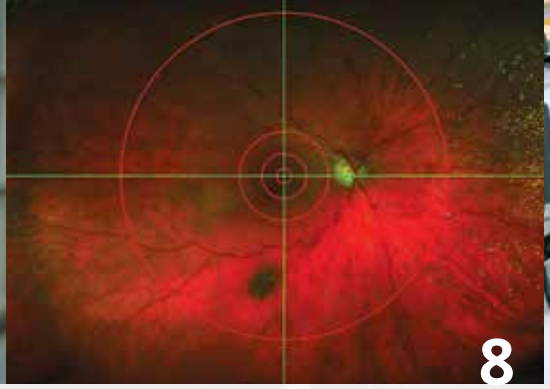
VISION2017

Duke Eye Center

quiet eyes

searching for better ways to quiet the inflammation and pain of uveitis



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On the cover: Fundus photograph of eye with serpiginous choroiditis. Image by Duke Eye Center Imaging.

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From our Chair, Edward G. Buckley, MD

As long as I can remember, Duke Eye Center has been a world-leader in ophthalmology. Excellence is the standard at Duke Eye Center. We had an incredible 2016 and I am excited to share some highlights of the 2017 issue of Vision. We hope you enjoy reading about our most impressive accomplishments over the last year.

- Duke Ophthalmology moved up to number 6, from number 8 in the 2016–2017 *US News and World Report* ranking.
- Glenn Jaffe, MD, who has dedicated his career to finding treatments and ultimately a cure for uveitis, is one step closer with his involvement in the studies that led to the recent FDA approval of Humira® for treatment of uveitis.
- Our new research laboratory space rises above the traditional lab design to encourage collaboration among our scientists and to facilitate high-impact research.
- Duke Eye Center is known for offering the latest ophthalmic treatments; we recently began offering the first FDA-approved treatment for keratoconus called "cross linking."
- We have some very talented new faculty, including a new Director of Ophthalmic Oncology and we launched a new Center for Retinal Degeneration and Ophthalmic Genetic Diseases.

In addition to the remarkable clinical and research work we are doing, we are offering scholarly events that will benefit trainees, ophthalmologists and ophthalmic professionals. In April, we will host the 20th anniversary of the Advanced Vitreoretinal Surgery (AVS) course. The course commenced over 40 years ago by Robert Machemer, MD a pioneer in vitreoretinal surgery and former chair of the Department. It has been a major forum for new ideas and treatments for complex retinal disease. We are introducing two new CME programs this year, the Advanced Pediatric Retina Course (APR) being held in March and a glaucoma fellows program that will be held during AAO in November. We hope to see you at one of our events.

Our predecessors set the path for today's success and we are carrying the torch into the future. I am proud of our faculty and staff for their dedication to excellence in research, education and patient care.

They inspire me every day.

Sincerely,

Edward G. Buckley, MD
Chair, Department of Ophthalmology
Vice Dean for Education, School of Medicine
Vice Chancellor for Duke-National University Singapore Affairs
James P. and Joy Gills Professor of Ophthalmology
Professor of Pediatrics

quiet eyes

Duke Ophthalmology's Glenn Jaffe, MD is at the epicenter of the search for better ways to quiet the inflammation and pain of uveitis. The clinician-scientist is leading the way for two promising new treatments for patients.

UVEITIS, A GROUP OF DISEASES THAT CAUSE CHRONIC INFLAMMATION IN THE FRONT OR BACK OF THE EYE, OR BOTH, CAN CAUSE PAIN, RETINAL SWELLING, AND VISION LOSS. Although relatively uncommon—it afflicts an estimated 200,000 people of all ages worldwide—uveitis is one of the leading causes of blindness in developed countries, including the United States.

Treatments to quiet the inflammation and pain of uveitis do exist, but they often come with risks and side effects. For instance, Steroids, which are the most common medications used to treat uveitis, can cause cataracts and glaucoma, as well as systemic side effects such as weight gain, difficulty sleeping, calcium loss, acne, and unwanted hair growth, especially when taken orally or injected into other parts of the body. Steroidal eye drops may work for uveitis in the front of the eye, but for posterior cases, treatment must be directed to the back of the eye. Even when injected directly into or near the eye, long-term use of steroids can be toxic.

Physicians also treat uveitis with immune-suppressing medications, which carry their own concerns, including increased risk of cancer. These medications are often used "off-label," meaning they are not yet approved by the Food & Drug Administration (FDA) for treatment of uveitis. Unfortunately, insurance companies do not always cover off-label use, making this option cost-prohibitive for many patients. In addition, two FDA-approved, surgically implanted sustained delivery systems can provide time-release medication directly into the eye for up to three years.

"There are pros and cons to all of the treatments that we use, so we always need to balance those," says Glenn Jaffe, MD, Chief of Duke Ophthalmology's Retina Division and a leading authority on the treatment of uveitis. "And because uveitis is not one, but a group of different diseases, treatment must be highly individualized, not only by disease type and severity but also with regard to the patient's other health factors."

Jaffe works closely with several major biomedical companies to develop and test potential new treatments for uveitis. He has been involved in many of the major breakthroughs in uveitis over the past three decades. 2016, he says, was a milestone year, with two especially promising new treatments providing hope for improved outcomes.

Humira®: A non-steroid alternative

In June 2016, the FDA approved the use of adalimumab (manufactured and sold by the biopharmaceutical company AbbVie as Humira®) to treat noninfectious uveitis, making it the first and only FDA-approved non-corticosteroid therapy for adults with noninfectious uveitis. The European Commission has also approved Humira to treat uveitis in the European Union. This steroid alternative has been approved previously for the treatment of arthritis, Crohn's disease, and several other immune-mediated diseases. Prior to this approval, ophthalmologists often prescribed Humira off-label, but FDA approval should make it easier for patients to get this treatment covered by insurance. Humira is given as a subcutaneous injection; patients inject themselves in the midsection every few weeks.

Jaffe was instrumental in conducting two AbbVie-sponsored clinical studies that informed the FDA's decision. He led a study to assess the efficacy and safety of Humira in patients who had active inflammation in the eye despite being on steroids. As reported in the September 8, 2016 issue of the *New England Journal of Medicine,* investigators found that patients treated with Humira went nearly twice as long before "treatment failure": the point at which they saw a recurrence or worsening of one or more signs of inflammation. Time to treatment failure is important because delaying or preventing inflammation is the key to successful treatment. Median time to treatment failure was 24 weeks in the Humira group and 13 weeks in the placebo group. (On the downside, patients in the Humira group reported serious adverse effects, such as respiratory tract infections and allergic reactions, more often than those in the placebo group.)

Jaffe was also involved in a large study of patients whose eyes were not inflamed while they were on oral steroids, but who would be better served if they could get off of those potentially toxic medications. Outcomes from that phase 3 trial were shared in August 2016 in *The Lancet*. That study also provided very encouraging results, with patients in the Humira group avoiding treatment failure for similarly long periods of time.

"Many uveitis patients have unwanted side effects when taking steroids long-term, so the goal of these studies was to determine whether Humira is a safe and effective alternative that could replace or minimize the use of steroids," Jaffe notes. "Despite the side effects we observed, the overall positive outcomes from these studies gave us, and the FDA, the confidence to move forward with Humira as a treatment option for patients with these serious diseases."

Medidur™: An injectable time-release medication delivery system

Back in 2005, the FDA approved Retisert®, a surgically implanted time-release drug delivery system developed by Control Delivery Systems in collaboration with Jaffe, and in partnership with Bausch + Lomb, as a treatment for uveitis. Now Jaffe is helping drug delivery technology company pSivida Corp. test an injectable form of a time-release implant that can be inserted on an outpatient basis rather than surgically.

quiet eyes

"I have responded well to the Humira treatments, and my uveitis is at a 'quiet place' right now. I'm not seeing any floaters, and my vision has remained stable or improved since I began the Humira treatments."

Shirley Mims, study participant

"This is the next generation of the implantable time-release system," he says.

Medidur™ Technology is a miniaturized, injectable, sustained-release drug delivery system designed to deliver small amounts of a steroid directly to the site of the chronic inflammation over two to three years. Because the Medidur system is implanted directly into the inflamed site in the eye, it could potentially reduce system-wide exposure to, and hazardous side effects from, oral steroids or those injected into other parts of the body.

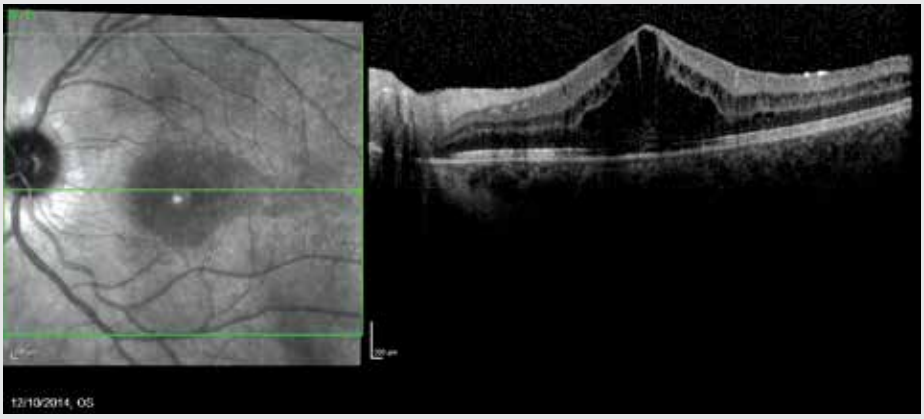
Duke Eye Center was the first to treat uveitis patients with this injectable implant. After testing the Medidur system in preclinical models, the Duke team, led by Jaffe, conducted a small study with 11 Duke patients that yielded encouraging results over a two-year period. During this time, none of the patients experienced inflammation recurrence. In addition to reduced inflammation and improved vision, the patients experienced less elevated eye pressure with the injected device than most patients who get the surgically implanted device. Findings were published in the September 2016 issue of *Ophthalmology*.

Jaffe is now the lead investigator on a much larger, multicenter phase 3 study to test the efficacy and safety of the Medidur system in chronic, noninfectious uveitis occurring in the back of the eye. Over the first six months of the study, investigators found that patients who received the injected implant had significantly lower incidence of inflammation recurrence than the control group, which received a sham injection—the sham injection is an empty syringe without a needle that is pressed on the outside of the eye so that the patient didn't know of he/she was given a true injection or not. Study participants will continue to be tracked for three years. Based on these favorable results, pSivida plans to submit an application to the FDA to gain approval for the implant.

