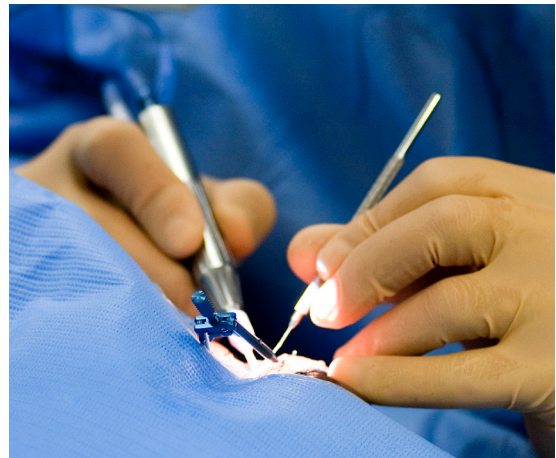
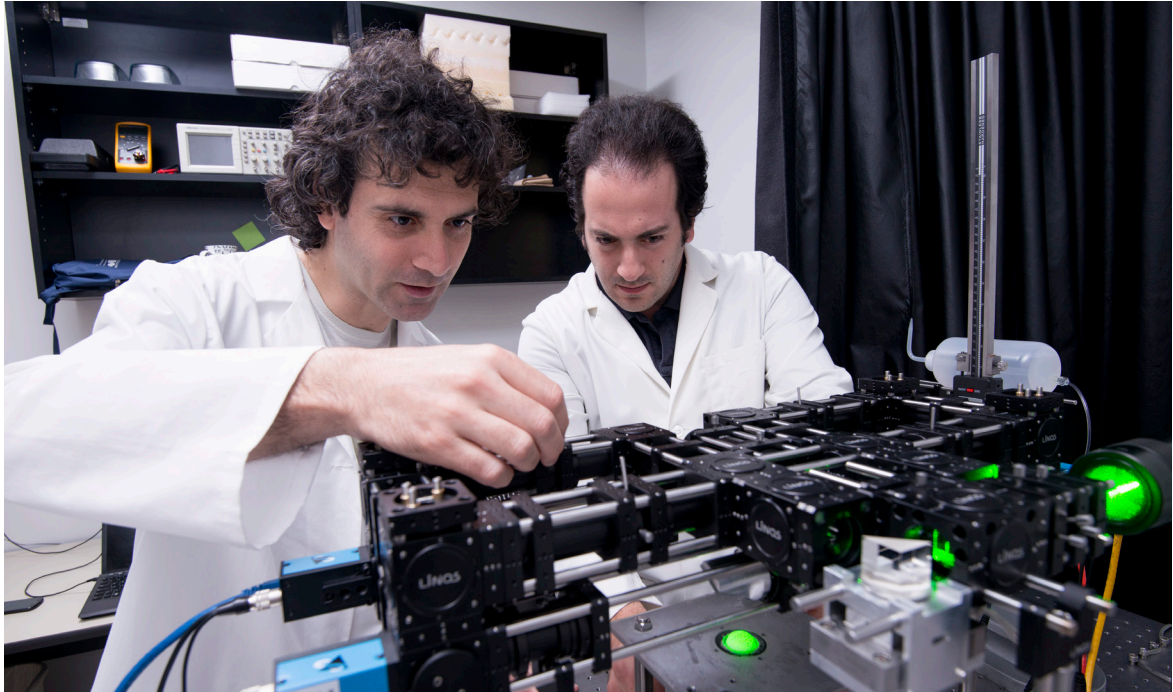
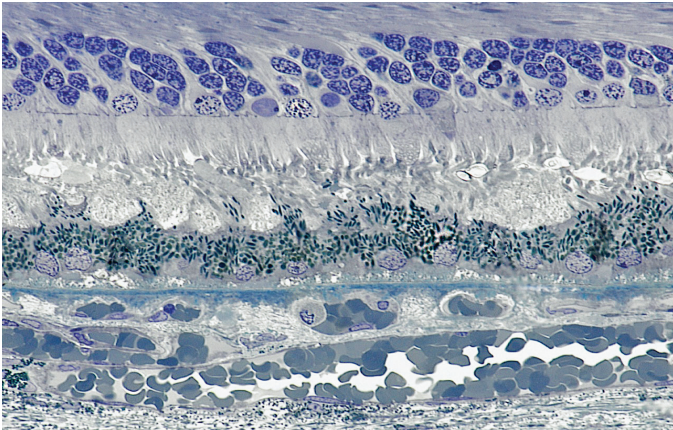


