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Images

Leading the Fight Against
Macular Degeneration

Focus on
Vision Research

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Bascom Palmer Eye Institute's mission is to enhance the quality of life by improving sight, preventing blindness, and advancing ophthalmic knowledge through compassionate patient care and innovative vision research.

FEATURE

Leading the Fight Against Macular Degeneration

Bascom Palmer's commitment to identify and manage this common eye disease, a leading cause of vision loss in people 50 years or older



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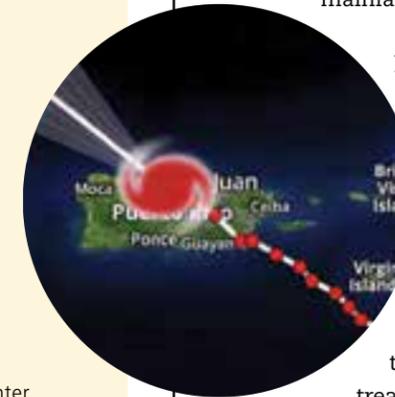
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Dear Friends and Colleagues:

Bascom Palmer Eye Institute's professionals know that every natural disaster has a unique impact on the delivery of sight-saving care. After Hurricane Katrina, our physician-led team traveled to Louisiana providing eye care to residents and first responders. Following the 2010 earthquake, our team arrived in Haiti with ophthalmic supplies to offer medical aid and eye surgery. The following year, our Vision Van traveled to Japan so Japanese ophthalmologists could care for victims of the earthquake and tsunami. Now, we are actively engaged in providing support to Puerto Rico following Hurricane Maria. Immediately after the storm, our professionals flew into San Juan carrying medications for patients with glaucoma, macular degeneration and other chronic conditions. We also helped arrange transport to the mainland for young children with vision-threatening problems.



With an almost total loss of power in Puerto Rico, we launched "EYE CARE PR," an online communications network using Facebook and WhatsApp to help local ophthalmologists coordinate patient care. We contacted leaders in Puerto Rico's ophthalmology community, who added eye care professionals to the social media and messaging list. That allowed eye doctors, clinics and hospitals to coordinate patient calls and correspond amongst themselves. We launched #EyeCarePuertoRico for Puerto Ricans who have left the island and need emergency eye care in the U.S. After treatment, the patients will reconnect with their eye doctors in Puerto Rico, to promote continuity of care.

Why is Bascom Palmer so actively involved in these medical relief efforts? Simply put, this is fundamental to our global mission of service. While we are proud of our consistent series of national #1 rankings, we are more proud to serve communities in need. While our disaster response efforts draw the most attention, Bascom Palmer also organizes local health fairs, vision screenings and educational programs throughout the year. It is another aspect of the commitment to our community. Bascom Palmer is able to provide this compassionate care at home and abroad because of your continued support. On behalf of the patients we help each day, I thank you.

Wishing you and your loved ones a year of good health, happiness and peace.

Eduardo C. Alfonso, M.D.
Kathleen and Stanley J. Glaser Chair in Ophthalmology
Chairman, Bascom Palmer Eye Institute

RESEARCH

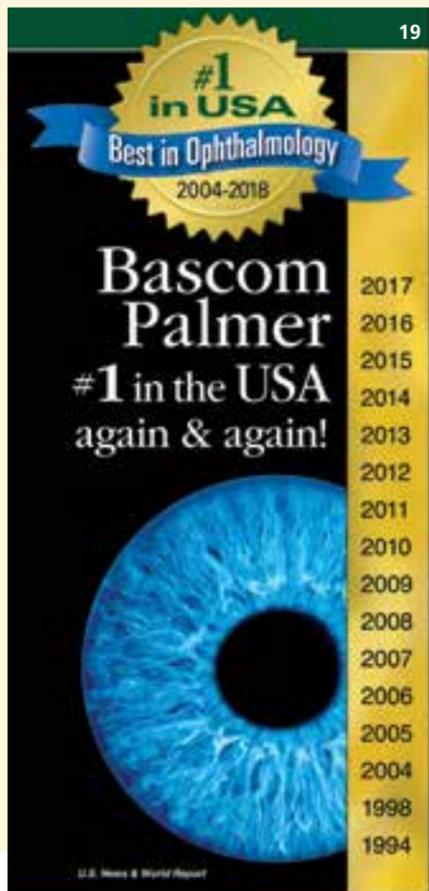
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BASCOM PALMER EXCELLENCE

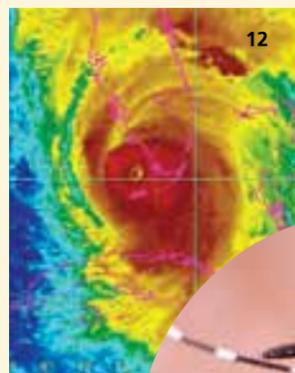
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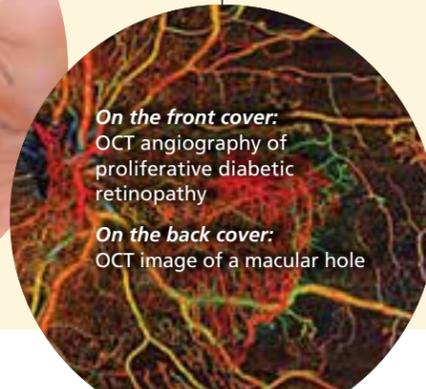
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On the front cover:
OCT angiography of proliferative diabetic retinopathy

On the back cover:
OCT image of a macular hole

Leading the Fight Against Macular Degeneration



“When I joined the Bascom Palmer faculty in 1996, patients with wet AMD were sentenced to legal blindness over a period of weeks to months. After 21 years of research and exceptional clinical care, we’ve been able to transform AMD into a disease where vision loss progresses slowly over many years. Now, with our revolutionary new drugs for dry AMD and novel imaging techniques, I predict vision loss from AMD will soon be a never-event.”

– Philip J. Rosenfeld, M.D., Ph.D.



Dr. Philip Rosenfeld

A diagnosis of age-related macular degeneration (AMD) raises serious concerns for elderly patients. In its most aggressive “wet” form, AMD can cause rapid and irreversible vision loss. Now, with newer treatments for wet AMD, it is the slower form, “dry” AMD, that robs seniors of their sight.

For more than 50 years, researchers and clinicians at the Bascom Palmer Eye Institute have been leaders in the global fight against AMD, a condition that progressively damages the macula, the center of the retina. The macula is responsible for central vision; the vision that lets people read, drive and recognize faces. The most common symptom of late AMD is a blurred central area of vision.

Millions of AMD cases are diagnosed in the U.S. each year with about 85 percent having the dry form, which involves the gradual degeneration of the macula. The others have wet AMD (also called exudative or neovascular AMD), in which tiny blood vessels grow in the macula and leak fluid and blood.

“We have come a long way toward understanding the various stages of AMD,” said Philip J. Rosenfeld, M.D., Ph.D., professor of ophthalmology and one of the world’s leading experts on this blinding disease.

“All AMD starts as dry AMD, but often it is undiagnosed. Then, abnormal blood vessels grow in the dry AMD and it becomes “wet” due to the leakage of fluid and blood into the macula. It is vitally important to diagnose AMD before vision is lost. The earlier we can identify and manage AMD, the better the long-term outcome.”

Using imaging tools

When J. Donald M. Gass, M.D., joined the Bascom Palmer faculty in 1963, he began studying the challenging diseases of the retina. He soon became a pioneer in fluorescein angiography, a powerful imaging technique for wet AMD and other eye conditions. While fluorescein angiography is still widely used today, its use has diminished over the past decade as other non-invasive imaging techniques have become available.

The first step in fluorescein angiography is to insert a needle into the arm of a patient, and then a yellow dye called fluorescein, a small, water-soluble fluorescent molecule, is injected into the patient’s vein. As the dye circulates throughout the body, it passes through the blood vessels in the eye. The imaging team takes a series of photos using special filters on the camera, and the fluorescein dye is seen as it circu-

lates through the normal vessels in the eye, as well as the abnormal vessels. The abnormal vessels are detected by the leakage of fluorescein seen in the photographic images of the macula.

Beginning in the 1960s, ophthalmologists from around the world would send photographs of their patients' eyes to Miami for Gass to review and provide a diagnosis. He also led a weekly fluorescein conference at Bascom Palmer for more than 20 years, teaching the Institute's residents and fellows about AMD and other retinal disorders.

"Fluorescein angiography became the gold standard for diagnosing macular disease in the 1960s, and Dr. Gass was the global leader in interpreting these photos," said Rosenfeld. In 1999, the Association of Cataract and Refractive Surgeons named Gass as one of the "Ten Most Influential Ophthalmologists of the 20th Century."

Drawing on this film-based imaging technology, ophthalmologists in the 1970s identified two forms of wet AMD: "classic," referring to obvious blood vessels under the retina, and "occult," for the vessels in the back of the eye that were more difficult to detect due to a more subtle leakage. These

"occult" blood vessels were deeper in the back of the eye and located under a layer known as the retinal pigment epithelium. "We found that the classic blood vessels progressed more rapidly with greater vision loss than the occult version," Rosenfeld said.

During the 1980s, Bascom Palmer's retinal specialists began using a digital photographic technique called indocyanine green (ICG) angiography to evaluate patients' retinal conditions. Because the ICG dye attached to protein molecules in the circulation and was not free in blood, it did not leak from the abnormal blood vessels and the fluorescent images gave clinicians a clearer view of the normal and abnormal blood vessels in and around the macula.

A major imaging breakthrough occurred in 1991 with a new technology called optical coherence tomography (OCT). Vitreoretinal specialist Carmen A. Puliafito, M.D., M.B.A., who served as Bascom Palmer chair from 2001 to 2007, was one of the co-inventors of this powerful, non-invasive system, which was brought into clinical use in the late 1990s.

Using detection of reflected light rather than stimulation of fluorescent dyes, OCT is a non-invasive technique that scans the back of the eye with light of a defined wavelength and takes multiple cross-sectional images of the retina. This has been referred to as an optical biopsy of the retina because the images that are generated look like the type of retinal anatomy one might see if the retina could be examined through a microscope.

These images allow the ophthalmologist to determine whether the macula is wet or dry by detecting the presence of fluid that arises from the abnormal blood vessels in the wet form or the presence of drusen and geographic atrophy that are the hallmarks of dry AMD.

"Over the past decade, OCT technology has evolved dramatically, helping us understand the progression of the disease and how well the eye responds to treatment," said Rosenfeld. One notable advancement was the development of spectral domain OCT (SD-OCT), which increased the speed and density of the scans, resulting in 3D as well as two-dimensional images.