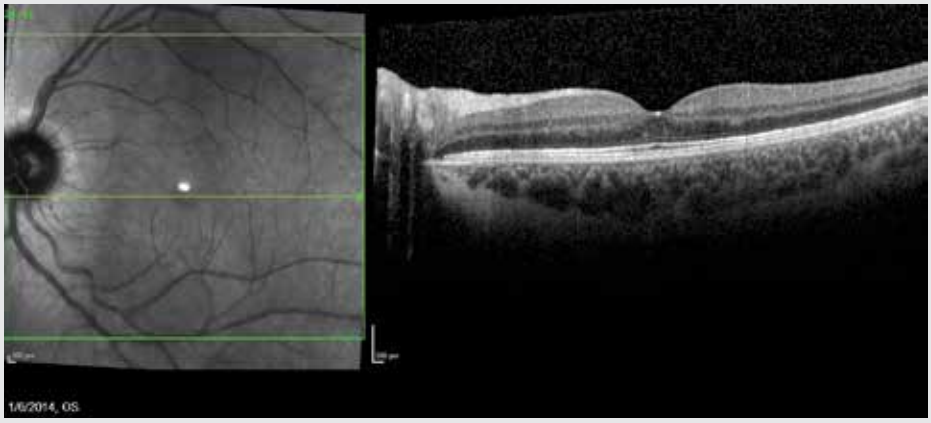
"This system is a very promising approach for patients with uveitis who do not respond to, or are intolerant to, conventional therapy," Jaffe says. "If approved, Medidur could make it much easier for many patients to receive treatment."

Unique measurement of outcomes

Jaffe is thrilled to have these valuable new options to offer the patients he and his colleagues see in the Duke Eye Center retina and uveitis clinic. The FDA's approval of Humira "supports our prior use of this drug off-label and will allow us to get treatment for people who weren't able to get it before, especially for insurance reasons."



Optical coherence tomographic image before Humira treatment showing swelling in the retina (cystoid macular edema).



Optical coherence tomographic image six weeks after Humira treatment showing complete resolution of retinal swelling. The vision improved from 20/80 to 20/20 following Humira treatment.

"At the same time, novel ways of giving the drugs locally, like the Medidur system, allow our patients to be free of many of the really dangerous or intolerable systemic side effects that are caused by steroids and even some of the immune-suppressing medications that we're giving to the whole body just to treat the eye," he notes. "And if we can give this treatment in the clinic rather than the operating room, that's even better."

The results of the Humira and Medidur studies are significant not only because they indicate that these treatments delay or eliminate inflammation recurrence, but also because investigators assessed several conditions associated with treatment failure: new areas of inflammation in the back of the eye, reduced visual clarity, more inflammatory cells in the front of the eye, and/or more cloudiness of the vitreous gel that fills the eye. (Most ophthalmology drug studies focus solely on the patient's visual acuity as an endpoint.)

"Using these multiple, composite endpoints was something unique, and likely the way uveitis studies are headed," Jaffe says. "Since each of these signs can be associated with different types of uveitis, the studies' results broaden the applicability of treatment for patients experiencing flare and vision impairment associated with this group of inflammatory diseases of the eye."

The dearth of new FDA-approved treatments for uveitis before now was not for lack of trying, Jaffe makes clear. "There have been several drug studies that failed to yield positive results, so these successes are particularly exciting, and we are looking forward to several other potential new treatments that are now in the pipeline."

Patient profile: Shirley Mims

Shirley Mims was driving home one night from her job as a retail executive when she noticed something wrong with her eyesight. Scared by the starbursts and oil-like floating spots that suddenly appeared in her vision, she immediately went to her local eye doctor, who sent her to a nearby specialist. The local specialist knew she needed to see uveitis expert Dr. Glenn Jaffe at Duke and requested an appointment right away.

Jaffe diagnosed Mims with uveitis, and she began steroid treatments. While her vision stabilized, Dr. Jaffe suggested that she enroll in AbbVie Humira trial, the first clinical trial of Humira as a treatment for uveitis. As a clinical trial recipient, she could receive Humira as substitute for steroids and avoid all of the side effects that are associated with the use of steroids. Mims was nervous about giving herself injections, but she knew this was a potential route to saving her vision. After a period where she was unknowingly part of the study's control group, but Mims began treatment with Humira.

"Boom!" says Mims, who travels with her brother from Fayetteville every three months to check in with Jaffe. "I have responded well to the Humira treatments, and my uveitis is at a 'quiet place' right now. I'm not seeing any floaters, and my vision has remained stable or improved since I began the Humira treatments."

Mims retired from her high-powered career after the uveitis struck, and thinks that the reduced stress might also help reduce the inflammatory flare-ups. She gives credit to Jaffe and the other doctors who realized the seriousness of her symptoms and directed her into treatment right away. "They are lifesavers. Otherwise, I might not have my eyesight today."

Duke Study Makes Progress in Identifying Harbingers for Alzheimer's in the Retina

In the 2015 edition of VISION magazine, we reported that Duke Eye Center investigators were using pioneering imaging equipment and software to examine distinctive changes in the retina that could make it possible to diagnose Alzheimer's disease at an earlier stage than ever before.

Since then, these investigators have made exciting strides forward in their search for promising indicators for Alzheimer's in the eye that could eventually lead to earlier diagnosis and treatment to slow the progression of this insidious disease.

'This could be a game-changer'

Because the retina is part of the central nervous system, changes in the retina parallel the neurodegenerative changes in the brain with Alzheimer's disease (AD). But right now, there are no accurate, relatively inexpensive or noninvasive tools to diagnose AD at its early stages, explains Duke retinal ophthalmology specialist Eleonora (Nora) Lad, MD, PhD, one of three principal investigators on the Duke studies, who holds a PhD in neuroscience with a focus on neurodegenerative diseases. Duke geriatrician and ophthalmology research faculty member Heather E. Whitson, MD, MHS, and Sina Farsiu, PhD, director of Duke's Vision and Image Processing Laboratory, are the other two principal investigators on this important work.

"If we can successfully use imaging of the back of the eye to identify specific changes in the retina, or 'retinal biomarkers,' that occur in patients who develop AD, the door will be open to develop new diagnostic tests and therapies to slow cognitive decline in patients with mild AD," Lad explains. "This could be a real game-changer."

One-year study completed

Duke investigators selected three groups of participants for this initial study: people diagnosed with mild cognitive impairment (MCI), a strong risk factor for AD; those diagnosed with early to moderate AD; and those characterized as neurocognitively normal. The goal was to look for biomarkers in the retina and to see if there were differences between groups at the outset of the study—and if so, whether there were changes to these biomarkers at the one-year mark.

Eleonora Lad, MD, PhD

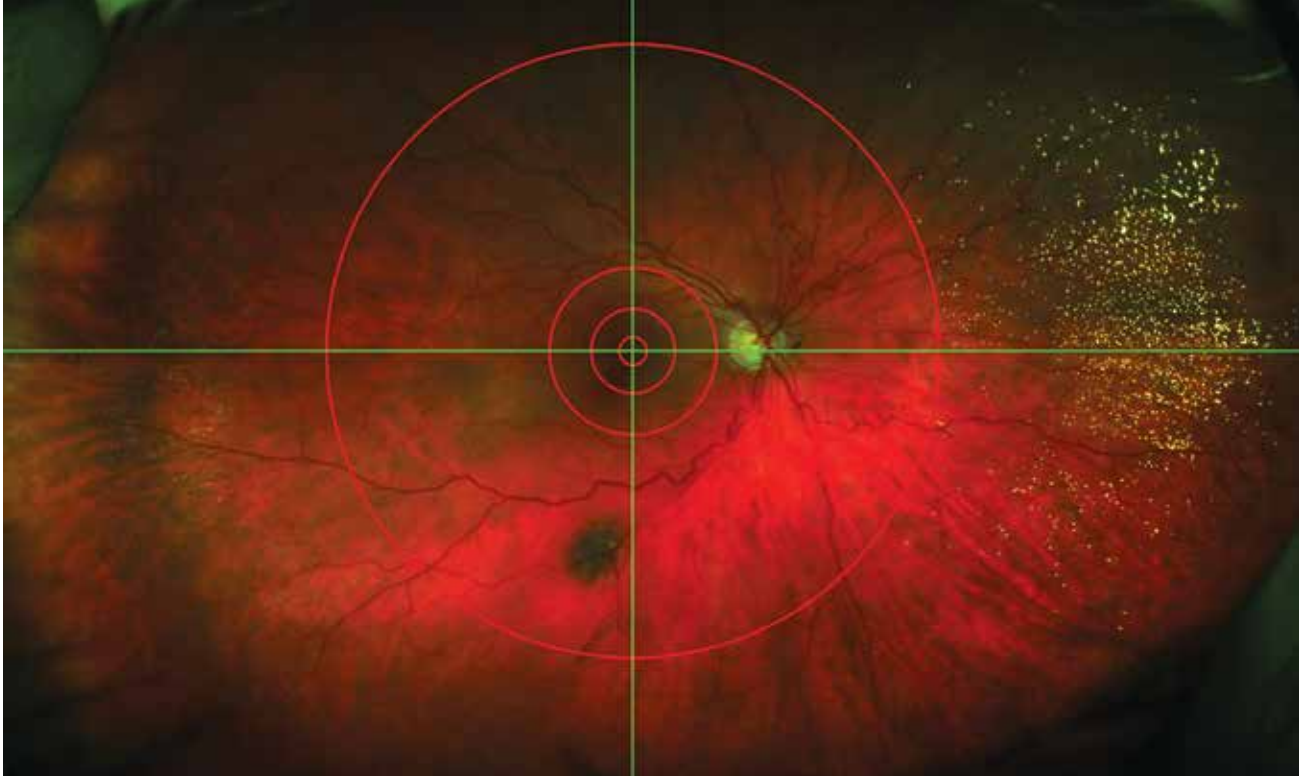
At the initial exam, baseline measurements of several retinal characteristics were taken for each participant. Then, at the one-year mark, investigators took these same measurements again to determine whether any changes were apparent.

The Duke team used highly sophisticated software developed at the Duke Ophthalmology to capture and analyze images of the retina. Optical coherence tomography (OCT) captures precise 3-D images of the back of the eye. The Duke Optical Coherence Tomography Retinal Analysis Program (DOCTRAP), developed in Farsiu's laboratory, is a comprehensive software package for extracting meaningful information from OCT images. Using OCT and DOCTRAP together, investigators can measure the thickness of each individual retinal layer, allowing them to differentiate characteristics of, and changes in, each.

Results promising, and surprising

Duke investigators recently completed their analysis of data from the baseline exams, and found some unexpected results. Based on studies by other researchers, Duke investigators had expected to see thinning of the retina as a potential biomarker for AD, but they did not observe a significant difference between the AD and non-AD groups in the Duke subjects' OCT images.

"Rather than finding retinal thinning across the board, we saw that the retinal layers could become thicker in some places and thinner in others," Farsiu shares. "Our study suggests that that the potential patterns of disease we can see on OCT images are far more complex than was previously reported."



Wide field of view color photo of a retina of a subject in our study showing drusen, small salt-like deposits in the periphery of the retina (as highlighted on the right side of the image in white by our DOCTRAP software). These are being investigated as a potential biomarker of early Alzheimer's disease. The concentric red circles are used to delineate various areas of the retina that are being investigated in the study.

