

**Christina Prescott,  
M.D., Ph.D.**

## The Challenge and the Privilege of Working with Children

**Imagine if you could be in the room when a baby sees her parents for the first time—three months after she was born and all thanks to your skill. Christina Prescott, M.D., Ph.D., assistant professor of ophthalmology, doesn't have to because it's her job. She is a pediatric corneal transplantation specialist. "To be part of such a moment is an indescribable honor," she said.**

She doesn't focus only on infants, however. Children of all ages come to see her at the Wilmer Eye Institute. "Since there are so few pediatric cornea surgeons, I have patients from around the world," she said. One reason she chose to build her practice at Wilmer is because of the Johns Hopkins Medicine International Office, which coordinates travel so she can focus on helping the children.

She also chose Hopkins because of the staff. "I am able to work with

the pediatric anesthesia team of Johns Hopkins, which is excellent," she said. "And Wilmer has a close relationship with Tissue Banks International. The eye bank contacts me when they have young donor tissue available." Because of this, she can often age-match tissue, which benefits her patients.

Prescott is grateful for any advantage she can offer her patients because pediatric corneal transplantation presents more challenges than adult

transplantation. "The success rate is much poorer in pediatric patients, due to increased risk of rejection and infection as well as other eye problems that often co-exist with corneal pathology in children with congenital problems," she explained. This situation means Prescott will see her pediatric transplant patients as many as four times as often as her adult patients.

"Because we see each other so often, over such a long period, the relationship that I develop with each child and his or her family is quite special," she said. "It is rewarding to watch the children grow and develop and know that my surgery enabled them to do things that they would otherwise not be able to do." ■

# Check out who joined us this summer...



**Farhan Merali,  
M.B.A., M.D.**

**What is your focus:** The most significant improvements in patient care occur at the boundaries between disciplines. I have enjoyed working with the Emergency Department to improve the quality and efficiency of care of patients who present with ocular emergencies. As a liaison between Wilmer and other departments at Johns Hopkins—most recently the Hospital Capacity Command Center—I endeavor to develop innovative models of care that save sight, lives and resources.

**What are you excited about:** I am passionate about addressing the numerous systems-level barriers that contribute to medical errors, inefficiency and wasteful spending that plague our medical system. The science of quality improvement and patient safety holds the promise of making a broad impact on outcomes and the cost-effectiveness of care, both at the institutional and policy levels.

**Why the eye:** As someone who has always enjoyed meticulous work and attention to detail, I am especially drawn to the delicate precision and refined elegance of anterior segment surgery. I continue to be awed by our ability to replace selective layers of the cornea as necessitated by a patient's disease.

**Interesting item:** I love adventure sports such as zip-lining and rock climbing. White-water rafting on the Nile River was incredible!



**Uri Soiberman, M.D.**

**What is your focus:** I am interested in the clinical management and research of keratoconus, a disease that leads to the loss of the structural integrity of the cornea. Many keratoconus patients have vision problems that can only be corrected with hard contact lenses and/or surgery—and these have an enormous effect on their quality of life.

**What are you excited about:** Soon, we're going to start providing a novel treatment, called corneal cross-linking, to slow down the progression of keratoconus. The procedure was only recently approved by the FDA, but it has been performed around the world for over a decade, so there is a good body of evidence to suggest its efficacy. It involves the use of a vitamin (riboflavin) and UV irradiation. Together, they strengthen the cornea and help to stop the progressive cone-like protrusion that characterizes keratoconus.

**Why the eye:** I think the eye is a beautiful organ—and that perception hasn't changed despite the fact that I've seen so many eyes over the course of my career! I think that improving vision has an immense impact on people's lives and I enjoy being a part of that process.

**Interesting item:** I've known of Wilmer since I was eight years old. That's when I started reading Tom Clancy books—one of his characters was a Wilmer surgeon.



**Meraf A. Wolle,  
M.D., M.P.H.**

**What is your focus:** I am interested in corneal transplants in all forms and in corneal infections, including the late stage vision-threatening complications. I also have an interest in complex cataract surgeries and secondary intraocular lenses.

**What are you excited about:** I am very excited about the future of endothelial keratoplasty, especially Descemet's Membrane Endothelial Keratoplasty (DMEK). I am currently looking at ways to streamline the current DMEK procedure by creating preloaded DMEK tissue. I am also excited about the medical and surgical management of high-risk corneal transplants and how we can improve outcomes. Lastly, I have a long-standing interest in corneal infections and public health ophthalmology.

**Why the eye:** When I was in fifth grade, I was prescribed glasses. I was also a very curious child. Luckily, I had the most awesome optometrist who, in response to my asking, 'Why? What's wrong with my eyes?' got out the big eye anatomy poster and proceeded to explain... I was immediately enthralled with the eye and have been ever since then.

**Interesting item:** While on a walking safari in Zimbabwe, my group unexpectedly walked into a group of lions hidden in the bushes. They started growling and we slowly backed up and eventually managed to walk away without being harmed!