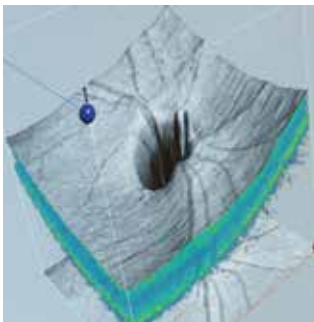
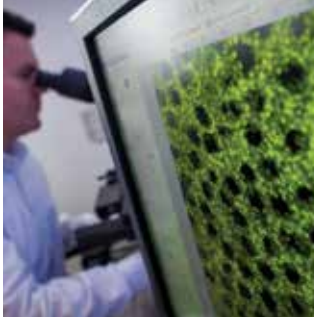
# PERSPECTIVE 2013



**UAB** SCHOOL OF  
MEDICINE  
Department of Ophthalmology

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The UAB Department of Ophthalmology is committed to preserving sight through the development of an innovative translational research program that integrates and informs cutting edge patient care and comprehensive education.

# Dear Friends and Colleagues,

I am honored to serve as the chair of this dynamic department that is committed to high-quality patient care, innovative research, and comprehensive education.

We are undergoing an exciting period of progress that will enhance our strengths in those three core areas with the recruitment of 12 new faculty over the past year and a half. During our growth, we are focused on retaining and recruiting top faculty members, developing new models of care delivery, and expanding our research programs. These endeavors all support our vision — to become a renowned leader in the treatment and cure of blinding diseases.

The department's rapid progress is fueled by support from our generous philanthropic partners, such as the EyeSight Foundation of Alabama. This support is critical to our goal of advancing vision health and research in Alabama. The start of The Campaign for UAB: Give Something, Change Everything, provides unique opportunities for matched giving, which amplify the impact of individual donations and allow the department to continue to excel in research, education, and patient care.

Through the UAB Callahan Eye Hospital Clinic, located within one of the busiest eye hospitals in the country, our physicians provide exceptional primary and consultative care to patients referred from throughout the region. Our faculty members represent every subspecialty of ophthalmology, providing comprehensive care for our patients. Recently, we've increased our number of clinic locations and hired new physicians for enhanced patient convenience.

In addition to our physician faculty members, the department includes a team of highly productive clinical

and basic research scientists. We strive to translate new research into clinical practice. To do so, we promote a collaborative relationship between our physician, physician-scientist, and research faculty.

I have come to appreciate the highly collaborative spirit of the biomedical research community at UAB. This culture supports the development of multidisciplinary teams within and between departments and schools, and greatly enhances opportunities for current and incoming research faculty. We believe a collaborative approach will allow our research teams to have a greater impact than simply the sum of their parts. Read more about our basic and clinical research teams on pages 22 and 24, respectively.

One example of a multidisciplinary research group is the team of ocular biomechanical engineers we recruited to develop the Program for Ocular Biomechanics and Bio-transport. This group has brought UAB to the forefront of this exciting, under-explored field, which we believe has potential for significant breakthrough in the treatment of glaucoma, age-related macular degeneration, myopia, and other eye disorders. Read more about our new program on page 6.

As part of the UAB School of Medicine, education is woven through everything we do. We provide robust training for the next generation of ophthalmologists in our residency and fellowship programs, which are the only ones of their kind in the state. Read more about recent enhancements to our residency program on page 20.

As the population ages, eye health needs will continue to increase and become more important in sustaining



overall health. This underscores the necessity of our current progress, through which we have established a foundation to achieve our vision. Ultimately, our success will move us closer to eliminating the suffering caused by blinding disease, improve access to care, and train the next generation of physicians and scientists.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Girkin". The signature is fluid and cursive, written on a white background.

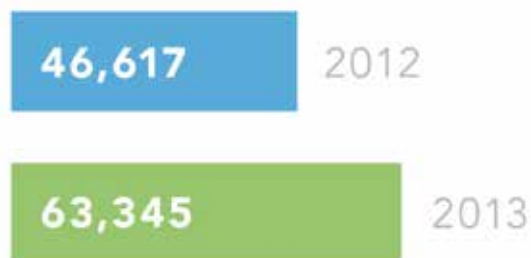
Christopher A. Girkin, M.D., M.S.P.H., F.A.C.S.  
EyeSight Foundation of Alabama Chair  
Professor and Chair, Department of Ophthalmology  
Chief Medical Officer, UAB Callahan Eye Hospital  
University of Alabama at Birmingham

# PERSPECTIVE 2013

This year marks the beginning of a period of growth in the UAB Department of Ophthalmology. Under the leadership of Christopher Girkin, M.D., the department added new faculty members, focused its clinical and basic science research efforts, and opened additional patient clinics.



