

Ian Pitha, M.D., Ph.D., works in his lab, located in Wilmer's Robert H. and Clarice Smith Building.

## A Microsolution for a Major Challenge

**F**or Ian Pitha M.D., Ph.D., a physician-scientist in both the Glaucoma Center of Excellence and the Center for Nanomedicine (CNM), becoming a researcher was joining the family business. “I always knew I wanted to do research and medicine from a very early age. My parents were scientists,” he says. One reason he chose ophthalmology in particular is because the eye is “a really interesting little machine.”

Unfortunately for doctors, patients themselves do not behave nearly as reliably as mechanical objects. This is certainly the case for patients prescribed eye drops—for a multitude of reasons, from the simple inconvenience of application to an inability to squeeze the eye drops because of arthritis.

In a pivotal study done at Wilmer, researchers learned that, “less than 50 percent of patients used their drops more than 75 percent of the time, so,

fewer than 50 percent of the patients were what we would consider well-adherent with their eye drops,” says Pitha. And if a patient had to use multiple drops a day, then he or she did even worse.

But hope is on the horizon. Pitha and other researchers at the CNM have created microparticles as a different “delivery mechanism” for the medication to treat glaucoma. If the microparticles work as desired, then a patient would visit the doctor,

have an implant placed on the eye or under the surface of the eye, and then let the medicine do its trick for the next four to six months.

To make a microparticle, the scientists take glaucoma drugs that already exist and combine them with polymers, which are long strings of compounds. Pitha works with polymer chemist Jie Fu, Ph.D., a research associate at the CNM, to create the microparticles. “There’s a considerable amount of science in just combining those two in a way where you’re going to get enough drug in there and it’s going to release over a nice duration of time,” Pitha says. The key development for patients will be the extended release of the drug, which will eliminate daily drops.

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From the Desk of  
Harry Quigley, M.D.,  
Director of the Glaucoma  
Center of Excellence

**T**he 10 physician-surgeons and our wonderful team are happy to present this selection of some of the many research programs that are ongoing in the Glaucoma Center of Excellence. Our patients, from infants to centenarians, are our first priority. During regular care visits, we strive to preserve and improve the quality of life and vision of each person who trusts us with their care.

Each physician additionally seeks to develop new diagnosis and treatment methods for glaucoma through investigations that involve a plethora of tools and strategies, from new nerve cells in culture dishes and new imaging instrument approaches to new surgery methods and projects throughout the world for those suffering from glaucoma.

Many of our patients graciously donate their time to help with this work during regular visits or on extra days by allowing us to learn about glaucoma from the people who have it.

Others support our work with donations. We use this assistance, whether large or small, to start new research projects that are grown into major, nationally funded research, which totaled over \$1 million in 2016.

From each member of our group, thank you. ■

## Honoring the Special Relationship Between Patients and Their Vision



**A**manda Bicket, M.D., of the Glaucoma Center of Excellence, admires her patients immensely. “People want to fight for their vision. They’ll do anything,” she says. This motivation drew her to ophthalmology because the field offers “a unique opportunity to partner with patients in a fight that is unbelievably important to them in a really visceral way,” she says.

**“You get to guide and shepherd them and bring whatever tools that you’ve acquired along the way to bear on their goal of maintaining their sight.”**

Bicket brought a host of new tools with her when she joined the Wilmer faculty last year—namely, surgical techniques used in minimally invasive glaucoma surgery, or MIGS for short, which actually comprises a family of surgeries.

“MIGS, by definition, are ab interno, conducted from inside the eye using mirrored prisms and other things that let you see where you’re going,” says Bicket. “They are done through incisions that are no larger than a cataract surgery incision.”

These surgeries are a boon to patients. “Recovery from MIGS is more like the recovery from cataract surgery, which is a week, whereas the recovery period from traditional glaucoma surgery can be four to six weeks,” says Bicket.

This is important to Bicket, whose research efforts focus on understanding what exactly patients value about their ophthalmic care. “I work with an interdisciplinary team that represents the American Glaucoma Society, the Food and Drug Administration (FDA), and

a Johns Hopkins division called CERSI, which is the Center for Excellence in Regulatory Science and Innovation,” says Bicket. “We are looking at what patients prefer in their eye care.”