Bascom Palmer's ophthalmologists not only played a pivotal role in the development of SD-OCT, but also the latest technology known as SD-OCT angiography, as well as swept source OCT (SS-OCT) and SS-OCT angiography. The FDA approved the SD-OCTA instrument in 2015 and SS-OCT instruments in 2016. The SS-OCT technology continues to be an active area of research at the Institute. "This technology provides the highest quality images of the macular anatomy we have ever seen," stated Rosenfeld. "We can see the blood flowing in blood vessels without using injected dyes and we can look for any changes in the micro-vasculature during a patient's eye examinations and after they receive treatment. This technology has replaced fluorescein and ICG angiography for macular diseases. Patients prefer OCT angiography to traditional angiography, and we get much more information about their disease. It's a win-win for everyone."

SS-OCT's sophisticated software also allows identification of seven different retinal layers, including the choriocapillaris, a fine capillary meshwork that had never been clinically

visualized in a living person. "None of the prior technologies allowed us to image this area, which we believe is the layer where most AMD starts and where the abnormal blood vessels arise," said Rosenfeld, who is chair of the Advanced Retina Imaging Network, a consortium of clinicians and researchers conducting leading edge retinal disease research using the new SS-OCTA system.

Today, Rosenfeld is a proponent of using advanced OCT technologies for assessing and monitoring patients with macular diseases, particularly AMD. "A seven-second OCT scan can give us more information than traditional angiography," he said. "It's faster, safer, less expensive and easier for patients. It's an ideal tool for retinal specialists."

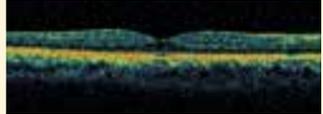
Advancing wet AMD treatments

In the 1970s and early '80s, ophthalmologists developed the first forms of treatment for wet AMD, using "hot" lasers to seal the leaking blood vessels in the eye, a procedure called laser photocoagulation. "The laser had to penetrate the retina in order to destroy the blood vessels under the retina in the macula," Rosenfeld said. "This technique generally resulted in vision loss, but better visual outcomes than a patient could expect without treatment. However, patients were not happy because they still lost their vision – just not as quickly."

When Rosenfeld joined the Bascom Palmer faculty in 1996, photodynamic therapy (PDT) was studied to see if it was an effective strategy for treating AMD. In 1996, he participated in a large-scale PDT clinical trial where a photosensitive dye was injected intravenously. When the dye reached the eye, a "cold" laser was focused on the macula, the dye was activated, and the blood vessels were destroyed from the inside. "We found that only a subset of AMD patients responded to the PDT laser treatment," he said. "While there was a slim chance of improvement, it was the only treatment that slowed vision loss better than the conventional "hot" laser, but there was only a slim chance of vision improvement. Furthermore, the treatment had to be repeated every few months to have any sustained effect."

Determined to find a better way to treat AMD, Rosenfeld became involved in a clinical trial using a drug that blocked a protein that

The OCT diagnostic scan enables the doctor to evaluate the health of the retina by providing a unique cross-sectional image of the layers of the retina.



OCT image of a normal retina



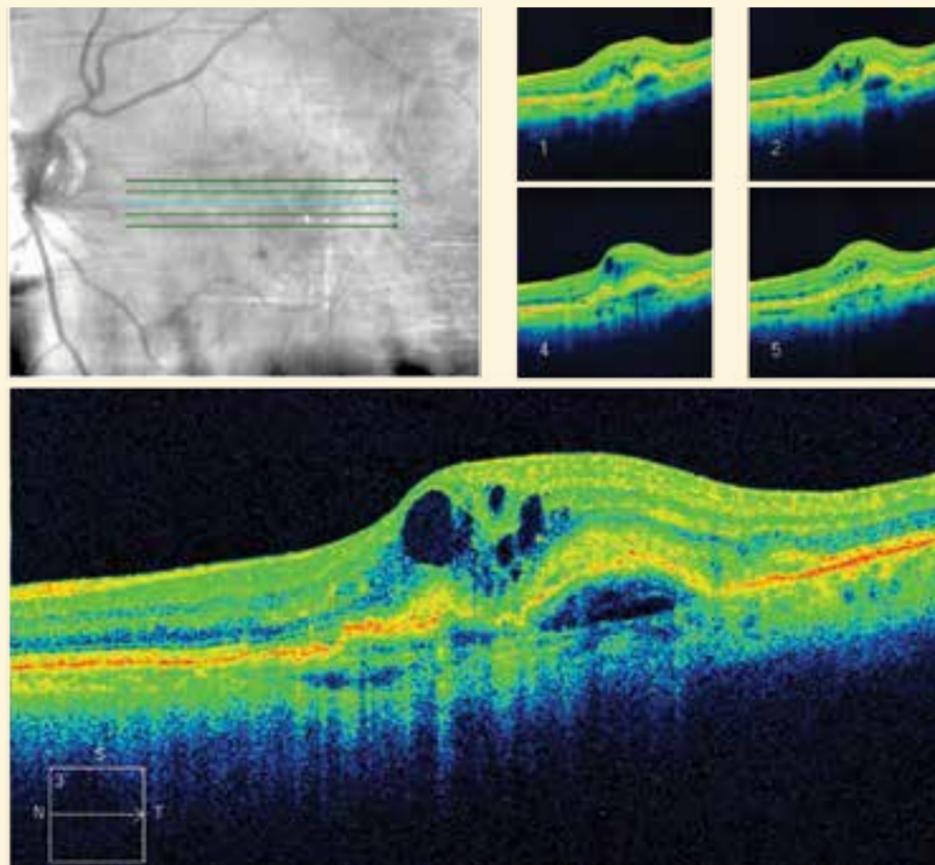
OCT image of a swollen retina affected by wet AMD

Spectral domain OCTs generate 3D images of the retina.

An OCT 3D image can be visualized as a fundus reconstruction. It allows for scan registration and quality assessment of the image. (top left image)

A typical scan consists of a set of equally spaced image slices (B-scans) covering a square region. (top right four images)

Color-coded OCT angiography of wet AMD. (bottom image)





was responsible for the growth of blood vessels. This protein was known as vascular endothelial growth factor (VEGF) and the original drug was known as ranibizumab or rhuFabV2.

After years of leading a global effort to investigate ranibizumab for wet AMD, Rosenfeld was the first author on a *New England Journal of Medicine* article describing the remarkable success of ranibizumab in treating wet AMD. Approved by the FDA in 2006, ranibizumab is known by its trade name Lucentis®. However, while working with ranibizumab, Rosenfeld had a remarkable insight regarding bevacizumab, a similar drug to treat cancer, also developed by Genentech.

Since bevacizumab and ranibizumab had a similar molecular structure and both halted the growth of abnormal blood vessels by blocking VEGF, he felt that this cancer drug might have the same impact as Lucentis in eyes with wet AMD, thus helping to improve vision in those patients. In 2004, Rosenfeld found that intravenous infusions of the cancer-fighting drug Avastin® were able to block VEGF in the eye and halt

the progression of wet AMD. Then, in 2005, he injected Avastin into the eyes of patients with wet AMD and the effect was identical to Lucentis. However, Lucentis was not yet FDA approved. Nevertheless, in 2005, following Rosenfeld's remarkable breakthrough, ophthalmologists around the world began incorporating the use of Avastin in their practices as well.

Over the past decade, Rosenfeld has continued to study and refine treatments for wet AMD and is now actively involved in finding treatments for dry AMD. "Currently, patients with wet AMD typically require frequent injections to control their disease," he said. "We would like to reduce that burden on individuals by prolonging the treatment interval, perhaps with a combination of drugs or a sustained-release formulation. With anti-VEGF therapy, our goal is to convert the wet form back to dry AMD, which typically progresses much more slowly. We now find that patients are starting to lose their vision from dry AMD and our most important research focus right now is to find a treatment. If we can stop dry AMD, then patients will never develop wet AMD vision loss from dry AMD. That's our holy grail objective."



Researching dry AMD

Rosenfeld has been studying the genetic and metabolic factors that drive the underlying dry form of this progressive disease. "There is clearly a genetic connection, and if a family member had AMD, your risk is higher than average," he said. "But there are many environmental variables that can affect the severity of the disease. Exercising regularly, taking AREDS2 vitamins and a multivitamin, and eating a healthy diet that is rich in green leafy vegetables may help slow the progression of dry AMD. If you smoke, you should stop immediately, because smoking has been shown to make AMD worse."

He recently collaborated with Jose Mauricio Botto de Barros Garcia, M.D., M.Sc., a Bascom Palmer research fellow, on an article that outlined three strategies now under investigation for the treatment of dry AMD, including:

- Complement pathway inhibitors that affect the body's autoimmune defenses. "This pathway helps protect you against anything foreign, such as invading bacteria," Rosenfeld said. "But the genetics of AMD suggests that an overactivation of the complement pathway damages the macula and is the cause of vision loss in AMD."
- Neuroprotective agents that may preserve the light-sensing cells of the macula.
- Stem cell therapies. Rosenfeld will be part of a multicenter phase 2 clinical trial for patients with late-stage dry AMD with geographic atrophy. Patients who meet the criteria will have fully differentiated embryonic stem cells implanted into cells known as retinal pigment epithelial cells.

"Cell transplantation could lead to prevention of disease progression, either by replacing damaged cells or by providing supportive factors to prevent degeneration," Rosenfeld said.

Meanwhile, Rosenfeld is using SS-OCT to follow 160 Bascom Palmer patients who have wet AMD in one eye and dry AMD in the other. "Our imaging technology lets us compare the normal blood vessels in both eyes, so we can see what happens before they start growing abnormal blood vessels and long before these blood vessels start to leak," he said. "Understanding the natural progression of the disease will help us find new ways to prevent the blood vessels from growing and leaking so the eye will not be damaged. We are about to begin two large imaging studies involving patients with dry AMD, and we encourage all our dry AMD patients to participate."

Looking ahead, Rosenfeld expects further advances in the next five years, including better home monitoring of wet and dry AMD conditions. "I'm convinced we have a complement inhibitor that works and will be on the market in three years, helping to slow the disease progression in some late-stage cases," he said. "We also need to study these drugs at an earlier stage of AMD so that the late stage never develops. By combining complement inhibitors with stem cells, we have the potential to not only prevent vision loss, but also replace damaged cells. I firmly believe we will be able to prevent blindness from AMD during my career."

2018 Roger H. Johnson Macular Degeneration Award

Rosenfeld will receive the 2018 Roger H. Johnson Macular Degeneration Award presented by the Department of Ophthalmology at the University of Washington to stimulate clinical and basic science research related to the pathogenesis or treatment of AMD. He is being recognized for his significant contribution to the understanding and treatment of this blinding disease. Rosenfeld and his colleagues at Bascom Palmer will continue the Institute's long tradition of leadership in the global fight against retinal diseases. ■ See related story, page 21.



