annual report 2017

scheie vision

Penn Medicine | Department of Ophthalmology

the ART OF DIAGNOSIS

Using Fine Arts to Prepare the Next Generation of Ophthalmologists

IN THIS ISSUE

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If you would like to add/remove your name from this mailing list, or have any questions or comments, please email **Emma.Wells@uphs.upenn.edu or call 215.662.8742.**

A MESSAGE FROM THE CHAIR

Penn Medicine's Department of Ophthalmology, Scheie Eye Institute, is dedicated to excellence in clinical care, research, teaching, collaboration, and community outreach. In 2017, our faculty, staff, and alumni made exciting advances in each of these missions.

On October 12, 2017, an advisory panel unanimously endorsed the FDA approval of the first gene therapy for a hereditary disease in the United States. This therapy is the product of 25 years of rigorous research led by Drs. Jean Bennett and Al Maguire at the Center for Advanced Retinal and Ocular Therapeutics. This work has already enabled vision in patients in Phase III trials and offers hope for many others facing a life of blindness.

Penn Medicine has one of the largest teams of ophthalmologists in the nation, and continues to expand. This year we welcomed Ahmara Ross, MD, PhD (glaucoma and neuro-ophthalmology); Karen Revere, MD (oculoplastics); Prathima Neerukonda Atluri, MD (glaucoma); Regina Altemus, OD (optometry); and Sara Bierwerth, OD (optometry); as well as a new Chief Operating Officer, Ginny Roberts, MBA, and Chief Financial Officer, Christopher Vogel, MBA, CPA. Each of these highly accomplished team members offers unique expertise and depth of knowledge. It is my pleasure to welcome them to the Scheie community, the larger Penn Medicine community, and our valued community of alumni.

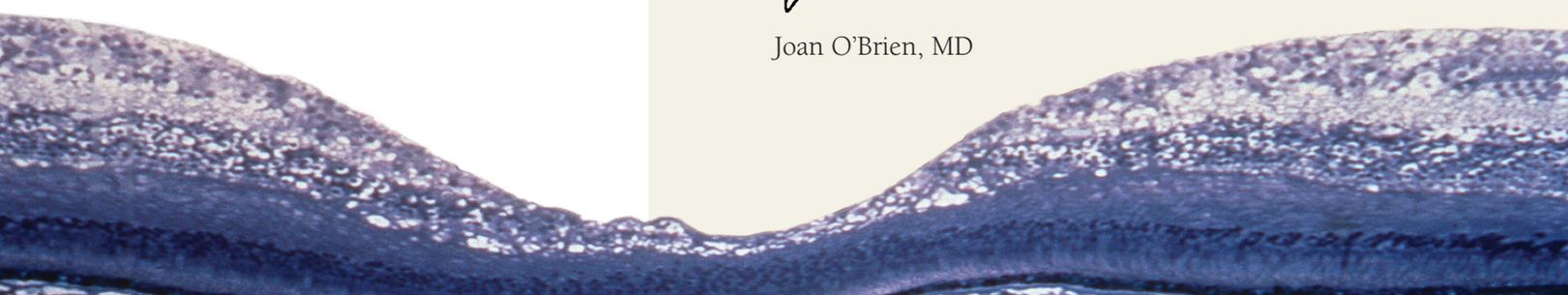
While our Philadelphia community had much to celebrate in 2017, we also experienced a great loss. This Annual Report honors the memory of Dr. Bill Tasman, former Ophthalmologist-in-Chief of Wills Eye Hospital. I have been graced with the close friendship of Bill and his wife Alice Lea since moving to Philadelphia in 2010. Bill's kindness, wisdom, and sense of humor guided me through my first seven years as Chairman. He leaves behind a legacy of true excellence and compassion, as a physician and leader in our field.

I hope you enjoy reading these articles and learning more about Penn Medicine Ophthalmology's most recent advances, initiatives, and discoveries.

Wishing you a happy and healthy holiday season.

Sincerely,

Joan O'Brien, MD



THE ART OF DIAGNOSIS

Penn Medical School's Creative Approach to Teaching Observation

By Ava Kikut

Illustration by Sai Merriam

Look at the photograph at the bottom of this page for 30 seconds. What are ten words or phrases that come to mind? Look at the image again. Can you think of ten more words or phrases? What colors do you see? Shapes? Lines? If you are next to someone, compare your observations. Did s/he notice details you missed? These are some of the exercises practiced in the electives "Art, Observation and Mental Illness" and "Fostering Resilience through Art Education" at the University of Pennsylvania Perelman School of Medicine.

It may seem unfitting, a class on art observation in medical school. Thus, when a team of Penn medical students and physicians designed the curriculum for a pilot course in 2014, they conducted a study to measure its effects (if any). The results, recently published in *Ophthalmology,* demonstrated that art observation training has a quantifiable impact on clinical observation performance.

The idea began when Jaclyn Gurwin, MD, and Stephanie Davidson, MD, then Penn medical students, learned of a course at another institution that weaved art training into clinical observation lessons. They wondered what would happen if medical students took a course solely focused on art without a correlate class in medical observation. "We felt that training medical students in art observation alone would translate into medical observational skills," explained Dr. Gurwin.

Dr. Gurwin, now a resident at the Scheie Eye Institute, studied communications and fine arts as an undergraduate at the University of Pennsylvania. She has always been interested in the intersection of art and science. "Having studied fine arts myself and having witnessed its impact on my medical training, I knew art observation training would be a beneficial practice in medical school," Dr. Gurwin said.

Drs. Davidson and Gurwin connected with Scheie resident, Karen Revere, MD, now an Assistant Professor of Ophthalmology at Penn; Horace DeLisser, MD, Associate Dean of Diversity and Inclusion; and Gil Binenbaum, MD, MSCE, Shafritz Chair of Ophthalmology Research. Dr. Binenbaum noted a specific need to teach observation skills in ophthalmology, as well as in radiology and dermatology—specialties that rely heavily on observation for diagnosis and treatment.

One of the team's objectives was to encourage students to notice and articulate the details of an image before attempting to draw conclusions. "Being able to observe and verbalize the clinical examination is crucial to developing a differential diagnosis. At the start of medical school, students don't yet have the experience to know what part of a clinical exam they should be mentioning, so it's helpful to develop a technique for systematically observing and describing," Dr. Gurwin said. "These skills are taught very well in the visual arts." To design a curriculum that would help students break down and discuss images, the study team collaborated with art experts Suzannah Niepold,

Example of piece students were asked to describe in art observation pre and post tests.
Sidney Goodman's painting, *Figures in a Landscape*, reprinted with permission from The Philadelphia Museum of Art (see http://philamuseum.org/).

Art training had a significant impact on observational skills.

MAT, Rebecca Mitchell, MA, and Barbara Bassett, MSEd, at the Philadelphia Museum of Art.

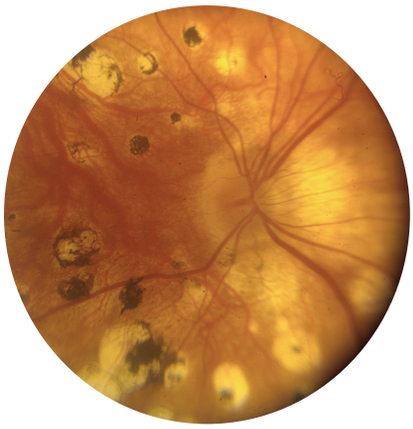
The pilot course extended over a three-month period, and consisted of six 90-minute sessions at the art museum. During these visits, art professionals showed students artwork and led exercises to facilitate thoughtful discussions. Following the "Artful Thinking" approach, each session was dedicated to one of the following themes: Observing & Describing; Questioning & Investigating; Reasoning; Comparing & Connecting; Exploring Viewpoints; and Perspective Taking. During the Observing & Describing session, for example, students were asked to stare at a piece of art for 30 seconds, list 10 words or phrases that came to mind, and then repeat. In a Questioning & Investigating session, students would answer prompts such as: "What do you think about the artwork? What questions or puzzles do you have? What does the artwork or topic make you want to explore?" For the Reasoning session, students were encouraged to make claims, support their claims, and then ask questions related to their claims. All of the classes involved collaboration between students as they engaged with the artwork.

To measure the effects of the art training, students were assessed before and after taking the course. A diagnostic test of observational skills asked for descriptions in paragraph form of three kinds of images: art, retinal photographs, and pictures of faces with ocular or periocular diseases. At the end of the three months, the students took a post-test with similar questions. Art experts graded descriptions of art based on how well students demonstrated flexibility, empathy, and the capacity to interpret, associate, and observe. Ophthalmologists assessed descriptions of medical images based on inclusion of specific details, which were part of a priori rubric, such as mentioning swollen eyelid or darkening of lower lid skin for a photo of limbal vernal conjunctivitis.

In addition to testing for changes in observation and description abilities, the study aimed to measure how the course affected interpersonal skills, particularly empathy. The group hypothesized that art observation training would help with reading emotional cues. "I believe that the first step in being able to empathize is being able to observe someone," said Dr. Gurwin. Along with observation tests, students took an online emotional recognition assessment called "Reading the Mind in the Eyes".

The study enrolled 36 medical students with no formal art training. After the initial assessments, the cohort was divided evenly and randomly into an art-training group (which would take the course) and a control group. All students were compensated with a year of free admission to the art museum.

The initial and follow-up description assessments demonstrated that art training had a significant impact on observational skills. For clinical image observation, the mean score of students in the art-training group went from 35.1 to 47.0 (out of 48 points). The mean for students in the control group decreased from 36.4 to 30.4. The leaders of the study stated that the decline in control group scores suggests that medical school



Example of photo students were asked to describe on their clinical oberservation pre and post tests.

courses "may actually inhibit the development of good observational skills early on" (Gurwin et al., 2017). Dr. Gurwin added, "In medical school, instead of learning techniques for observation, there's more focus on learning memorized signs."

In contrast to the dramatic improvements in observation testing, empathy did not seem to change after the course. The study group noted this could be because the initial emotional reading test scores were already quite high or because the test used was not an accurate measure of empathy. Dr. Gurwin plans to try alternative empathy testing measures in future studies.

Despite the quantitative data on changes in empathy, many of the students did feel the course increased their appreciation for considering alternative points of view. Rachel Johnson, who was a member of the art-training group as a first-year medical student, remarked: "The class opened my eyes to some of the parallels between art and medicine: the importance of observation in any clinical encounter, the power of story, the skill required to see things from multiple perspectives and question previously held assumptions." Rachel's experience in the art observation course inspired her to become the course coordinator for the fourth-year elective, "Art, Observation, and Mental Illness."

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FINDING HER WAY OUT OF THE DARKNESS:

Stacy Young's 17-Year Battle after a Fireworks Accident

By Ava Kikut

On July 1, 2000, 22-year-old Stacy Young was at an Independence Day barbecue when she heard a loud boom. Stacy had just begun her nursing career, she had a two-year-old son, and she had plans to continue building her family. But what followed would forever change the course of her life. The sound had come from an industrial firework, about the size of a two-liter bottle, which was launched a hundred yards away. It traveled at over 250 miles per hour and exploded about six inches from Stacy's face.

Stacy was medevaced to the University of Pennsylvania Hospital. The firework had fractured her skull in five places and damaged her frontal lobe. Her left orbital bones were shattered and her left optic nerve was completely severed. She had lost high volumes of blood and was put on life support.

On July 2, Stacy had a craniotomy. Over 25 postage stamp sized titanium plates were used to repair her skull. On July 13, surgeons removed her left eye and used part of her left rib to reconstruct the orbital socket. "The doctors didn't really have much to work with and they created my face again," Stacy remarked.

"There's a thing that goes on when you're hurt that badly. Nothing makes much sense, other than you're away."

In the first few weeks after the accident, Stacy struggled to confront what had happened to her. "I was scared," she remembered. "There's a thing that goes on when you're hurt that badly. Nothing makes much sense, other than you're away. And you don't know where you are or what's going on." In addition to the shock from the trauma, Stacy was suffering from frontal lobe damage, which was causing emotional confusion, severe migraines, and quivering on one side of her body. Due to the loss of her left eye and damage to her right eye, Stacy had become legally blind. "I could see a donut, a real thin ring. Nothing was clear," she explained. Stacy realized she could no longer work as a nurse. "Nobody was sure if I was going to be able to work at all," she explained.

While in rehabilitation, Stacy met another patient who had also undergone numerous treatments. "He said to me, 'The day you lose hope is the day your cards are folded,'" Stacy recalled. As she began to gain clarity, Stacy remembered those words. "I realized I needed to start focusing and stop fighting." She committed to never losing hope. "Some days I would hurt from the top of my head to my knees. I would say 'I got this. It might hurt today but it's going to be better. I might not see well today but maybe I will see better tomorrow.'"

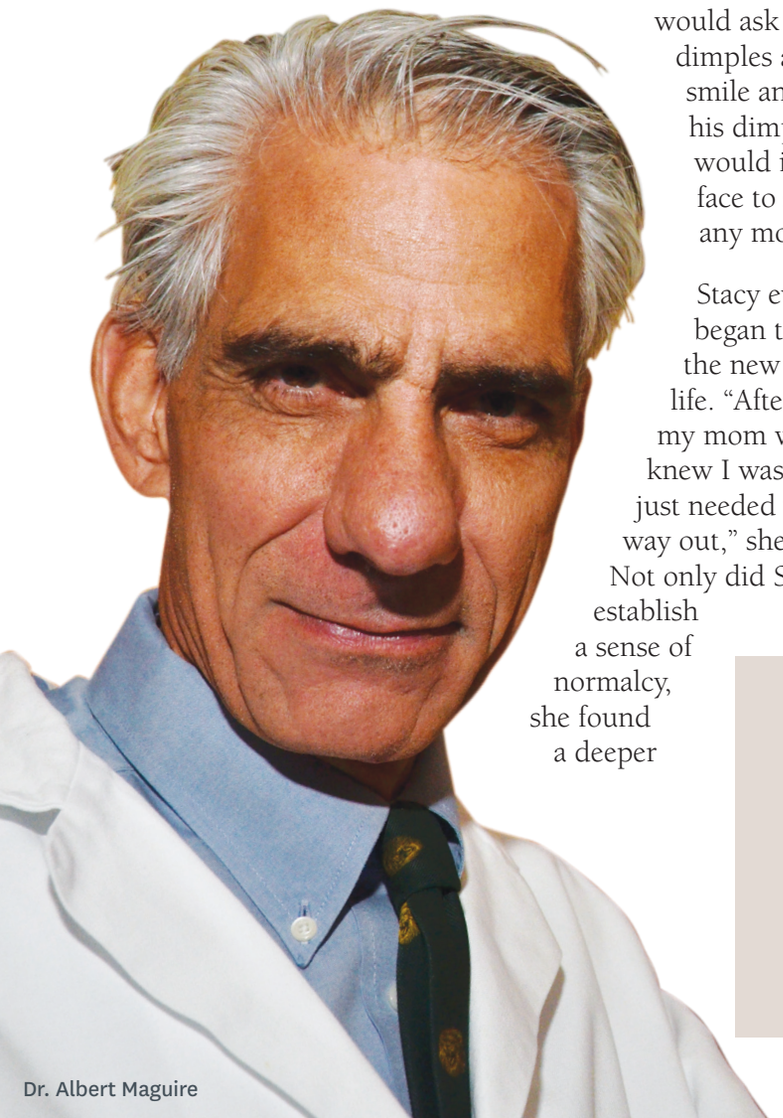
When Stacy returned home, she found a strong network of support ready to help her move forward. "There were people in the community that came around, and family, that did everything." Stacy's family members provided childcare and microwavable meals and drove her to doctor's visits. Her colleagues organized a toy drive for her son. Her friends learned how to replace her head bandages. And then there were the acts of kindness from unexpected places, like from the

hairdresser who washed and moisturized her scalp twice a week to prevent the craniotomy scar from scaling. "People came through," Stacy said. "It's amazing the small things you remember—the people that promised me they'd never leave and they haven't."