# The Science of Quality and Safety

**In an ideal world, patient safety and quality of care would take precedence in all healthcare settings. The reality, however, is different. “I entered medical school and naively thought that once we know the science behind illness, we can treat patients to the best of our ability,” said Farhan Merali, M.B.A., M.D., a junior faculty member in the Division of Cornea, Cataract and External Disease whose research examines the science of quality and safety in eye care.**

“I was shocked to see how many systems-level barriers to providing care there are,” he said. Merali, who attended Harvard Medical and Business Schools, explained that these include anything outside the physician’s own ability that hinders care—from process inefficiencies to communication problems.

His interest in the science of quality and safety drew him to the Wilmer Eye Institute for his residency training. “I remember having a conversation in Dr. McDonnell’s office when I came for my interview,” Merali said. “We were talking about my research interests and he said, ‘Dr. Schein is doing exactly this and he is someone that you should get to know.’ And so, I did.”

**Oliver Schein, M.D., M.P.H., M.B.A.,** is the Vice Chair for Quality and Safety at Wilmer. He explained that, “Johns Hopkins Medicine has been a leader in the medical safety movement.” Established in 2011, Hopkins’ Armstrong Institute for Patient Quality and Safety is “a major force in moving the needle

locally and nationally in safety,” he said.

Schein pointed out that most errors occur when a patient is transferred from one unit to another, or from an operating room to a post-operative area. “Communication accuracy can always be improved. We have devoted tremendous resources at Wilmer to developing our own ‘E-Posting’ system, which has created a tight communication link between decision-making in the clinic and precise planning for the day of surgery,” Schein said.

A major project Merali undertook also addressed a key communication challenge. When working in the emergency room, ophthalmologists

would receive multiple electronic pages, often close together in time. However, they were not receiving “all the information about each patient that would allow us to make an informed decision about who to see next,” Merali said.

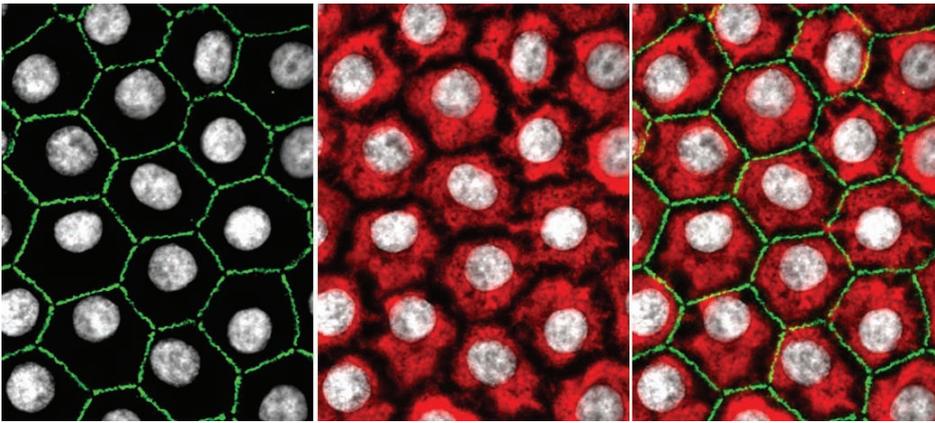
Merali adapted a triaging tool that originated in Italy to help emergency room nurses and care providers determine the urgency of patients’ eye conditions. “We found that this tool, which is a series of four questions, had a sensitivity of 96%, which meant that the nurses, who were not trained in any eye care at all, almost nearly every time, were able to tell us if a patient had a truly serious presentation—within five minutes of a patient arriving at the ER,” he said.

Although both Schein and Merali are cornea specialists, their research work spans all divisions. The wide view this affords them allows both doctors to labor for the good of their patients and for the healthcare system as a whole. The



**Schein and Merali confer in an exam room of Wilmer’s Stark-Mosher Center for Cataract and Corneal Diseases.**

aim is to employ systems-level research findings to dismantle obstacles that litter the healthcare field, which would “allow all physicians to do what they were meant to do—and that is deliver the best possible care to our patients,” Merali said. ■



**Human corneal endothelial cells showing locations of cell borders (green), cell nuclei (white) and energy producing organelles (red).**  
*Courtesy Zhiguo He, M.D., Ph.D.*

**The Transformation of Corneal Transplantation** *continued from page 5*  
 into the cartilage of a patient with a joint injury. Putting laboratory grown cells to therapeutic uses is something that we're excited about for the cornea," said Jun.

So what exactly does cell therapy entail?

"You're taking healthy cells that function properly and putting those into an environment where the cells aren't working very well because they're diseased. It's a progression from whole-tissue to partial-tissue to cell transplantation," he said.