Vision with age-related macular degeneration



Normal vision

DRY AMD SYMPTOMS

- Blurry distance and/or reading vision
- Need for increasingly bright light to read
- Colors appear less vivid or bright
- Difficulty recognizing faces
- Difficulty with night driving
- Blank or blurred spot in your central vision

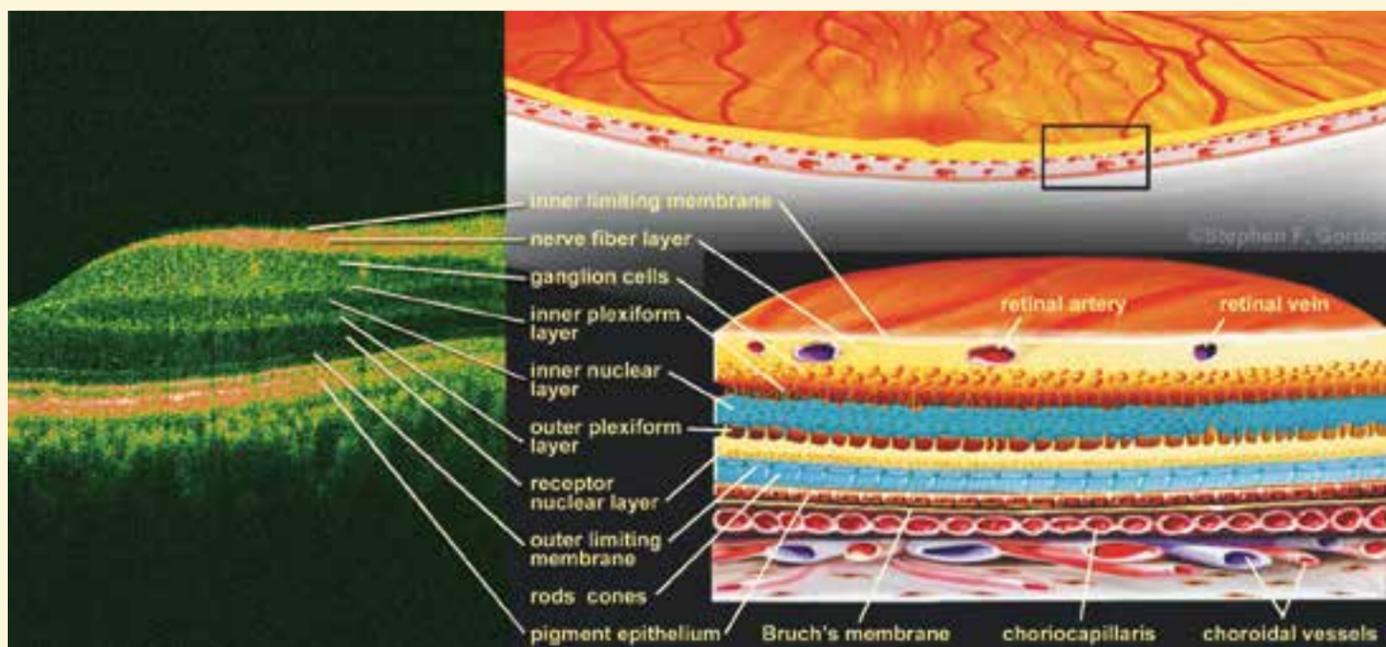
Dry macular degeneration eventually affects both eyes. You may not notice vision changes if only one eye is experiencing vision changes, as your unaffected eye will compensate for vision loss in the other eye.

WET AMD SYMPTOMS

- Distorted vision – straight lines will appear bent, crooked or irregular
- Dark gray spots or blank spots in your vision
- Loss of central vision
- Colors lose their brightness, colors do not look the same for each eye

Wet macular degeneration symptoms usually appear and get worse fairly quickly.

– Courtesy of American Academy of Ophthalmology



HOW OCT WORKS

Optical coherence tomography (OCT) is a non-invasive optical imaging technique that uses reflected laser light to produce high-quality images of the eye. OCT systems break the light into two parts: a sample beam that is sent to the part of the eye being studied, and a reference beam, usually a mirror. The combination of reflected light from the sample and the reference light from the mirror produce an interference pattern. The properties of this

interference pattern depend on the optical properties of the retina sample, allowing the system to create a cross-sectional profile or a 3D model of the tissues being examined. A patient undergoing an OCT scan simply rests the chin on the small diagnostic machine and stares ahead. OCT is a non-invasive, comfortable procedure that often takes just a few seconds.



Dr. Jorge Fortun

Innovative 3D System Enhances Retinal Surgery

“This new 3D technology enhances and magnifies the stereoscopic image and allows us to clearly visualize all aspects of the surgery, leading to excellent patient outcomes, even in highly complex retinal procedures.”

— Jorge Fortun, M.D.

Innovative 3D imaging technology is helping Jorge Fortun, M.D., treat patients with challenging vitreo-retinal diseases. “Visualization of the back of the eye is critical in successful ocular surgery,” said Fortun, medical director of Bascom Palmer’s Palm Beach Gardens ambulatory surgery center and a specialist in retinal disorders. “Our advanced technology provides an excellent foundation for safer and more efficient retinal surgery.”

Fortun, an assistant professor of ophthalmology, became one of the first ophthalmologists in the U.S. to use the NGenuity® 3D stereoscopic high-definition visualization system. It enables Bascom Palmer surgeons to operate in a “heads up” manner by viewing real-time images of a patient’s eye on a large 60-inch high definition OLED screen through special 3D glasses.

“We traditionally do ophthalmologic surgeries through a microscope looking through two ocular lenses, like binoculars,” said Fortun. “This new 3D technology enhances and magnifies the stereoscopic image and allows us to clearly visualize all aspects of the surgery, leading to excellent patient outcomes, even in highly complex retinal procedures.”

Unlike earlier versions of “heads-up” systems, the real-time NGenuity image allows the surgeon to see exactly what is happening in the eye with no perceptible lag time, Fortun said. “It’s an up-and-coming

tool for cataract and corneal procedures, as well as for retinal surgery,” said Fortun.

More recently, Fortun and Sarah P. Read, M.D., Ph.D., chief resident, co-authored “Visualization of the Retina and Vitreous During Vitreoretinal Surgery: New Technologies,” published in *Current Opinion in Ophthalmology*. “Better retinal visualization allows for new approaches to increasingly complex retinal cases,” they said in the article.

One of the many benefits of the system is that it allows surgeons to manipulate the acquired image, such as increasing the contrast in order to highlight parts of the retina. “We can also adjust a number of parameters and add digital filters to help better visualize certain tissues of the eye,” Fortun said.

The system also records the 3D surgical video for medical education, and can deliver on-demand and streaming content for medical meetings. “This is a fantastic tool for teaching,” said Fortun. “Physicians, fellows or residents can see the actual surgery as it was performed, and then pause or play back the video to pick up some of the subtle points.”

Looking ahead, Fortun says future 3D systems may be able to overlay diagnostic images from different types of technology onto one screen, giving surgeons convenient access to a wider range of data. He adds, “Our new system does a great job, and we look forward to the next advancements in the field.” ■

Bascom Palmer Doctors Warn of Unproven Stem Cell Treatment

Three South Florida women suffered serious loss of vision soon after receiving stem cell treatments for age-related macular degeneration (AMD) at a loosely regulated clinic in Florida, according to a recent study published in the *New England Journal of Medicine*.

“Retinal detachments, bleeding in the eyes, and other blinding complications in three patients raised concerns about stem cell clinics that charged patients for their services and lacked clinical data to support their practices,” said Bascom Palmer’s Thomas Albin, M.D., associate professor of clinical ophthalmology and co-author of the study.

Albin said three patients – ages 72, 78 and 88 – were concerned about losing their independence, including the ability to drive, due to age-related macular degeneration, a disorder that involves the gradual loss of the eye’s photoreceptor cells and the leading cause of vision loss among elderly patients in the United States.

Within 36 hours of their treatment at the clinic, two of the three patients sought emergency care at Bascom Palmer for serious blinding conditions including ocular hypertension, vitreous hemorrhage, retinal detachment, and/or lens dislocation. Although the patients had suffered

only moderate vision loss prior to their stem cell treatment, a year later their visual acuities ranged from 20/200 to total blindness.

“Patients seeking stem cell treatments for medical problems should only consider a carefully controlled clinical trial at an academic medical center,” said Albin. “Paying thousands of dollars to a local clinic for an unproven stem cell treatment – as these patients did – is extremely risky with a low probability of a successful outcome.” In the study, the Bascom Palmer ophthalmologists discussed how the Broward County clinic (whose name was not disclosed) harvested stem cells from the adipose fat tissues of the three patients and then injected the patient’s own cells into both eyes of each patient.

“While numerous stem cell therapies for medical disorders are being investigated at research institutions with appropriate regulatory oversight, many stem cell clinics are treating patients without that oversight and with potentially little concern for patient safety,” said Albin. “In this instance, these patients each paid \$5,000 for a procedure that had never been studied in a clinical trial for possible improvement of vision.”

Albin said his team alerted the U.S. Food and Drug Administration (FDA) after the second patient came to Bascom Palmer. In late 2016, at least 13 trials were registered on clinicaltrials.gov studying the role of intravitreal injections of various stem cell populations. However, Albin cautioned that not every trial registered on that site has been approved by an Institutional Review Board or the FDA. “Clinicaltrials.gov has added a disclaimer to this effect following the Bascom Palmer publication,” Albin said.

“Some clinics are claiming that treatments using the patient’s own stem cells don’t require FDA oversight or clinical trials, even though there is no evidence the treatments are safe or effective,” he said. “Almost all legitimate research is funded by an institution or company with an established protocol, lots of preclinical data and extensive pretrial and posttrial evaluations.” Following this report, the FDA clarified that eye procedures involving stem cells are high risk and should never be performed without FDA oversight.

Five other Bascom Palmer physicians were co-authors of the study, “Vision Loss after Intravitreal Injection of Autologous ‘Stem Cells’ for AMD,” in the journal: Drs. Ajay E. Kuriyan, Justin H. Townsend, Marianeli Rodriguez, Philip J. Rosenfeld, and Harry W. Flynn, Jr. ■



Dr. Thomas Albin

Study Suggests New Strategy for Preventing Vision Loss in Diabetics and Premature Babies

A Bascom Palmer scientist has made a breakthrough discovery that could lead to better clinical treatments for disorders like diabetic retinopathy that are caused by abnormal blood vessels in the eye.

After more than a decade of research, Wei Li, Ph.D., research associate professor of ophthalmology, recently identified a new molecule that damaged the tiny blood vessels in the eyes of diabetic mice.

“This finding could lead to targeted therapy in adults with diabetic retinopathy and in infants with retinopathy of prematurity (ROP),” said Li. “If we can keep the blood vessels from leaking, we can prevent the vision loss from damage to the retina.”

Li and his colleagues discovered that a protein called secretogranin III (Scg3) efficiently binds to the surface of retinal blood vessel cells in diabetic, but not healthy, mice. Their study found that inhibiting this molecule may prevent the formation of abnormal or leaking blood vessels.

“I believe that Dr. Li’s research offers an exciting potential option for future treatment of diabetic retinopathy, the number one cause of legal blindness in the U.S. in people between the ages of 20 and 65,” said Harry W. Flynn, Jr., M.D., professor of ophthalmology and the J. Donald M. Gass Distinguished Chair in Ophthalmology. “This research has not yet been applied to patient care, but with further scientific investigation, we would hope it can be in the future.”