Though Stacy's facial reconstructive surgeries were largely successful, there was still work to be done to try and improve her vision. In March 2001, Dr. Albert Maguire, a retina and vitreous specialist at the Scheie Eye Institute, performed a vitrectomy on Stacy's right eye. As she waited for him to remove the bandages, she heard him say. "Now you're going to see something. You're going to see a little bit of bright light." When Stacy opened her eyes, the first thing she saw was Dr. Maguire's eyes. "I remember telling him he had the prettiest eyes I'd ever seen in my life. Because I hadn't seen anything for so long and then the first thing I see is that man's eyes."

Stacy's vision opened up, and improved to 20/250. But she was still legally blind, and for the next 16 years, the world would remain blurry. "I could tell you the grass is green. That's because it was a green blob," she said.

One of the sights Stacy missed most was the face of her son. She often asked him to come close to her so she could make out the details in his face. "I could sit down and say, 'Let me be a mom. I want to look at your face.' And he would get right in my face and smile and show me his teeth. And he would pucker up and show me his kiss lips. And he would show me the side of his nose and the front of his nose. And he would show me his eyes. And I would ask him about his dimples and he would smile and show me his dimples. And he would investigate my face to see if I got any more booboos."



Dr. Albert Maguire

Stacy eventually began to embrace the new course of her life. "After the accident my mom would say she knew I was in there, I just needed to find my way out," she explained. Not only did Stacy re-establish a sense of normalcy, she found a deeper appreciation for life and the people around her. "Since I got hurt I listen more. I laugh. And when I laugh I laugh with all of me…I don't take things for granted. So when I tell someone I'm listening, I truly am listening. When I tell someone I understand it's because I do."

Though she could no longer work as a nurse, Stacy began working in a transitional living facility for drug and alcohol recovering homeless veterans. "I may not understand the military part but I understand the fears they talk about. I know what it feels like to be lost and try and bring it back together and nobody else believes in you but you've got to try and believe in yourself," she explained. Stacy has continued to work at the facility for 14 years, despite her low vision and chronic migraines.

Though the vitrectomy had risen Stacy's visual acuity to a functional level, her vision began to decline over time. For years, surgical intervention seemed too high a risk for her only remaining eye. In 2015, the dislocation of Stacy's lens had become substantial and she had developed a cataract that was becoming denser. By the summer of 2016, Stacy and Dr. Maguire agreed that the potential benefits of another operation outweighed the risks.

Dr. Maguire introduced Stacy to Dr. Stephen Orlin, a cataract

"I remember telling him he had the prettiest eyes I'd ever seen in my life. Because I hadn't seen anything for so long and then the first thing I see is that man's eyes."

“I’ve had the fire on my face. But I’ve been surrounded by some of the greatest doctors, who have given me hope.”

surgeon at Scheie. “Dr. Orlin is the most patient man,” Stacy said. “They are the most patient people with me. And they never lied.” The plan was for Dr. Maguire to make an incision on the side of Stacy’s eye to remove her lens and for Dr. Orlin to implant a new lens. They could not promise Stacy the surgery would work, but it was worth trying.

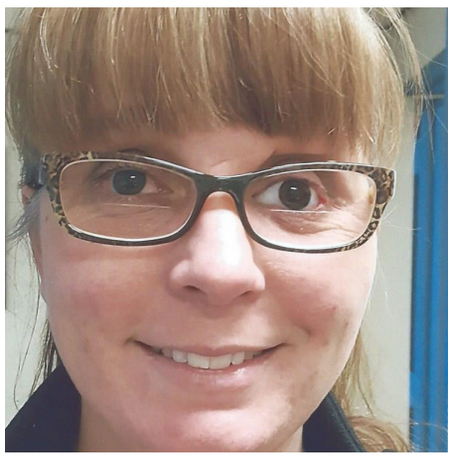
Not only was the lens replacement successful, the improvement to Stacy’s vision far exceeded expectations. “I have far better vision now than they ever thought I would have. I didn’t know Dr. Maguire and Dr. Orlin had teeth. They’re very stoic men. They don’t smile too much. But they smiled.” While Stacy is still legally blind, she can now see more vividly than even before the cataract. “I can tell there are leaves on the hedges behind my house. I can tell there are petals on flowers. I can tell there are lines on the sidewalk. I can see faces. For 17 years nobody had a face.”

After the operation, Stacy saw her nearly 18-year-old son’s face for the first time since he was a toddler. Her family, who “learned a lot of adjectives describing the world for 17 years,” no longer had to say what was in front of her. “They have seen me smile more, and surprised more, and giggle more, and see people that I haven’t seen—not just know they are in front of me but actually see them. It’s been a lot of fun. And I can’t wait to do it more.”

The last photo of Stacy taken in June 2000

Stacy in the spring of 2001, after receiving a vitrectomy on her right eye

Stacy on July 2, 2000, after being flown to HUP and receiving a craniotomy



Stacy in 2017

In the summer of 2000, Stacy was forced to accept the redirection of her career and personal life. But she refused to let go of two essential things—a sense of humor and resilience. After nearly two decades of saying “tomorrow might be the day,” Stacy feels her tomorrow has happened. “I’ve had the fire on my face. But I’ve been surrounded by some of the greatest doctors, who have given me hope,” she said. “Hope is everything. Never lose hope. Never lose faith in the people you have around you.”

Are you a patient interested in telling your story in a future issue of Scheie Vision?
If so, call **215.662.8176** or email **ava.kikut@uphs.upenn.edu**. We would love to hear from you!

FDA ENDORSES GENE THERAPY

FOR HEREDITARY BLINDNESS

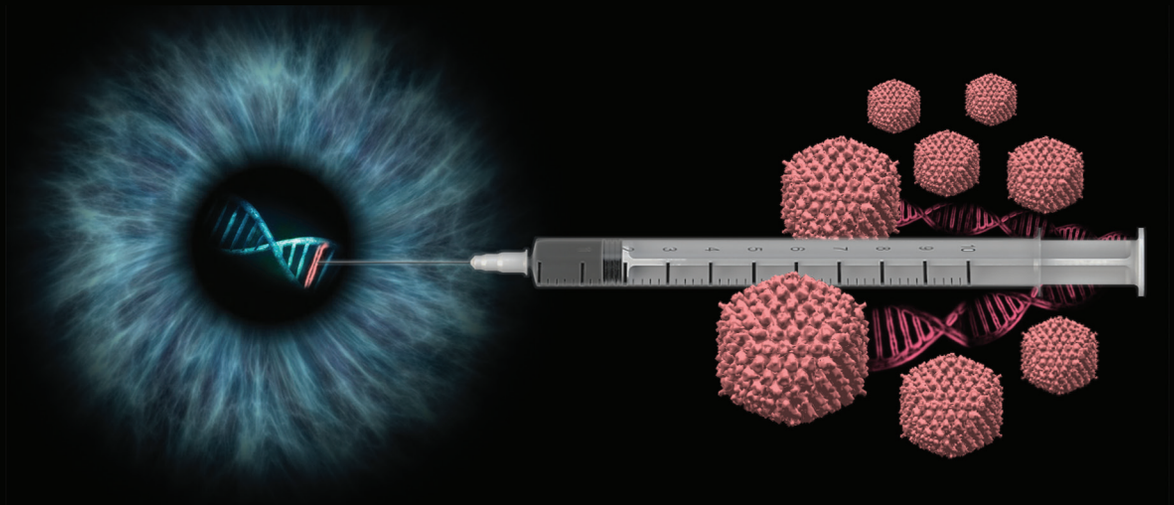
By Ava Kikut

On October 12, 2017, the Food and Drug Administration (FDA)'s Cellular, Tissue, and Gene Therapies Advisory Committee endorsed Luxturna, a gene therapy for certain forms of inherited blindness, in a 16-0 vote. The committee's unanimous recommendation will inform the FDA's final decision on whether to approve the drug by January 12, 2018. If approved, Luxturna will be the first gene therapy for an inherited disease available in the United States. This exciting milestone marks the beginning of a new era for the treatment of blinding conditions and gene therapy research.

Luxturna targets mutations of the RPE65 gene, which are associated with a variety of vision-impairing retinal disorders, including Leber Congenital Amaurosis (LCA) and retinitis pigmentosa. Administered through an injection, Luxturna delivers an adeno-associated virus (AAV) carrying the correct RPE65 gene into the retina, restoring photoreceptor responses within 30 days. The treatment, which was developed in collaboration with Spark Therapeutics, has already enabled patients in clinical trials to gain and maintain vision.

Luxturna is the product of 25 years of rigorous research, led by Jean Bennett, MD, PhD, and Al Maguire, MD, who established the Center for Advanced Retinal and Ocular Therapeutics (CAROT) in 2014. Currently, more than 260 genes are known to cause inherited retinal disease. The pioneering work at CAROT has the potential to not only transform the lives of individuals with RPE65 mutations, but to lead to treatments for millions of individuals now facing a life of blindness.

The FDA endorsement has made headlines across several major news outlets, including NBC, CNN, CBS, ABC, FOX, NPR, *The New York Times, Washington Post, USA TODAY, San Francisco Chronicle, The Bulletin, Forbes Magazine, MIT Technology Review, HealthDay,* and the *Philadelphia Inquirer*. Drs. Bennett and Maguire were also featured in a PBS special, *The Gene Doctors*. Stay tuned for updates on the final FDA decision and a longer feature article in the summer edition of *Scheie Vision.*

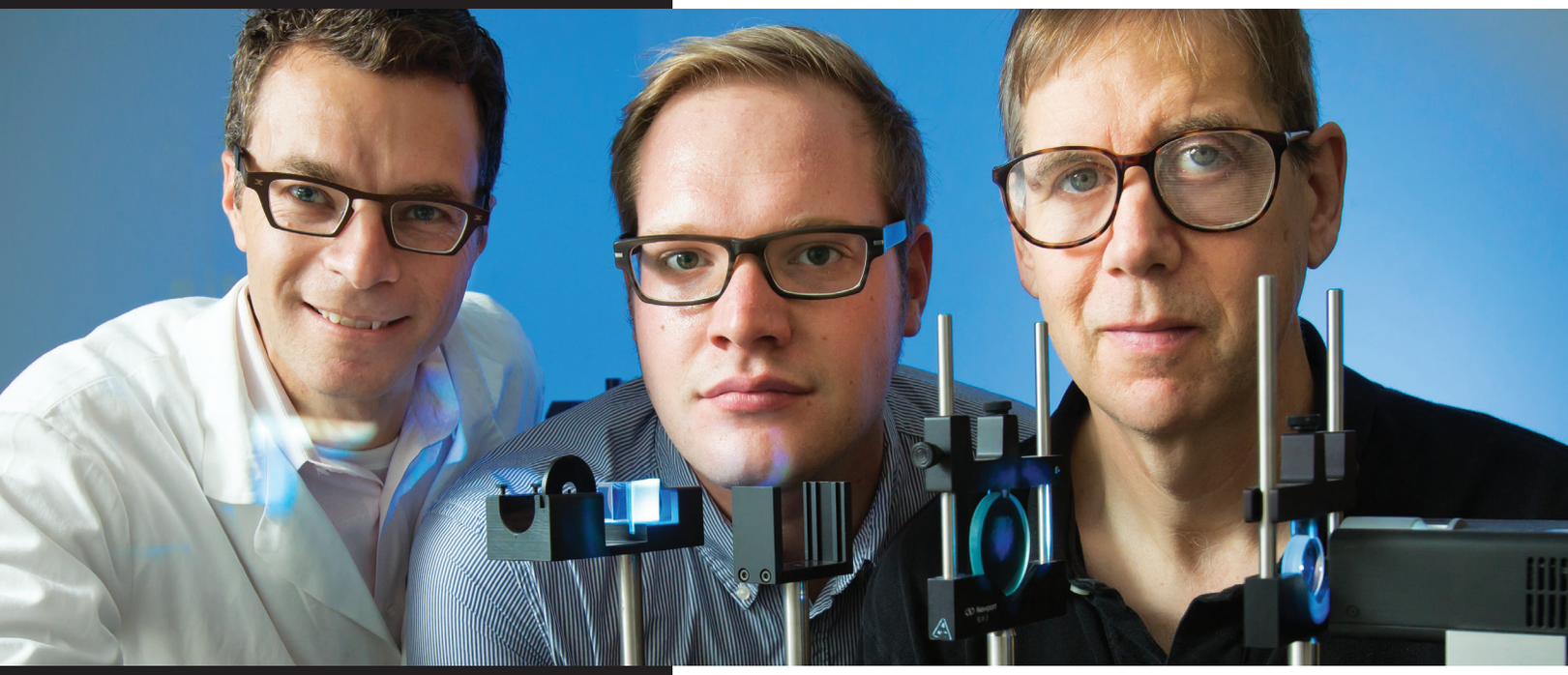


Luxturna delivers an adeno-associated virus carrying the correct RPE65 gene into the retina. Digital illustration is conceptual and not drawn to scale.

Created by Ava Kikut

A THIRD CLASS OF LIGHT-SENSING CELLS

By Rebecca Salowe



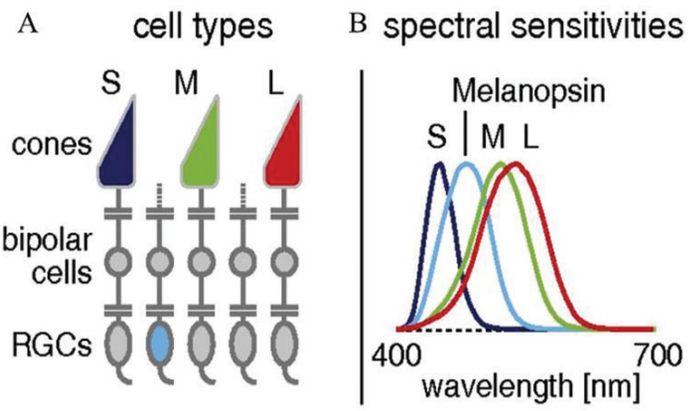
For many years, researchers believed that rods and cones were the only cells that could sense light. Rods were responsible for night vision, while cones mediated color vision in bright light. About 15 years ago, however, researchers discovered a third class of light-sensing cells in the retina. This surprising finding provoked many questions about the purpose and clinical significance of these cells. Do they affect sight? Do they trigger light sensitivity? Dr. David Brainard (Psychology) and Dr. Geoffrey Aguirre (Neurology), both vision scientists at the University of Pennsylvania, sought to answer these questions.

"The basis of this work began with a clinical observation," explained Dr. Aguirre. "Some patients with dysfunction of their rod and cone photoreceptors get migraines – and bright light makes it worse. And this was an enduring mystery. Without functioning photoreceptors, which cells were sensing light and making these headaches worse?"

These questions pointed towards a third class of light-sensing cells, which were reported in a series of papers by researchers at Brown University and Johns Hopkins University between 1999 and 2002. These researchers found that a small subset of retinal ganglion cells (RGCs) express a photopigment called melanopsin that can detect light. Melanopsin is involved in the constriction of the pupil in response to bright light, as well as regulation of the circadian clock, but its full functionality is not yet understood.