Bicket and collaborators from the Bloomberg School of Public Health are interviewing patients from Wilmer’s glaucoma division to elicit from them what they value in their eye care and how they weigh risks and benefits. “This information will be used to build patient-reported outcomes instruments”—basically, a set of criteria—“that the FDA will ultimately use to accelerate approval for things that patients need or want that aren’t available,” she says.

Bicket’s research and patient care work in concert to honor what she sees as the defining characteristic of ophthalmology. “People value their vision. Obviously, people value their health in general, but people’s relationship with their vision is really special and unique.” ■

# A New Tool in the Fight for Sight: Exercise



**O**ne patient can make all the difference. Just ask Pradeep Ramulu, M.D., Ph.D., who is launching the Visual Improvement with Physical Activity Study (VIPS), largely based on the experience of one patient whose vision improved after she started running. “Her findings are very striking,” says Ramulu. “And with VIPS, we’re trying to actually see whether people’s vision can get a little bit better if they start exercising.”

Interested in understanding how people were affected by their glaucoma, Ramulu began to study if, and in which ways, people changed their behaviors as their disease progressed. He and his researchers put GPS trackers and accelerometers on patients with various levels of glaucoma to try to answer these questions.

“We found those with greater disease were less physically active,” Ramulu says. This could seem like a simple conclusion to reach, “but when we started looking at that association in

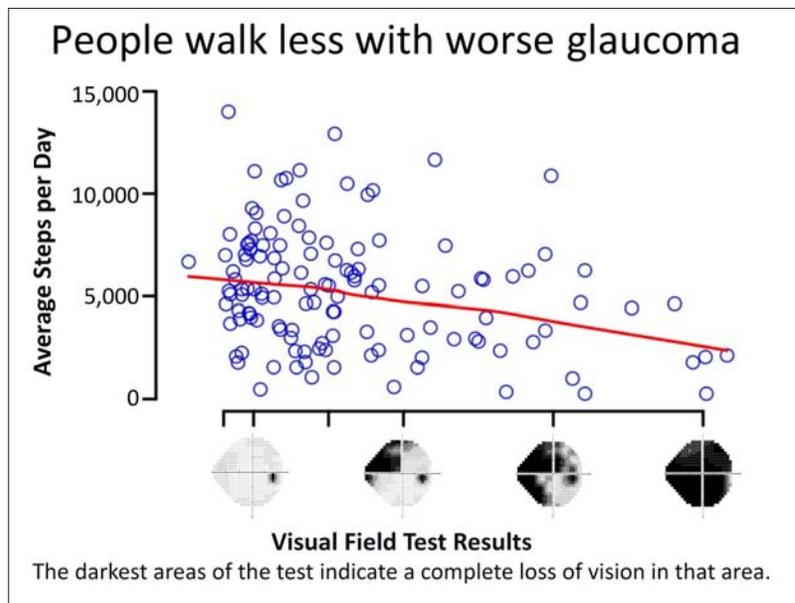
more complicated ways, we could actually see that it didn’t seem like they were restricting their activity because they were fearful of falling

or other reasons,” says Ramulu. “The data suggested maybe the opposite was happening—that the reason we found this association was that the people who were more physically active just weren’t getting the disease as much.”

So, one day, when a patient came to see him desperate to do something, a suggestion bubbled up. “She said, ‘What can I do?’ and I said, ‘Well, we have this theory that maybe running helps.’ So she started running, and her vision got a little bit better. Then she stopped, and her vision got a little worse. And then

she started up again, and it improved,” says Ramulu. “When I saw these results, I said, ‘Oh, this is real.’ At least in this one person, exercise made a difference.”