Around the world, an estimated 93 million people suffer from diabetic retinopathy, characterized by high levels of blood sugar causing the tiny capillaries and veins in the eye to swell, leak or close, halting the flow of blood to the retina. In other cases, it leads to the growth of new blood vessels, which can also permanently damage a patient’s vision.

Abnormal blood vessels also lead to ROP, the most common cause of vision loss in children, affecting up to 16,000 premature infants per year in the U.S.



Wei Li, Ph.D.

“While there are two FDA-approved drugs for diabetic retinopathy, vascular endothelial growth factor (VEGF) inhibitors are not approved for use in infants because this molecule is crucial for vascular development in newborn children,” Li said. Instead, those infants are treated with lasers that may cause a scar to form, or cryotherapy, which freezes the blood vessels. Either form of treatment may lead to loss of peripheral vision.

Building on years of VEGF research, Li developed a technique called “comparative ligandomics” to identify additional molecules that regulate the behavior of blood vessels and compare how these molecules bind to the surface of retinal blood vessel cells in diabetic, but not healthy, animals.

“It is estimated that between one-third and one-half of all marketed drugs act by binding to cell surface signaling molecules or their receptors,” said Li. “Our ligandomics approach can be applied to any type of cell or disease to efficiently identify signaling molecules with pathogenic roles and therapeutic potential.” ■

Opioid Crisis Linked to Rise in Fungal Eye Infections

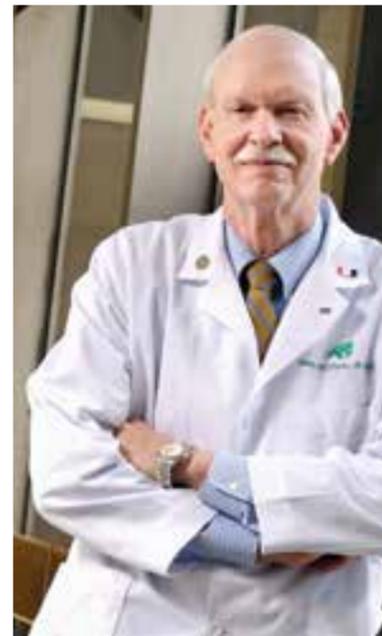


A rise in fungal infections of the retina is linked to the nation’s opioid crisis, according to researchers at Bascom Palmer. Physicians treating intravenous drug users should be aware of this dangerous complication and screen their patients for recent changes in their vision.

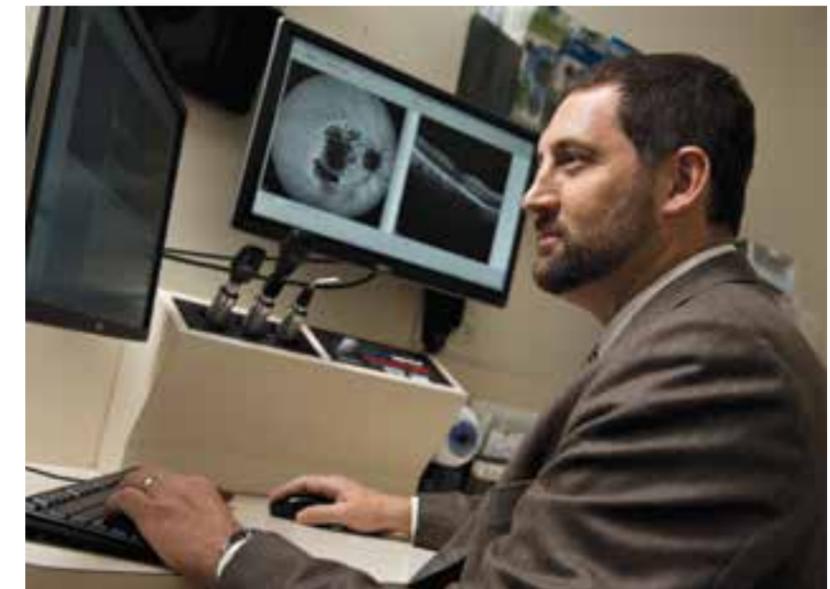
“Using a needle to inject drugs can introduce fungal contaminants to the bloodstream,” said Harry W. Flynn, Jr., M.D., professor of ophthalmology and the J. Donald M. Gass Distinguished Chair in Ophthalmology. “When the blood carries the fungi to the eye, they begin to grow in the retina, a condition called endogenous fungal endophthalmitis, that can cause severe vision loss and blindness even with early diagnosis and treatment.”

Flynn was co-author of a commentary, “Endogenous Fungal Endophthalmitis: An Increasing Problem Among Intravenous Drug Users,” published recently in *JAMA*, the *Journal of the American Medical Association*, with Stephen G. Schwartz, M.D., M.B.A., associate professor of ophthalmology and medical director of Bascom Palmer Eye Institute at Naples; and Nidhi R. Batra, M.D., a fellow at Bascom Palmer.

“This dangerous visual complication represents a new perspective on the opioid problem, and our commentary presented an update on the characteristics, management and visual outcomes in patients with endogenous fungal endophthalmitis,” said Schwartz. He noted that Bascom Palmer researchers have conducted a number of studies in the past few



Dr. Harry Flynn, Jr.



Dr. Stephen Schwartz

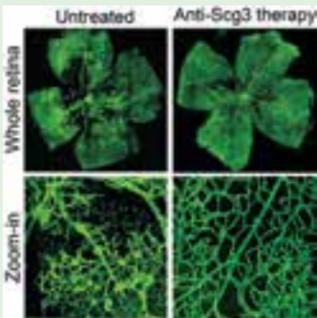
years on bacterial and fungal infections related to intravenous drug use.

A recent report from the U.S. Centers for Disease Control and Prevention found that drug overdose deaths nearly tripled between 1999 and 2014. In 2014, about 61 percent of the 47,055 drug overdose deaths involved opioids such as heroin. A separate study by Pittsburgh researchers indicated there are approximately 30 nonfatal overdoses for every death.

Bascom Palmer researchers urged physicians and other health care professionals to ask intravenous drug using patients about recent changes to their vision.

“When these patients report vision loss, endogenous fungal endophthalmitis should be considered,” said Schwartz. “The external eye may appear normal to a penlight examination, making it unlikely that the correct diagnosis will be made unless a formal, dilated eye examination is performed.”

“In view of the increasing worldwide prevalence of intravenous drug use, endogenous fungal endophthalmitis is an important challenge for all of medicine,” Flynn said. ■



The effect of anti-Scg3 therapy to treat retinopathy of prematurity in a mouse model. The left images show the untreated retina.



Weathering the Storm

As Hurricane Irma's intense winds began lashing the Caribbean in early September, Bascom Palmer began preparing its staff and facilities for a major storm that could cause severe damage to South Florida and disrupt the delivery of medical care. By Friday, September 8, it was clear that the powerful hurricane would be pounding the region throughout the weekend.

"As we await the force of nature in the early hours of tomorrow morning, rest assured that we are all concerned with the well-being and safety of the Bascom Palmer family," said Eduardo C. Alfonso, M.D., in a Saturday email to 1,300 Bascom Palmer faculty and staff members.

"We trust that you have found a safe place to protect yourselves and your loved ones," he added. "The BPEI emergency operations team is in full force tonight making sure that all our staff serving as emergency personnel are safe and ready to help those in need. Our facilities have been secured to the best of our abilities. Bascom Palmer at Naples will likely suffer the most, and we have been planning for measures that will need to be taken after the storm."

The University of Miami emergency operations team was actively involved in making sure that all policies and procedures for storm readiness were activated.

Riding out the storm

Beginning the night before, essential personnel of the Bascom Palmer family began moving into Bascom Palmer's flagship facility in Miami to ride out Hurricane Irma. The group consisted primarily of faculty members, residents, and fellows, along with the emergency management team, security and maintenance – and their families.

By Saturday afternoon, more than 300 people were "hunkered down" in the hospital awaiting the massive storm that was headed straight toward Florida. All people staying at Bascom Palmer had been

told they would be sleeping on the floor in common areas such as hallways and waiting areas. They were asked to bring their own food, water, bedding, medications and toiletries. Most importantly, Michael Kelley, head of the Institute's emergency management team, told everyone to "bring a good attitude and a sense of humor."

As electrical power was being lost through the metropolitan area, the building's generators were turned on to provide lighting and air conditioning in the mid-90-degree weather. Tornado warnings were occasionally issued and people were asked to go into interior rooms or hallways on the lowest floors.

Meanwhile, staff members and their families patiently waited out the storm, drawing on their own limited resources. As Alfonso said, "Lunch is peanut butter and jelly sandwiches, and dinner is jelly and peanut butter."

A sudden emergency

In the midst of the hurricane, Irma's high winds lifted up tiles on an outdoor patio, sending water pouring down into the Mary and Edward Norton Library of Ophthalmology below. "We had to move quickly to save our books," said Alfonso. Concerns were particularly high for the library's Dr. and Mrs. Ralph Kirsch Rare Book Room, which has several million dollars' worth of fragile and historic ophthalmology volumes. "Fortunately, we were able to keep the flow of water out of that room," said Alfonso. "Using generators, we were able to bring in blowers and dehumidifiers to dry the air and remove moisture from the library."



Blowers and dehumidifiers were used to remove moisture from the Dr. and Mrs. Ralph Kirsch Rare Book Room.

Finally, the "all-clear"

Early Monday morning, the medical campus received an "all-clear," and staffers and their families were able to leave Bascom Palmer. Even though the storm had passed, it was extremely dangerous to travel, as traffic lights were out, streets were flooded, large trees were blocking roads, and power lines were down throughout Miami-Dade and Broward counties.

Before they left, every employee and family member – from 9 months to 91 years – received an award certificate stating "EYE survived Hurricane Irma at Bascom Palmer Eye Institute" to commemorate the storm. "I made the rounds every day – and apologized for the conditions," said Alfonso, "but everyone said, 'Dr. Alfonso, we are so appreciative that we were able to stay here.'"

Bascom Palmer quickly reopened its emergency department, and by 8:00 a.m. Monday, three emergency surgeries had already been performed.



The Bascom Palmer Vision Van arrives in the Florida Keys.

A medical mission to the Keys

On September 12, Richard K. Lee, M.D., Ph.D., associate professor of ophthalmology, made an advance trip to assess conditions in the Upper Florida Keys and drop off a load of medications at the Islamorada Fire Rescue station. He determined that ophthalmic care was a pressing medical need in the Keys for residents and first responders. The Vision Van, donated by the Josephine Leiser Foundation, rolled out of Bascom Palmer on September 15, carrying medications for glaucoma and other eye conditions, as well as eyeglasses donated by the Bascom Palmer Optical Shop.

"Eye injuries are very common after a disaster, as are lost eyeglasses," Lee said. "Restoring eye health is a priority, because when people can't see, they are at high risk for other injuries, as their whole environment becomes unfamiliar." In addition, closed pharmacies mean that people quickly run out of medications and have a need for antibiotics for acute eye injuries.