Around five years ago, Drs. Brainard and Aguirre began their collaboration to better understand how "melanopsin-containing RGCs" act in humans. Their first task was to figure out how to isolate and stimulate melanopsin and cone cells separately. This task was particularly difficult because melanopsin responds to blue light, so any light that stimulates melanopsin would also trigger cone cells that respond to this region of the spectrum.

After several months of development, Drs. Brainard and Aguirre successfully deployed a device that precisely controls the intensity of 56 bands of the visible spectrum of light. Using a process called "silent substitution," they shined blue-green light (triggering melanopsin and cone cells) and subtracted off red light (triggering only cone cells) in a carefully balanced manner—ultimately leaving an isolated melanopsin signal. This discovery allowed Drs. Brainard and Aguirre to study what we "see" with melanopsin alone.



A) In a healthy eye, light is absorbed by cones, passed to biopolar cells, and transmitted to retinal ganglion cells (RGCs). RGCs then send the signal through the optic nerve to the brain. A decade ago, it was discovered that approximately 1% of RGCs contain a photopigment called melanopsin, which can also detect light.

B) RGCs that contain melanopsin respond to light at a short-medium wavelength (i.e. blue-ish light).

Cited from: *Spitschan M, Jain S, Brainard DH, & Aguirre GK. (2014). Opponent melanopsin and S-cone signals in the human pupillary light response. Proceedings of the National Academy of Sciences, 111(43), 15568-15572.*

Using this technique, they began conducting experiments to investigate if (and how) melanopsin affects brain signals. They measured the visual cortex response to melanopsin-stimulating light via fMRI, which is a non-invasive MRI technology that detects brain function. To their surprise, Drs. Brainard and Aguirre initially found that a melanopsin light, flickering at rates typical of normal vision, does not produce a brain response. After this initial study was published in the *Journal of Neuroscience*, however, they extended their methods to study much slower stimulation, at temporal frequencies closer to what would be appropriate for control of the circadian clock and the pupil. Their preliminary finding is that this slow melanopsin stimulus does drive the visual cortex. "This brain response serves as a clue that these cells do not just affect circadian rhythms; they may also affect how you see," explained Dr. Brainard.

In addition to exploring how melanopsin affects brain signals, Drs. Brainard and Aguirre are studying how healthy people actually *see* melanopsin. "In all of us—even those with normal sight—is part of what you perceive when you see being supplied by melanopsin cells? Do they influence what things look like?" asked Dr. Aguirre. To test this theory, 20 healthy volunteers were exposed to the melanopsin-stimulating light. They were then asked questions about how bright it looked, if it hurt, and so on. Interestingly, people did have a visual response to this light, describing it as unpleasant and a "blurry kind of brightness". These results were published in *Proceedings of the National Academy of Sciences.*

A future aim of this work is to provide benefit for patients with photophobia. As mentioned above, melanopsin contributes to the expansion and contraction of the pupil in response to changes in light intensity. Thus, a malfunctioning melanopsin system may contribute to conditions that involve sensing too much or too little light, such as migraine, concussion, insomnia, or seasonal affective disorder.

Drs. Brainard and Aguirre's next steps will be to recruit patients with light sensitivity for their studies. "We plan to make the same measurements as in our previous studies and find out if people with light sensitivity have different melanopsin function," said Dr. Aguirre. If this is the case, future studies could examine genetic variants of the melanopsin photopigment that may lead to these differences.

Patients with dysfunction in their rods or cones could also be positively impacted by this research. In some blinding conditions, patients lose function of their photoreceptors, while their RGCs are spared. "Some of these patients can still sense light – and one theory is that they still detect light because melanopsin cells are still working," said Dr. Aguirre.

In support of this theory, Dr. Artur Cideciyan, a Research Professor of Ophthalmology and colleague of Drs. Brainard and Aguirre, recently showed that some patients with severe rod and cone dysfunction still have a pupil response to light, which is likely due to melanopsin (published in *Investigative Ophthalmology & Visual Science*). This data is valuable, as it can serve as an indicator that RGCs are still functioning and can transmit a signal from the retina to the brain. In the future, this information could be used to help select patients who would derive the greatest benefit from gene therapy clinical trials for photoreceptor disorders.

In a similar way, measures of melanopsin response could also be used as a clinical tool to evaluate the degree of RGC damage in diseases such glaucoma (in which RGCs degenerate). This information could help diagnose or pinpoint the severity of such diseases.

Look out for more publications in the coming year on what Dr. Aguirre calls "the additional feature of the visual system that adds to what we perceive of the world."

do omega-3 fatty acids help dry eye disease?

By Emma Wells

dry eye occurs when the lacrimal glands around the eye do not produce enough tears to keep the eyes wet and comfortable or when the tears evaporate too quickly

As the American population ages, dry eye disease (DED) is emerging as a major public health problem. According to the American Academy of Ophthalmology, an estimated 3.2 million women and 1.68 million men over the age of 50 are affected by dry eye in the United States.

Omega-3 fatty acids may alleviate the symptoms of DED due to their anti-inflammatory effect. Many ophthalmologists recommend omega-3 supplements for patients with DED, but previous studies exploring their efficacy have been small-scale and inconclusive.

Ophthalmologists at Scheie are researching the impact of omega-3 supplements on DED. Scheie is one of 25 eye centers across the country involved in the Dry Eye Assessment and Management (DREAM) study, which seeks to test the efficacy and safety of omega-3 fatty acids as a treatment for DED.

DREAM's germination occurred a number of years ago, when Dr. Penny Asbell of the Icahn School of Medicine at Mount Sinai approached Dr. Maureen Maguire, the Director of the Center for Preventative Ophthalmology and Biostatistics (CPOB) at the University of Pennsylvania, with an idea for a multicenter clinical trial. At the time, there were very few treatments for DED that worked, and Dr. Asbell was interested in whether omega-3 fatty acid supplementation actually helped dry eye.

Dr. Maguire agreed to collaborate with Dr. Asbell on the study planning process. They received an $8 million grant from the National Eye Institute (NEI), making DREAM the first NEI-funded randomized controlled trial on DED.

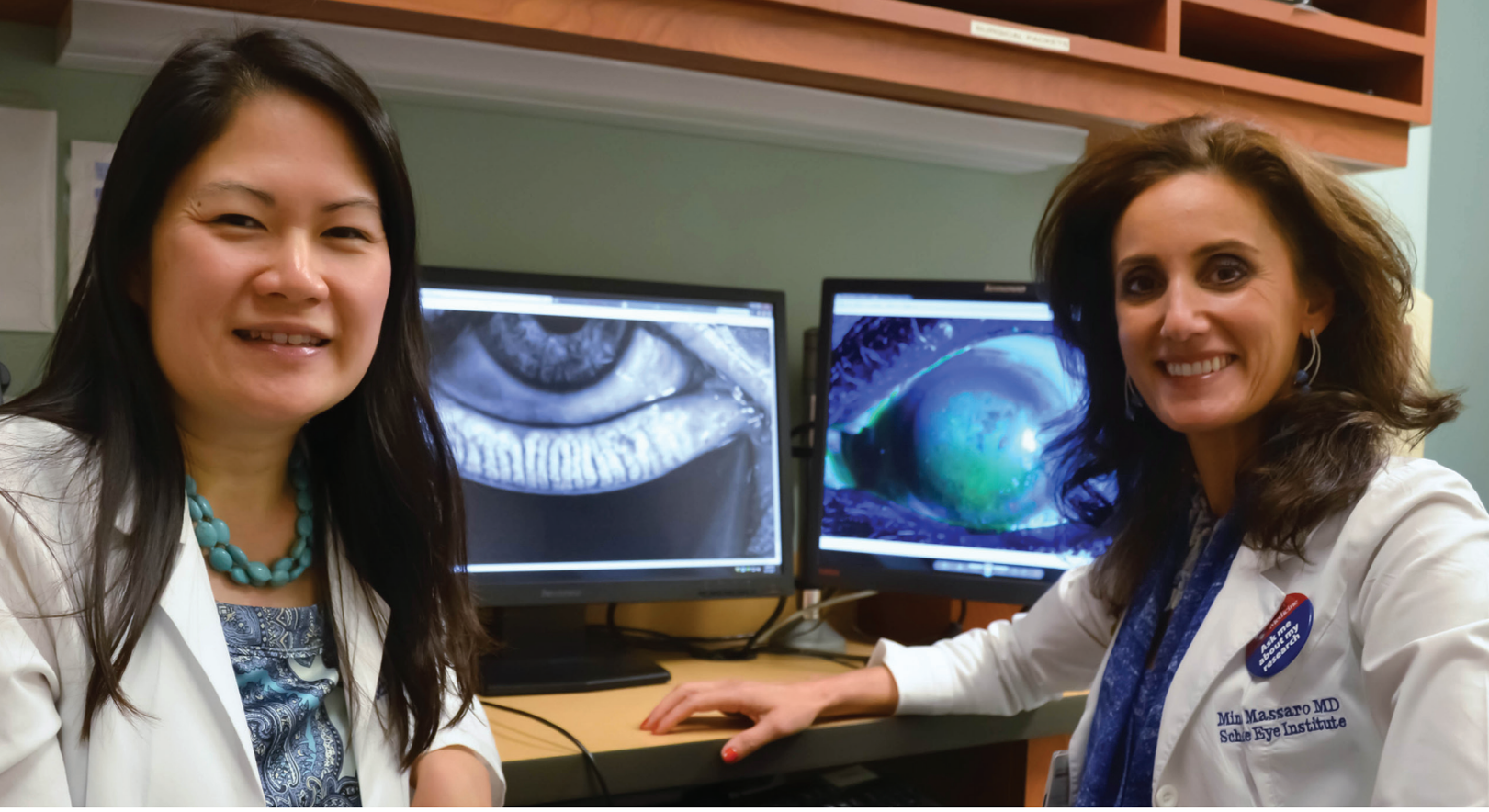
"The trial was designed very well, and the results are more reliable because it's free from commercial bias," said Dr. Vatinee Bunya, the Principal Investigator for DREAM's clinical center at Scheie.

Drs. Maguire and Bunya agree that the study's biggest challenge was the recruitment process. In addition to meeting the eligibility criteria, participants had to be willing to take five large supplements per day for a year.

"I think all of our centers found it harder to recruit than they originally thought," said Dr. Maguire, the Principal Investigator of the coordinating center for DREAM. Although the enrollment process took longer than expected, in 2016 the DREAM clinical centers met their goal of enrolling 535 patients suffering from moderate to severe DED. Dr. Maguire noted that Scheie was one of DREAM's highest performing centers.

The participants were divided into an experimental group and a control group. Those in the experimental group took omega-3 supplements while those in the control group took a placebo containing olive oil. The clinical trial was "masked" so that both participants and the examining physicians did not know which group each patient was in. Researchers checked in with the participants through three office visits and one phone call.

"We have 92% follow up. I feel very confident in the results that we have," said Dr. Maguire, who added that results will be published in 2018.



Dr. Vatinee Bunya with Dr. Giacomina Massaro-Giordano, co-investigator on DREAM.

"While dry eye is not a blinding disease that will take vision away, it can have a significant impact on a patient's quality of life."

Dr. Maguire explained that dry eye occurs when the lacrimal glands around the eye do not produce enough tears to keep the eyes wet and comfortable or when the tears evaporate too quickly. A lack of tears can stimulate inflammation, which can then result in even less tear production. "Dry eye is thought to be a vicious cycle," said Dr. Maguire.

Symptoms of dry eye can include a dry, gritty, itchy, or burning sensation in the eyes. Eyes might also be red, watery, or teary, and many people report the feeling of something in the eye or eye strain.

"I think in the past it was underestimated how much dry eye affects people," said Dr. Bunya. "While it's not a blinding disease that will take vision away, it can have a significant impact on a patient's quality of life."

Dry eye can result from a number of causes, but aging is the single highest risk factor. As people age, they tend to produce less tears, and Dr. Bunya explained that DED has become more of a problem as the population ages. The increase in prevalence has drawn attention to DED as an area in need of more research.

"In recent years, more and more people are becoming interested in dry eye and in finding better ways to treat the disease," said Dr. Bunya. "It's one of the most common reasons why people go to the eye doctor."

The findings of the DREAM study will have implications for both patient management and for the understanding of dry eye's etiology. While opinion is currently split among ophthalmologists over whether or not omega-3s are effective for the treatment of dry eye, the results of DREAM will either give credence to or contest their efficacy, guiding future prescriptions.

"I think we'll learn a lot from the DREAM study not only about the effect of omega-3 fatty acids, but also about the natural history of dry eye," said Dr. Bunya. "We will learn valuable information about how the symptoms and eye exam findings of the patients in the placebo group changed over the course of the study without treatment."

The DREAM study results will be published in early 2018.

DR. WILLIAM KATOWITZ: FROM MUSICIAN TO OCULOPLASTIC SURGEON

By Emma Wells

As an oculoplastic and orbital surgeon who primarily treats children, Dr. William Katowitz fills a highly specialized role at The Children's Hospital of Philadelphia (CHOP).

He is not to be confused with his father Dr. James Katowitz, who also works at CHOP as an Attending Surgeon in the Division of Ophthalmology and the Director of Oculoplastic and Orbital Surgery. It is easy to assume that Dr. Katowitz the younger followed in the footsteps of his father. But as Paul McCartney would say, Dr. Katowitz took "the long and winding road" to where he is today.

Dr. Katowitz took "the long and winding road" to where he is today.

"My dad is an incredible inspiration," said Dr. Katowitz, who noted that although he ultimately ended up in the same division of the same hospital as his father, he didn't realize that he wanted to pursue medicine until later in life. "My journey was somewhat circuitous in that I didn't go right out of college into med school," said Dr. Katowitz.

After earning his undergraduate degree from Brown University in 1989, Dr. Katowitz decided to move to New York to pursue music professionally. After ten years of playing in a band, however, he decided that life in the music industry was no longer what he wanted.

"I realized I wasn't using my mind to the extent that I wanted to," said Dr. Katowitz, who then moved to Boston to do a post-baccalaureate pre-med program.

When Dr. Katowitz was accepted into the Perelman School of Medicine, he did not yet know he would specialize in ophthalmology. "I actually was interested in infectious diseases when I applied to medical school, because it was the time of the AIDS crisis," he said. During medical school, however, his interests veered towards surgical specialties, and he eventually settled on ophthalmology.

After graduating from his ophthalmology residency at Scheie, Dr. Katowitz completed not one, not two, but three fellowships. Two of those fellowships were at CHOP, one in Pediatric Ophthalmology and another in Oculoplastic and Orbital Surgery. Dr. Katowitz went to London for his third fellowship, which was in Orbital and Lacrimal Surgery at Moorfields Eye Hospital.

Because Moorfields Eye Hospital is a high-volume center for orbital disease, Dr. Katowitz did a great deal of surgical training during his year there. "When you're well trained and then you do more training, you just turbocharge your skillset," said Dr. Katowitz.

In 2008 he joined the faculty at CHOP as an Assistant Professor of Ophthalmology. Dr. Katowitz is also the director of CHOP's two-year oculoplastics fellowship.

Dr. Katowitz's practice is roughly 90% pediatric and 10% adults, but he sees all of his patients at CHOP. "Most of what I see, I call it the four Ts: tumors, trauma, tearing, and ptosis," Dr. Katowitz said, chuckling. "And that's kind of a medical joke because ptosis is spelled with a P."