What they did find was a significant difference between groups in "peripheral drusen"—small salt-like deposits in the outer regions of the retina. The presence of similar protein plaques in the brain is a classic sign of Alzheimer's disease.

"We found that subjects who had peripheral drusen in either eye had nearly four times higher odds of having MCI or AD than subjects who did not have these drusen," Lad notes. "We don't know why yet, but this finding presents an exciting line of investigation for us to pursue."

The Duke team is currently analyzing the one-year follow-up measurements to detect whether any significant changes took place over the year. This study was funded by the Alzheimer's Association and the Duke Institute for Brain Science.

Sharing technology and expertise

Duke's DOCTRAP technology has enabled researchers around the world to advance the search for biomarkers for Alzheimer's and MCI, as well as other neurodegenerative diseases like amyotrophic lateral sclerosis (ALS). Duke is also collaborating with several institutions on multicenter trials to pinpoint these biomarkers for MCI, AD, and ALS.

In addition, the Duke Ophthalmology trio is collaborating with colleagues at Duke-NUS University in Singapore to continue their search for noninvasive, inexpensive biomarkers to diagnose AD. Singaporean researchers are looking at blood vessels in the back of the eye as potential biomarkers, complementing Duke's focus on drusen and retinal thinning. The groups are sharing images from study subjects on both sides of the world, providing an opportunity to increase the data pool and compare Asian, Caucasian, and African-American populations. Both teams are using DOCTRAP and OCT to capture and analyze ocular images at a finer scale and level of clarity than ever before.

An answer to patients' concerns

Whitson believes this study could help answer a question she hears often in her clinic. "Patients often see a geriatrician because their memory isn't as sharp as it used to be, and that scares them. They want to know if they have Alzheimer's, and right now, we don't have a good way to tell them yes or no. If we can develop good tools to catch the disease at its early stages, we can begin to develop new treatments as well. That would allow us to answer the patient's question, and if needed, to be able to recommend an effective course of treatment given that answer."

New Macular Research Lab's 'Radically Different' Design Aims to Facilitate High-impact Research

WHEN DR. SCOTT COUSINS, DUKE OPHTHALMOLOGY'S VICE CHAIR OF RESEARCH AND DIRECTOR OF THE DUKE CENTER FOR MACULAR DISEASES, learned that the center's research laboratory would be moving into a new space, he saw an opportunity to eschew traditional lab design conventions in favor of a plan that better supports today's research practices and needs.

Cousins worked closely with Duke architects and his colleagues who will share the space to design the new, state-of-the-art macular research lab. This innovative lab emphasizes common technology zones and comfortable, clustered work spaces to encourage interaction and collaboration among technicians, students, and staff scientists.

"In traditional laboratories, each scientist is isolated at his or her own bench, with ownership of their equipment and space," Cousins explains. "But today's research isn't about ownership and separation; it's about interaction, collaboration, and technology. So we've thoughtfully designed this new space to create an environment that stimulates creative thought, sharing, and collaboration, but is also flexible enough to accommodate evolving technologies and expansion and contraction of individual research programs. This innovative design gives us tremendous bang for our buck."

In addition to the shared lab benches, technology areas, and work spaces, the bright, open lab includes cores that are used collectively by all investigators on the floor, including histology, cell culture, microscopes, and a "freezer farm" filled with various refrigerators.

continued on page 12

Michael Allingham, MD, PhD; Scott Cousins, MD; and Prithu Mettu, MD; Duke Eye Center medical retina clinician-scientists, partner on research and worked closely on the lab space design (bottom right).

New innovative lab space (top, opposite page), Prithu Mettu, MD discusses a project with lab staff (bottom, opposite page).

Work area outside of lab encourages collaboration among the research team (bottom left).

In addition to the shared lab benches, technology areas, and work spaces, the bright, open lab includes cores that are used collectively by all investigators on the floor, including histology, cell culture, microscopes, and a “freezer farm” filled with various refrigerators.

Duke Eye Center researcher working in common technology zone.

The lab, which opened in September 2016, is located in the Albert Eye Research Institute (AERI), in an area formerly used for faculty offices. The conversion from office to wet lab was made possible by the vision of Dr. David Epstein, the late Chair of Duke Ophthalmology, to initially design AERI with the flexibility to convert spaces easily. Dr. Edward Buckley, the current chair, secured an investment from the School of Medicine and provided seed funding to make the new lab design a reality.

As the home of the research arm of the Duke Center for Macular Diseases, this lab is the primary space where Duke investigators are seeking new knowledge about the wet and dry forms of age-related macular degeneration, diabetes and vein occlusion, and degenerative diseases related to the back of the eye. But the new, larger, and more efficiently organized space also provides opportunities to expand research into immunology, which plays a major role in macular degeneration, as well as into studies of immunological diseases in the front of the eye.

"Ultimately, we're here to cure disease," Cousins notes, "and this space is designed to facilitate that by enabling us to quickly adapt and incorporate cutting-edge gadgets and technology and by encouraging people to communicate and interact. It's a radically different approach to laboratory design, and I am confident that over time we'll see it bear fruit."

Duke Ophthalmology Faculty Share Expertise

Around the World

Grace Prakalapakorn, MD, MPH, a pediatric ophthalmologist at Duke Eye Center in Durham, spent the month of May providing eye care for Ebola survivors in Liberia, one of the West Africa countries most severely impacted by the Ebola epidemic. Studies suggest that survivors might be at risk for eye-related complications.

Prakalapakorn volunteered to work on the PREVAIL III study, a partnership between the Liberian Ministry of Health and the U.S. National Institutes of Health to provide eye care while helping to expand understanding of the disease and build clinical and research capacity in Liberia.

In an NIH clinic in Monrovia, Prakalapakorn worked with Liberian ophthalmologists, nurses, and technicians to perform comprehensive eye exams for study participants, who included Ebola survivors and their close contacts who did not get the disease. The team also treated common conditions and referred surgical cases for care by Liberian partners.

"Studying survivors and their close contacts will help us determine whether certain eye diseases are associated with Ebola or are prevalent within the population," she explains.

As the only pediatric specialist on the team, Prakalapakorn was able to share her expertise in working with young patients. Sadly, some survivors of this epidemic are children who lost their parents

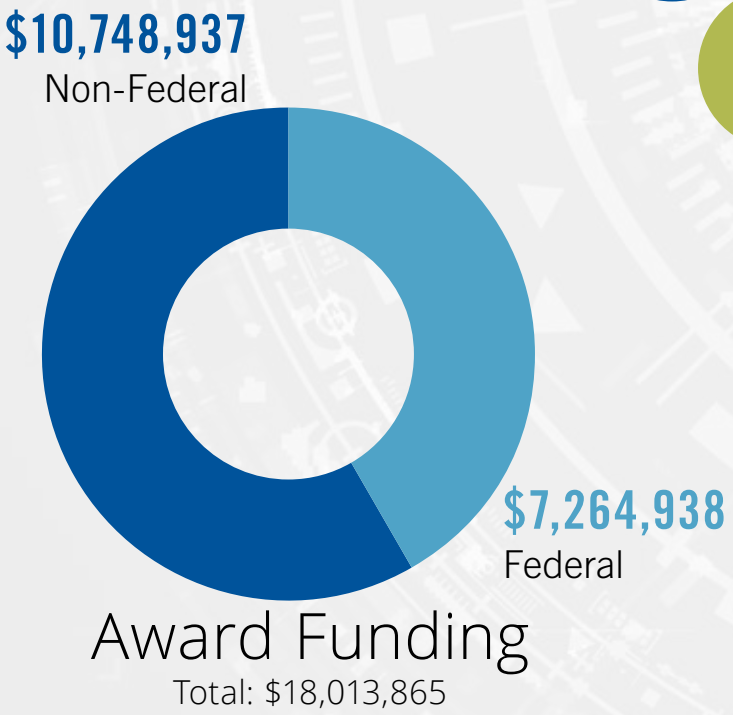
during the outbreak. While the epidemic has passed, as a precaution, clinic staff and visitors must wash their hands in chlorinated water and have their temperatures taken before entering the facility.

PREVAIL III is a five-year study, so Prakalapakorn hopes to return to Liberia. "What made this a great experience was the people I met. I made some great friends who I look forward to seeing again."

Grace Prakalapakorn, MD, MDH (below, center) with PREVAIL III Ebola Natural History Study Eye Sub-study Team members, JFK Hospital, Monrovia, Liberia May 2016.

