.



Susan Patz; David Patz, M.D.; Nancy Patz; Ellen Patz; John Shwed; Wilmer director Peter J. McDonnell, M.D.; Judith Goldstein, O.D.; and Morton F. Goldberg, M.D.

*Save the Date*

**WRA day**  
June 19, 2015

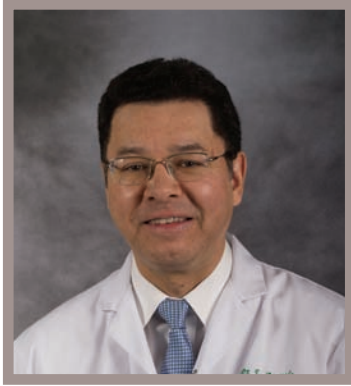
**WRA at the AAO**  
Nov. 14, 2015



Sheila K. West, Ph.D., the El-Maghraby Professor of Preventive Ophthalmology and vice chair for research at the Wilmer Eye Institute, presents an overview of the collaboration and increased productivity in research created as result of the Smith building.



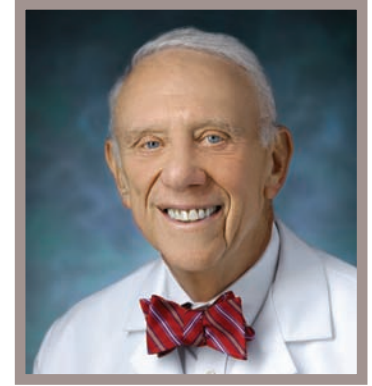
Mrs. Liz Dubin and Mrs. Sue Greenberg



**Fernando Arevalo**, the Edmund F. and Virginia Ball Professor of Ophthalmology and the chief of the retina division at King Khaled Eye Specialist Hospital (KKESH), Wilmer's affiliate hospital in Saudi Arabia, was named president-elect of the Pan-American Association of Ophthalmology. Established in 1940, the association is the representative body of ophthalmologists in Latin America and the Caribbean. Arevalo will join Wilmer's retina division in Baltimore when he completes his efforts at KKESH next year.



**Donald J. Zack** is one of five recipients of the Research to Prevent Blindness (RPB) Nelson Trust Award for Retinitis Pigmentosa. These award winners were selected after rigorous reviews by multiple RPB advisory panels, including outstanding scientists and chairs of departments of ophthalmology from across the country. Zack tested more than 10,000 compounds to develop candidate drugs for the treatment of retinitis pigmentosa.



**Myron B. Blum** has been honored by the SEED School of Maryland Board of Directors for his continued support and dedication to providing eye exams to students. The SEED School is a statewide college preparatory public boarding school for low-income students in grades six through 12. The school's mission is to provide students from across the state with an opportunity to receive a tuition-free education that prepares them for success in college and beyond.

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# A Wise Investment

For five decades, Helen Leighton struggled with vision problems that doctors said couldn't be fixed: strabismus, or misaligned eyes, and amblyopia, a sight-robbing visual impairment caused by the strabismus.

Her life changed dramatically when she came to Wilmer in 1992 and met **David L. Guyton, M.D.**, Zanvyl Krieger Professor of Pediatric Ophthalmology. He is internationally known for his research and inventions in the fields of optics and strabismus. "Dr. Guyton did what Helen had been told for 50 years couldn't be done," David Leighton. "He operated on her with great success." A few years later, when Helen developed cataracts, Guyton referred her to **Walter J. Stark, M.D.**, the T. Boone Pickens Professor of Ophthalmology and director of the Stark-Mosher Center for Cataract and Corneal Diseases at Wilmer.

Another successful surgery heightened the Leightons' gratitude to Wilmer. Between 2006 and 2010, the couple gave generously to support Drs. Stark and Guyton. After Helen's death in March 2011, David honored her memory with a charitable gift annuity to continue support of their efforts. Most recently, in honor of Helen, he established another charitable gift annuity given in support of **Michael P. Grant, M.D. Ph.D.**, director of the Division of Ophthalmic Plastic and

Reconstructive Surgery.

The Leightons selected a charitable gift annuity as the vehicle for their giving because it provided annual income and significant tax savings to them. With a charitable gift annuity, the donor transfers cash or appreciated securities to Wilmer, which invests the funds and pays up to two beneficiaries (including the donor if desired) annual payments for life. Upon the beneficiaries' death, the balance of the annuity is available for Wilmer's use as specified by the donor.