Dr. Katowitz often works with children with thyroid conditions, hemangiomas, and vascular malformations in addition to eyelid and tear duct abnormalities. He explained that the aim of most of his surgical work is rehabilitation. "I take something that doesn't look as good as it could and try to make it look better," said Dr. Katowitz. He added that although most of the procedures he performs at CHOP are functional, appearance and functionality go hand-in-hand. For example, a child with an eyelid abnormality, or ptosis, will see and look better after undergoing a surgery.

"People feel very strongly about the way they look, and sometimes the way they look gets in the way of how they feel," said Dr. Katowitz.

In addition to being a passionate surgeon and clinician, Dr. Katowitz also conducts research. Most recently, he was involved in a study that was successful in identifying risk factors for craniosynostosis, a condition in which the plates in a child's skull fuse too early.

"The pressure in the head goes up, and it can lead to cognitive delays and issues with swallowing, chewing, breathing, and seeing," explained Dr. Katowitz. "One of the signs of pressure in the head is a change to the back of the eye."

Conventional techniques for detecting craniosynostosis are invasive and can potentially cause problems such as bleeding, infections, or a leak of cerebrospinal fluid. Dr. Katowitz and his colleagues investigated if taking light-wave images of the retina through a process called optical coherence tomography (OCT) could be an alternative, non-invasive technique for identifying elevated intracranial pressure. They studied 79 children undergoing treatment at CHOP and compared the results of a spectral-domain OCT with directly measured intracranial pressure. Ultimately, the study identified retina imaging as a promising technique for safely and noninvasively measuring pressure in the skull.

Above all, Dr. Katowitz's passion for patient care is the ultimate motivation behind his work.

"The main thing is that, as touchy-feely as it sounds, in medicine you're here to serve people," said Dr. Katowitz. "I love the interactions I have with patients and their families. That's why I do it."

The History and Promise of Anti-VEGF Drugs:

10 Years After the Beginning of CATT

By Ava Kikut

On July 18, 2005, two novel treatments for neovascular age-related macular degeneration (AMD) were presented back-to-back at the American Society of Retina Specialists Annual Meeting in Montreal. The first drug, Lucentis (ranibizumab), was developed by the biotechnology company Genentech specifically for neovascular AMD. Clinical trials for Lucentis were yielding amazing results and the drug was on its way to becoming FDA approved. The second treatment presented was Avastin (bevacizumab), another Genentech product. Avastin was on the market for the treatment of colon cancer, but intravitreal injections of the drug were also helping patients with neovascular AMD.

AMD is the leading cause of vision loss in Americans aged 60 and older. Neovascular (wet) AMD accounts for 90% of cases of severe vision loss from the disease. This form of AMD results from the growth of abnormal leaky blood vessels under the retina, due in-part to excess amounts of a protein called vascular endothelial growth factor (VEGF). Thirteen years ago, a patient diagnosed with neovascular AMD was certain to lose vision in one or both eyes within a few years.

The introduction of Lucentis and Avastin, both VEGF inhibitors, was pathbreaking. “These anti-VEGF drugs revolutionized care and treatment for patients,” said Maureen Maguire, PhD, Director of the Scheie Eye Institute’s Center for Preventive Ophthalmology and Biostatistics. Yet many ophthalmologists were initially hesitant to use Avastin for AMD.

AVASTIN VS. LUCENTIS

Lucentis and Avastin are similar in use and composition. Both are administered through intravitreal injections and both are derived from the same base molecule. Originally, Genentech predicted the Avastin molecule would be too big to penetrate the retina of the eye, and the company trimmed down the molecule to make Lucentis. However, in 2005 ophthalmologists were beginning to find that Avastin could penetrate the eye successfully.

What was remarkable about the prospect that Avastin could be equally efficacious as Lucentis was the price difference. Because Avastin was put on the market for cancer treatment, it is sold in higher quantities. An injection in the eye only requires 0.05 ml of the 16 ml package. Thus, Avastin costs $50 a dose for AMD, while Lucentis costs $2000 a dose.

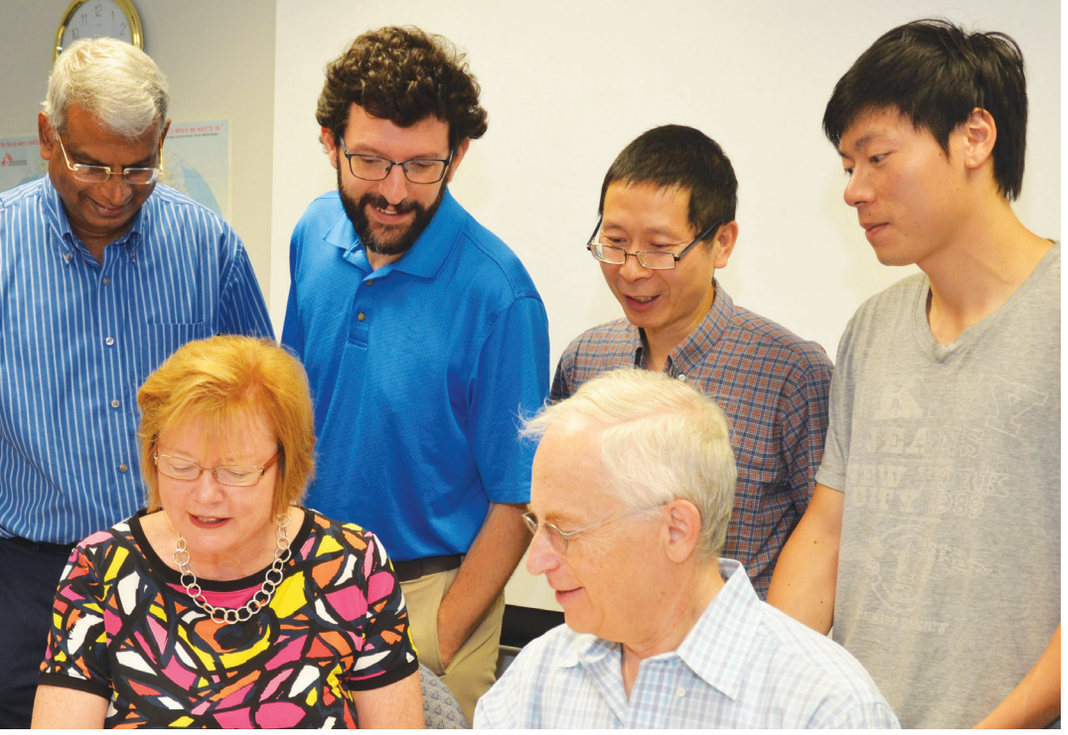
Avastin was also on the market before Lucentis. “Once a drug is approved and on the market a physician can take it and treat any condition,” explained Dr. Maguire. “It’s off-label but it’s legal.” Due to Avastin’s affordability and accessibility, it quickly became a leading first-line therapy for neovascular AMD.

These anti-VEGF drugs revolutionized care and treatment for patients.

CATT

The increased off-label use of Avastin for AMD called for a clinical trial to test the drug’s long-term effects. “All the ophthalmologists wanted it to happen because, even though they were using Avastin off-label, they were worried that it might not be as efficacious and there might be some safety problems,” said Dr. Maguire.

In January 2007, the National Eye Institute (NEI) provided funding for the Comparison of Age-Related Macular Degeneration Treatments Trial (CATT), a $26 million study designed to test the efficacy and safety of Avastin compared to Lucentis. The CATT team included Drs. Maureen Maguire, Gui-shuang Ying, Juan Grunwald, Ebenezer Daniel, and Stuart Fine of the Scheie Eye Institute; Dr. Daniel Martin of the Cole Eye Institute; and Dr. Glenn J. Jaffe of the Duke Department of Ophthalmology. Between 2008 and 2010, CATT enrolled 1185 patients with neovascular AMD, each assigned to one of four groups defined by drug (Avastin or Lucentis) and dosage (monthly or as needed).



CATT team discussing results of follow-up study. (Standing from left: Ebenezer Daniel, MBBS, MS, MPH, PHD; Maxwell Pistilli, MEd, MS; Gui-Shuang Ying, PhD; Wei Pan, MS. Seated from left: Maureen Maguire, PhD; Juan Grunwald, MD)

CATT found that Avastin and Lucentis were equally efficacious and safe. After two years of treatment, both drugs could increase visual acuity from about 20/60 to around 20/40 (the required acuity for a driver's license in most states) or better. "[Patients] actually improved. This was a huge change. All of our treatments before kept people from getting worse, and never improved vision. So everybody is happy about that," said Dr. Maguire. These findings were replicated by five additional clinical trials in other countries.

THE IMPACT OF CATT

The results of the comparison studies have had significant implications for health care services and their patients. Dr. Maguire explained, "Worldwide the CATT trial and the five other supporting trials have had a major impact in lowering the price and getting more patients treated." In some countries, health services that previously covered Lucentis now only cover Avastin. In others, such as England, health care services have negotiated with Genentech to reduce the price of Lucentis. In poorer countries, where Lucentis is unaffordable, the acceptance of Avastin has made treatment for neovascular AMD a possibility that didn't exist before.

In the United States, CATT results have had less impact on prices and formal regulation than in other countries, but they have helped inform treatment decisions for physicians and patients. Because Medicare is not permitted to negotiate drug costs, the prices remain $2000 a dose for Lucentis and $50 for Avastin. While one might expect Avastin to become FDA approved for AMD, FDA approval is a process that is usually initiated by the company making the drug. Genentech does not have incentive to initiate this process, since it already has Lucentis on the market. However, FDA approval would not particularly benefit ophthalmologists or their patients. The bottom line is CATT results have increased confidence in Avastin's effectiveness and safety; ophthalmologists can comfortably prescribe Avastin and insurance services have agreed to cover it. Avastin and Lucentis, as well as Regeneron Pharmaceutical's anti-VEGF drug Eylea (aflibercept), which was FDA approved in 2011 and costs $1850/dose, are currently the leading therapeutic options for neovascular AMD.

THE CATT FOLLOW-UP STUDY

In 2016, CATT published results for a five-year follow up study. "We were now interested, not so much in comparing the drugs, but how do people do after long-term anti-VEGF treatment," said Dr. Maguire. The CATT results demonstrated that after five years of anti-VEGF therapy, 50% of patients increased to and maintained 20/40 vision and 20% decreased to 20/200 or worse.

The results of the follow-up study show a dramatic difference between anti-VEGF therapy and any previous treatment for AMD. Before anti-VEGF drugs were available, the leading treatment for AMD was photodynamic therapy. After a year of photodynamic therapy, only 15% of patients maintained 20/40 vision and 40% of patients decreased to 20/200 or worse. In untreated patients, 90% experienced vision loss within a year and 75% declined to 20/200 or worse.

While the effectiveness of anti-VEGF treatment may decrease over time, anti-VEGF therapy helps significantly with the odds of maintaining vision. "If you continue seeing an ophthalmologist and keep getting anti-VEGF injections, you have about half a chance to keep really good vision," stated Dr. Maguire. "If you keep being observed for treatment you can maintain vision that is much better than you would if you were not being treated."

There is no doubt the prospects for patients with neovascular AMD have become far more promising since 2005. The CATT trial and follow-up study results have shed light on the potential for both Lucentis and Avastin to save the vision of AMD patients, and the importance of checking in with patients after clinical trials conclude. In 2016, National Eye Institute Director Dr. Paul Sieving called CATT "the most comprehensive study of anti-VEGF therapy for AMD to date."

scheie residents **gain top notch experience**

By Emma Wells

In the past several years, Scheie's Ophthalmology Residency Program has significantly increased surgical volume for residents, while continuing to foster quality mentorship and teaching.

Dr. Paul J. Tapino, the Director of the Ophthalmology Residency Program and an Associate Professor of Clinical Ophthalmology, explained that the addition of an extra operating room in the Philadelphia Veterans Administration Medical Center (VAMC) has contributed to increased surgical volumes. "We were able to secure an extra operating room at the VA at least one day of the week," said Dr. Tapino. "That opened up the opportunities."

The extra operating room allowed for the addition of a second rotation for surgical senior residents. Dr. Tapino then worked with faculty members to reorganize the resident curriculum to accommodate the additional rotations.

There have been several other changes in the residency program that have bolstered the surgical learning experience for residents. Four years ago, the residency program acquired a surgical simulator, which trains residents in microsurgery and hand-eye coordination.

Associate Professor of Ophthalmology Dr. Stephen Orlin added that residents have had exposure to using a new state-of-the-art laser housed at the VA Medical Center. The residency program also recently revitalized their wet lab, where residents practice suturing techniques and incisions on cadaver, animal, and synthetic eyes.

"Oftentimes the primary thing they want to get out of the residency, besides being in a top-notch academic program, is to have lots of practical hands-on experience," said Dr. Orlin.

During their three years in the Ophthalmology Residency Program at Scheie, residents progress from the general eye examination through sub-specialty work. By the third year, residents perform increasing amounts of microsurgery, particularly cataract surgery. Dr. Orlin and Dr. Michael Sulewski, Chief of Ophthalmology at the VA Medical Center, guide residents through surgeries, ensuring a safe and quality learning experience.

"When we start training them, they do bits and pieces of cataracts, until we feel comfortable giving them more and more," said Dr. Orlin. "Eventually they get to the point when they can do the whole case all on their own."

Dr. Tapino explained that the bulk of surgeries are done in the third year of residency, but he and Dr. Orlin are interested in integrating more surgical training in the first and second years as well.

"When they come to third year, they should hit the ground running,

Scheie Residency Graduation 2017. Left to right: Stephen Orlin, MD, Daniel Sarezky, MD (res '17), Christiana Munroe, MD (res '17), Marisa Lau, MD (res '17), Paul Tapino, MD, Nicole Fuerst, MD (res '17), Michael Sulewski, MD, Katherine Uyhazi, MD, PhD (res '17), and Scheie Educational Programs Director John Dempsey.

having a number of cases under their belts," said Dr. Orlin.

Dr. Orlin cited the high class academics and plentiful research opportunities as factors distinguishing the Scheie residency program. Dr. Tapino agreed, and added that an entirely full-time faculty committed to resident education sets Scheie apart.

"A priority of the faculty is resident education," said Dr. Tapino. Dr. Tapino also remarked on the outstanding teamwork and camaraderie among the residents.

"The residents all get along very well, and they're very close," said Dr. Tapino. "We try to foster an 'I've-got-your-back' mentality."

When ophthalmology residents graduate from Scheie, they then have the option of beginning to practice comprehensive ophthalmology or specializing further. Residents often apply to fellowships in sub-specialties such as cornea, glaucoma, retina, oculoplastics, pediatrics, and neuro-ophthalmology. Scheie residents have an outstanding track record for matching with highly competitive fellowship programs nationally.

"All of our residents not only match into fellowships, but get their top choice, and if not their top choice, then their second choice," said Dr. Tapino. "I think increasing the surgical experience makes them even more prepared for their surgical sub-specialties."

Scheie residents also generate prodigious amounts of research after graduation. Scheie's Alumni Clinical Trial Percentile (the number of grants/trials per alumnus in the past 15 years) ranks in the top 1% nationwide.

"Coming out of Scheie opens the door for them for their future academic and clinical careers," said Dr. Orlin.

The supportive environment, committed faculty, high quality academics, and intensive surgical training in Scheie's residency program combine to produce highly skilled ophthalmologists who go on to perform cutting-edge research and provide exceptional patient care.