2016 DUKE

Employees



Award Funding

Total: $18,013,865

EYE CENTER STATS

6

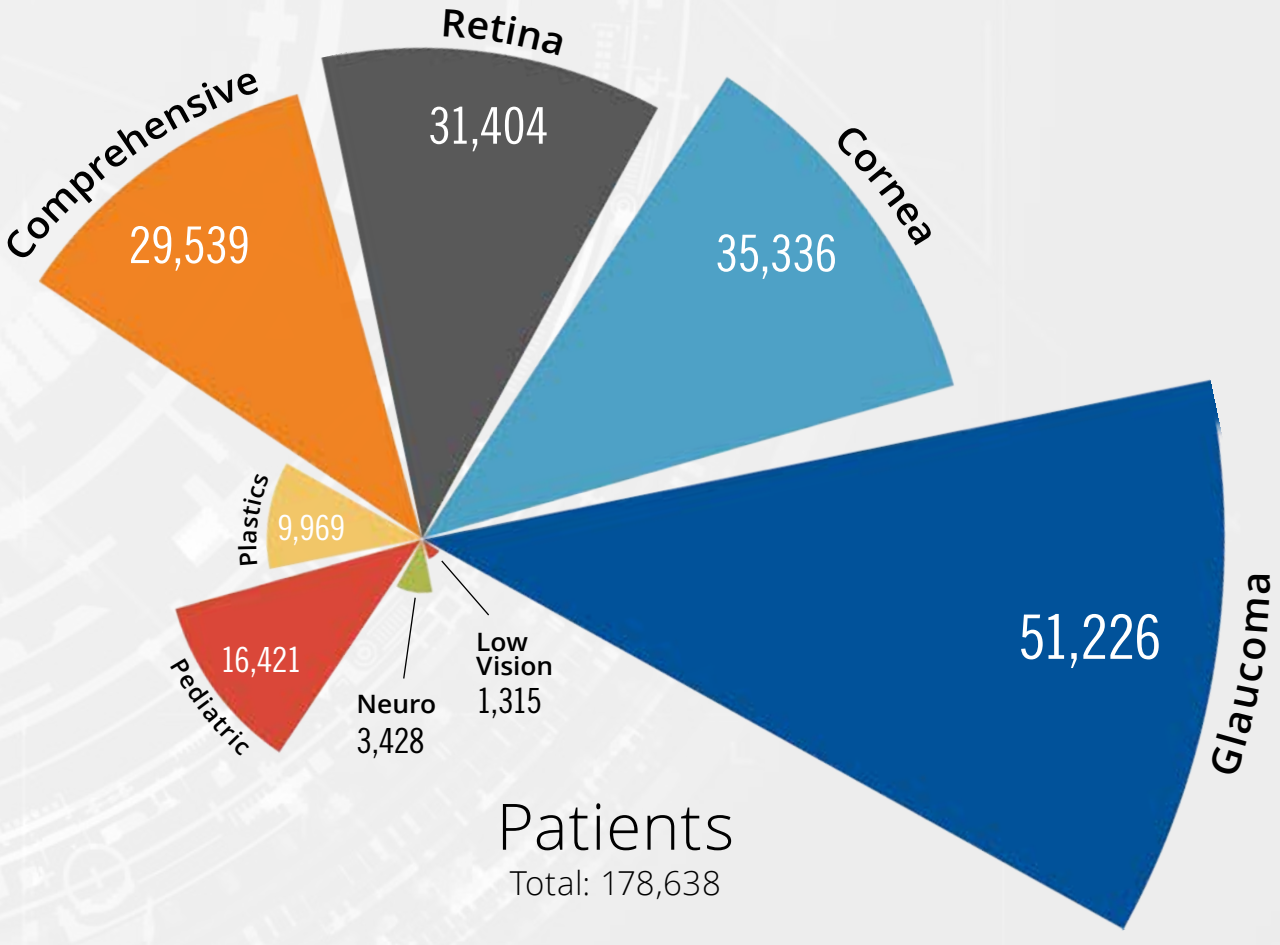
Ranking

US News & World Report
Best Hospitals in Ophthalmology

BEST HOSPITALS U.S.News & WORLD REPORT NATIONAL OPHTHALMOLOGY 2016-17

13,870

Surgeries



Patients

Total: 178,638

Duke Eye Center faculty traveled to Winston-Salem to thank them for their support, tour Miracles In Sight and learn about eye banking. Pictured are Edward Buckley, MD; Daniel Saban, PhD; Gargi Vora, MD; and Anthony Kuo, MD with members of Miracles In Sight leadership team, including Dean Vavra, Jan Keeling, Mike Tramber, Ingrid Schunder, and Isaac Perry.

Miracles In Sight Supports Cornea Research at Duke Eye Center

BY DAVE HART

EVERYONE KNOWS THAT THE HUMAN EYE IS MADE UP OF DISTINCT PARTS AND REGIONS—THE CORNEA, THE RETINA, THE OPTIC NERVE, AND SO ON. It is less commonly understood, says Daniel Saban, PhD, that funding for research and treatment of eye disorders tends to be similarly divided and compartmentalized.

That's why a recent $500,000 gift from Miracles In Sight to Duke Eye Center to support early career faculty research into diseases and disorders of the cornea is so important. The support, Saban says, brings together two rare but critical resources: funding for corneal research and expert scientists with the knowledge and skills to make important advances.

"Unlike other diseases of the eye, such as age-related macular degeneration or glaucoma, very few foundational agencies support funding for ocular surface and corneal diseases," says Saban, assistant professor of ophthalmology and assistant professor in immunology. "And very few institutions in the world have the expertise in corneal and ocular disorders that Duke has. Miracles In Sight is getting funding into the right hands to make a difference for these patient populations."

Miracles In Sight, based in Winston-Salem, North Carolina, is one of the largest eye banks in the world. Its mission is to recover, process, and distribute ocular tissue for

Miracles In Sight, based in Winston-Salem, North Carolina, is one of the largest eye banks in the world. Its mission is to recover, process, and distribute ocular tissue for the restoration of sight through corneal transplantation and related medical therapy and research.

the restoration of sight through corneal transplantation and related medical therapy and research.

The gift to support corneal and ocular research follows close on the heels of another $500,000 donation in 2016 from Miracles In Sight to Duke Eye Center. That one will help establish a biorepository at Duke to expand the availability of eye tissue for research to help defeat potentially blinding eye diseases, including major causes of visual disability such as dry eye, macular degeneration, glaucoma, and diabetic retinopathy.

Taken together, the two recent gifts, totaling $1 million, reflect an important partnership between Duke and Miracles In Sight, which earlier provided funding to support an ophthalmology fellowship.

"At Duke Eye Center, we have a strong commitment to our early- to mid-career faculty and pushing the edge of biomedical research," says Edward Buckley, T'72, MD'77, HS'81, the James Pitzer Gills III, MD, and Joy Gills Professor of Ophthalmology and chair of the Department of Ophthalmology. "Philanthropic support is an increasingly important avenue of support. These gifts from Miracles In Sight are great examples of funding important needs that will

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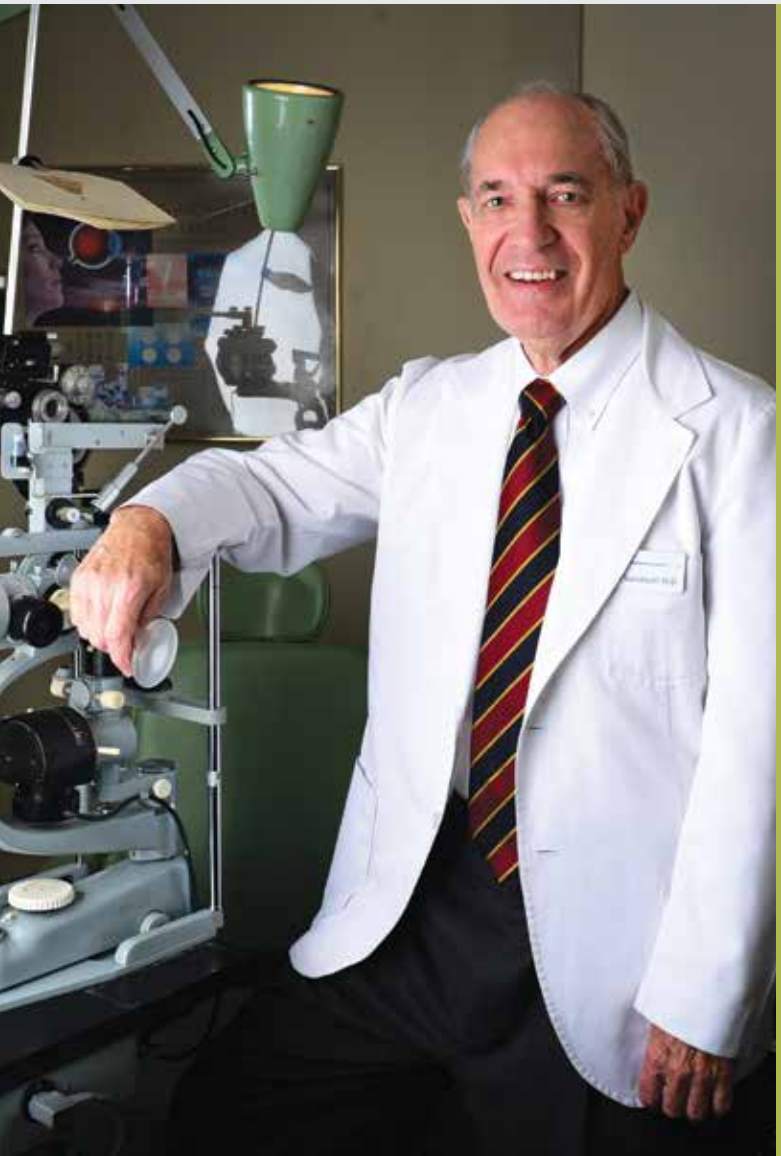
donate-and-give



A Good Deed Remembered

John Karickhoff, MD'64, HS'68, had just $37.50 in his pocket when he arrived at Duke medical school in 1960. He asked the director of student loans for a loan to cover his first year's tuition, but learned no loans could be made until after the first semester. Disheartened, he asked to borrow bus fare to return home to West Virginia.

The director gathered his associates and soon returned with good news: an exception would be made.

Karickhoff worked all four years of medical school, graduated, completed training in ophthalmology at Duke Eye Center, and went on to become an accomplished ophthalmologist.

To say thank you for the opportunity he was given, he and his late wife, Madge, longtime Duke supporters, made a generous bequest commitment to Duke Eye Center.

You can include a gift to the Duke Eye Center in your estate plan. To learn more about a wide array of gift plans, contact Joseph W. Tynan, JD, senior executive director of gift planning, joseph.tynan@duke.edu or 919-385-3114.

germinate ideas and collaborations beyond the scope of the initial gifts."

The gift to advance corneal research will provide much-needed resources that will enable early-career faculty such as Saban, Anthony Kuo, MD, and Gargi Vora, MD, to pursue research that otherwise would probably not be possible.

Saban studies ocular surface diseases, which include allergy, meibomian gland dysfunction, and other inflammatory disorders that affect the surface of the cornea. These diseases can cause debilitating problems ranging from chronic pain and irritation to impaired vision and blindness.

"We've made a lot of progress in understanding these diseases," says Saban. "We've made some novel discoveries about the role of lymphocytes for example, that could change the way doctors treat meibomian gland dysfunction. This funding will allow us to take those studies to the next level and develop the leads that we can translate to improved therapies."

The donation to create a biorepository for eye tissue at Duke will pilot a novel program that will increase procurement of tissue for research, establish an eye donation registry that will allow donors to designate eye tissue for research if it isn't eligible for transplantation, and integrate data collection with Duke's electronic medical records system.

"In addition to our dedication to helping restore sight through transplantation, we are committed to supporting laboratory research that will advance our understanding of blinding diseases, leading to cures," says Dean Vavra, CEO of Miracles In Sight.

Many donors don't realize that even eye tissue too badly damaged by disease to be used in transplantation can be extremely useful in research that will move medical science ever closer to cures for some of the most damaging diseases. Eye tissue for research is in short supply, and the Miracles In Sight donation will help fill a serious need, says Daniel Stamer, PhD, professor of ophthalmology and biomedical engineering at Duke Eye Center.

"Donated human eye tissue for research is critical for understanding the root causes of eye disease," Stamer says. "Damaged tissue from devastating diseases such as glaucoma and macular degeneration provides valuable research material for these uniquely human conditions. While patients may think their eyes are broken, they may be surprised to learn that their eyes are incredibly valuable."

"At Duke Eye Center, we have a strong commitment to our early- to mid-career faculty and pushing the edge of biomedical research, These gifts from Miracles In Sight are great examples of funding important needs that will germinate ideas and collaborations beyond the scope of the initial gifts."

Edward Buckley, T'72, MD'77, HS'81

The James Pitzer Gills III, MD, and Joy Gills Professor of Ophthalmology and chair of the Department of Ophthalmology

Philanthropic support is integral to advancing the work of Duke Eye Center. For information on giving, please contact the Duke Eye Center development staff at 919-385-3100 or eyegiving@duke.edu.

Fibrosis Discovery

Unexpected Finding Could Lead to New Treatments, Prevention of Scarring in Eye

THE CONJUNCTIVA IS THE MUCOSAL LINING OF THE EYELIDS. IN HEALTHY EYES, THE CONJUNCTIVA LUBRICATES AND PROTECTS THE EYE. But when diseases cause scarring ("fibrosis") in this lining, the result can be chronic eye pain, and even blindness. Eye diseases that may cause fibrosis include severe eye allergies, autoimmune diseases like pemphigoid, and trachoma, a form of chronic contagious conjunctivitis.