"The charitable gift annuity is a very attractive approach—you reduce your vulnerability to taxes, give in your lifetime, and get income in return. Frankly, I have more faith in what I've invested in Wilmer than I do in my own investments, and when I die, my heirs don't have to worry about it. It's all taken care of."

David Leighton has every confidence that Guyton, Stark and Grant will do good work with the funds entrusted to their care. "Wilmer is a wonderful institution dedicated to eliminating blindness," says Leighton. "If anyone can do it, Wilmer can."



Wilmer is a wonderful institution dedicated to eliminating blindness," says David Leighton. "If anyone can do it, Wilmer can."

*For information about charitable gift annuities, contact the Office of Gift Planning at 410-516-7954 or 800-548-1268, email [giftplanning@jhu.edu](mailto:giftplanning@jhu.edu), or visit [rising.jhu.edu/giftplanning](http://rising.jhu.edu/giftplanning).*



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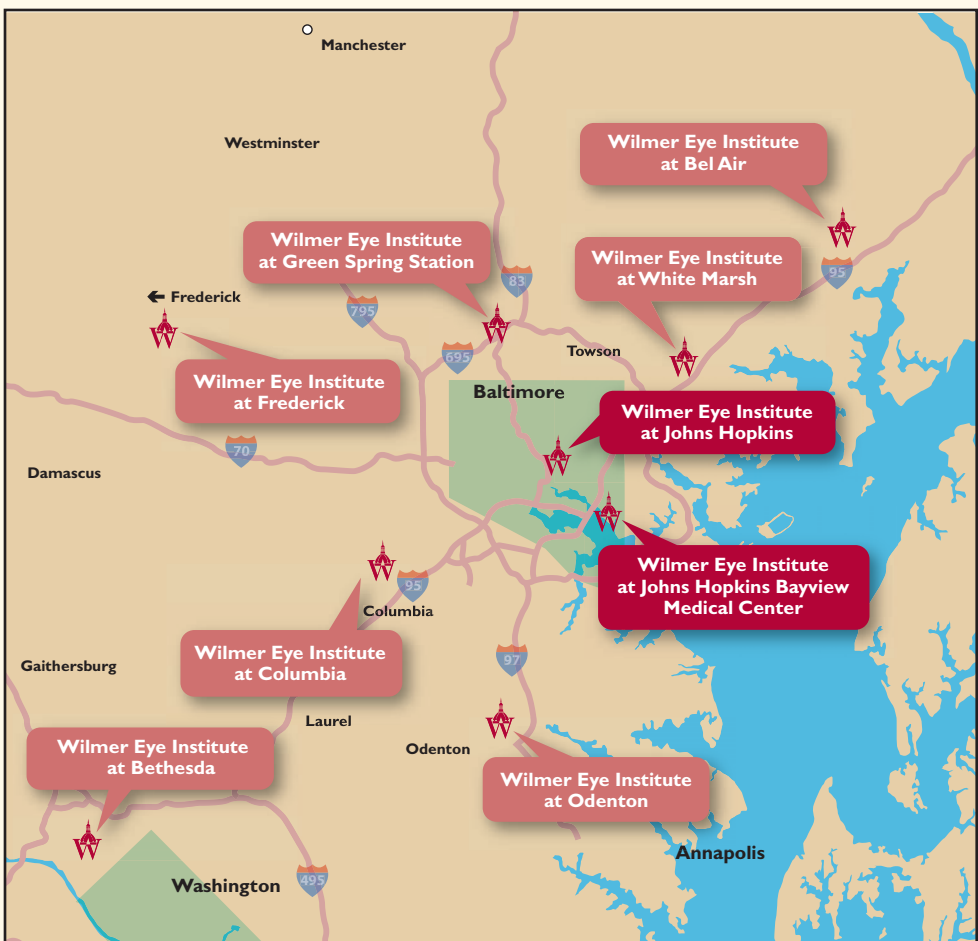
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The mission of the Wilmer Eye Institute is to use and develop the finest scientific evidence to promote improved ophthalmic care and the reduction of visual disability in a collaborative environment that combines compassionate patient care, innovative research, and the training of future leaders in ophthalmology and visual sciences.

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