However, two main challenges face researchers. The first involves cell quality. "Once you take them out of their environment, eventually the cells will change. You must maintain their function and identity," he said. Doctors will need to both understand the quality level acceptable for clinical use and have

markers to recognize high-quality cells. The level of caution, care and detail required to grow cells for therapeutic use as opposed to research purposes is "a hundred-fold more."

The second challenge encompasses creating and testing new surgical techniques. "How do I deliver the cells to the cornea—what does that look like?" said Jun. "There are a lot of technical issues because no one's ever had these materials to transplant before."

Though relatively early in the development process, cell therapy has the potential to transform people's lives. "In the old days a transplant patient might get 20/40 vision. A partial-thickness corneal transplant patient might get 20/20 or 20/30. So, I would expect a patient who has cell therapy to end up with even greater vision recovery," said Jun.

On a personal note, Jun added, "I'd be thrilled to be part of devising a beneficial new treatment for patients. To contribute intellectually to the whole process start to finish is rare even for an academic physician. So, that would be really exciting." ■

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## Meet our Alik Perroti Scholar...



**Kathleen Corcoran Oktavec, M.D., M.H.S.**

**What is your focus:** As a fellow, I'm in the OR and the clinic with Dr. Jun. A fellowship finally earns you that precious possibility to learn one-on-one with a mentor. To have someone still sitting with you for another year, pointing out effective tips and different techniques, is an invaluable time in the life of a physician.

**What are you excited about:** Corneal transplantation has truly taken off in the last few years because of the newest procedure—the DMEK. To put it simply, only the defective layer of the cornea is replaced, whereas before, the entire cornea would be.

**Why the eye:** It's the only part of the body where we can see a nerve and the blood flowing in our vessels. There's no other place in your body where someone can actually see those things. The infinitely delicate structure of the cornea is one of the most refined tissues of the eye.

**Interesting item:** I have a dog that had severe entropion and had to get eye surgery. He is a Shar-Pei with lots of wrinkles and was abandoned because he could not open his eyes. At the SPCA, they said, 'Oh, we think he just needs some drops.' I had just come back from Tanzania, where I was working on trachoma and knew this poor pup needed more than drops. Fortunately, he had an excellent outcome. Watching him see for the first time solidified my passion to help all walks of life see better. ■

# The Transformation of Corneal Transplantation

**W**e're in the midst of a revolution. If it's successful, people whose lives have become cloudy and dark because of diseased corneas will be able to see the world clearly again, with far fewer side effects than current treatments allow. Leading the charge is **Albert S. Jun, M.D., Ph.D.**, Chief of the Division of Cornea, Cataract and External Diseases.



A little historical perspective to explain the excitement: beginning in 1905, surgeons solved the problem of diseased corneas with a full-corneal transplant.

“For the first, probably, ninety to a hundred years, corneal transplantation involved replacing the entire cornea,” said Jun. An interesting characteristic of the cornea, however, is that it doesn't consist of a uniform mass of tissue.

“Typically, we think of the cornea as being divided into three parts—

outside, middle and inside. And any one of those parts can become diseased,” said Jun. Because of its distinct layers, a cornea may be damaged in one area, but perfectly healthy in another. “The idea of replacing just the affected part made a lot of sense.”

In 1999, surgical techniques caught up with this good idea and partial-corneal transplants became the standard treatment. This was great news for patients. “We've found with the transition from full-corneal transplants to partial-corneal transplants there's less rejection because you're transplanting less amount of tissue for the body to attack,” said Jun. “The surgery is less invasive and safer. The patient heals faster and the vision comes back sooner. All of those benefits should be enhanced as we move toward the

next stage.”

And here comes the revolution—a transplant that doesn't involve conventional surgery at all. How?

Cell therapy.

“The ability to grow cells in the lab has long been a research tool. But now the idea of cell therapy is coming to the forefront,” said Jun.

The idea has permeated all of medicine. “Examples would be injecting cells into the brain of a patient with Alzheimer's disease or

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## Introducing...

**Albert S. Jun, M.D., Ph.D.**, the new Chief of the Division of Cornea, Cataract and External Disease

We have such a tradition of excellence and leadership in our subspecialty, which dates back to the earliest days of the Wilmer Eye Institute, that being named chief of the Division is truly an honor and a rare opportunity.

Our subspecialty, as with all of medicine and science, has become an international endeavor well beyond the ability of an individual practitioner to master. As the field continues to grow, we need to grow along with it.

My vision is to expand the global presence of the Division through our clinical and research activities. An international focus is paramount to remaining relevant in today's connected world. I see the Division building upon

the energy and intellect of faculty, both junior and senior, who seek to be global leaders in their chosen areas of clinical and academic focus. In this way, we will establish the breadth and depth of expertise necessary to be the world leader in cornea, cataract and external disease care.

I am excited to lead this group of amazingly talented and accomplished physicians and scholars as we seek to remain at the forefront of our field. ■

For information on how to support the Wilmer Eye Institute, contact:  
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