Ramulu describes VIPS as a small study of 35 to 40 people. “We’re really trying to see whether we can get people (Continued on back page)



## Ramulu wins Lighthouse 2016 Pisart Award

Lighthouse Guild, a leading nonprofit vision and health care organization, named Pradeep Ramulu, M.D., Ph.D., the Pisart Honoree in March 2016. Established in 1981, the Pisart Award recognizes an early-career vision clinician or scientist whose contributions in vision science have the potential to substantially aid the understanding of vision loss, treatment of eye disease or rehabilitation of people with vision loss. “There are some amazing people who have won this award. When you see who’s won this award and you see your name, it’s very humbling,” says Ramulu.



# SToP in the Name of Sight



**D**avid Friedman, M.D., Ph.D., M.P.H., chose glaucoma as his specialty because “you have a long-term, close relationship with your patients. And that really appealed to me,” he says. And there was another reason too. “It’s an area where we’re on the edge of tremendous research change. There are basic science research programs that will fundamentally alter how we manage glaucoma, and there are a lot of newer technologies that will allow for better care processes.”

Because glaucoma is a silent disease with almost no symptoms before a person has lost a substantial amount of vision, the challenge is to find people before it is too late.

Enter Screening to Prevent (SToP) Glaucoma, a Centers for Disease Control and Prevention-funded, multiyear effort led by Friedman to screen people, free of charge, for glaucoma and other eye diseases. “I’ve hired a team of people, and we’ve created a traveling clinic, where we go and screen for eye diseases and vision loss,” says Friedman. “While we are determined to find undiagnosed glaucoma, we also find people who need glasses, or who have cataracts,

macular degeneration or diabetic retinopathy.”

The SToP Glaucoma team just finished the second year of its five-year grant and has so far screened more than 3,000 people. To ensure its efforts have the widest reach at a low cost, the team has instituted several innovative practices.

“Our screeners are all laypeople,” says Friedman. The screeners evaluate people using a series of procedures, including testing vision, measuring to see if glasses can improve vision (autorefractometry), taking photos of the back of the eye, measuring eye pressure and, if indicated, testing side vision.

“I review all the electronic data

to determine who needs to be seen by an eye doctor,” says Friedman. “And we have arranged for a free eye exam here at Wilmer for everybody who screens positive for an eye condition. If they need glasses, we also give them a pair for free.” The glasses are funded through charitable donations by grateful patients to Johns Hopkins.

To recruit people for the eye screenings, the team works with organizations like Chase Brexton, a federally qualified health center, and nonprofits such as Sisters Together and Reaching. And it sets up its mobile clinic in churches and senior housing facilities as well.

Reaching people where they live is a priority for Friedman. “I’ve always wanted to have a larger impact on communities and people, particularly people who are the most vulnerable. And a lot of those people don’t make it to my clinics,” says Friedman. “This is why we have to go to them to help them preserve their sight.” ■

*To learn more about SToP Glaucoma, visit [stopglaucomahopkins.org](http://stopglaucomahopkins.org).*



**The SToP Glaucoma team, composed of Johns Hopkins University students and staff members from the Dana Center for Preventive Ophthalmology, hosted a screening event at Chase Brexton Health Services in Baltimore.**

# Seeing the Future

**C**ourtney Kraus, M.D., knows well the stress a child can feel at the doctor's office. Luckily for children who come to Wilmer, Kraus has dedicated herself to building a practice where "kids come into my office and do not leave crying."

A pediatric ophthalmologist whose practice includes the medical and surgical management of glaucoma, Kraus knew she wanted to work with children before she knew which specialty to pursue. She chose ophthalmology because "a child's sight is something that is so critical to their interaction with the world, with their education, with what they go on to be, and I want to maximize whatever potential they have."

While children are her favorite part of her chosen field, they are also a "unique challenge. Unlike adults, where coming in to check eye pressure can be a very simple thing to do, with children, this can be the absolute hardest aspect of the appointment."

There is a "true art" to figuring out a way to check a child's eye pressure so the process doesn't result in screaming or crying and provides accurate information, says Kraus. For this, Kraus has a secret weapon.

There is a "true art" to figuring out a way to check a child's eye pressure so the process doesn't result in screaming or crying.