Until now, not much has been known about how conjunctival fibrosis forms. But a recent, surprising discovery by Duke Ophthalmology researchers may bring us closer to understanding the mechanisms of fibrosis development and designing more effective treatments.

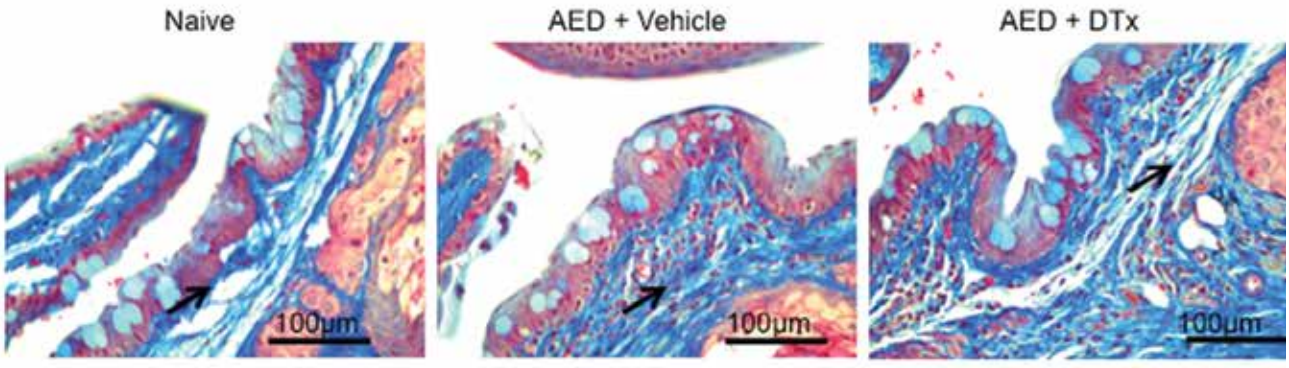
A Duke team led by Daniel Saban, PhD, in collaboration with investigators from the University College London Institute of Ophthalmology, has identified a key immune cell type, called the dendritic cell, that causes fibrosis in the conjunctiva. Dendritic cells, a type of white blood cell, are found in most tissues of the body, including the eye.

"This discovery was completely unexpected, because the main function of dendritic cells is to act as the sentinels of the immune system," Saban explains. "To our surprise, however, we observed dendritic cells directly stimulating cells in the conjunctiva called 'fibroblasts' that normally help in tissue maintenance and repair. In mice, we actually saw that this interaction causes the fibroblasts to induce fibrosis of the conjunctiva."

The research team, and another team they collaborated with, have detailed their respective findings in the *Journal of Clinical Investigation Insight* (http://insight.jci.org/).

Daniel Saban, PhD

"These findings are very exciting, because they open up a new research vista for the development of novel therapeutic targets to potentially combat fibrosis and reduce patients' eye pain or risk of blindness," Saban notes. "Our next step is to determine whether dendritic cells can be targeted to step or reverse scarring processes in the conjunctiva."



Left: Normal Conjunctiva (arrow) with Dendritic Cells; center: Fibrotic Conjunctiva with Dendritic Cells; right: Fibrotic Conjunctiva without Dendritic Cells. Image: Sarah D. Ahadome, Rose Mathew, Nancy J. Reyes, Priyatham S. Mettu, Scott W. Cousins, Virginia L. Calder, and Daniel R. Saban, JCI Insight. 2016;1(12):e87012. doi:10.1172/jci.insight.87012

International Network Advances Pediatric Eye Research and Care

Duke Plays Prominent Role in Network's Direction and Studies

For nearly 20 years, a network of over 200 pediatric ophthalmologists and optometrists throughout the United States and Canada has worked to advance eye care for infants and children through large-scale, collaborative research. The Pediatric Eye Disease Investigator Group (PEDIG), funded by the National Eye Institute, has done many of the most important multicenter clinical research studies in strabismus, amblyopia, and other eye disorders that affect children. Duke Ophthalmology faculty have long played a leadership role in PEDIG, and Duke has been among the top enrolling sites for many of the network's studies.

One of PEDIG's most important current studies is on the treatment of retinopathy of prematurity, a potentially blinding disease that affects a significant number of premature infants. In many cases, laser treatment is effective to prevent retinal detachment and avoid permanent vision loss, but the treatment has some disadvantages. A drug called bevacizumab (Avastin®), injected into the eye, has shown promise, but has the potential to harm developing organs when it moves through the bloodstream. PEDIG investigators are engaged in a uniquely designed study to determine the lowest dose of bevacizumab to effectively treat the retinopathy while minimizing other harmful effects. Duke pediatric ophthalmologist David Wallace, MD, MPH, the current PEDIG network chair, is leading this study, and Duke has been the top recruiting site for patients.

"Parents have been very enthusiastic about this trial, particularly because, compared to laser treatment, the injection takes much less time to do, doesn't require general anesthesia, begins reversing the disease almost immediately, and the babies tend to end up much less nearsighted," Wallace says. "We explain the safety concerns with the medication, but when the parents understand that this study is helping us go to a lower, probably safer dose, most are eager to participate."

PEDIG is also exploring the potential to use video games to treat amblyopia ("lazy eye") in young children, rather than having the child wear a patch over the stronger eye to strengthen the weaker one. (Many parents find it quite a battle to get their child to wear the eyepatch.)

Canadian researchers have designed an iPad video game that the child can play while wearing red/green glasses (like those old 3-D movie glasses, with red film over one eye and green over the other) that causes them to use both eyes to effectively play the game, thus strengthening the weaker eye.

"Kids like playing video games, so if we can design one that that they like enough to play for a while and that shows effectiveness in treating amblyopia, this would be a whole new avenue for treatment, either as an alternative to the eye patch or to augment that traditional treatment," Wallace explains.

This study is a great example of why PEDIG is so valuable, Wallace notes. "Researchers did pilot studies in two sites that showed the video game approach was quite promising. Then the PEDIG network did a larger study with hundreds of children, but we found that it wasn't as good as wearing a patch. The problem seemed to be that kids lost interest in the game quickly and wouldn't play for very long. However, researchers have now designed a new, more exciting game that we think will hold kids' attention longer, and the PEDIG team is preparing to launch a new study using the redesigned game."

One early finding is not at all surprising, says Wallace, who is practicing the new game so he can explain it to his young patients. "The kids are much better at playing the games than any of the doctors or research coordinators!"

Duke Eye Center's entire pediatric ophthalmology faculty is involved as PEDIG investigators; many have held leadership positions within the network. Duke Ophthalmology Chair Edward Buckley, MD served from many years on PEDIG's Data Safety and Monitoring Committee. Laura Enyedi, MD is the principal investigator for Duke's site and has served on PEDIG's executive committee, and Sharon Freedman, MD recently joined PEDIG's executive committee and has been a top recruiting investigator for cataract and retinopathy of prematurity studies.

"Kids like playing video games, so if we can design one that that they like enough to play for a while and that shows effectiveness in treating amblyopia, this would be a whole new avenue for treatment, either as an alternative to the eye patch or to augment that traditional treatment."

David Wallace, MD, MPH
Duke Pediatric Ophthalmologist

David Wallace, MD, MPH with a patient

Duke Offers New Treatment for Keratoconus

A new, minimally invasive outpatient procedure, called corneal collagen crosslinking (CXL) with riboflavin (vitamin B-2), strengthens the cornea by increasing the collagen crosslinks that anchor the cornea and prevent it from bulging.

Duke Eye Center is one of the first centers in the Southeast to offer an innovative new FDA-approved treatment for the sight-threatening disease keratoconus that could prevent the need for corneal transplants.

Terry Kim, MD

Keratoconus is a progressive thinning and weakening of the cornea. This uncommon yet likely underdiagnosed disease causes the cornea to bulge from its normal dome-like shape, producing blurred and distorted vision that can be difficult to correct with eyeglasses and contact lenses. Keratoconus often manifests in the late teens or early twenties and, over time, can result in significant visual loss and may eventually require corneal transplantation.

But a new, minimally invasive outpatient procedure, called corneal collagen crosslinking (CXL) with riboflavin (vitamin B-2), strengthens the cornea by increasing the collagen crosslinks that anchor the cornea and prevent it from bulging.

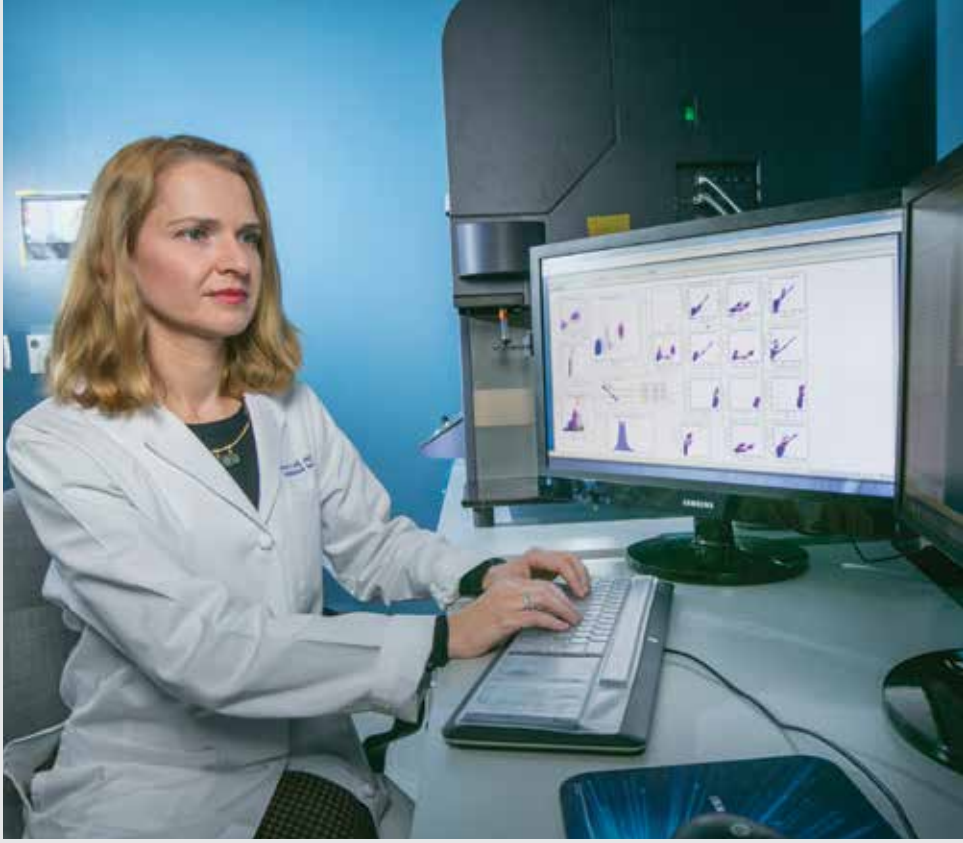
"This one-time treatment can stop progression of the disease and can prevent the need for a corneal transplant down the road," explains Terry Kim, MD, professor and division chief of cornea and external disease at Duke Ophthalmology, who performed the first crosslinking procedure at Duke in January. "This is particularly valuable for younger patients, who could otherwise require several corneal transplants over their lifetimes."