Patient volume increased from fiscal year 2012 to fiscal year 2013 **35%**

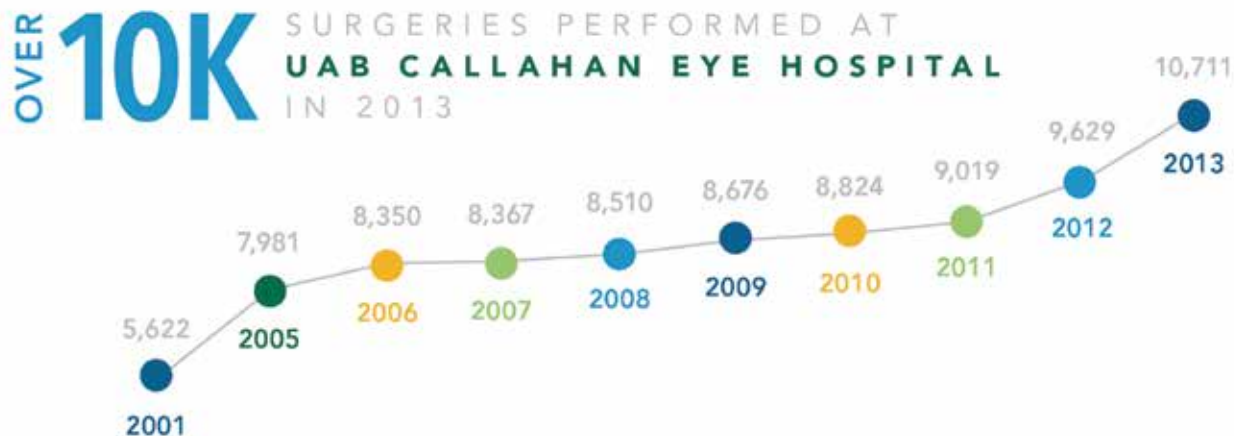


**4 new** clinic locations

**\$8.5 million**

in direct costs of active vision science research grants at UAB

**101** PUBLICATIONS IN NATIONAL JOURNALS BY VISION SCIENCE FACULTY IN 2013



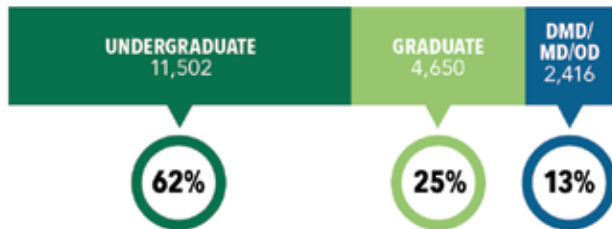
# UAB BY THE NUMBERS

Known for its innovative and interdisciplinary approach to education, the University of Alabama at Birmingham is the state of Alabama's largest employer and an internationally renowned research university and academic health center; its professional schools and specialty patient-care programs consistently rank among the nation's top 50.