UNDERSTANDING RETINAL DAMAGE FROM ZIKA

Dr. Tomas Aleman

By Emma Wells

The 2015-2016 Zika epidemic in the Americas brought to light the virus's potential to cause devastating birth defects. A recent collaborative study spearheaded by Dr. Tomas S. Aleman has provided new insight into Zika's effect on retinal development in infants exposed to the disease in utero.

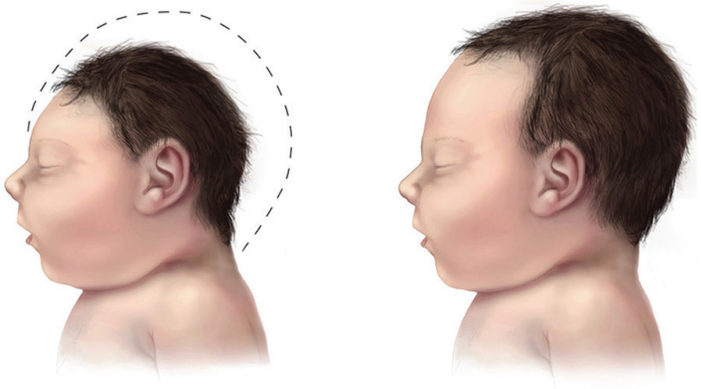
The mosquito-born Zika virus is usually benign in adults, but babies born to infected mothers are at risk for neurological disorders. The most well-known of these birth defects is microcephaly, in which the infant experiences serious malformation of the brain, but Zika can also cause a number of other neurodevelopmental abnormalities. Congenital Zika Syndrome (CZS) encompasses the unique pattern of birth defects associated with Zika, including microcephaly and, of particular interest to Dr. Aleman, retinal abnormalities that can impair a child's vision.

At the outset of the study, Zika researchers understood that CZS caused retinal damage, but the mechanism through which the virus enters the retina and causes a problem remained a topic of debate. One idea held that the infection causes inflammation in the retina, leading to damage. Another hypothesis proposed that infection and death of neuronal progenitors in-utero is behind the devastating malformations.

Dr. Aleman had been following the research of his colleagues in Brazil who study the retinal changes associated with CZS. While looking over the images they published, Dr. Aleman had a realization. "I noticed that the changes were very reminiscent of a condition that is caused by a genetic problem of Vitamin B12 metabolism called cobalamin C (cblC) deficiency, where we have postulated a malformation of the central retina as a possible disease mechanism," he said.

Although cblC deficiency and CZS do not have a common etiology, both conditions are associated with very similar retinal lesions. Dr. Aleman was curious if comparing the two conditions could help assess whether Zika, like cblC deficiency, is associated with damage to specific areas of the retina.

Intrigued, Dr. Aleman approached the Brazilian team of researchers, and they agreed to collaborate on a study comparing the microstructural changes of the retina in CZS and cblC deficiency. In contrast to prior studies on retinal damage



The most well-known birth defect caused by the Zika virus is microcephaly, which is a congenital condition characterized by abnormal smallness of the head and incomplete brain development. However, Zika can cause a number of other neurodevelopmental problems, such as retinal abnormalities.

The Zika virus is primarily transmitted to humans by Aedes mosquitos.

in CZS, Dr. Aleman was interested in examining areas of the retina unaffected by scarring. “Rather than looking at the atrophic scarred retina, we looked away from that area and went to areas that clinically would look normal or nearly normal,” said Dr. Aleman.

The study enrolled eight infants with CZS and nine individuals with cblC deficiency. All patients underwent ophthalmologic evaluation and spectral-domain optical coherence tomography (SD-OCT) imaging in at least one eye.

Dr. Aleman was surprised by the results. “What we found was that the predilection of both diseases is to affect the inner retina, especially a layer called the ganglion cells, which connects the retina to the brain,” he said. “The implication of the finding is that Zika may reach the retina through the axons of the ganglion cells and the surrounding tissue.” These results provide the first *in vivo* evidence in humans for retinal ganglion cell loss in CZS.

The researchers found a spectrum of problems from the inner retina to the outer retina in both diseases, casting doubt on the inflammation hypothesis. “There is more of a problem in the superficial layers of the retina than there is in the deeper layers,” said Dr. Aleman. “And that is new.” Since the publication, studies in mice have been consistent with the findings in Dr. Aleman’s work.

These findings have implications for future treatment of CZS. “If retinal damage from CZS resulted from spread from the retinal circulation, then the expectation would be a predilection for regions and cells that follow the path and territories served by those blood vessels to be affected,” said Dr. Aleman. This study suggests instead that the infection may spread through the neurons themselves or through their supportive tissue or glia, which may then be better (or additional) targets of treatments. “Ideally we would modify the ability of the virus to enter the neuronal progenitor cells or the supportive glia,” said Dr. Aleman.

The study results could also revolutionize the way clinicians monitor children who were exposed to Zika in utero. The researchers discovered that a retina damaged by CZS may appear normal in routine ophthalmic assessments. The study’s findings support the use of SD-OCT when monitoring patients at risk for CZS as a way to catch developmental abnormalities early and provide support during post-natal development. “We could use these kinds of quantitative measures as biomarkers of whether we have to worry about their development, not only visually but neurologically, in otherwise asymptomatic but Zika-exposed infants,” said Dr. Aleman.

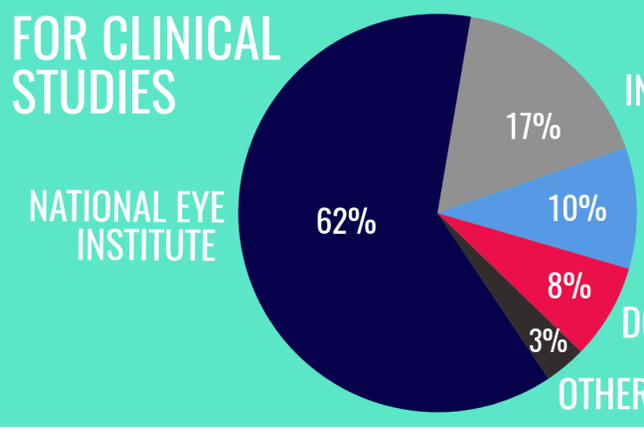
There is hope for children who have sustained retinal damage from CZS. “The retina remains malleable and in development until later in life, and we may still have an opportunity to favorably modify the final visual outcome,” said Dr. Aleman. Early detection and closer monitoring of retinal damage in children exposed to CZS could improve their neurologic and visual outcomes in the future.

SCHEIE BY THE NUMBERS FY2017*

CREATED BY AVA KIKUT

56 CLINICAL & RESEARCH FACULTY

SOURCES OF EXTERNAL FUNDING FOR CLINICAL STUDIES



2,888 SURGERIES PERFORMED BY FACULTY

116 CLINICAL TRIALS IN PROGRESS

100% OF GRADUATING RESIDENTS PURSUE TOP FELLOWSHIP PROGRAMS

178 FACULTY PUBLICATIONS

A LEADER IN RESEARCH IMPACT

102 H-INDEX

RANKED #2 IN THE NATION FOR NATIONAL EYE INSTITUTE FUNDING $14,664,650

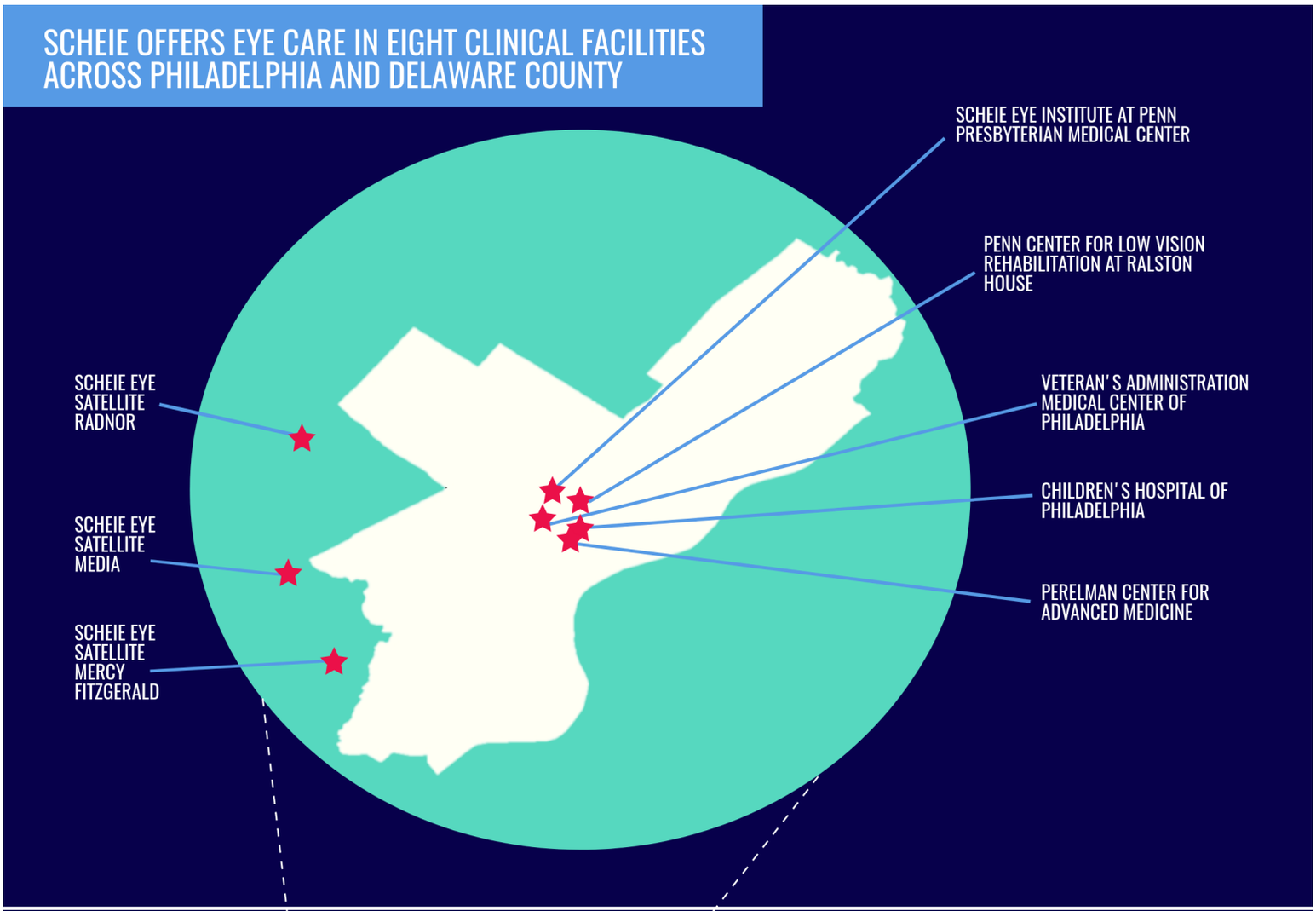
TOP 1% NATIONWIDE FOR RESEARCH OUTPUT PER ALUMNUS

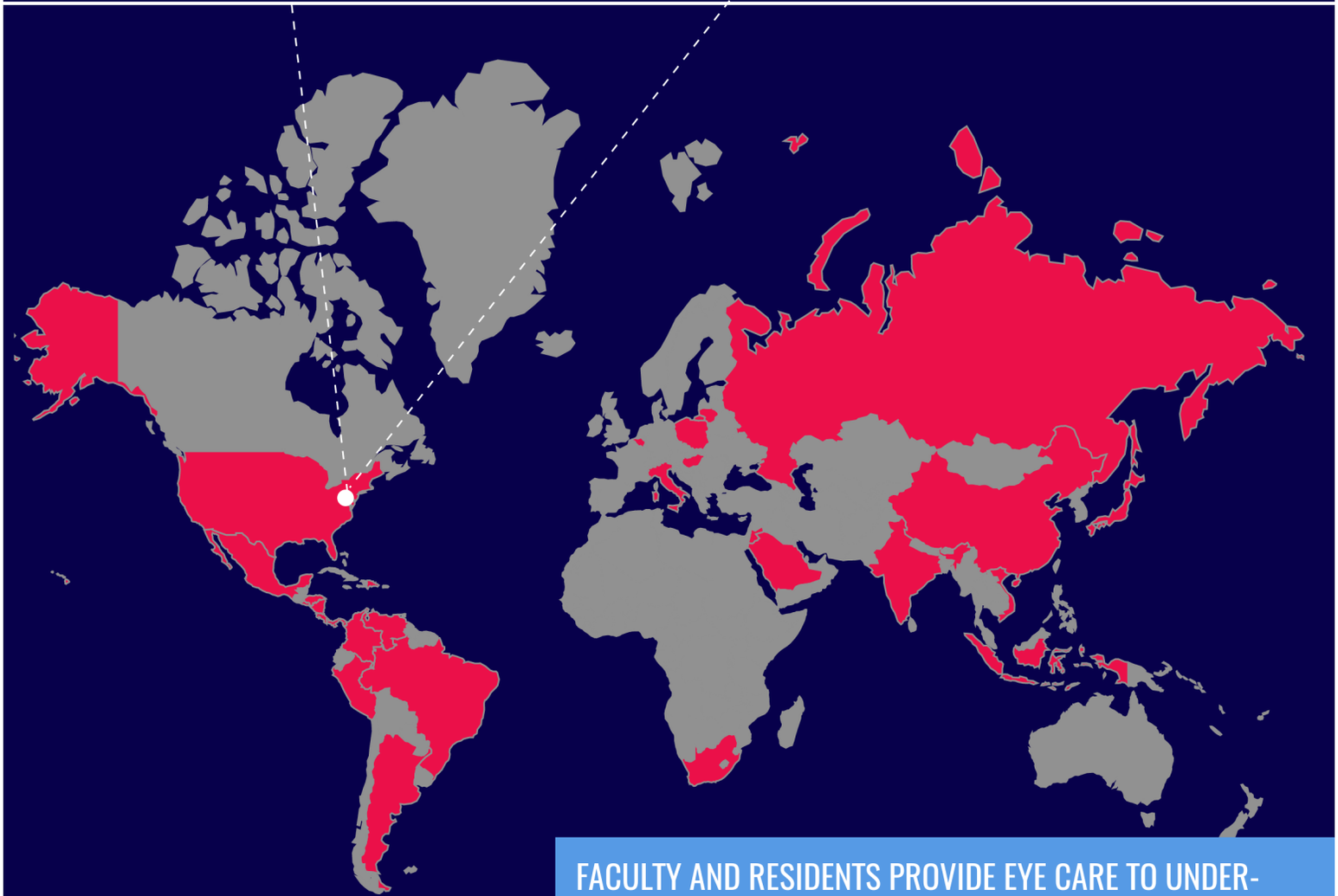
17 OPHTHALMIC SPECIALTIES

120,725 PATIENT VISITS

*JULY 1, 2016 - JULY 1, 2017

SCHEIE OFFERS EYE CARE IN EIGHT CLINICAL FACILITIES ACROSS PHILADELPHIA AND DELAWARE COUNTY





FACULTY AND RESIDENTS PROVIDE EYE CARE TO UNDER-SERVED POPULATIONS AROUND THE WORLD

Remembering Dr. William Tasman

By Emma Wells

Dr. William Tasman, former Ophthalmologist-in-Chief of Wills Eye Hospital, passed away on March 28, 2017 at the age of 87.

Among his many contributions to the field of ophthalmology, foremost is his pioneering research in retinopathy of prematurity (ROP). Dr. Tasman was a leader in the development of laser photocoagulation as a treatment for ROP, and he consequently saved the eyesight of thousands of premature infants. He also made important advances in the treatment of retinal detachment and diabetic retinopathy.