Avedro, Inc., an ophthalmic pharmaceutical and medical device company, developed the system, which includes two riboflavin ophthalmic solution drugs (Photrexa® Viscous and Photrexa®) and the KXL® ultraviolet irradiation system. In April 2016, Avedro's system became the first and only corneal crosslinking therapeutic product approved by the U.S. Food and Drug Administration to treat progressive keratoconus.

Duke Eye Center is one of the first practices in the region to offer corneal collagen crosslinking using the Avedro system. The total treatment time is about one hour. After numbing drops are applied to the eye, the epithelium is gently removed. Then, every few minutes, riboflavin drops are applied and activated using the ultraviolet light. Patients go home the same day; recovery time is three to four weeks. Glasses or contact lenses will likely still be needed following the crosslinking treatment, although a change in the prescription may be required.

Terry Kim, MD performs Duke Eye Center's first corneal collagen crosslinking treatment for keratoconus.

Faculty News and Awards



R. Rand Allingham, MD was inducted into Glaucoma Research Society (GRS) in Seoul, Korea. GRS is a research society limited to 100 top glaucoma researchers globally. Allingham was also awarded Coulter Award to develop a patented device designed to deliver sustained medications for glaucoma (peri-ocular).

Sanjay Asrani, MD was invited to join the Editorial Board of the Journal of Glaucoma, an international peer reviewed journal on this field.

Sina Farsiu, PhD won the 2017 Association for Research in Vision and Ophthalmology (ARVO) Foundation/ Pfizer Ophthalmics Carl Camras Translational Research Award. The award honors excellence in research and fundamental scientific discoveries, concepts and novel technologies.

Sidney Gospe III, MD former resident and current neuro-ophthalmology fellow was selected to receive the 16th Annual Robert Machemer Resident Research Award for 2015–2016. His proposal was titled "Development of a retinal explant model of Leber Hereditary Optic Neuropathy and was presented at Residents' and Fellows' Day in June 2016.

Fekrat

Dilraj Grewal, MD and **Akshay Thomas, MD** will be Associate Editors with **Sharon Fekrat, MD** as Chief Editor of the second edition of SLACK Publishing, Curbside Consultation in Retina: 49 Clinical Questions! We will have 49 contributing retina MD authors from all over the country. **Alessandro Iannaccone, MD** will be authoring one of the 49 chapters.

Eleonora "Nora" G. Lad, MD, PhD received several awards over the last year. She received the Research to Prevent Blindness Ernest and Elizabeth Althouse Special Scholar Award, NIH/NEI K23 Mentored Patient-Oriented Research Career Development Award, Duke-Duke/NUS Pilot Collaborative Award with her Co-PIs Heather Whitson, MD, MHS and Sina Farsiu, PhD) and International Society for Eye Research Travel Fellowship Award, 2016.

Leon Herndon, MD received the 2016 American Academy of Ophthalmology Secretariat Award.

Michael Kelly, FOPS has been elected the twenty-first President of the Ophthalmic Photographers' Society (OPS). The OPS Presidency has been at Harvard for the last two terms. Michael is the first to bring the Presidency to Duke. The OPS is a non-profit organization founded in 1969 with members in thirty countries.

Terry Kim, MD has accepted the position of 2017–2018 Secretary on the American Society of Cataract and Refractive Surgery (ASCRS) Executive Committee as of May 2017.

Anthony Kuo, MD was named a Duke Health Scholar. This award recognizes past achievements and future potential for continued success as a clinician-scientist.

Tamer Mahmoud, MD, PhD won the award of "Coolest surgical video" at the retina subspecialty day at AAO 2016.

Henry Tseng, MD was named Duke Health Fellow. He also received a clinician-scientist research award for his paper "Age-related Autophagy Function in an Optineurin Mouse Model of Normaltension Glaucoma" from American Glaucoma Society.

Glen Jaffe, MD received the Academy of Ophthalmology Life Achievement Honor Award announced at AAO 2016.

Duke Receives RBP Unrestricted Grant

Duke University has been granted an Unrestricted Grant by Research to Prevent Blindness (RPB) to support eye research conducted by the department of ophthalmology in the amount of $115,000. This funding has been awarded based on a thorough review of criteria, including the department's research activities, laboratory environment, and clinical and scientific staff, as evaluated by RPB's renowned Scientific Advisory Panel.

The funds will be deployed at the discretion of the department chair, to provide maximum flexibility in developing and expanding eye research programs, and to provide opportunities for creative planning that go beyond the scope of restricted project grants.

Duke holds one of 38 RPB Unrestricted Grants nationwide.

Since it was founded in 1960, RPB has channeled more than $345 million into eye research. As a result, RPB has been identified with nearly every major breakthrough in vision research in that time. For information on RPB's grants program, listings of RPB institutional and individual grantees, and findings generated by these awards, go to www.rpbusa.org.

DUKE EYE CENTER CONTINUING MEDICAL EDUCATION

CME

Ophthalmology Grand Rounds
2017: March 9, April 6, May 11, June 17 (trainee day)

Advances in Pediatric Retina (APR) Course
March 24–25, 2017

3rd Fellows Advanced Vitreous Surgery Course (fAVS)
April 20, 2017
Register: regonline.com/avs2017

Advanced Vitreous Surgery Course (AVS)
April 21–22, 2017
"What have we achieved in the past 40 years and what to look forward to in the next 40 years. Progress comes from doing the unconventional."
Register: regonline.com/avs2017

Duke Ophthalmology Trainee Day Scientific Session
June 16–17, 2017

Duke Glaucoma Symposium
October 7, 2017

Duke Glaucoma Fellows Course
November 11, 2017 (during AAO)
New Orleans, LA

CE

Community Education Series *(for Optometrists)*
2017: April 3, June 5, August 14, October 9, December 4

Spring Vision Quest *(for Ophthalmic Medical Technicians)*
May 20, 2017

LECTURES

Science Visiting Professor
March 8, 2017
Speaker: Roska Botond, PhD
Professor, Faculty of Medicine, University of Basel, Basel, Switzerland

April 13, 2017
Speaker: Joshua Dunaief, MD, PhD
Adele Niessen Professor of Ophthalmology, Perelman School of Medicine, University of Pennsylvania

Stephen and Frances Foster Lecture
March 21, 2017
Presenter: Rachel R. Caspi, PhD
Chief, Immunoregulation Section, Acting Chief, Lab, Immunol., NEI, NIH
Bethesda, MD

Science of Disease Seminar
May 17, 2017
Catherine Bowes Rickman, PhD and Eleonora Lad, MD, PhD

Distinguished Gordon K. Klintworth Lecture
May 23, 2017
Presenter: Gerard A. Lutty, PhD
Director, Ocular Vasculogenesis and Angiogenesis Laboratory, Johns Hopkins Medical Center

Joseph M. Bryan Lecture
June 8, 2017
Presenter: Claude Burgoyne, MD
Glaucoma Clinician and Surgeon, Senior Scientist and Van Buskirk Chair for Ophthalmic Research, Director, Optic Nerve Head Research Laboratory, Devers Eye Institute, Portland, Oregon, Clinical Professor of Ophthalmology, Oregon Health Sciences University, DEI – Discoveries in Sight Research Laboratories

Online CME at reachmd.com/cme/duke-health/

For more information or to register:
dukeeyecenter.duke.edu/cme

Renee Wynne
Program Director, Continuing Medical Education
919-684-6593
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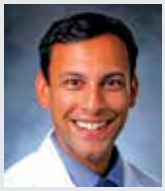
Divakar Gupta, MD



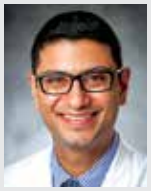
Divakar Gupta, MD is a board certified, fellowship-trained ophthalmologist specializing in the medical and surgical treatment of glaucoma and cataracts. He performs both traditional glaucoma surgery such as trabeculectomy and glaucoma tube shunts, as well as cutting-edge Minimally Invasive Glaucoma Surgery (MIGS). He is trained in the latest surgical techniques of cataract and laser-assisted cataract surgery.

Gupta completed his fellowship in Glaucoma at Duke Eye Center and joined the faculty in August 2016 as Assistant Professor of Ophthalmology. He received his medical degree from Duke University School of Medicine and completed his residency and glaucoma research fellowship at the University of Washington. He is currently pursuing a Master of Management in Clinical Informatics at Duke University.

"I am proud to be a part of Duke Health, a world-renowned academic center, and to have the privilege of working with an unbelievably talented group of doctors, residents, fellows, and ophthalmic technicians at Duke Eye Center," says Gupta. "Our faculty have made significant advances in the field of ophthalmology and have improved the care of countless patients. I am extremely excited to join them in their efforts."

As a new faculty member at Duke Eye Center, Dr. Gupta has made it his primary goal to deliver high-quality clinical care to his patients and to improve their health and quality of life. He also performs clinical research with focus on novel methods for optical imaging to diagnose and manage glaucoma.

Dilraj Grewal, MD



Dilraj Grewal, MD, a Duke Vitreoretinal Surgery trained ophthalmologist joined Duke Eye Center in December, 2016 as Associate Professor of Ophthalmology, following additional Uveitis fellowship training at Moorfields Eye Hospital in London.

He specializes in managing patients with complex Vitreoretinal pathology and Uveitis. Grewal is excited about treating patients with several of the new diagnostic and therapeutic modalities available as well as several others in the pipeline to better help patients with these potentially blinding diseases.

He completed his fellowship in vitreoretinal surgery at Duke in June 2016 followed by a Uveitis Fellowship at Moorfields Eye Hospital, London December 2016. "During my Vitreoretinal Surgical fellowship at Duke, I absolutely loved the environment here. It is a true pleasure to work with some of the brightest people in Ophthalmology at the Duke Eye Center who are so committed to patient care and education," said Grewal. "It was an honor to be invited to stay on the faculty at the Duke Eye Center following completion of my additional training in Uveitis," he continued.

Prior to coming to Duke, Grewal pursued his surgical internship and ophthalmology residency at Northwestern University and completed a post-doctoral fellowship in Advanced Ocular Imaging at the Bascom Palmer Eye Institute. He attended medical school at the Armed Forces Medical College in Pune, India.

Grewal has special interest in clinical research activities in advanced ocular imaging for both Retina and Uveitis. He will also work at the Duke Reading Center, a comprehensive image reading center that specializes in systematic analysis of images captured by many different retinal imaging technologies, including optical coherence tomography, fundus autofluorescence, color fundus photography and fluorescein angiography. In addition, he will participate in national and international clinical trials in retina and uveitis.