**\$5 BILLION**  
in economic impact

### CLASS ACT

Total enrollment at UAB for the Fall 2013 semester: 18,568



**80%**  
**OF ALABAMA DOCTORS**  
trained at UAB

**No. 21**  
nationally for NIH funding

**21,500**  
employees

## A CLOSER LOOK AT UAB CALLAHAN EYE HOSPITAL

**VISION FOR LIFE**  
PATIENTS FROM

**20** TO **109**  
DAYS YEARS OF AGE

TRAINED CLINICAL STAFF FOR PEDIATRIC THROUGH GERIATRIC



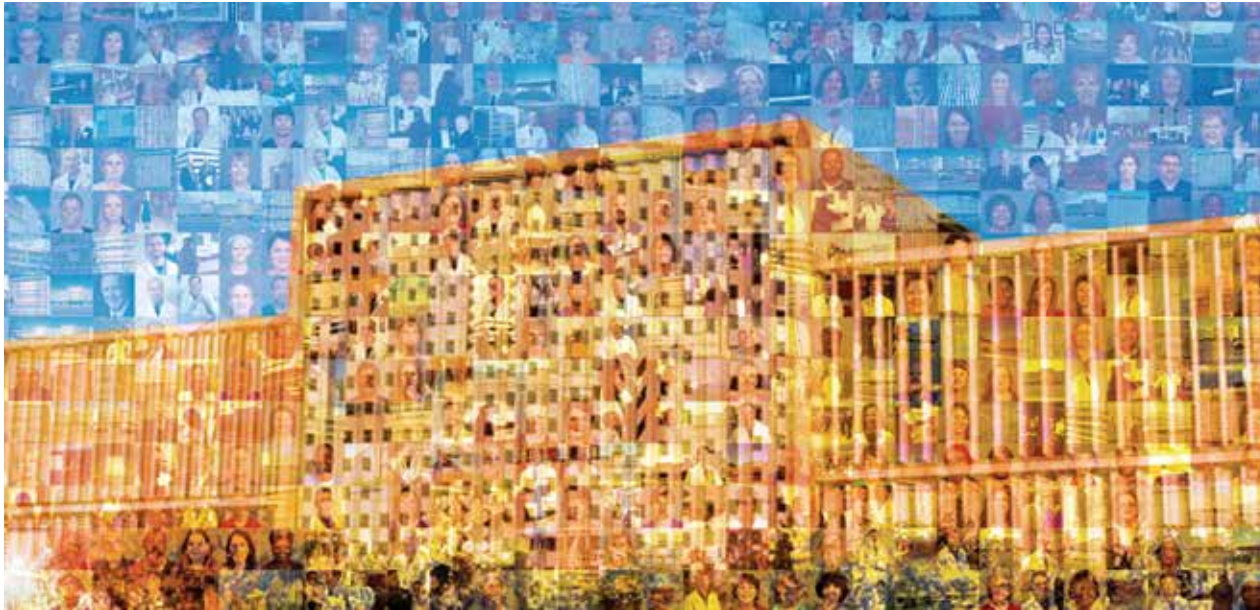
**ALABAMA'S ONLY**  
**EYE HOSPITAL**

**TRAINING**  
**TOMORROW'S**  
**SURGEONS**

Since 1971, our residency program has trained more than 200 ophthalmologists.

# UAB Callahan Eye Hospital Celebrates 50 Years

*Since 1963, the nation has looked to us for innovation and breakthroughs in sight restoration*



The UAB Callahan Eye Hospital owes its beginning to a 5-year-old girl. The hospital, which celebrated its 50th anniversary in November, was the vision of ophthalmologist Alston Callahan, who established a clinical practice in Birmingham after World War II. In the early 1950s, Callahan treated young Barbara Ingalls' crossed eyes with glasses and eye-strengthening exercises.

Her grandfather Robert Ingalls was a wealthy industrialist and founder of Ingalls Ironworks and Ingalls Shipbuilding Corp. When he discovered that Callahan had not sent a bill for his services, Ingalls demanded he do so. Callahan asked Ingalls to, instead, donate money to help establish an eye specialty hospital in Birmingham. It was Callahan's dream to create a facility to provide the best possible eye care to all those who needed it, regardless of their ability to pay. Ingalls agreed, and the Callahan Eye Foundation was born.

The facility opened in 1963 as the Eye Foundation Hospital. Connections to the University of Alabama at Birmingham were established in 1971 with a combined residency-training program with the UAB Department of Ophthalmology. The hospital joined the UAB Health System in 1997, and Callahan's name was added to the title in 1999 to honor the visionary who had made it possible.

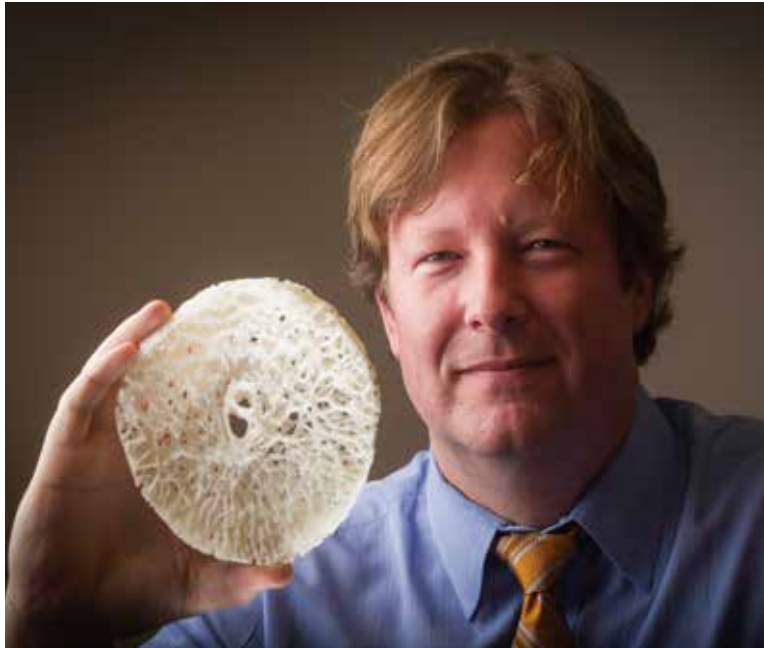
To date, the residency program has trained more than 200 ophthalmologists. The hospital boasts 154 credentialed medical staff, including 80 surgeons. In a typical year, the hospital sees 23,000 patients, performs over 10,000 surgeries in nine state-of-the-art operating rooms dedicated strictly to vision surgery, and treats 5,600 patients in its emergency department — the only 24-hour, seven-day-a-week, eye-emergency center in Alabama.