In addition to leading Wills Eye Hospital as Ophthalmologist-in-Chief from 1985 to 2007, Dr. Tasman served as President of the American Academy of Ophthalmology, Chairman of the American Board of Ophthalmology, and President of the American Ophthalmological Society and the Retina Society.

Scheie faculty reflected on the impact Dr. Tasman had on their careers and on the field of ophthalmology.

> "I first got to know Dr. Tasman as a resident at Wills Eye Hospital and then in subsequent years as a colleague. In addition to making significant contributions to the field of ophthalmology, he was also a wonderful person and mentor. He will be dearly missed."
>
> — Dr. Vatinee Bunya

Scheie faculty reflected on the impact Dr. Tasman had on their careers and on the field of ophthalmology.

"Bill Tasman was among the most generous, kind, and supportive men I have ever met. On my becoming Chairman at UPenn and Director of the Scheie Eye Institute, Bill immediately reached out to me as former Ophthalmologist-in-Chief at Wills Eye Hospital. He and his beloved wife Alice Lea made my husband Jim and I feel welcome in our new city of Philadelphia. We shared many happy events: marching with Mummers, having quiet dinners with the Tasmans' many friends, sharing the AAO's Orbital Gala, and so much more. In my new position, I knew that I could go to Bill for advice, and that he would provide me answers full of wisdom, thought, and insight, bred from years of experience. Bill was a true leader, an internationally recognized physician, and an exemplary humanitarian. I continue to miss Bill and his advice, his jokes, his laugh, and his help with every situation I encountered as a Chairman of Ophthalmology. Thankfully, we still have Alice Lea as a treasured friend, also wisely guiding our path. Bill Tasman will not be forgotten; he lives on in our memories and in our hearts, and he lives on in the legacy of excellence within the Philadelphia ophthalmology community that he created. None of us can count the debt we owe to Bill Tasman."

— Dr. Joan O'Brien

"Dr. Tasman had a great impact on my life and career. He treated my father for a retinal condition, and thanks to Dr. Tasman my father enjoyed a long and successful career in medicine and research. As a colleague, I could always count on Dr. Tasman, especially when it came to help in caring for infants and children with complicated retinal diseases."

— Dr. Albert Maguire

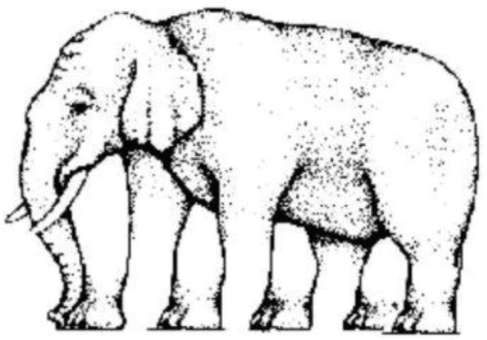
"When I was in the later years of high school and college I had occasion to have numerous conversations with a good friend of my parents, who also happened to be my obstetrician. These conversations revolved around my desire to go to medical school, and frequently he would mention his nephew, Bill Tasman, who was in medical school and subsequently became an ophthalmology resident. Over a number of years, I saw Bill Tasman and his wife socially at events in Philadelphia, and finally we put together the fact that his uncle was my parents' friend and my obstetrician. This led to a warm relationship between us until his unfortunate passing. Bill, Alice Lea, and I had opportunities to spend some lengthy times together in Newport and on a cruise from Venice to Croatia and Montenegro. During those times, he was always a great raconteur filled with many, many stories, which meant our time together was always exceedingly pleasurable. As people know, many of the stories were told again and again, but were always a delight to hear."

— Dr. Charles Nichols

OPTICAL ILLUSIONS

by Rebecca Salowe

How many legs does this elephant have?

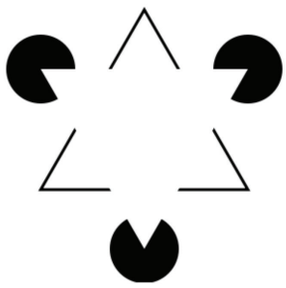


ANSWER: Most people count anywhere between four and eight legs. However, the elephant actually has one intact leg.

EXPLANATION: This elephant is a paradox illusion, or a falsified image. The only "real" elephant leg is the back left leg, which is completely intact. The other three legs do not have connecting feet; instead, the artist drew the feet between each leg. Cover the bottom of the image with your hand to see more clearly.

Source: Shepard RN. (1990). Mind sights: Original visual illusions, ambiguities, and other anomalies, with a commentary on the play of mind in perception and art. WH Freeman/Times Books/ Henry Holt & Co.

How many triangles do you see?



ANSWER: Most people see two triangles (a white triangle overlaying a triangle outlined in black), but there are actually zero triangles in this image.

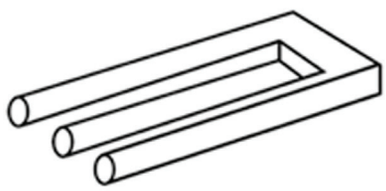
EXPLANATION: The Kanizsa triangle has illusory contours. In truth, this image shows three black circles with missing segments and three v-shaped lines. The contours of the white triangle are "phantom edges" created by your brain. The brain tends to see objects grouped together as a whole, often ignoring gaps and incomplete lines to form familiar objects.

Source: Kanizsa G. (1955). Quasi-perceptional margins in homogenously stimulated fields. Rivista di Psicologia, 49, 7-30.

What's wrong with this object?

ANSWER: The object appears to have three cylindrical prongs on the left end, which mysteriously transform into two rectangular prongs on the right end.

EXPLANATION: The "devil's fork" is an impossible object. If you cover the right or left side, each visible piece makes sense on its own. However, the two parts of the figure were drawn from incompatible perspectives and cannot form a real 3D object.



Source: Ernst B. Impossible Worlds: Adventures With Impossible Objects / Optical Illusions. 2006. Evergreen.

dear friends

Scott M. Goldstein, MD
Pediatrics & Adult
Oculo-Facial Plastic Surgeon
Tri-County Eye & Wills Eye Institute

It is often said youth is wasted on the young. While perspective is gained with experience and growing older, our youth are our future. As former residents and fellows of Scheie, Penn, and CHOP, we have walked in their shoes. We all started at the beginning of the same road even though our paths may have diverged as we moved on.

Nonetheless, I feel a sense of gratitude to the many people who helped shape my career in ophthalmology, even in the subspecialties that I no longer treat day-to-day. It has been 17 years since I performed cataract surgery, but I have taken the lessons learned with me into my oculoplastics surgery career. My retinal examination skills and glaucoma treatment knowledge have been very helpful in treating patients with severe trauma to preserve their vision.

At the midpoint of my career, I want to return the gratitude and ensure the time of our young residents is nourished. I announced in the spring at our Annual Alumni meeting and in my previous column that more opportunities to support the young doctors in training would become available. The details are still taking shape, but opportunities to share time, wisdom, and even monetary donations will come into focus in the coming months. I encourage all alumni, old and young, to give back to the Department that gave so much to us, and to ensure that Scheie remains the great institution it is known as around the world.

Scott M. Goldstein, MD Res '00, Fel '02
President, Scheie Alumni Society

SAVE the DATE

2018 Scheie Eye Institute Alumni Association CME Accredited Conference

Friday, April 13, 2018
7:30am-4:30pm
Scheie Eye Institute, breakfast and lunch served
Honored Alumni Lecture: Michael Kazim, MD
David M. Kozart Lecture: Graham Quinn, MD, MSCE

7:00pm-10:30pm
Dinner and Dancing at Rittenhouse Hotel

Saturday, April 14, 2018
7:30am-12:30pm
Scheie Eye Institute, breakfast served

scheie WELCOMES

By Emma Wells

Dr. Ahmara Ross

The Scheie Eye Institute is thrilled to welcome back Dr. Ahmara Ross, who recently joined the faculty as an Assistant Professor of Ophthalmology. Dr. Ross was awarded a University of Pennsylvania institutional K12 grant, which protects 80% of her time for research. She splits her remaining time between glaucoma and neuro-ophthalmology clinical work.

Dr. Ross received her undergraduate degree from Bryn Mawr College, where she studied chemistry. She went on to earn an MD and a PhD in molecular pharmacology and structural biology from Thomas Jefferson University. Dr. Ross thought she would become an oncologist, but a rotation in ophthalmology changed her mind.

"I remember being in the operating room with Carol Shields at Wills. One of her fellows taught me how to look in the eye with the indirect," said Dr. Ross. "I saw the retina, and I thought, 'This is amazing.' You can look at an organ in vivo with the subject still alive. I was sold from there."

During her ophthalmology residency at University of Pittsburgh, she noticed that neuro-ophthalmology and glaucoma were two separate specialties. "But really they're studying two of the same things, the degeneration of the optic nerve," said Dr. Ross. With the help of her mentors Dr. Eydie Miller and Dr. Kenneth Shindler, she decided to do two ophthalmology fellowships at Scheie: one in glaucoma and one in neuro-ophthalmology. "I wanted to combine those two specialties to try to change the way we look at the diagnosis and the treatment of glaucoma," she said.

In her research, Dr. Ross explores other variables aside from intraocular pressure that can be treated to prevent vision loss from glaucoma. "I'm working in conjunction with Dr. Kenneth Shindler to design medications that don't rely on lowering pressure to preserve retinal ganglion cells, which are ultimately lost in glaucoma," said Dr. Ross. "I want to develop and use techniques to measure ganglion cell function that we use in neuro-ophthalmology but that we would not have originally thought to use in glaucoma."

Dr. Ross lives in Philadelphia with her husband Elvin Peter Ross III, an attorney who owns the legal firm Legis Group LLC. They have a one-year-old son, Elvin Peter Ross IV, whom they call "E4". In her free time, Dr. Ross enjoys making her own soap, lotions, and hair care products for her family.

Dr. Karen Revere

The Scheie Eye Institute is delighted to welcome back Dr. Karen Revere, who joined the faculty in July 2017 as an attending oculoplastic and reconstructive surgeon. She practices both at Scheie and Children's Hospital of Philadelphia (CHOP).

Dr. Revere received her MD from the Perelman School of Medicine, and a rotation at Scheie put ophthalmology on her radar. "I was captivated by the structural beauty of the eye, as well as the detailed and technically challenging nature of ocular surgery," said Dr. Revere. "The main goal in ophthalmology is to restore and maintain vision, something to which I am truly committed." Dr. Revere went on to do her residency at Scheie and then completed two years of specialized fellowship training in Oculoplastic and Orbital Surgery at CHOP.

"I am so excited to once again be part of the Scheie community, now as an attending surgeon and teacher," said Dr. Revere. "I am humbled to work alongside the many brilliant and caring doctors at Scheie and CHOP."

A Philadelphia native, Dr. Revere lives in Center City with her husband.

Dr. Prathima Neerukonda Atluri

The Scheie Eye Institute is thrilled to welcome Dr. Prathima Neerukonda Atluri, who joined the faculty in July 2017 as an Assistant Professor of Clinical Ophthalmology. Dr. Neerukonda will be seeing glaucoma patients at both the Radnor and Media locations.

Dr. Neerukonda attended Chicago Medical School, where she excelled, being inducted into Alpha Omega Alpha during her junior year. During her clinical rotations in medical school, it rapidly became clear that she had a clinical passion for ophthalmology. "It was truly amazing to witness how ophthalmologists can influence the quality of one's life and really make a difference," said Dr. Neerukonda. She went on to complete an ophthalmology residency at George Washington University. Pursuing her strong interest in glaucoma, Dr. Neerukonda subsequently continued her education with a glaucoma fellowship at Emory University.

Prior to her arrival at Penn, Dr. Neerukonda spent several years in busy glaucoma practices in suburban Chicago and Philadelphia where she developed expertise in managing complex glaucoma. Dr. Neerukonda is excited to join the faculty at Scheie and has found her new role very rewarding. "The residents, faculty, and staff have been so gracious and welcoming," she said. "I am so impressed with the expertise of the faculty here at Scheie and look forward to future collaboration."

In addition to seeing glaucoma patients, Dr. Neerukonda has been enjoying teaching residents in the walk-in clinic. "They are exceptional learners and compassionate doctors, and are proving to be a great asset to our field," she said. Dr. Neerukonda is also working to develop the ophthalmology lane in the Emergency Department, with the goal of creating an integrated program where ER residents can become proficient in ophthalmic care.

Dr. Neerukonda lives in Penn Valley with her husband Dr. Pavan Atluri, who is a cardiac surgeon at Penn Medicine. They have two daughters, Karina (5 years) and Riya (1.5 years), and are currently expecting their third child in the winter.

Dr. Regina Altemus

The Scheie Eye Institute is pleased to welcome Dr. Regina Altemus, who returned to Scheie in July as an optometrist after a 12-year hiatus. Dr. Altemus is working with Drs. Stephen Orlin and Michael Sulewski in the cornea subspecialty.

Dr. Altemus began her career in ophthalmology at age 16 as a technician for a retina specialist. She worked at this practice for four years, and she went on to earn her undergraduate degree in health science with an emphasis in ophthalmic technology from Old Dominion University in Norfolk, Virginia. She then worked with Dr. Orlin at Scheie as a Certified Ophthalmic Medical Technologist from 2004-2005, and continued to assist Drs. Orlin and Sulewski with LASIK surgery for another two years. In 2013, Dr. Altemus decided to pursue a Doctor of Optometry (OD) degree at the Pennsylvania College of Optometry at Salus University, from which she graduated in May 2017.

Dr. Altemus is thrilled to return to Scheie and said that the institute is much as she remembers it. “The only thing that’s changed is that they did a remodel. Dr. Orlin doesn’t look any different!” she said.

Dr. Altemus particularly enjoys performing complex refractions. “I love working with patients, and I really enjoy doing refractions,” said Dr. Altemus. “With a little bit of time spent doing a careful refraction, you can really help these patients.”

Dr. Altemus lives in Lansdale, PA with her husband John and their nine-year-old twins, Cole and Lilly. In her free time, she enjoys hiking and biking with her family.

Dr. Sara Bierwerth

The Scheie Eye Institute is delighted to welcome Dr. Sara Bierwerth, who joined the Department in July 2017 as an optometrist.

Dr. Bierwerth grew up in western Minnesota, and she earned her undergraduate degree at the College of Saint Benedict. She then completed her OD at the Pennsylvania College of Optometry at Salus University and her residency in Cornea and Contact Lenses at Southern California College of Optometry.

At Scheie, Dr. Bierwerth will be performing routine eye care as well as specialized contact lens fittings. “I enjoy fitting complex, medically necessary lenses to give our patients improved vision that their glasses often cannot provide,” said Dr. Bierwerth. She will be working closely with Drs. Massaro and Bunya in the Dry Eye and Ocular Surface Center, and she especially looks forward to following patients who use scleral contact lenses for dry eye disease.

In her free time, Dr. Bierwerth enjoys hiking and traveling with her husband and two daughters.

Virginia Roberts

The Scheie Eye Institute is pleased to welcome Virginia (Ginny) Roberts, who assumed the role of Chief Operating Officer of the Department of Ophthalmology in July 2017. In her new role, Ginny oversees all administrative functions for the Department and serves as a critical strategic and business partner for Dr. Joan O'Brien and the University of Pennsylvania Health System (UPHS).