Charlene James, OD

Charlene James, OD is an optometrist who delivers comprehensive eye care which includes managing eye conditions such as cataracts, glaucoma, diabetic retinopathy, and macular degeneration. She also provides post-operative care for those undergoing cataract surgery and contact lens evaluations.

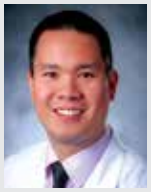
"I am passionate about promoting eye health and educating my patients on the importance of taking care of their eyes and in turn their overall health, said James. "For me, there is no greater feeling than when a patient shares with me how our practice improved the quality of their life," she continued.

James received her undergraduate degree from the University of North Carolina at Chapel Hill. She attended Indiana University Bloomington where she earned her doctorate degree in optometry, and completed her primary care residency through Southern California College of Optometry at the Veterans Affairs Hospital in San Diego, CA.

After completing her residency training, James was the anchor optometrist at an OD/MD ophthalmology practice in Goshen, Indiana for four years. She then decided to return home to North Carolina in 2015, where she practiced at MyEyeDr Brier Creek before joining Duke Eye Center in October 2016.

In her new role, Dr. James will be taking care of a variety of patients in the comprehensive clinic as well as post-operative patients in the surgical comprehensive clinic. She is excited for the opportunity to work with leaders in the field of ophthalmology and to help patients who have complex eye disease obtain better vision and a new outlook on life.

Nathan Cheung, OD



Nathan Cheung, OD joined Duke Eye Center as medical instructor in September 2016. Cheung specializes in pediatric optometry and infant aphakia contact lens fittings.

He recently completed residency training at the Cincinnati Children's Hospital which is affiliated with the Ohio State University. Cheung obtained his undergraduate degree from Queen's University with a Bachelor of Science and earned, with honors, his Doctor of Optometry at the University Of California Berkeley School Of Optometry.

"The pediatric population is often the hardest group of patients to treat and examine because they don't often communicate their needs and problems. I love and enjoy working with children and look forward to every patient encounter and every challenging case," says Cheung.

As a new faculty member at Duke, he hopes to investigate further into various methods of myopia control and its validity. He is also very interested in establishing a pediatric optometry residency at Duke to train future optometry residents and equip them with the skills needed to work in a medical center.

Cheung said he came to Duke for the opportunity to reach his maximum potential and to work with the best and brightest minds in the field.

New Director Joins Duke Center for Ophthalmic Oncology

Miguel Materin, MD, an ophthalmic oncologist with over 20 years of experience recently joined Duke Eye Center faculty as Professor of Ophthalmology and the new Director of the Duke Center for Ophthalmic Oncology, one of the only specialty clinical and research programs of its kind in the region. He joins Duke from Yale University School of Medicine where he ran a similar program for seven years and was an Associate Professor of Ophthalmology & Visual Science (2009–2016). Prior to his appointment at Yale, he was at Wills Eye Hospital at Thomas Jefferson University in Philadelphia, where he has served as Director of Diagnostic Studies for the Ocular Oncology Service for 7 years (2002–2008). Dr. Materin completed his ocular oncology fellowship at Wills Eye Hospital (1999–2000).

His clinical focus involves state-of-the-art diagnosis and treatment of patients with ocular tumors, including benign and malignant tumors of the eye. Dr. Materin has special interests in ocular melanoma, retinoblastoma, choroidal hemangiomas (circumscribed and diffuse), retinal hemangioblastomas, ocular metastases, astrocytic tumors and tumors related to other conditions or syndromes, like von Hippel Lindau disease, Tuberous Sclerosis among others.

He is an internationally recognized ocular oncologist, who has published extensively in the peer-reviewed literature. He has been invited as a visiting professor in US, Canada, Israel, Spain, Brazil, Puerto Rico, Argentina, and has lectured around the world on ocular tumors and their treatment.

The Center for Ophthalmic Oncology, draws upon the expertise of a wide range of specialists in ophthalmology and oncology at Duke. The Duke Cancer Institute and Duke Eye Center are among the premier clinical and research programs in the world. The center's full-time team includes specialists in retina, cornea, pediatric ophthalmology, oculoplastics, medical oncology, radiation oncology and pediatric oncology.

"Although eye tumors are relatively rare, a dedicated center like Duke will see hundreds of patients a month with these conditions," Materin notes. "We are able to treat all types of eye tumors: inside and around the eye, benign and malignant, those that originate in the eye and those that metastasize from other parts of the body. Our priorities are life, eye, and vision—in that order. Our goal is to retain all of these, as often as we can."

The Center for Ophthalmic Oncology also conducts clinical research and collaborates with researchers at Duke and other institutions around the country on investigations to uncover the genetic basis and identify potential new therapeutic treatments for cancers in the eye.

Duke Launches Center for Retinal Degenerations and Ophthalmic Genetic Diseases

Alessandro Iannaccone, MD, MS, FARVO joined the Duke Eye Center faculty in September 2016 as Professor of Ophthalmology and started the Center for Retinal Degenerations and Ophthalmic Genetic Diseases. The new center at Duke aims to improve diagnosis and treatment of retinal degenerative diseases that are both genetic and nongenetic in nature. Iannaccone led a similar program at the University of Tennessee's Hamilton Eye Institute for 19 years. The Center for Retinal Degenerations and Ophthalmic Genetic Diseases at Duke is the only center between Baltimore and Miami and one of less than 20 such centers in the country.

He specializes in progressive hereditary diseases like retinitis pigmentosa (RP), Stargardt disease, and choroideremia, conditions that also affect other parts of the body, such as Usher syndrome, genetic minimally progressive conditions such as achromatopsia and blue cone monochromacy, and nongenetic conditions such as autoimmune retinopathy (AIR) that may appear suddenly. In addition to his clinical expertise, Iannaccone also brings over 20 years of experience with visual function testing via electrophysiological and psychophysical methods, and retinal imaging.

The center brings together the expertise of Duke medical and surgical retina specialists, genetics counselors and researchers, and imaging experts. The clinic will also include a state-of-the-art Visual Function Diagnostic Lab.

"In addition to a battery of visual function tests, diagnosing these complex diseases often requires stepping back and looking at the whole patient to put together the entire puzzle, from hearing loss or kidney problems to obesity or cancer," Iannaccone explains. "Once we've made the diagnosis, we can direct patients to further laboratory testing, which can range from identifying the gene causing the hereditary diseases to discovering the autoantibodies causing AIR, begin treatment when possible, or enroll them in a drug- or gene therapy-based clinical trial if appropriate."

Iannaccone is also working with biomedical development companies to develop high-potential new drugs and devices. And, because retinal degenerative diseases have some similarities to other eye diseases like age-related macular degeneration (AMD), he is working closely with Duke AMD clinician-scientists on several translational science studies.

"We always thought of conditions like AMD, RP, and AIR as distinct entities, but there is a component of inflammation and autoimmunity in all of them," Iannaccone says. "We're making some exciting discoveries, including some potential new treatment targets, that could help patients with all these diseases conserve vision."

2016–2017 RESIDENTS

Third-Year Residents

Michelle Kim, MD
Andrew Lee, MD
Landon Meekins, MD
Sally Ong, MD
Duncan Berry, MD
Nambi Nallasamy, MD

Second-Year Residents

Tanya Glaser, MD
Morgan Godin, MD
Katy Liu, MD, PhD
Atalie Thompson, MD, PhD
Ryan Constantine, MD
Amy Tong, MD

First-Year Residents

Henry Feng, MD
Sanja Galeb, MD
Jennifer Lira, MD
Samuel Passi, MD
Adam Rothman, MD
Daniel Vu, MD

2016–2017 FELLOWS

Sonya Blizzard, MD
Pediatrics
Xi Chen, MD, PhD
Vitreoretinal
Lisa Cowan, MD
Glaucoma
Katayoon Ebrahimi, MD
Medical Retina
Avni Patel Finn, MD
Vitreoretinal
Sidney M. Gospe, MD
Neuro
Majda Hadziahmetovic, MD
Medical Retina
Abagail Huang, MD
Glaucoma
Narae Ko, MD
Cornea
Nicole Langelier, MD
Oculofacial and Orbital Surgery
Diane Leitner, MD
Medical Retina
Maria Lim, MD
Pediatrics
Wonchon Lin, MD
Cornea
Yasmin P. Mali, MD
Pediatrics
Ashiyana Nariani, MD
Cornea
Sonali D. Talsania, MD
Pediatrics
Akshay Thomas, MD
Vitreoretinal
Sarah Van Tassel, MD
Glaucoma
Brad Wainwright, MD
Glaucoma
Scott Walter, MD
Vitreoretinal
Christopher Weller, MD
Plastics
Wendy Zhang, MD,
Chief Resident

Duke Eye Center Administration, Faculty and Staff

FACULTY LEADERSHIP

Edward G. Buckley, MD	Chair, Department of Ophthalmology Vice Dean of Medical Education, Duke University School of Medicine Vice Chancellor Duke-NUS Affairs
Scott W. Cousins, MD	Vice Chair of Research Director, Translational Research Program Director, Center for Macular Diseases Director, Ophthalmic Imaging Medical Director, Duke Eye Center Durham
Eric A. Postel, MD	Vice Chair, Clinical Affairs and Chief, Ambulatory Eye Surgery
David K. Wallace, MD, MPH	Vice Chair, Clinical Strategic Planning, Director, Clinical Research Unit
Vadim Arshavsky, PhD	Scientific Director of Research
Sanjay Asrani, MD	Medical Director, Duke Eye Center of Cary
Pratap Challa, MD	Director, Residency Program
Sharon Fekrat, MD, FACS	Associate Chief of Staff for Surgery Durham VA Medical Center
Christopher Boehlke, MD	Medical Director, Duke Eye Center, Raleigh
Preeya Gupta, MD	Medical Director, Duke Eye Center at Page Road
Glenn J. Jaffe, MD	Director, Duke Reading Center
Kelly Muir, MD, MHSc	Director, Fellowship Program Chief, Division of Ophthalmology, Durham VA Medical Center
Diane B. Whitaker, OD	Director, Optometry Education
Catherine Bowes Rickman, PhD	Director, Third-Year Medical Student Program
Jullia A. Rosdahl, MD, PhD	Director, Patient Education
Tina Singh, MD	Director, Second- and Fourth-Year Medical Student Program
Cynthia A. Toth, MD	Chair, Department APT Committee
Robin R. Vann, MD	Medical Director, Perioperative Services
Julie A. Woodward, MD	Director, Public Education Program Faculty Liaison Director, Ophthalmic Technician Program

ADMINISTRATION

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Elizabeth Hunter, MHA, CFM	Director of Finance
Heidi Campbell, COT	Health Center Administrator, Satellites
Marjorie Veihl, COT	Health Center Administrator, Main Campus
Lauren Walls, MHA	Health Center Administrator, Main Campus, North Duke Street
Martha Wilson, MHA	Health Center Administrator, Winston-Salem
Tori Hall	Director, Marketing and Communications
Robert Hayford, MBA	Administrative Manager
Jillian Ream	Director, Development
Michael Flintosh, MBA	HR Manager
Renee Wynne	Program Director, Continuing Medical Education Program Director, Special Events