"The UAB Callahan Eye Hospital is the state's only facility dedicated to providing quality medical and surgical eye care to the people of Alabama and the Southeast," said Brian Spraberry, president and CEO of the hospital. "It's one of the busiest ophthalmology surgery centers in the country and teams with the Department of Ophthalmology at UAB to conduct groundbreaking research in eye diseases such as macular degeneration, glaucoma and uveitis."

The hospital is home to a Level 1 Ocular Trauma Center, one of only two in the country. The American Society of Ocular Trauma and the United States Eye Injury Registry were founded by members of CEH. The registry continues to be housed in Birmingham.

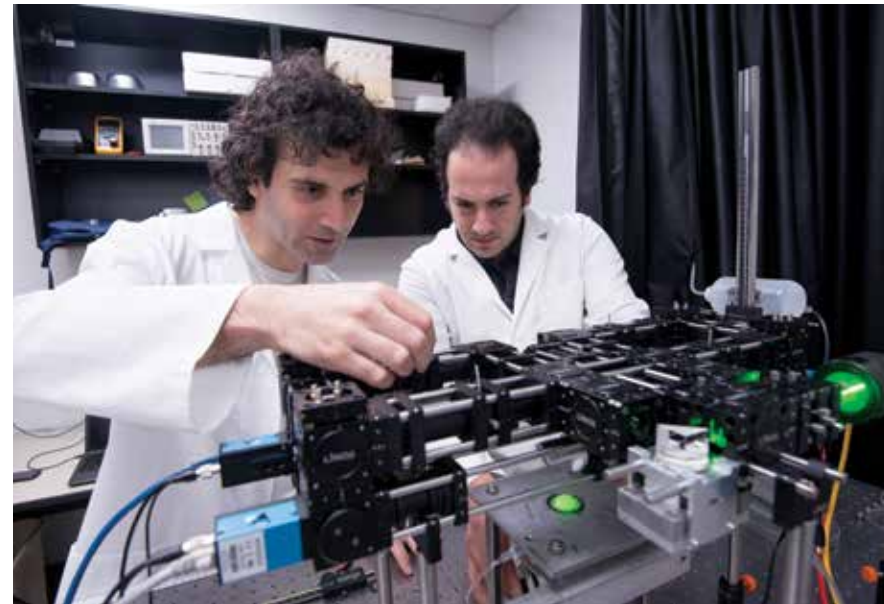
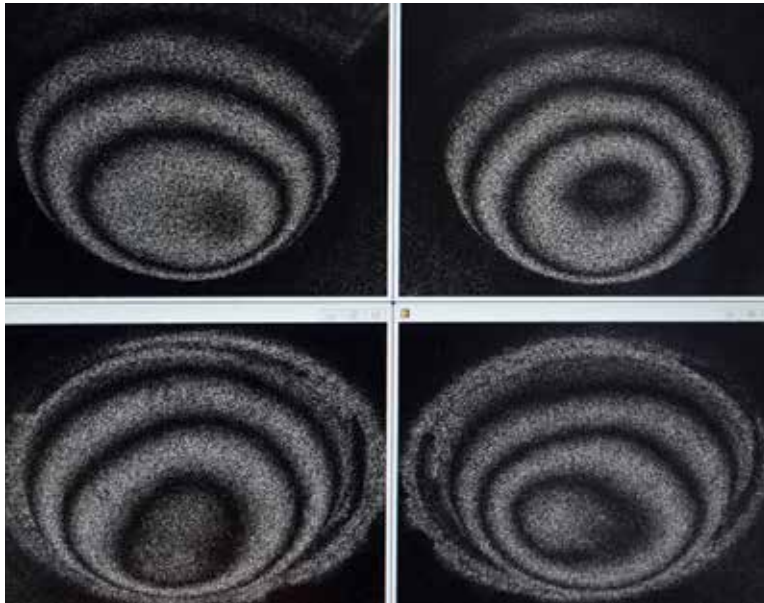
The hospital also is considered a great place to work. It was named one of the best places for working parents six times by Child Times/Family Times Magazine and was named one of the "100 Great Places to Work in Healthcare" by Becker's Hospital Review. CEH has also won two prestigious Press Ganey Summit awards for inpatient satisfaction and a 2013 Press Ganey Guardian of Excellence award for dedication to inpatient care.

"The UAB Callahan Eye Hospital is truly one of Alabama's gems," said UAB Health System CEO Will Ferniany. "For 50 years, it has been recognized internationally for eye trauma, outstanding and innovative patient care, important research into eye disease and has trained the next generation of ophthalmologists. As the hospital embarks on its next 50 years, it will continue to be a national and international leader representing the very best in vision care."