A widespread impact

In the week after Hurricane Irma, most of Bascom Palmer's facilities were able to return to near-normal conditions. Bascom Palmer Eye Institute at Naples on Florida's Gulf Coast, was closest to the eye of Hurricane Irma, which passed near the community on September 11. Although Bascom Palmer's newest campus had no structural damage, the center had neither power nor water. The biggest problem, however, was the difficulty in communicating with staff since many had evacuated their homes and had no power or cell phone service.

Responding to the situation, the Bascom Palmer Vision Van returned from the Keys, re-loaded supplies in Miami, and immediately left for Naples. Under the direction of Stephen G. Schwartz, M.D., M.B.A., professor of ophthalmology and medical director of Bascom Palmer at Naples, the Vision Van began serving Southwest Florida patients. On September 18, a generator had restored power to the building and the Naples facility opened for emergency patients. Two days later, it opened for all patient appointments.

As Hurricane Maria formed in the Caribbean, Bascom Palmer's attention was then directed to assisting its colleagues in the region. Besides the damage in the smaller islands, the storm had caused devastating damage to Puerto Rico. This year's historic hurricane season came to an end with Bascom Palmer's professionals ready and willing to assist wherever they are needed. ■ See related letter, page 1.

"Lunch is peanut butter and jelly sandwiches, and dinner is jelly and peanut butter."

– Eduardo C. Alfonso, M.D.

Marcela Hickey, director of business operations, with Dr. Stephen Schwartz and Robert Hassler, facility and maintenance lead at Bascom Palmer at Naples



The youngest and oldest family members - from 9 months to 91 years old - to receive an award certificate stating "EYE survived Hurricane Irma at Bascom Palmer Eye Institute" commemorating the storm.



Striving to Help Zika Babies with Vision Problems

“This is the first study to look at visual impairments in children born with the Zika virus”

– Camila V. Ventura, M.D.

Audina M. Berrocal, M.D., has examined babies born with congenital Zika syndrome in the Caribbean, Brazil and South Florida, seeking to understand why the dangerous virus causes vision problems in virtually every infant.

“Zika attacks the brain, causing neurological damage like microcephaly, and other severe developmental problems,” said Berrocal, professor of clinical ophthalmology, and specialist in adult and pediatric vitreoretinal diseases, surgery and retinopathy of prematurity. “Vision problems, including blindness, are part of the damaging cluster of medical issues affecting these infants.”

Zika may also cause neurological and vision problems in adults, although the impact appears to be far less severe than in babies.

“Adult patients have developed inflammation in the eye or lesions in the retina,” said Berrocal. “That’s another reason for seeking immediate medical care if you suspect you have been exposed to the virus.”

In the past year, Berrocal and Camila V. Ventura, M.D., formerly a pediatric retina research fellow at Bascom Palmer, traveled to Brazil, Colombia and Haiti to provide care to Zika babies and educate local physicians, clinics and communities about the mosquito-borne virus.

“We knew that the Zika virus would come to South Florida, and we wanted to gain as much knowledge as we could in advance,” said Berrocal.

“Now, we are seeing locally transmitted cases and we predict that number will grow in the future.”

Berrocal and Ventura were co-authors of “Visual Impairment in Children with Congenital Zika Syndrome,” a study published recently in the *Journal of AAPOS*, of the American Association for Pediatric Ophthalmology and Strabismus.

“This is the first study to look at visual impairments in children born with the Zika virus,” said Ventura, who has returned to head the department of research at the Altino Ventura Foundation (FAV) in Recife. “We found that the earlier a pregnant woman was infected, higher were the chances of her fetus presenting with ocular manifestations at birth.”

The FAV-led study focused on 32 infants, born in Pernambuco, Brazil, from May to December 2015, who tested positive for Zika infection. Visual impairment was detected in all 32 babies, and retinal or optic nerve problems were observed in 14 patients (44 percent).

“Currently, there are hypothesis of how Zika virus affects infants’ eyes. Zika might be travelling down the optic nerve or crossing the blood-retinal barrier in the eye affecting the optic nerve and macula,” Ventura said. “That damage is irreversible once it occurs.”

But Berrocal said early intervention, including visual stimulation and the use of eyeglasses, can help with vision, as part of a multidisciplinary therapy program for the infant. “The sooner Zika can be diagnosed, the quicker we can intervene with a program for the baby and family,” she said.

Berrocal and Ventura traveled to Brazil in June 2016, where they examined 25 babies with congenital Zika virus. Later in the year, they assessed a Zika baby born with retinal scarring whose mother was infected in Venezuela and gave birth in Miami.

Early this year, the two retinal specialists flew to the Dominican Republic and traveled to the remote mountain village of Barahona as part of a University of Miami Miller School of Medicine/Jackson Health System medical mission. “We saw



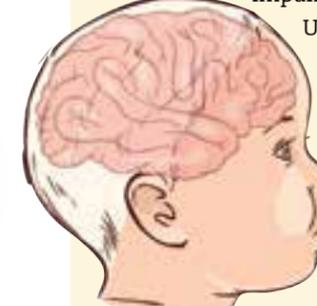
Dr. Audina Berrocal

about 30 infants and detected six probable Zika cases,” said Ventura. “We also educated local physicians about Zika and its effects on infants.”

Looking ahead, Berrocal wants to continue to collaborate with medical professionals in the Caribbean, Central and South America. “Through our telemedicine program, we could view images of the retina in babies whose mothers have been exposed to the Zika virus,” she said. “Then, we could consult on the best way to address visual impairments. By sharing clinical knowledge and research findings, we can determine the best strategies for fighting this crippling disease.”



Microcephaly



Normal Head Size

Researchers Identify the Widespread Impact of Zika Virus on the Eye

“For the first time, our research group identified the Zika virus within the optic nerve, iris, retina and choroid – the vascular layer between the retina and the sclera,” said lead author Sander R. Dubovy, M.D., professor of ophthalmology and pathology, and the Victor T. Curtin Chair in Ophthalmology, in a groundbreaking study recently published in the *Journal of the American Medical Association’s JAMA Ophthalmology*. “Understanding the virus’ impact on the eye allows us to guide future clinical strategies, including the development of vaccines and medications.”

For this study, the National Institute of Health in Colombia sent ocular tissue samples from four diseased fetuses diagnosed with congenital Zika syndrome (CZS) to the Florida Lions Ocular Pathology Laboratory at Bascom Palmer for evaluation.

“Congenital Zika syndrome is known to be associated with severe malformations in newborns whose mothers were infected with the virus during pregnancy,” said Dubovy. “Although microcephaly – a small undeveloped head – is the hallmark of this disease, the ocular findings are important, given the severe visual

impairment that has been observed in these patients.”

Unlike prior research using experimental models, the Bascom Palmer study took a systematic look at the Zika virus’ presence and impact on the human eye. “We were able to identify areas of inflammation and damage to the tissues. We found thinning and atrophy of the optic nerve, thinning of the choroid, atrophy of the retina and associated inflammation in these tissues,” Dubovy said. “We plan to continue our collaborative research.” ■



Angela M. Fernandez, president of the Colombian Society of Ophthalmology, with Dr. Edgar Parra Saad, Instituto Nacional de Salud, Bogotá, Colombia, and Dr. Sander Dubovy. Not pictured is Maria P. Fernandez, former fellow at Bascom Palmer and first author of the manuscript.

Surgical Team Saves Vision For Patient with Thyroid Disorder

Lydia Borgatta did not know she was at high risk for blindness due to increasing pressure on her optic nerves. Fortunately, the experienced team at Bascom Palmer identified the problem in time. Her ophthalmologists also coordinated the clinical care for her underlying thyroid disorder with other specialists at the University of Miami Miller School of Medicine.

After a series of orbital surgeries, Borgatta was fitted with special prism glasses, giving her the best vision she has had in decades, and opening the door to a more rewarding, independent lifestyle.

"We are very fortunate to have Bascom Palmer in our community," said Borgatta, who is a managing director for Wells Fargo Advisors. "This is a great institution, where the physicians, the researchers and the entire staff clearly understand their mission to save vision. Rich or poor, young or old, whatever your background, you will get the best possible care."

Dealing with poor vision

Although Borgatta has had poor vision since childhood, she never let it slow her professional career, traveling regularly to help clients with their private banking needs. "I had a retinal detachment several years ago, but it resolved itself without surgery, although my vision deteriorated," she said.

Borgatta also began experiencing severe double vision, making it difficult for her to maintain her balance. As her condition worsened in early 2015, Borgatta called Bascom Palmer to make an appointment with a specialist. "The receptionist asked me to describe my symptoms," she said. "When I told her my eyelids felt swollen, she told me to come into the emergency room right away. Rather than refer me to someone else, she recognized that I had a very serious vision problem. I never got her name, but I can't thank her enough for her concern."

Thomas E. Johnson, M.D., professor of clinical ophthalmology, and his fellow, Brian C. Tse, M.D., now assistant professor of clinical ophthalmology, examined her and found she was at high risk of blindness from compressive optic neuropathy caused by swelling of the muscles that control eye movements, the "extraocular muscles." They also diagnosed Borgatta's underlying problem as Graves' disease, which occurs when the body's own immune system attacks the thyroid gland in the neck. The same immune response also attacks



Dr. Eduardo Alfonso and Lydia Borgatta

tissues in the orbits where the eyes are situated, causing "thyroid eye disease."

"Even though Lydia didn't have severe bulging of the eyes, which is often associated with Graves' disease, her diagnostic MRI scans showed enlarged muscles around the eyes," said Tse. "We performed blood tests to confirm the diagnosis of thyroid disease."

Johnson and Tse realized that Borgatta needed coordinated care with Miller School endocrinologists and surgeons before her vision could be treated. "It's like having a house that's on fire from a gas leak in the basement," Tse said. "You have to turn off the gas before you can fight the fire effectively."

A careful series of treatments

Under the guidance of Johnson and Tse, Borgatta began coming to Bascom Palmer three or four times a week for medications and blood test monitoring to prepare her for thyroid surgery to bring her Graves' disease under control. "My liver, heart and sugar levels needed to be stabilized before an endocrinology surgeon could remove my thyroid," Borgatta said. "That process took about two months."

During the presurgery phase, the Miller School's endocrinology team discovered Borgatta had Marine-Lenhart syndrome, a rare cancer of the thyroid.

"Along with clearing the way for me to get immediate thyroid care, the Bascom Palmer specialists advised on limiting the use of x-rays using dyes, as this would have made my vision even worse," Borgatta said. "It points to the incredible interactive care that Bascom Palmer provides, even beyond the Institute, to achieve a positive outcome."

Two weeks after the August thyroid surgery, Johnson began preparing Borgatta for bilateral orbital surgery



Dr. Thomas Johnson



Dr. Hilda Capó



Dr. Brian Tse

to relieve the pressure on her optic nerves. "With Graves' disease, the eyes often bulge out due to the enlarged muscles that control the eye movements," said Johnson, who specializes in oculofacial plastic, reconstructive and orbital surgery. "We usually initiate treatment with systemic steroid medications to quiet the inflammation in those muscles before we perform surgery."