COMPREHENSIVE OPHTHALMOLOGY

Anna Bordelon, MD	Assistant Professor of Ophthalmology
Thomas Devetski, MD	Assistant Professor of Ophthalmology
Anupama Horne, MD	Assistant Professor of Ophthalmology
Thomas Hunter, MD	Assistant Professor of Ophthalmology
Nicola Kim, MD	Associate Professor of Ophthalmology
Charlene James, OD	Medical Instructor
John T. Petrowski III, OD, FAAO	Assistant Professor of Ophthalmology
Laurie K. Pollock, MD	Assistant Professor of Ophthalmology
Dianna Seldomridge, MD	Assistant Professor of Ophthalmology
Tina Singh, MD	Assistant Professor of Ophthalmology
Robin R. Vann, MD	Assistant Professor of Ophthalmology Division Chief

CORNEA AND REFRACTIVE SURGERY

Christopher S. Boehlke, MD	Assistant Professor of Ophthalmology
Alan N. Carlson, MD	Professor of Ophthalmology
Melissa Daluvoy, MD	Assistant Professor of Ophthalmology
Preeya Gupta, MD	Assistant Professor of Ophthalmology
Terry Kim, MD	Professor of Ophthalmology Division Chief
Anthony Kuo, MD	Assistant Professor of Ophthalmology
William Rafferty, OD	Assistant Professor of Ophthalmology
Terry Semchyshyn, MD	Assistant Professor of Ophthalmology
Gargi Vora, MD	Assistant Professor of Ophthalmology

GLAUCOMA

R. Rand Allingham, MD	Richard and Kit Barkhouser Professor of Ophthalmology
Sanjay Asrani, MD	Professor of Ophthalmology
Pratap Challa, MD	Associate Professor of Ophthalmology
Divakar Gupta, MD	Assistant Professor of Ophthalmology
Leon W. Herndon, MD	Professor of Ophthalmology Division Chief

Jill B. Koury, MD	Assistant Professor of Ophthalmology
Stuart J. McKinnon, MD, PhD	Associate Professor of Ophthalmology Associate Professor in Neurobiology ++
Frank J. Moya, MD	Assistant Professor of Ophthalmology
Kelly W. Muir, MD	Associate Professor of Ophthalmology
Jullia A. Rosdahl, MD, PhD	Assistant Professor of Ophthalmology
Henry Tseng, MD, PhD	Assistant Professor of Ophthalmology
Molly M. Walsh, MD, MPH	Assistant Professor of Ophthalmology
Carol Ziel, MD	Assistant Professor of Ophthalmology

LOW VISION REHABILITATION SERVICE

Diane B. Whitaker, OD	Assistant Professor of Ophthalmology Division Chief

NEURO-OPHTHALMOLOGY

M. Tariq Bhatti, MD	Professor of Ophthalmology and Professor in Medicine Division Chief
Edward G. Buckley, MD	James P. and Heather Gills Professor of Ophthalmology Chair, Department of Ophthalmology
Mays El-Dairi, MD	Assistant Professor of Ophthalmology

OCULOFACIAL SURGERY

Parag D. Gandhi, MD	Assistant Professor of Ophthalmology
Ilya Leyngold, MD	Assistant Professor of Ophthalmology
Jason Liss, MD	Assistant Professor of Ophthalmology
Julie A. Woodward, MD	Associate Professor of Ophthalmology Associate Professor in Dermatology ++ Division Chief

PEDIATRIC OPHTHALMOLOGY AND STRABISMUS

Edward G. Buckley, MD	James P. and Heather Gills Professor of Ophthalmology Professor of Pediatrics Chair, Department of Ophthalmology
Mays El-Dairi, MD	Assistant Professor of Ophthalmology
Laura B. Enyedi, MD	Associate Professor of Ophthalmology Associate Professor in Pediatrics ++
Sharon F. Freedman, MD	Professor of Ophthalmology Professor in Pediatrics ++ Division Chief
Nathan Cheung, OD	Medical Instructor
S. Grace Prakalapakorn, MD, MPH	Assistant Professor of Ophthalmology
Yos Priestley, OD, FAAO	Assistant Professor of Ophthalmology
David K. Wallace, MD, MPH	Professor of Ophthalmology Professor in Pediatrics ++

VITREORETINAL DISEASES AND SURGERY

Michael Allingham, MD, PhD	Assistant Professor of Ophthalmology
Scott W. Cousins, MD	Robert Machemer, MD, Professor of Ophthalmology Professor in Immunology ++
Sharon Fekrat, MD, FACS	Associate Professor of Ophthalmology
Dilraj Grewal, MD	Associate Professor of Ophthalmology
Alessandro Iannaccone, MD	Professor of Ophthalmology
Glenn J. Jaffe, MD	Robert Machemer, MD, Professor of Ophthalmology Division Chief
Eleonora Lad, MD, PhD	Assistant Professor of Ophthalmology
Tamer Mahmoud, MD, PhD	Associate Professor of Ophthalmology
Miguel Materin, MD	Professor of Ophthalmology
Priyatham Mettu, MD	Assistant Professor of Ophthalmology
Eric A. Postel, MD	Professor of Ophthalmology
Stefanie G. Schuman, MD	Assistant Professor of Ophthalmology
Cynthia A. Toth, MD	Joseph A.C. Wadsworth Professor of Ophthalmology Professor in Biomedical Engineering ++
Lejla Vajzovic, MD	Assistant Professor of Ophthalmology

RESEARCH OPHTHALMOLOGY

Vadim Arshavsky, PhD	Helena Rubinstein Foundation Professor of Ophthalmology Professor in Pharmacology & Cancer Biology ++ Scientific Director
Sina Farsiu, PhD	Associate Professor of Biomedical Engineering Assistant Professor in Ophthalmology++
Paulo Ferreira, PhD	Associate Professor of Ophthalmology Associate Professor in Pathology ++
Pedro Gonzalez, PhD	Associate Professor of Ophthalmology Associate Professor in Pathology ++
Jeremy Kay, PhD	Assistant Professor of Neurobiology Assistant Professor in Ophthalmology
Paloma Liton, PhD	Associate Professor of Ophthalmology Assistant to Associate Professor in Pathology
Goldis Malek, PhD	Associate Professor of Ophthalmology Assistant to Associate Professor in Pathology
P. Vasantha Rao, PhD	Professor in Ophthalmology Professor in Pharmacology & Cancer Biology ++
Catherine Bowes Rickman, PhD	Associate Professor of Ophthalmology Associate Professor in Cell Biology ++
Daniel Saban, PhD	Assistant Professor of Ophthalmology
Nikolai Skiba, PhD	Associate Professor in Ophthalmology
W. Dan Stamer, PhD	Joseph A.C. Wadsworth Research Professor of Ophthalmology
Sandra Stinnett, DrPH	Associate Professor of Biostatistics Associate Professor in Ophthalmology

Secondary appointment ++

Duke Eye Center

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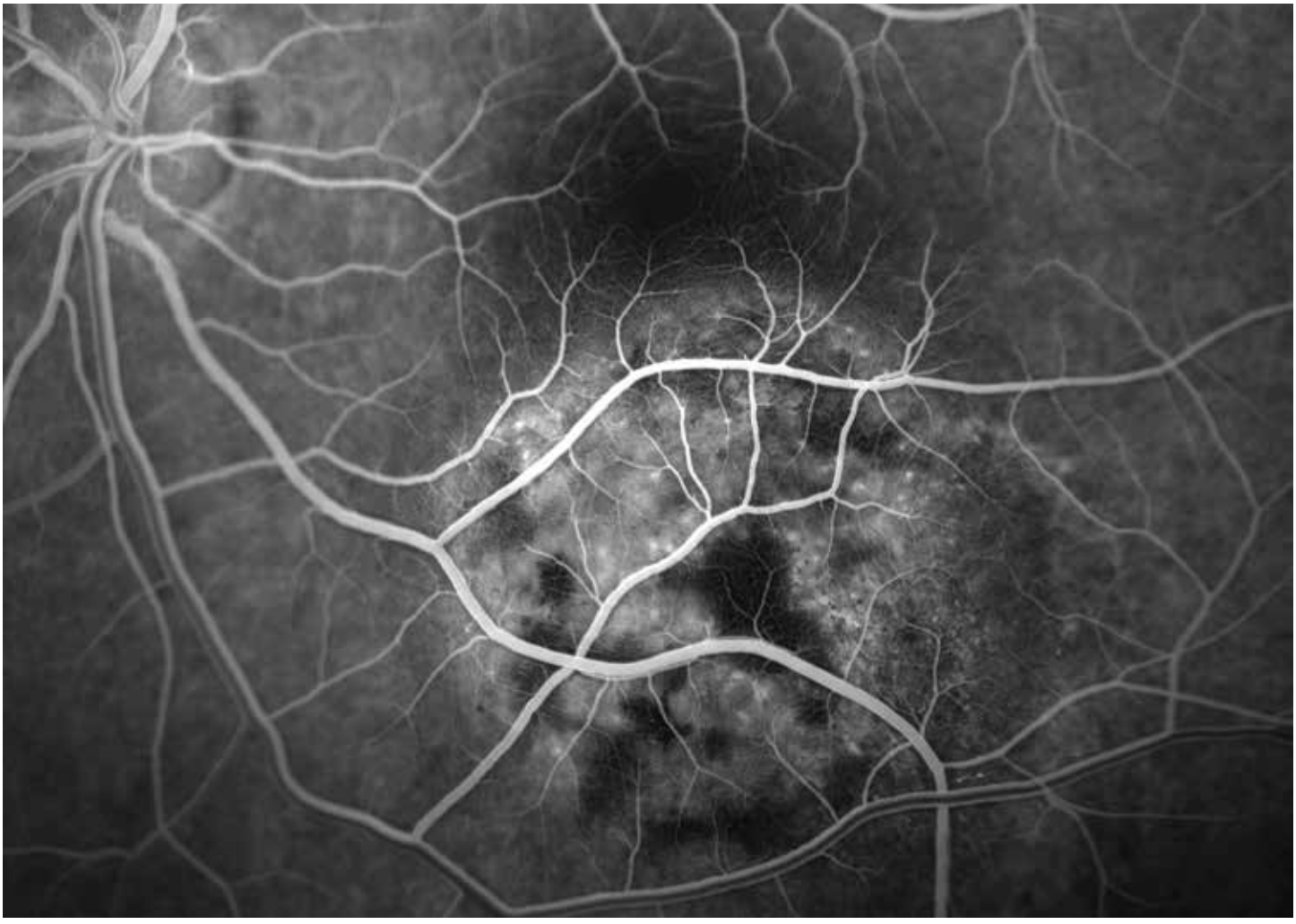

Fluorescein angiogram image of a choroidal melanoma. Image by Michael P. Kelly, FOPS.