# Advancement in Ocular Biomechanics

*The UAB Department of Ophthalmology has emerged as a leader in this under-explored field of vision science*



Top: Dr. Downs holding a 3-D printed plastic reconstruction of the connective tissues of the optic nerve head from a human donor eye. Bottom Right: Luigi Bruno, Ph.D., visiting professor from University of Calabria in Cosenza, Italy, with Massimo Fazio, Ph.D., working with the ESPI, which measures intraocular pressure-induced 3-D deformations of the posterior human sclera with nanometer precision. Bottom Left: The machine transmits those readings to a computer for further analysis. With this custom, one-of-a-kind device, scientists can compare how differences in age and race impact the eye's response to changes in intraocular pressure.

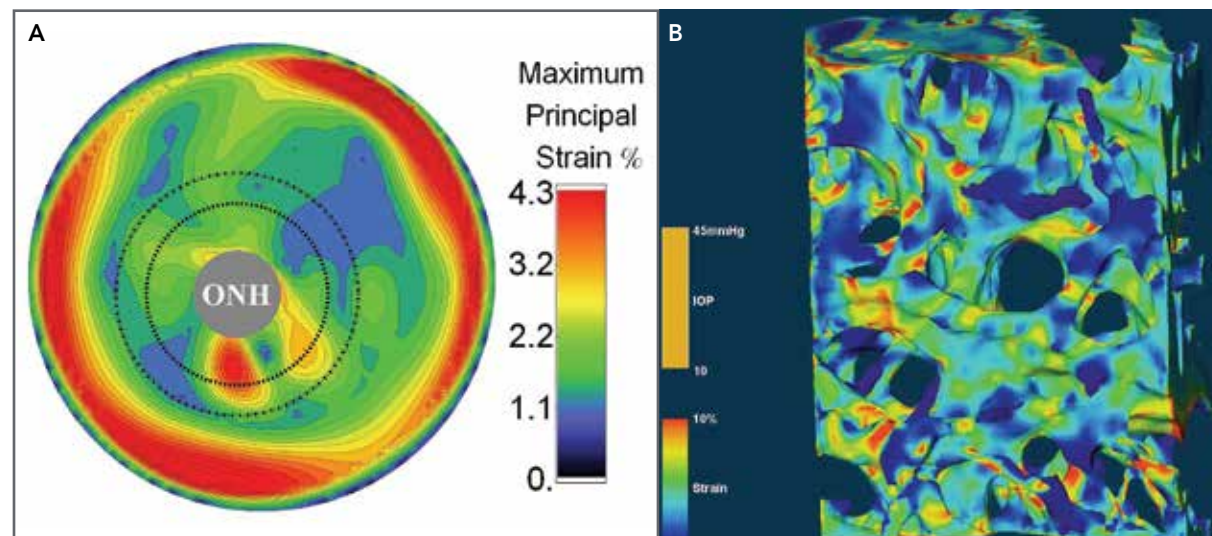
Recent advances in technology have opened up new avenues for vision science research. One such area is ocular biomechanics, which is the study of the eye using traditional engineering principles and approaches. The UAB Department of Ophthalmology recognizes the bright future of ocular biomechanics and aims to become a global leader in the field with the establishment of the Program for Ocular Biomechanics and Biotransport.

The program has already spurred recruitment of renowned scientists to UAB, including its founding director J. Crawford Downs, Ph.D. It has also accelerated research in this field, which possesses the potential for significant breakthrough in the treatment of blinding diseases.

Researchers in the program are studying glaucoma, myopia (commonly known as nearsightedness), age-related macular degeneration, and corneal biomechanics in keratoconus, as well as the biomechanics of ocular trauma. The new program brings together engineers, biologists, imaging experts, and clinicians to build the knowledge to further understand disease mechanism and improve treatments.

As one of only a few serious ocular biomechanics labs and home to the largest group of ocular biomechanics specialists in the world, UAB is at the forefront of this developing field.

Department Chair Christopher Girkin, M.D., M.S.P.H., says the scientists work closely together in spacious new research laboratories. “I started working with Dr. Downs 10 years ago as the field started to emerge, and finally there are enough specialists to bring together and tackle some big problems,” he says. “We are excited to bring these



A: The strain field in the posterior scleral shell of a human donor eye in the peripapillary region (dashed line) and the mid-posterior region (solid line). UAB researchers combine all the directional components of strain into the maximum principal strain (shown), which is a measure of the overall maximum tensile stretch present in the tissue. Tensile strain varies sectorially around the ONH in very complex patterns, which likely affects the biomechanics of the ONH sectorially as well since the lamina cribrosa inserts directly into the sclera at the neural canal.; B: A 3-D model showing the strain exerted on a small section of the load-bearing lamina cribrosa in the optic nerve head by 45mmHg of intraocular pressure.

researchers together with other scientists and clinicians to begin to really develop the field. The group is a perfect fit for the thriving and diverse biomedical research community at UAB.”