Johnson and Tse then performed orbital decompressions in which they removed some of the orbital bones around her eyes to increase the volume of her orbits. This surgery relieves the pressure on the optic nerves due to the enlargement of those muscles. "I had excellent results," Borgatta said. "Each time I opened my eyes after surgery, I was stunned at the immediate improvements in my vision."

Correcting the double vision

However, she was still suffering from diplopia, commonly known as double vision, due to her tight eye muscles. In December 2016, Hilda Capó, M.D., professor of clinical ophthalmology and the John T. Flynn Chair in Ophthalmology, was able to correct the problem without surgery.

"Her eye muscles were causing vertical and horizontal misalignment of her eyes, a condition known as strabismus," Capó said. "She would see an object at two different heights or side by side, making it hard for her to walk, climb stairs or focus on things."

After evaluating Borgatta, Capó fitted her for eyeglasses with special prisms to correct the strabismus. "We encourage people with double vision like Lydia to be evaluated," Capó said. "You are never too old or too young to be treated for strabismus."

As for Borgatta, her double vision was gone within minutes of putting on her new eyeglasses. "My eyes stopped darting around like the metal balls in a pinball machine," she said. "It was an amazing result. My life has changed for the better, thanks to Bascom Palmer."

Since her treatment, Borgatta has become an active fundraiser for Bascom Palmer. "Spending all those hours in the waiting room gave me a chance to know some of the Institute's patients," she said. "I talked with parents without insurance who knew their child needed specialized care, and adults who slept in a car overnight because they couldn't afford a hotel room. Bascom Palmer delivers world-class care, regardless of a patient's financial background, and richly deserves our support." ■



Onboard the Orbis Flying Eye Hospital, Dr. Thomas Johnson operates on hundreds of patients and teaches doctors from around the world, exemplifying the diverse talent and adaptability of Bascom Palmer's physicians. Their ability to adjust to different environments with different cultures and still perform the most complicated surgeries is one of the ways Bascom Palmer makes a global impact. To see Dr. Johnson in action, visit <http://www.cnn.com/videos/health/2017/11/21/vital-signs-onboard-the-flying-eye-hospital-b.cnn>

WELCOME NEW FACULTY

Bascom Palmer Eye Institute is pleased to announce the appointment of three new faculty members, bringing with them expertise in the field of ophthalmology. With these physicians, the Institute has increased the size of its faculty to 71 physicians and 19 investigators. This team of 90 is committed to continuing Bascom Palmer's history of advancing the practices of ophthalmology through innovations in therapeutics, diagnostics and vision research.

CARLOS MENDOZA SANTIESTEBAN, M.D., FRCS, joins the faculty as assistant professor of clinical ophthalmology.



Mendoza's field of work includes adult and pediatric neuro-ophthalmology and medical retina with special interest in di-

agnostic tools such as visual electrophysiology and retinal imaging. He received his medical degree and completed residencies in neurophysiology and ophthalmology at Havana Medical University. He then completed two fellowships at New England Eye Center of Tufts University School of Medicine in neuro-ophthalmology and medical retina and visual electrophysiology, and also served as medical director of the visual electrophysiology unit from 2013-2016. At that time, he worked in the field of retinal imaging and visual electrophysiology to study the structure and function relationship in the retina and the identification of retinal biomarkers for neuro-ophthalmological diseases. Mendoza is available for consultation on adult and pediatric neuro-ophthalmology, retinitis pigmentosa and visual electrophysiology in Miami and Naples.

PATRICK O'CONNOR, M.D., a neuro-ophthalmologist, joins the faculty as a voluntary professor of ophthalmology. A



graduate of Georgetown University, O'Connor received his medical degree from Saint Louis

University, Saint Louis, Missouri. He completed two residencies at Cleveland Clinic in Cleveland, Ohio: general surgery and ophthalmology, and a third in neurology at Jackson Memorial Hospital, Miami, Florida. He then completed a fellowship in neuro-ophthalmology at Bascom Palmer. After practicing for many years in San Antonio, Texas, O'Connor is now available for consultation on neuro-ophthalmology in Naples.

To schedule an appointment with a Bascom Palmer specialist, please call 1-888-845-0002 or visit bascompalmer.org.

RAHUL S. TONK, M.D., M.B.A., a corneal and external disease specialist, joins Bascom Palmer as assistant professor



of clinical ophthalmology. Tonk earned his bachelor of science degree, *magna cum laude*, from Cornell

University. He then earned his doctor of medicine and master of business administration degrees from Rutgers University. He completed an ophthalmology residency at Albany Medical College, where he served as chief resident, followed by fellowship training in cornea and external diseases at Bascom Palmer.

He is available for consultation on corneal and external diseases, including cataracts and intraocular lens, corneal transplant surgery, and ocular surface diseases, at Bascom Palmer in Miami, Plantation and the Lennar Foundation Medical Center in Coral Gables.

Bascom Palmer Ranked #1 Again!



Bascom Palmer Eye Institute has received top honors in two prestigious national rankings. *U.S. News & World Report* once again ranked Bascom Palmer as the nation's **Best in Ophthalmology** in its *Best Hospitals* edition. It is the 14th consecutive year and the 16th time that Bascom Palmer has been ranked #1 since the publication began surveying U.S. physicians 27 years ago.



More recently, *Ophthalmology Times* ranked Bascom Palmer as the **#1 Overall Ophthalmology Program, First in Clinical Care** and **First in Residency Program** in the United States. The Institute also received second place honors for its robust research program. *Ophthalmology Times*, a national publication focused on cutting-edge advancements in vision care, resumed its national rankings after a five-year hiatus. In 2012, Bascom Palmer was also honored as having the nation's best overall program, clinical care and residency education programs.

"It is a deep honor for our team of clinicians, scientists and educators to be recognized for the high quality of our care," said Eduardo C. Alfonso, M.D., chair of Bascom Palmer. Alfonso noted *Ophthalmology Times* pays close attention to vision research and education, as well as patient care. "Bascom Palmer provides a forum where key issues and challenges confronting ophthalmology have been addressed, where new technology has been unveiled, and where ophthalmologists come together to discuss and teach the best care for their patients," he said. "The credit belongs to our entire team of physicians, scientists, researchers and dedicated staff members."

Bascom Palmer's residency program, under the leadership of Steven J. Gedde, M.D., professor of ophthalmology and the John G. Clarkson Chair in Ophthalmology, consistently attracts "the best and the brightest young physicians

BEST HOSPITALS FOR OPHTHALMOLOGY		
Rank	Hospital	Reputation (%)
1	Bascom Palmer Eye Institute, Miami	59.6
2	Wills Eye Hospital, Thomas Jefferson University, Philadelphia	53.0
3	Wilmer Eye Institute, Johns Hopkins Hospital, Baltimore	43.1
4	Mass. Eye and Ear Infirmary, Massachusetts Gen. Hosp., Boston	29.1
5	Stein and Doheny Eye Institutes, UCLA Medical Ctr., Los Angeles	23.7
6	Duke University Hospital, Durham	12.6
6	University of Iowa Hospitals and Clinics, Iowa City	12.6
8	W.K. Kellogg Eye Center, University of Michigan, Ann Arbor	9.4
9	Cole Eye Institute, Cleveland Clinic, Cleveland	9.0
10	UCSF Medical Center, San Francisco	7.0
11	USC Roski Eye Institute, Los Angeles	5.7
12	New York Eye and Ear Infirmary of Mount Sinai, New York	5.6
13	Emory University Hospital, Atlanta	5.1

Ranked by *U.S. News & World Report* 2017-2018

entering the field of ophthalmology," Alfonso said. "We have a large patient volume, giving our residents vast experience on a wide range of ophthalmic diseases and disorders. Many go into academic medicine and educate other physicians, contributing to Bascom Palmer's long-term and global impact."

"At Bascom Palmer, the patient always comes first. Having ophthalmologists from throughout the country recognize our Institute as the best in the nation again and again is a great honor."

– Eduardo C. Alfonso, M.D.

Awards and Honors

Congratulations to **HARRY W. FLYNN, JR., M.D.**, professor of ophthalmology, for receiving the 2017 Relja Zivojnovic Award from the European VitreoRetinal Society (EVRS) at its annual congress in Florence, Italy. Flynn, holder of the J. Donald M. Gass Distinguished Chair in Ophthalmology, was chosen unanimously by EVRS to receive the award for his outstanding contributions to the field of vitreoretinal surgery.



Dr. Harry Flynn, Jr.



Dr. Adam Katz, president, Florida Society of Ophthalmology, 2016-2017, with Dr. Kara Cavuoto

This award celebrates those who have made an impact on the lives of students in medicine and recognized Cavuoto as an exceptional mentor.

At the annual meeting of the Florida Society of Ophthalmology, **KARA CAVUOTO, M.D.**, received the Michael R. Redmond, M.D., Outstanding Young Ophthalmologist Award. The award, established in honor of Michael R. Redmond, M.D., recognizes a Florida-based ophthalmologist younger than 40 years old, who has demonstrated organizational leadership, service, competence and devotion to the high ethical and professional standards of the organization. Cavuoto, who specializes in pediatric ophthalmology and strabismus, also received the 2017 Exceptional Membership Award from the American Medical



Fabrice Manns, Ph.D.

The biometry system provides synchronized, real-time images of the eye's lens and the ciliary muscle surrounding the lens during accommodation, which is the way the eye changes focus from distant to near images.

FABRICE MANN, PH.D., professor of biomedical engineering and ophthalmology recently received a \$1 million research grant to improve the understanding of presbyopia, the age-related gradual loss of the eye's ability to focus on near objects. The research will build upon the accommodation biometry system developed previously by Manns, who is co-director of Bascom Palmer's Ophthalmic Biophysics Center with **JEAN MARIE PAREL, ING. ETS-G, PH.D.**, **FARVO**, and **MARCO RUGGERI, PH.D.**

Congratulations to Bascom Palmer's **DANIEL PELAEZ, PH.D.**, and **J. WILLIAM HARBOUR, M.D.**, for receiving Honorable Mention from the National Eye Institute in its 3D Retinal Organoid Challenge. Pelaez led the University of Miami team in the challenge that asked participants for ideas on how to generate human retinas from stem cells. The team's approach included the design and manufacturing of a novel bioreactor system that allows the team to separate the differentiation stimuli given to the stem cells just as they would be delivered during normal development of the retina. This system, optimized by **ZENITH ACOSTA**, a Ph.D. student in the Pelaez laboratory, allows the stem cells to develop a fully-functional human retina with all its layers in normal configuration. The Pelaez and Harbour labs are using this new platform, along with gene-editing technology to find new therapeutic targets for the developmental tumor of the retina called retinoblastoma.



Daniel Pelaez, Ph.D.