Ginny earned her undergraduate degree in Business Administration from The Wharton School of the University of Pennsylvania and holds an MBA from St. Joseph's University. She is a Certified Medical Practice Executive and throughout her career has held a number of elected leadership roles in her specialty's national associations.

Ginny is a seasoned health care executive, with her most recent experience at the University of Chicago. During her tenure there, Ginny was the Executive Director for all surgical disciplines and also served as Vice President for Surgical Services and Women's Health for the medical center. Ginny also held the role of Executive Director for the Department of Surgery at University of Florida. Prior to that, Ginny served for 17 years at Penn Medicine as the Department Administrator for the Department of Obstetrics and Gynecology. During her years at Penn, Ginny's role was expanded to include Service Line leadership, where she oversaw strategy and marketing for the women's health brand across the Health System.

ART OF DIAGNOSIS continued

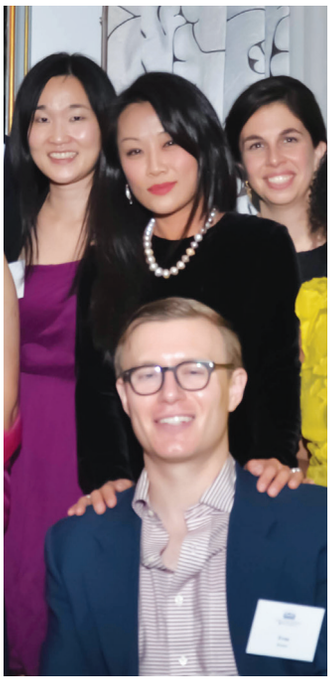
Christy Hong, another student in the art-training group said, "My biggest takeaway was the importance of appreciating perspectives of other people." Christy is in the MD/MBA program at Penn, and continues to apply the lessons she learned in the art-observation pilot course to her work in both clinical and business settings. "Through discussions around various artworks, I realized my peers and I picked up different stories even though we were looking at the same painting. That taught me that my observation alone is not enough, especially in patient care. By relying solely on my initial read of the patient, I may miss out on some key aspects that would influence management decisions. I now seek the opinions of my colleagues on the floor if possible, which enables us to triage the patient more appropriately as a team." As with analyzing a piece of art, exchanging perspectives and observations with others can strengthen the overall understanding of a clinical case.

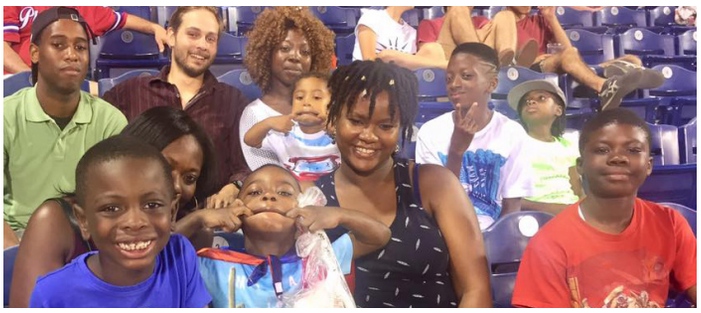
The proven benefits of formal art training for clinicians are becoming more widely recognized. When the investigators of Penn's art observation training study presented their results at the Annual Meeting of the American Association for Pediatric Ophthalmology and Strabismus in April 2017, a number of physicians approached them with questions for how to bring similar curricula into their own programs. "It's definitely becoming more accepted, and I think it's extremely promising for the future of medical education," said Dr. Gurwin. Dr. Gurwin hopes to conduct a follow-up study on the long-term effects of art observation training on students' medical school experiences and clinical careers. While observation is especially important in ophthalmology, Dr. Gurwin is certain there is something to be gained from formal observation training for future clinicians in all specialties. "The results of our study should be a reminder to the medical community that we should not be hesitant to look to other fields, especially the liberal arts, for assistance in training quality physicians," she said.

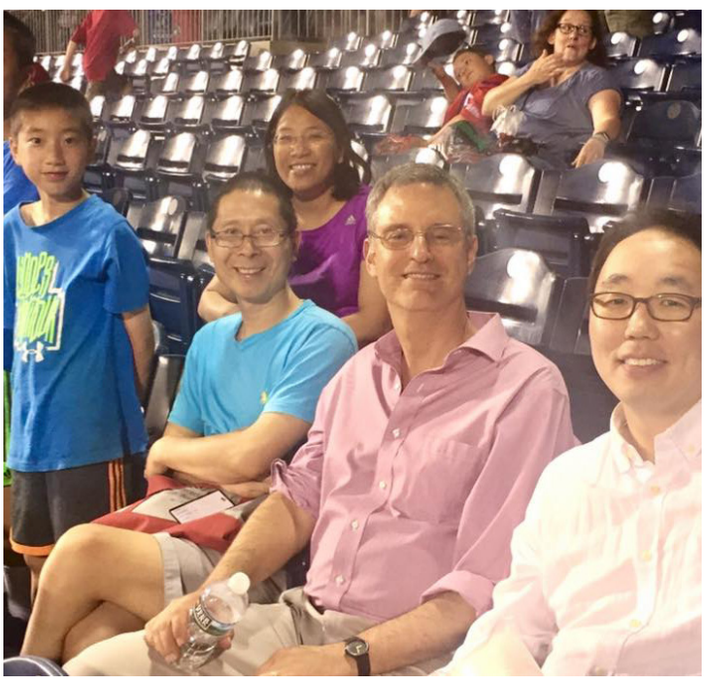
FOR MORE ABOUT THIS STUDY:

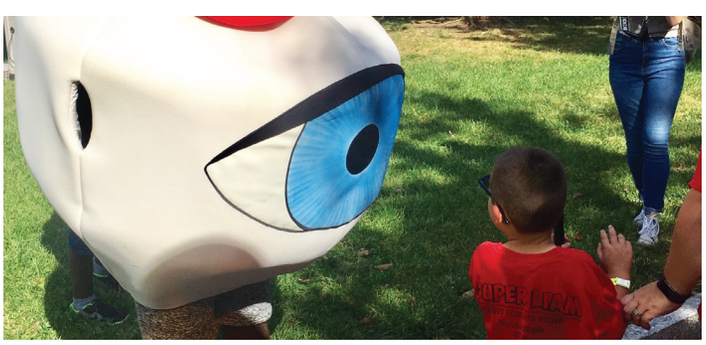
Gurwin, J., Revere, K. E., Niepold, S., Bassett, B., Mitchell, R., Davidson, S., DeLisser, H., Binenbaum, G. (2017). A Randomized Controlled Study of Art Observation Training to Improve Medical Student Ophthalmology Skills. *Ophthalmology*.

SNAPSHOTS OF SCHEIE IN 2017





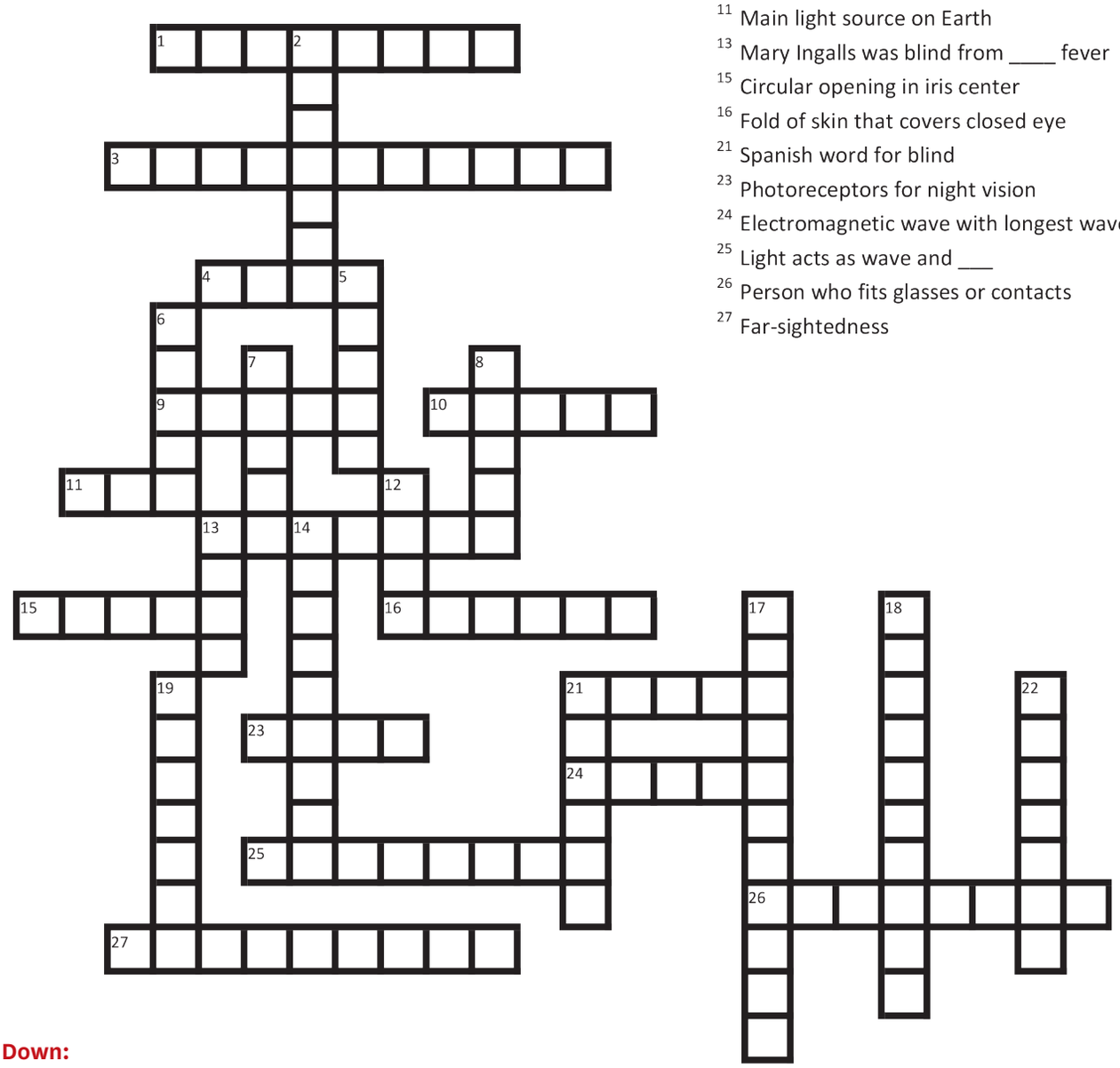




This year’s Vision Walk was another success! The Scheie team exceeded its fundraising goal of $10,000 for the Foundation Fighting Blindness. Shout out to team captain Tyrone Quarterman!

Sharp Eyes Crossword

by Rebecca Salowe



Across:

1 Discovered $E=mc^2$
3 Removal of eyeball
4 Cataracts develop here
9 High-energy light source used as treatment
10 World's most common eye color
11 Main light source on Earth
13 Mary Ingalls was blind from ____ fever
15 Circular opening in iris center
16 Fold of skin that covers closed eye
21 Spanish word for blind
23 Photoreceptors for night vision
24 Electromagnetic wave with longest wavelength
25 Light acts as wave and ___
26 Person who fits glasses or contacts
27 Far-sightedness

Down:

2 ___ chart has rows of letters
5 Animal with most similar cornea to humans
6 ____ Keller
7 *Fault in Our Stars* character with retinoblastoma
8 Cavity containing eyeball
12 Primary color
13 *Star Wars* character blind from "hibernation sickness"
14 Lazy eye
17 Light sensitivity
18 _____ glass
19 Short-sighted whale/shark in *Finding Dory*
21 Transparent front of eye
22 ___ scans can be used for identification

answer key page 42

Meet Our Team

Comprehensive Ophthalmology
Charles Nichols, MD
Deborah Herrmann, MD
Dwight Stambolian, MD, PhD
Jane Portnoy, MD
Paul Tapino, MD
Thomasine Gorry, MD, MGA

Cornea
Michael Sulewski, MD
Stephen Orlin, MD

Dry Eye
Giacomina Massaro-Giordano, MD
Vatinee Bunya, MD

Glaucoma
Amanda Lehman, MD, MSc
Eve Higginbotham, SM, MD
Eydie Miller-Ellis, MD
Prathima Neerukonda Atluri, MD
Prithvi Sankar, MD
Qi Cui, MD, PhD
Victoria Addis, MD

Low Vision
Ranjoo Prasad, OD

Neuro-Ophthalmology
Ahmara Ross, MD, PhD
Grant Liu, MD
Kenneth Shindler, MD, PhD
Madhura Tamhankar, MD

Ocular Oncology
Joan O'Brien, MD

Ocular Pathology
Vivian Lee, MD

Oculoplastics
César Briceño, MD
Sonul Mehta, MD

Optometry
Alisha Fleming, OD
Kelly McCann, OD
Regina Altemus, OD
Sara Bierwerth, OD
Stacey Cesarano, OD

Pediatric Ophthalmology (CHOP)
Brian Forbes, MD, PhD
Gil Binenbaum, MD
Graham Quinn, MD
James Katowitz, MD
Karen Revere, MD
Monte Mills, MD
Priyanka Kumar, MD
Robert Avery, DO, MSCE
Stefanie Davidson, MD
William Anninger, MD
William Katowitz, MD

Retina & Vitreous
Albert Maguire, MD
Alexander Brucker, MD
Benjamin Kim, MD
Brian VanderBeek, MD, MPH
Joshua Dunaief, MD, PhD
Juan Grunwald, MD
Samuel Jacobson, MD, PhD
Tomas Aleman, MD

Uveitis
Nirali Bhatt, MD

Research Faculty
Alan M. Laties, MD
Artur Cideciyan, PhD
Ebenezer Daniel, MBBS, MS, MPH, PhD
Gui-shuang Ying, MD, PhD
Jason Mills, PhD (CAROT)
Jean Bennett, MD, PhD (CAROT)
Jessica Morgan, PhD (CAROT)
Manzar Ashtari, PhD, DABR (CAROT)
Maureen Maguire, PhD
Richard Stone, MD
Venkata Ramana Murthy Chavali, PhD

2017-2018 Fellows

Ali Hamedani, MD, MHS (Neuro-Ophthalmology)
Anne Jensen, MD (Pediatrics)
Anton Kolomeyer, MD, PhD (Retina)
Avni Badami, MD (Glaucoma)
Christiana Munroe, MD (CHOP Oculoplastics)
Katherine Uyhazi, MD, PhD (Retinal Degeneration & Medical Retina)
Robert Carroll, MD (Retina)
Sara Reggie, MD (Neuro-Ophthalmology)
Zachary Elkin, MD, MPH (Pediatrics)

2017-2018 Residents

First Year Residents
Brian Shafer, MD
Drew Scoles, MD, PhD
Erin O'Neil, MD
James Bavinger, MD
Kurt Scavelli, MD

Second Year Residents
Jaclyn Gurwin, MD
Lindsay Dawson, MD
Michael Ammar, MD
Michael E. Sulewski, Jr., MD
Rebecca Bausell, MD

Third Year Residents
Akosua Nti, MD
Christopher Hwang, MD, PhD
Iga Gray, MD, PhD
Keirnan Willet, MD
Preema Buch, MD

Recruiting Clinical Studies

DRY EYE

Giacomina Massaro-Giordano, MD
An 8-week Study to Evaluate Safety and Efficacy of Recombinant Human Nerve Growth Factor (rhNGF) Eye Drops Solution Versus Vehicle in Patients With Dry Eye
Giacomina Massaro-Giordano
(215) 662-9903