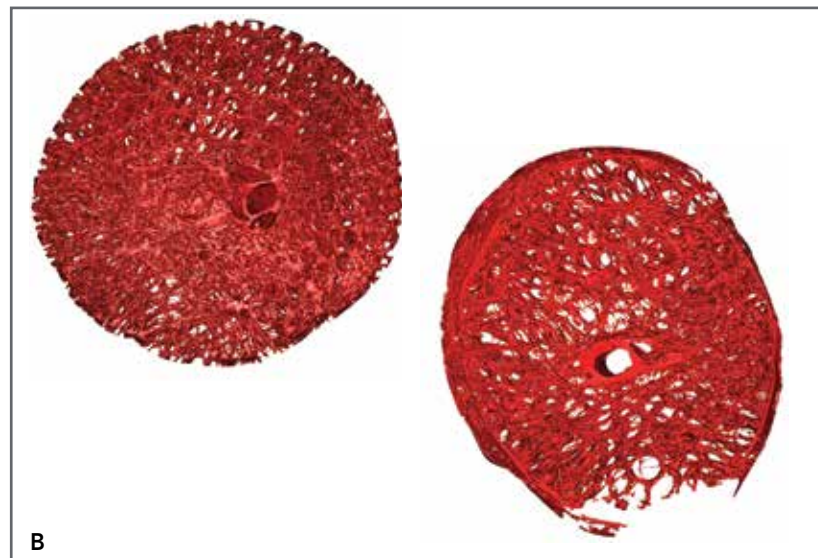
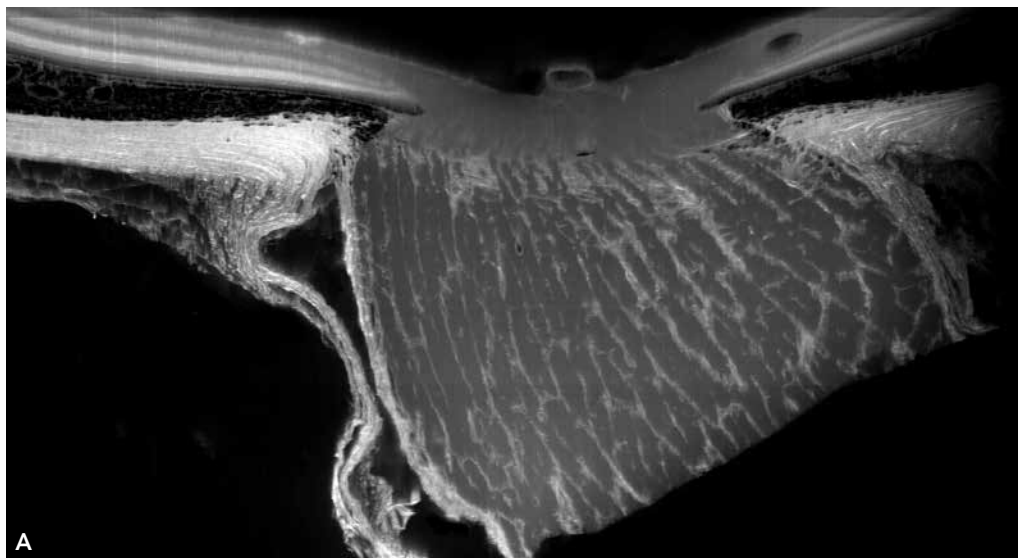
The following unique characteristics make UAB a natural location for groundbreaking research in ocular biomechanics, because they position program scientists to tackle complex problems and diseases on a comprehensive level right from the start.

- A strong clinical research team with a background in age- and ethnicity-related glaucoma research is already established at UAB. Collaboration with clinical research programs, such as the African Descent and Glaucoma Evaluations Study (ADAGES) and the Alabama Study on Early Age-Related Macu-

lar Degeneration (ALSTAR), provides researchers access to existing data collected from a large cross-section of the population over a long period of time.

- The department’s ongoing relationships with outside groups, such as the Alabama Eye Bank and the EyeSight Foundation of Alabama, give researchers important access to human donor tissues, resources, and funding, which help get new work off the ground.
- Close ties between the research and clinical faculty in the department help scientists achieve the goal of translating their research findings into clinical practice.