Congratulations to the department of ophthalmology for receiving a Research to Prevent Blindness (RPB) unrestricted grant of \$115,000 to support research into the causes, treatment and prevention of blinding diseases. The research will be directed by **EDUARDO C. ALFONSO, M.D.**, chair of Bascom Palmer, and the grant will automatically renew annually, until 2021, when the Institute can reapply. RPB also awarded a \$30,000 Medical Student Eye Research Fellowship to Bascom Palmer that will enable Adanna Udeh, to take a year off from medical school to investigate new treatments that promote optic nerve regeneration at Bascom Palmer. This research project will contribute to work taking place in the laboratory of **ABIGAIL HACKAM, PH.D.**, associate professor of ophthalmology and active researcher. Hackam, whose lab focuses on developing therapies for diseases of the retina, will serve as Udeh's mentor and provide expertise and training for Udeh. RPB is the leading voluntary health organization supporting eye research directed at the prevention, treatment or eradication of all diseases that threaten vision.



Bascom Palmer celebrated its 39th Annual Inter-American Course in Clinical Ophthalmology (CURSO) in Miami. Nearly 700 ophthalmologists from 35 countries in Central and South America attended the popular, four-day conference. CURSO is the largest meeting in the United States

Bascom Palmer excels at AAO

For decades, Bascom Palmer's clinicians and researchers have tackled the world's most challenging vision diseases and disorders. This year, in its mission to advance ophthalmic education and discovery, 70 faculty members, residents and fellows delivered more than 200 lectures, instructional sessions, scientific posters and papers during the 2017 American Academy of Ophthalmology's (AAO) annual meeting.



Mark L. Dlugoss, editor-in-chief, *Ophthalmology Times*, (left) presents Bascom Palmer with the Best Overall Program award at the Alumni Association reception held during AAO, to (left to right) Drs. Eduardo Alfonso, John Clarkson, William Harbour and Steven Gedde. See related story, page 19.

At the AAO meeting, Bascom Palmer faculty members accepted these outstanding honors: **NINEL Z. GREGORI, M.D.**, received an Achievement Award; **HARRY W. FLYNN, JR. M.D.** and **STEVEN J. GEDDE, M.D.** received Secretariat Awards; **EDUARDO C. ALFONSO, M.D.**, received a Distinguished Service Award on behalf of the Pan-American Association of Ophthalmology; **RICHARD K. PARRISH, II, M.D.**, presented the Jackson Memorial Lecture; **CAROL KARP, M.D.**, was the program director for the Cornea Subspecialty Day; and **WENDY W. LEE, M.D.**, was program director for the Oculofacial Plastic Surgery Specialty Day. **JANET L. DAVIS, M.D., M.A.**, **RICHARD K. LEE, M.D., PH.D.**, **SARAH WELLIK, M.D.** and **HILDA CAPÓ, M.D.**, served as program chairs for their respective specialties.

The Bascom Palmer Alumni Association honored former Bascom Palmer chair, **JOHN G. CLARKSON, M.D.**, at its annual reception, held during the AAO meeting in New Orleans. More than 250 alumni attended to honor Clarkson, professor of ophthalmology and dean emeritus of the University of Miami Miller School of Medicine.

held for Spanish-speaking ophthalmologists. The course is presented with simultaneous English-Spanish translation and designed to provide maximum emphasis on practical approaches to clinical problems. Drs. Eduardo Alfonso, Carol Karp and Paul Palmberg are CURSO's directors.

Optical coherence tomography (OCT) has saved Medicare \$9 billion by reducing the frequency of anti-vascular endothelial growth factor injections used to treat patients with wet age-related macular degeneration (AMD), according to **PHILIP J. ROSENFELD, M.D., PH.D.**, professor of ophthalmology. "OCT monitoring significantly reduces the need for costly injections for wet AMD," Rosenfeld told a Congressional delegation at a December 7 briefing organized by the Association for Research in Vision and Ophthalmology (ARVO). "Over the past 20 years, the National Institutes of Health and the National Science Foundation have invested about \$400 million in OCT research. Since the Medicare savings were in excess of 21 times that funding, it's clear that investments in basic vision research reap huge rewards and can more than pay for themselves."

Patients receiving anti-VEGF drug injections and OCT imaging under Medicare Part B also benefited from an estimated savings of \$2.2 billion in copays, along with the \$9 billion return to the U.S. government.

ARVO President Claude Burgoyne, M.D., and Eric A. Swanson, M.S., co-inventor of OCT, joined Rosenfeld in presenting the paper's findings to U.S. Rep. Ileana Ros-Lehtinen (R-Miami) and other Congressional delegates at the briefing, cosponsored by the Alliance for Eye and Vision Research. "While many news headlines highlight the cost of medicine, OCT is an example of an innovative technology that makes healthcare more affordable," Rosenfeld said.

"Sight-saving research, primarily funded through the NEI, is responsible for numerous therapies that help prevent patients from losing vision," Rosenfeld said. "We believe Congressional funding is vital for helping NIH/NEI build upon past basic and clinical research that has accelerated the development of life-changing cures, train the next generation of scientists, drive the nation's economy by creating jobs and economic growth, and maintain U.S. leadership in global innovation."

"Dr. Rosenfeld has been at the forefront of clinical research and care for the past 20 years, and he isn't slowing down. Not only has he saved vision in countless numbers of patients worldwide, but due to his efforts, he has saved government healthcare providers billions and billions of dollars through his pioneering work with Avastin and OCT-guided therapy," said Eduardo C. Alfonso, M.D. See related story, page 2.



Dr. Philip Rosenfeld



Good Cheer and Cherry Blossoms



More than 250 Bascom Palmer supporters gathered to celebrate the 36th annual *Evening of Vision Gala*. Nancy and William Rollnick chaired the event that supports patient care and vision research. Marietta and Dale McNulty served as honorary chairs, and Hermé de Wyman Miro served as international honorary chairwoman.

“Tonight we are gathered here to salute Bascom Palmer’s international eye-rescue mission to Japan following the Tohoku earthquake and tsunami,” said Eduardo C. Alfonso, M.D., Bascom Palmer’s chair. “In 2011, we joined forces with Japanese ophthalmologists when our Vision Van, a 40-foot, mobile, self-contained eye clinic, went to Japan for seven months to treat people in remote areas hardest hit by the natural disasters.”

Grand Gala Patrons were Veronica Atkins, Christy and Earl Powell, Findlay Galleries, and the McNulty Family Charitable Foundation. Gala Patrons were

Carole Bastek, Raysa and Alfonso Fanjul, Dr. Richard and Janet Forster, Michele and Howard Kessler, Hildegarde Mahoney, Hermé de Wyman Miro, Lois Pope, Ari Rifkin, William and Nancy Rollnick, Robin and Irvin Saltzman, and Kathryn and Leo Vecellio. Society Patrons were Eva and Herbert Jacobi, Tamar and Milton Maltz, Peggy and Dudley Moore, the William H. Pitt Foundation, Helen and Walter Ross, and Northern Trust.



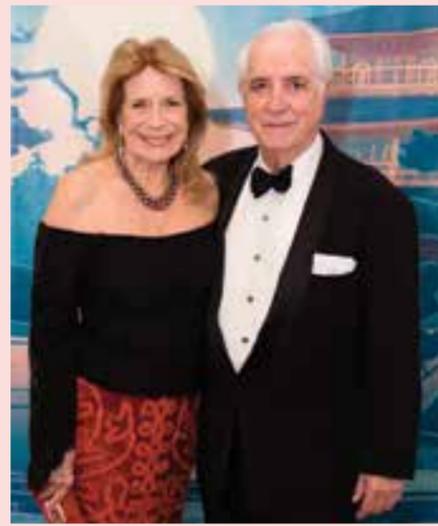
Dale and Marietta McNulty with Adolfo Zaralegui and James Borynack



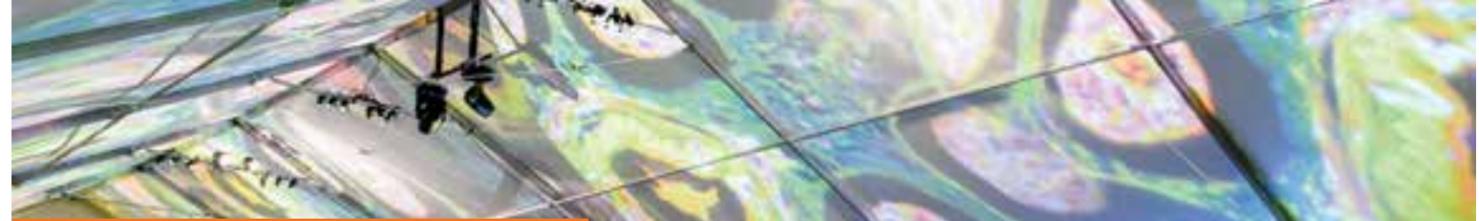
Drs. Masako and Terrence O'Brien



Veronica Atkins and Hermé de Wyman Miro



Nancy and William Rollnick



Eyeing the Future with U



Dr. Eduardo Alfonso, Andrew Cummins, Dr. Stephen Schwartz

Bascom Palmer Eye Institute thanks the Naples community for its generosity in supporting “Eyeing the Future with U,” the annual *Evening of Vision Gala*. Special thanks to Gala Chairs Hanna and Andrew Cummins, who created the exciting event that took place at Bascom Palmer’s outstanding eye center in Naples. The gala raised more than \$700,000 to support the Institute’s clinical and research programs.

Twelve years ago, Bascom Palmer opened the only university-based eye care center in southwest Florida. Begun primarily to diagnose and treat retinal and macular diseases, the practice has grown considerably. With the opening of its \$25 million, 20,000-square-foot eye center in 2015, Bascom Palmer’s physicians now treat virtually all eye diseases, perform on-site surgery, and offer clinical research trials to residents and visitors to the Gulf Coast of Florida.



Andrew and Hanna Cummins



(standing) Don Jensen, Penny and Michael Isermann, Kerry and Dr. Ron Riner (sitting) Mary Jensen, Dr. Joseph and Jean Beauchamp, Jim and Linda Mayer

The Bascom Palmer Society

Recognized as the George E. Merrick Society at the University of Miami

Honoring the Institute's most generous benefactors whose gifts exceed \$1 million, the Bascom Palmer Society was created in memory of the Institute's namesake, Bascom Headon Palmer, M.D., an ophthalmologist who pioneered eye care in Miami.

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The Norton Society

Recognized as The Bowman Foster Ashe Society at the University of Miami

Members of the Norton Society have generously supported Bascom Palmer with gifts totaling \$500,000 – \$999,999. This society honors the vision and leadership of Edward W.D. Norton, M.D., the Institute's founding chairman.

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Salah Foundation Supports Macular Degeneration Research

Nearly a century ago, Joseph and Nora Salah emigrated from Lebanon to the United States in pursuit of the American dream. With little more than a pickup truck and a wheelbarrow, their son Jim started a construction business in Boston that grew into a major company. He later ventured into real estate development and heavy equipment leasing in the Northeast. Like many successful individuals, Jim Salah understood the importance of giving back to his community. Upon his death in 2009, the Salah Foundation was founded as a living tribute to his lifelong success and generosity. Today, that nationwide commitment to philanthropy lives on through his niece, Noreen Salah Burpee, who was honored with a prestigious Ellis Island Medal of Honor in 2013.