"For better or for worse, I have a personality and a mindset that help me jump into a child's brain," she says. "Shiny, sparkly things appeal to me too. I can often come up with another thing within my arm's reach that will distract

a child for a split second longer and allow me to get that critical piece of information that is going to enable me to better treat them."

Kraus also takes her skills and passion for working with children

on the road. For the third year in a row, she spent a week in Belize working with an organization called the World Pediatric Project, which coordinates volunteer surgical missions to South and Central America in a range of specialties, including ophthalmology.

"You're often operating long into the night and working with a group of people sharing this common, single-minded vision to take care of this large group of children," says Kraus. "There's a lot to love about it."

This passion extends to the entire field of ophthalmology. "I love that I can focus on this one little thing, the eye," says Kraus, "but because so much of our general health is reflected in that one little thing, I'm also caring for a whole person." ■



The World Pediatric Project partners with the Belize Council for the Visually Impaired, which informs people about Kraus' arrival and the availability of appointments for patients, such as Kahleel Wade, left, in Kraus' arms.

For information on how to support the Johns Hopkins Wilmer Eye Institute, contact:  
Libby Bryce Bell  
Wilmer Development Office  
Email: [wildev@jhmi.edu](mailto:wildev@jhmi.edu)  
Phone: 410-955-2020

Editor, writer: Jessica Wilson  
Designer: Max Boam

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## **A Microsolution** *continued from page 1*

“If the medication in the drops already lowers the pressure, the microparticles are going to be more effective. If, on average, people are getting drops in 50 percent of the time, microparticles are a guarantee that medicine is always getting delivered,” says Pitha. And this reliability will help Pitha’s “interesting little machine” get what it needs to combat glaucoma as effectively as possible. ■

## **A New Tool** *continued from page 3*

to safely exercise and get some understanding of whether it seems to actually help their vision in some meaningful way.”

In the meantime, Ramulu has found that glaucoma patients who walked more experienced less damage to their visual field over time, independent of other factors, such as intraocular pressure and age. These results inspire hope that any physical activity—even nonvigorous exercise—can provide vision protection for patients. ■



Wilmer faculty member **Randy Craven, M.D.**, is returning to Maryland from his post as chief of glaucoma at King Khaled Eye Specialist Hospital in Saudi Arabia. He will now practice at the Johns Hopkins

Wilmer Eye Institute’s East Baltimore location and in the national capital region at Wilmer, Bethesda. We are excited that his addition to the Glaucoma Center of Excellence increases our ability to serve more patients. ■

## **Glaucoma Center of Excellence Faculty**

Amanda Bicket, M.D.  
Michael Boland, M.D., Ph.D.  
Randy Craven, M.D.  
David Friedman, M.D., Ph.D., M.P.H.  
Henry Jampel, M.D., M.H.S.  
Courtney Kraus, M.D.  
Ian Pitha, M.D., Ph.D.  
Harry Quigley, M.D.  
Pradeep Ramulu, M.D., Ph.D.  
Donald Zack, M.D., Ph.D.

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[hopkinsmedicine.org/wilmer](http://hopkinsmedicine.org/wilmer)

**Wilmer Eye Institute at The Johns Hopkins Hospital**  
1800 Orleans St.  
Baltimore, MD 21287

**Johns Hopkins Bayview Medical Center**  
4940 Eastern Ave.  
Baltimore, MD 21224

**Bel Air**  
620 Boulton St.  
Bel Air, MD 21014

**Bethesda**  
Air Rights Center, West Tower  
7315 Wisconsin Ave., Ste. 610  
Bethesda, MD 20814

**Columbia**  
Medical Pavilion at Howard County  
10710 Charter Drive, Ste. 310  
Columbia, MD 21044

**Frederick**  
87 Thomas Johnson Drive, Ste. 102  
Frederick, MD 21702

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10753 Falls Road, Pavilion 2, Ste. 455  
Lutherville, MD 21093

**Odenton**  
1106 Annapolis Road, Ste. 290  
Odenton, MD 21133

**White Marsh**  
4924 Campbell Blvd., Ste. 100  
White Marsh, MD 21236