Vatinee Bunya, MD
Anterior Segment Imaging Study (ASIS)
Matt Henderson
(215) 662-9393

GLAUCOMA

Eydie Miller-Ellis, MD
Safety and Efficacy of Bimatoprost Sustained-Release (SR) in Patients With Open-Angle Glaucoma or Ocular Hypertension
Judy Chen
(215) 662-8691

Joan O'Brien, MD
The Primary Open-Angle African American Glaucoma Genetics Study
Sai Merriam
(215) 662-8673

RETINA

Alexander Brucker, MD
A Natural History Observation and Registry Study of Macular Telangiectasia Type 2; The MACTEL Study
Sheri Drossner
(215) 662-8177

Alexander Brucker, MD
Anti-VEGF Treatment for Prevention of PDR/DME
Sheri Drossner
(215) 662-8177

Alexander Brucker, MD
Evaluation of OCT-Angiography in Retinal and Optic Neuropathy Patients and Normal Controls
Joan DuPont
(215) 622-8038

Alexander Brucker, MD
Treatment for CI-DME in Eyes With Very Good VA Study (Protocol V)
Sheri Drossner
(215) 662-8177

Benjamin Kim, MD
OCT Evaluation of the Retina in Patients with Frontotemporal Lobar Degeneration, Amyotrophic Lateral Sclerosis, or Alzheimer's Disease
Benjamin Kim
(215) 662-8675

Jessica Morgan, Ph.D.
High Resolution Retinal Imaging (AOSLO)
Jessica Morgan
215-614-4196

NEURO-OPHTHALMOLOGY

Madhura Tamhankar, MD
Phase 2/3, Randomized, Double-Masked, Sham-Controlled Trial of QPI-1007 in Subjects With Acute Nonarteritic Anterior Ischemic Optic Neuropathy (NAION)
Judy Chen
(215) 662-8691

Robert Avery, DO, MSCE
Developing Evidence-Based Criteria for Initiating Treatment for NF1 Associated Optic Pathway Glioma (OPG)
Robert Avery
(215) 590-2791

UVEITIS

Nirali Bhatt, MD
Macular Edema Ranibizumab v. Intravitreal Anti-inflammatory Therapy Trial (MERIT)
Meghan Karlik
(215) 662-8094

Faculty Publications

(July 1, 2016 – July 1, 2017)

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Faculty Awards

(July 1, 2016 – July 1, 2017)

Jean Bennett, MD, PhD
- Invited Speaker, National Medical Association
- Top 100 Ophthalmologist Power List

Gil Binenbaum, MD, MSCE
- The Queen's Ophthalmology Lecture, Queen's University
- Honor Award, American Academy of Ophthalmology
- Richard Shafritz Endowed Chair in Pediatric Ophthalmology Research, Perelman School of Medicine
- 2017 American Association for Pediatric Ophthalmology and Strabismus Young Investigator Award

César Briceño, MD
- Token of Appreciation from Medical Students (TAMS) Award, University of Michigan Medical School
- Invited Speaker, National Medical Association
- Invited Speaker, Pan-American Association of Ophthalmology
- 2017-2018 Best Doctors in America

Alexander Brucker, MD
- 11th Annual David M. Kozart Memorial Lecturer, Scheie Eye Institute, Perelman School of Medicine
- Coscas Medal for outstanding achievement in retinal diseases
- Invited Speaker, Fourth International Congress on OCT Angiography and Advances

Artur Cideciyan, PhD
- Proctor Award, Association for Research in Vision and Ophthalmology

Stefanie Davidson, MD
- South Jersey Magazine Top Docs for Kids, Ophthalmology

Joshua Dunaief, MD, PhD
- Invited Speaker, Columbia University Ophthalmology Grand Rounds
- Invited Speaker, Duke University Ophthalmology Grand Rounds
- Invited Participant, Ryan Institute for Macular AMD Brainstorming Meeting

Thomasine Gorry, MD, MGA
- 2016 Carol Emmott Fellowship for Women Leaders in Health

Deborah Hermann, MD
- Castle Connolly Exceptional Women in Medicine
- Castle Connolly Regional Top Doctor

Eve Higginbotham, SM, MD
- President-Elect, Alpha Omega Alpha Medical Honor Society
- Chair, Section 6, National Academy of Medicine
- Member, Membership Committee, National Academy of Medicine
- Member, Strategic Planning Committee, National Academy of Medicine
- Subset Chair, Review of Deployment Health Center, Defense Health Board, United States Department of Defense
- Women Physicians Section (WPS) Inspirational Physicians Recognition Program Honoree

Samuel Jacobson, MD, PhD
- Keynote Speaker, Federation of American Societies for Experimental Biology (FASEB)
- Invited Speaker, MRC Human Genetics Unit, The University of Edinburgh
- Proctor Award, Association for Research in Vision and Ophthalmology

James Katowitz, MD
- 2017 Richard D. Wood Distinguished Alumni Award, Children's Hospital of Philadelphia

Vivian Lee, MD
- Inducted into Verhoeff-Zimmerman Society

Albert Maguire, MD
- Invited speaker, Geisinger Health System
- Invited Speaker, National Medical Association
- Top 100 Ophthalmologist Power List

Maureen Maguire, PhD
- Senior Achievement Award, American Academy of Ophthalmology

Sonul Mehta, MD
- Bartley R. Freuh Award for Best Presentation by a Young ASOPRS member, American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS)
- Invited Speaker, National Medical Association

Joan O'Brien, MD
- 52 Ophthalmologists to Know, Becker's ASC Review
- Laureate Award, USC Keck School of Medicine
- Invited Speaker, National Medical Association

Stephen E. Orlin, MD
- Surgical Teaching Award, Scheie Eye Institute, Perelman School of Medicine
- Achievement Award, American Academy of Ophthalmology
- 2017 Philadelphia Magazine Top Doctor

Jane Portnoy, MD
- Lifetime Membership Award, American Academy of Ophthalmology

Graham Quinn, MD
- South Jersey Magazine Top Docs for Kids, Ophthalmology

Michael E. Sulewski, MD
- 2017 Resident Surgical Teaching Award, Scheie Eye Institute, Perelman School of Medicine

Paul Tapino, MD
- Jeffrey W. Berger Golden Apple Award for Resident Teaching, Scheie Eye Institute, Perelman School of Medicine

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ART PIECES FEATURED ON COVER:

1. Christ Pantocrator in the Byzantine style. c. 1145-60. Mosaic. Cefalù Cathedral, Sicily.

2. Sandro Botticelli, The Birth of Venus. 1486. Tempera on canvas. Uffizi Gallery, Florence, Italy.

3. Thutmose, Nefertiti Bust. 1345 BCE. Painted stucco-coated limestone. Neues Museum, Berlin, Germany.

4. Johannes Vermeer, Girl with a Pearl Earring. C. 1665. Oil on canvas. Mauritshuis, The Hague, Netherlands.

5. Vincent Van Gogh, Self Portrait. 1889. Oil on canvas. Musée d'Orsay, Paris, France.

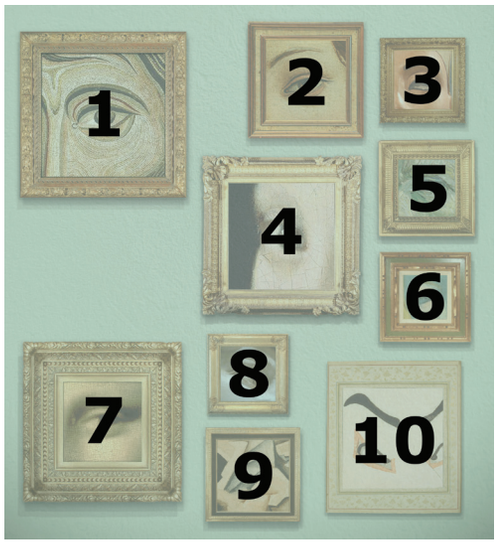
6. Henri de Toulouse-Lautrec, At the Moulin Rouge. 1892-1895. Oil on canvas. Art Institute of Chigaco, Chicago, Illinois.

7. Leonardo da Vinci, Mona Lisa. C. 1503-06 perhaps continuing to 1517. Oil on poplar panel. Musée du Louvre, Paris, France.

8. Michelangelo, David. 1501-1504. Marble statue. Galleria dell'Accademia, Florence, Italy.

9. Juan Gris, Portrait of Juan Legua. 1911. Oil on canvas. Metropolitan Museum of Art, New York, New York.

10. Tōshūsai Sharaku, Ōtani Oniji III in the Role of Yakko Edobei. 1794. Polychrome woodblock print; ink, color, white mica on paper. Metropolitan Museum of Art.



Faculty in the News

Below are some recent news stories about our ophthalmology faculty's research and clinical work.

November 10, 2017: Drs. Benjamin Kim and Joshua Dunaief – **Age-Related Macular Degeneration Foils Drugmakers.** *Nature Biotechnology*: "The jury is still out as to whether complement inhibition alone is going to be enough to slow down geographic atrophy."

October 12, 2017: Drs. Jean Bennett and Al Maguire – **FDA Panel Recommends Gene Therapy to Reverse Blindness.** *NBC's Nightly News*: "Scientists believe one day this approach could treat other conditions caused by genetic defects—like certain cancers, heart disease, and Parkinson's."

October 12, 2017: Drs. Jean Bennett and Al Maguire – **FDA Panel Unanimously Votes to Approve Gene Therapy for Blindness.** *CNN*: "Spark Therapeutics believes that 1,000 to 2,000 people in the US would be eligible for its gene therapy."

October 12, 2017: Drs. Jean Bennet and Al Maguire – **FDA Panel Endorses Gene Therapy For A Form Of Childhood Blindness.** *NPR*: "The recommendation came in a unanimous 16-0 vote after a daylong hearing."

September 29, 2017: Dr. Alexander Brucker – **Struggling with Vision Loss, She Finds New Purpose in Philly's Foundation Fighting Blindness.** *Philly.com:* Scheie patient Heather Napolitano writes, "Though I still may not have a true reason for my life's unexpected turn to this journey of vision loss, it has taught me to take time every day to truly see all the important things that make up my life."

September 8, 2017: Dr. Benjamin Kim – **Eye Changes May Signal Frontotemporal Lobe Degeneration.** *Science Daily:* "Study suggests that a quick, non-invasive retina test may help diagnose frontotemporal lobe degeneration."

September 8, 2017: Dr. Tomas Aleman – **Zika Associated with Similar Retina Problems as Cobalamin C Deficiency.** *MPR:* "The findings provide the first, to date, in vivo evidence in humans for possible retinal maldevelopment with a predilection for retinal GCL loss in CZS."

September 6, 2017: Dr. Gil Binenbaum – **Penn-CHOP Study: Art Courses Could Help Medical Students Become Better Doctors.** *PhillyVoice*: "'Artful Thinking' improved clinical observation in medical students, researchers say."

August 30, 2017: Dr. Ranjoo Prasad – **How Low Vision Services Can Help You.** *BrightFocus*: "Ranjoo K. Prasad, O.D., a specialist in low vision rehabilitation at Penn Medicine, is the guest speaker on this podcast."

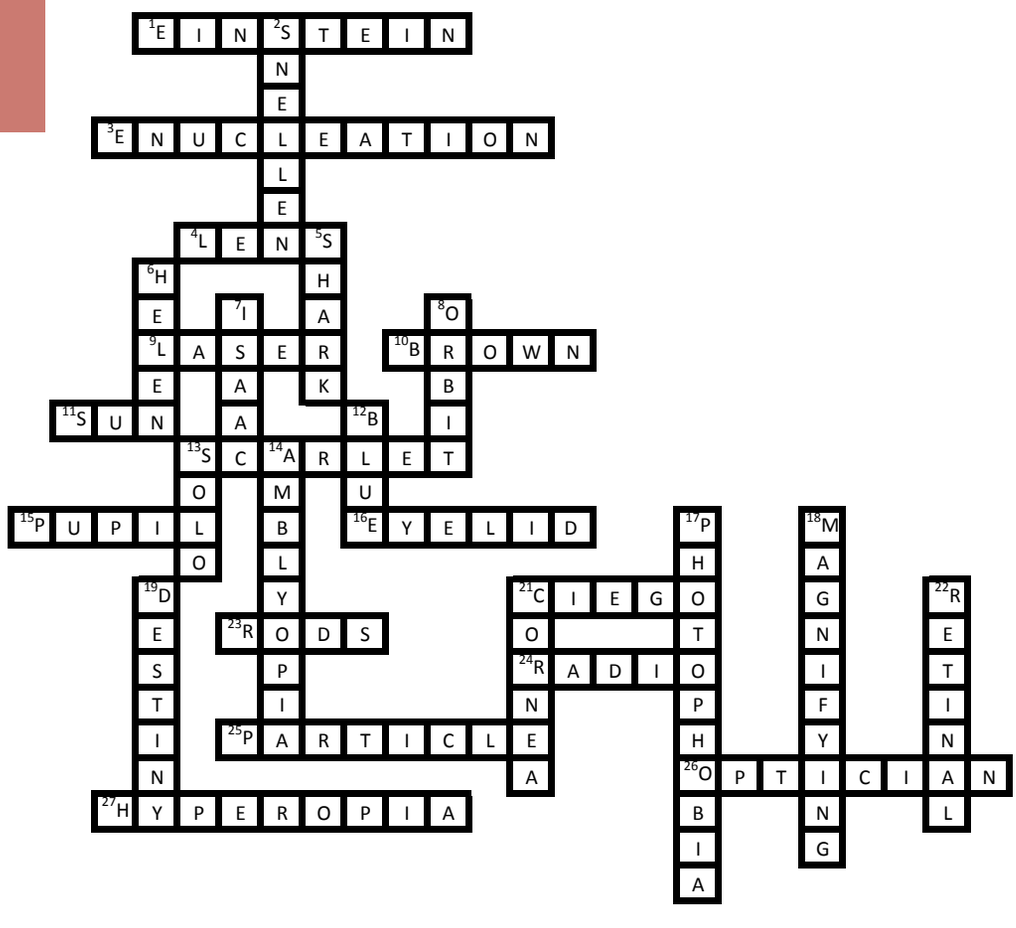
June 29, 2017: Dr. Albert Maguire – **Woman Regaining Sight After Fireworks Mishap.** *CBS Philly*: "After six reconstructive surgeries at Penn Medicine, some of Young's vision has been restored in one eye."

June 29, 2017: Dr. Joshua Dunaief – **Wet AMD Treatment: What's on the Horizon?** *BrightFocus*: "New long-lasting medications are now in clinical trials for wet age-related macular degeneration."

June 5, 2017: Drs. Albert Maguire and Stephen Orlin – **Woman's Vision Saved After Devastating Fireworks Injury.** *AAO*: "She was told she would never see again, but with the help of her ophthalmologists, physicians who specialize in medical and surgical eye care, her sight was saved – twice."

Note: This list includes a selection of news items from the summer and fall of 2017. For a complete list, visit https://www.pennmedicine.org/departments-and-centers/ophthalmology/news.

Answer Key



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SCHEIE
EYE
INSTITUTE

The Scheie Eye Institute is the Department of Ophthalmology at the University of Pennsylvania. Scheie has been a leader in the field of ophthalmic research, education, and patient care for 144 years. Many of our greatest advancements in vision saving therapy have been made possible by donations from individuals and organizations.

Will you join the Scheie Eye Institute?

For more information contact us at
215.662.8415
Or by email:
Rebecca.Salowe@uphs.upenn.edu

PennMedicine.org/supportscheie