Burpee serves as executive director of the private foundation, which has won numerous awards for its philanthropic work. She guides the foundation's invitation-only grant process.

Under her direction, the Salah Foundation recently awarded a two-year, \$1 million grant to Bascom Palmer for research into



Noreen Salah Burpee

Bascom Palmer is known for leadership in research and clinical care for patients with the aggressive "wet" form of AMD, as well as the "dry" form of the disease, which causes a more gradual loss of vision.

"Bascom Palmer's scientists and physicians conduct leading-edge research on AMD, as well as other types of eye diseases. They deserve our Foundation's support," Burpee said. "Our grant can help increase the understanding of macular degeneration and make a difference in the lives of patients here in South Florida, across the country and throughout the world."

age-related macular degeneration (AMD), one of the major causes of vision loss among the elderly.

"AMD is a condition we all get with advancing age," said Burpee. "My father, age 90, and my mother-in-law, age 92, both have macular degeneration."

A South Florida resident, Burpee said Bascom Palmer is known for leadership in research and clinical care for patients with the aggressive "wet" form of AMD, as well as the "dry" form of the disease, which causes a more gradual loss of vision.

"Bascom Palmer's scientists and physicians conduct leading-edge research on AMD, as well as other types of eye diseases. They deserve our Foundation's support," Burpee said. "Our grant can help increase the understanding of macular degeneration and make a difference in the lives of patients here in South Florida, across the country and throughout the world."

It's All About the Care

Angela Whitman deeply appreciates how Bascom Palmer's entire team delivers professional care with a personal touch. "They take great care of me – especially my doctor," she said, referring to Harry W. Flynn, Jr., M.D., professor of ophthalmology and the J. Donald M. Gass Distinguished Chair in Ophthalmology.

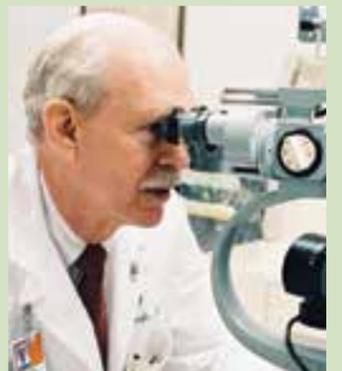


Dr. Eduardo Alfonso and Angela Whitman

"It's really a privilege to be Dr. Flynn's patient," she said. "He takes time to explain things and answer my questions. On my last visit, he saw I had an injury to my hand and he walked me downstairs so I could be seen right away by a UHealth orthopedic specialist."

During the past decade, Whitman has seen Dr. Flynn regularly for her retinal condition. "He's been able to control my condition with medication," she said. "I've lost some peripheral vision in my right eye through the years, but he monitors me closely, and my eyes have been stable for some time."

Angela Whitman and her late husband, William, are members of the Institute's Luminary Society. Angela also serves on the board of Miami Lighthouse for the Blind. "I know how important it is to support vision research," she said. "Bascom Palmer's doctors and scientists are doing a great job and you can see the progress."



Dr. Harry Flynn, Jr.

The Luminary Society

Recognized as The Grand Founder Society at the University of Miami

The Luminary Society recognizes individuals who are beacons for progress in vision research, clinical care and education. Generous donors have contributed gifts totaling \$100,000 - \$499,999.

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Recognized as The Founder Society at the University of Miami

The Founder Society honors donors who have supported Bascom Palmer's mission with gifts totaling \$50,000 - \$99,999 that enable the Institute's physicians and researchers to combat blinding eye disease.

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Save the Dates

EVENING OF VISION GALA NAPLES ART AND THE EYE

Friday, February 9, 2018

Bascom Palmer Eye Institute Naples
Dr. Joseph and Jean Beauchamp, Chairs

EVENING OF VISION GALA PALM BEACH ENVISIONING THE FUTURE

Friday, March 2, 2018

The Breakers Hotel, Palm Beach
James Borynack and Adolfo Zaralegui, Chairs
Nancy and Bill Rollnick, Honorary Chairs

Giving the Hope of Sight

There is a broad range of philanthropic giving societies available at Bascom Palmer. Please contact the development office at 305-326-6190 for additional information.

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Building a Home for Scientific Discovery

The Center for Retinal and Macular Degeneration Research & Innovation at Bascom Palmer's Palm Beach Gardens campus will allow for much of Bascom Palmer's retinal and macular degeneration disease research and clinical trials to reside under one roof.

The mission of the new center is to bridge the gap between laboratory research and clinical care of retinal eye diseases. Building upon the Institute's trajectory of scientific excellence, Bascom Palmer's physicians and scientists funded by national research grants and private philanthropy, will continue to pioneer new technologies resulting in ophthalmic innovation.

Bascom Palmer is committed to fast track pioneering research that will translate into new treatments and cures

for eye diseases including wet and dry age-related macular degeneration, diabetic retinopathy, inherited retinal diseases, retinal detachments, macular holes and glaucoma. In addition to containing the latest research, diagnostic and imaging technology, the 21,318-square-foot center will include training facilities for young scientists.

Research and innovations at the Center will focus on:

- The genetic basis for retinal and macular degenerations
- Molecular diagnostic testing for retinal degenerations
- Basic biological investigations into the cause of retinal cell death and degeneration
- Clinical investigations to study retinal degenerations and potential therapeutic approaches
- Development of pharmaceutical agents to treat degeneration

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Special friends for our youngest patients

An adult preparing for eye surgery at Bascom Palmer can feel reassured by the skills and experience of the medical team. However, children getting ready for surgery may need a different form of comfort. Thanks to the generosity of special donors, our youngest patients receive soft, stuffed animals that they can name and hug before their surgery. Many children enjoy telling their new huggable friend what to expect during their visit to the hospital – a great way to relieve stress and feel a little more comfortable.

Children also receive an age-appropriate storybook for them to read before or after surgery. Children are encouraged to bring their stuffed animal back for follow-up visits with their surgeon. This often leads to interesting, three-sided conversations with the physician, the child and their cuddly friend!

Every month, Bascom Palmer's ophthalmologists treat 150 – 200 pediatric surgical patients. We would like to thank the Laskin and Farbman family, and the Florida Lions Eye Bank Beauty of Sight Foundation for bringing smiles to these very special patients.



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Gift for Research Honors Innovative Engineer and Builder

Jack Schillinger came to Miami in 1948 after earning an engineering degree at New York University and serving in the U.S. Army during World War II. He began running Destin Block Company, and with several partners launched Durwin Corp., which offered "poured-in-place window frames." In the 1970s, he designed a keystone joist system, and with his partners developed Prestressed Systems, Inc. (PSI), which literally changed the South Florida skyline.

"My father was an innovative engineer and builder," said his son Lee Schillinger, an attorney in Hollywood, Florida. "The PSI system allowed developers to construct parking garages with fewer columns, making more efficient use of space. Most of the large buildings from the 1970s to the 1990s, including several garages at Miami International Airport, use the PSI system."

With his wife Marjorie, Jack Schillinger became active in a number of philanthropic organizations, including United Cerebral Palsy of Miami after their daughter Lynn was diagnosed with cerebral palsy. In 1991, he became president of the National Board for United Cerebral Palsy, and a year later helped the Miami organization rebuild its assisted living housing after Hurricane Andrew.

In the 1990s, Schillinger was diagnosed with age-related macular degeneration (AMD), and was treated for many years by Bascom Palmer's retinal specialist Philip J. Rosenfeld, M.D., Ph.D.

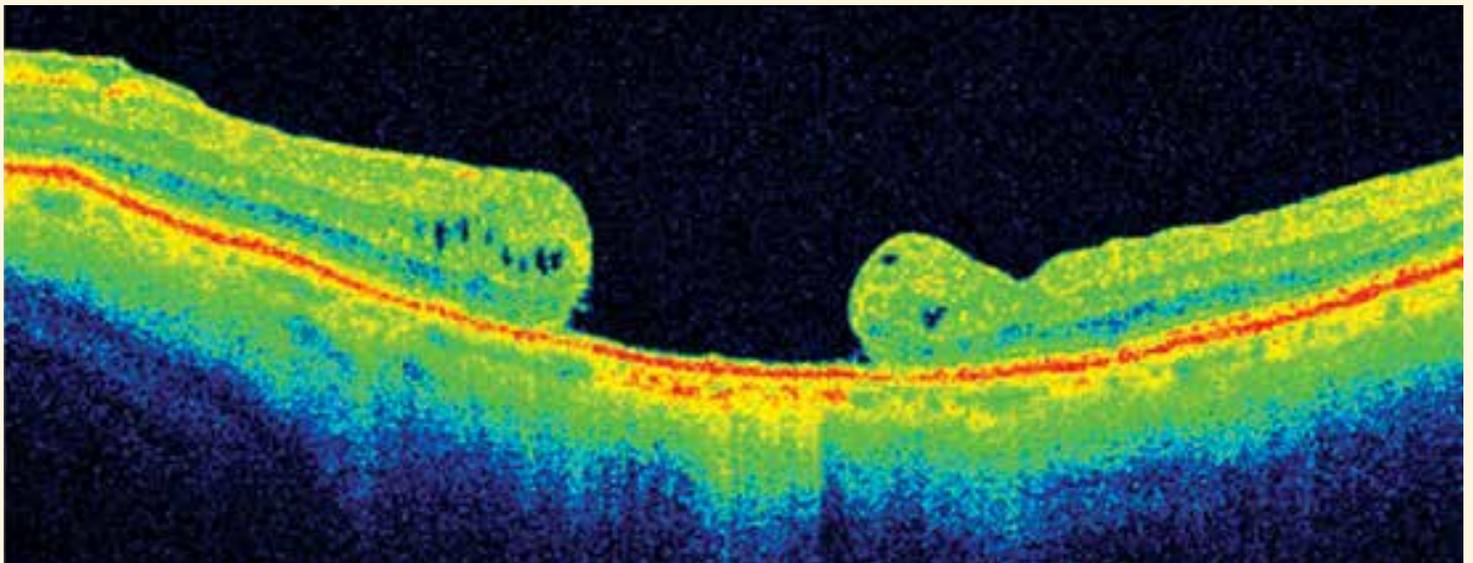
"Dr. Rosenfeld was able to delay the progression of AMD, and my dad just dealt with the disease," said Lee Schillinger. "He continued his hobby of photography and set up large screens on his computer with software that enlarged text for reading."

Before his death last year at age 96, Schillinger created the Jack and Marjorie Schillinger Family Foundation, to support worthy charities. This fall, the Schillinger family gave a \$250,000 grant in memory of Jack to support Bascom Palmer's leading-edge AMD research. "We knew how much my father appreciated the care he received at Bascom Palmer," said his son Lee. "This is a fitting way to honor him, while advancing medical understanding of this sight-stealing disease."



Jack and Marjorie Schillinger

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