**A:** A digital section through a 3-D optic nerve head reconstruction generated with UAB's automated episcopic fluorescent image capture system. This technology, developed by Dr. Downs, images a donor optic nerve head after each 1.5-micrometer-thick section is cut away and automatically stacks those image slices into a volumetric 3-D reconstruction. Within these reconstructions, UAB glaucoma researchers are able to study the age- and race-related differences in optic nerve head morphology at unprecedented resolution. **B:** The left image shows the reconstruction of a normal human lamina cribrosa, while the right image shows a reconstructed lamina cribrosa from a human donor with a clinically documented acquired pit of the optic nerve (APON). Note the loss of laminar microstructure in the inferior portion of the ONH in the APON eye, which was associated with an arcuate visual field defect.

The long-term goal of the program is to use the principles of engineering to understand the mechanisms underlying various ocular diseases. It will use these findings to fill in the knowledge gaps about these eye disorders and develop novel engineering-, imaging-, and molecular-based diagnostic tools and therapies. For example, one can imagine a clinical imaging instrument that could determine a patient's individual risk for developing glaucoma or other eye disorders, says Dr. Downs.

Initially, researchers are focusing on several short-term goals funded by the NIH, EyeSight Foundation of Alabama, and Research to Prevent Blindness, among others:

- Identifying the factors underlying increased susceptibility to glaucoma in the elderly and persons of African descent, by studying changes in the ONH structure and its response to intraocular pressure.

- Using a wireless pressure telemetry system unique to UAB, researchers study how the normal daily fluctuations in intraocular pressure relate to glaucoma to better understand this key risk factor.
- Clarifying the biological foundations for the biomechanical changes in the eye seen with aging, corneal disease, and myopia.
- Studying the transport trafficking of lipid complexes of age-related macular degeneration.

The recruitment of Downs and creation of the program establishes UAB as home to the world's leading group of experts in the field of ocular biomechanics. Researchers will collaborate with clinical scientists in cornea, oculoplastics and glaucoma specialties. The close ties between the research and clinical faculty and facilities

at UAB are critical to success, as is the translation of research findings into the clinic.

Downs has recruited three ocular biomechanical engineers into the research program, all specializing in various domains of ocular biomechanics. He is currently recruiting a fourth engineer, specializing in biotransport, to join the program.

"Coming to UAB was a great opportunity to help Dr. Girkin build a multi-investigator collaborative group," says Dr. Downs. "There are only a handful of serious ocular biomechanics labs anywhere, and none are collaborative teams of several bioengineering-focused faculty members that can tackle large, multidisciplinary problems. So, we will be helping build the ocular biomechanics and biotransport fields from scratch."

# INTRAOCULAR PRESSURE TELEMETRY

*Understanding IOP's role in the development and progression of glaucoma*

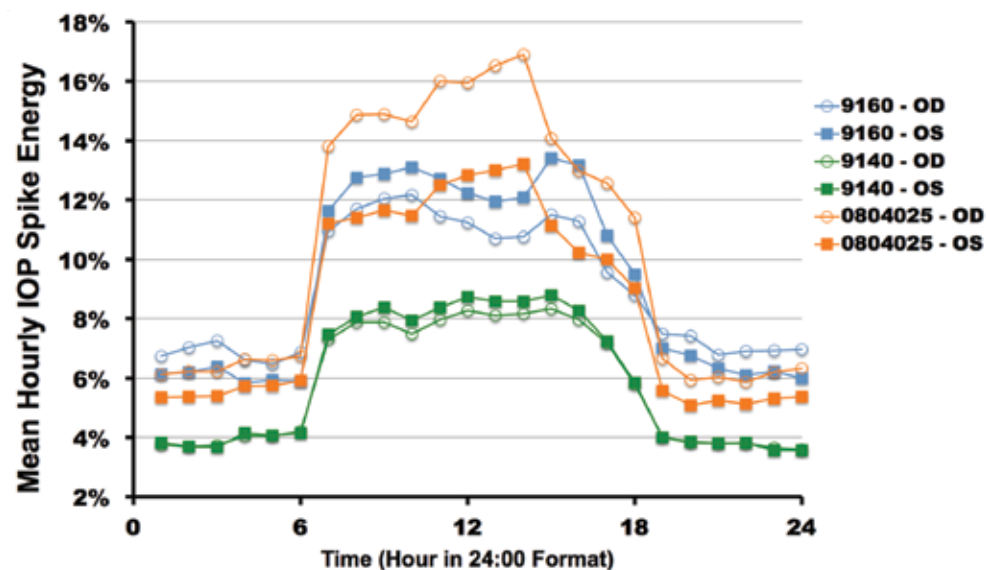
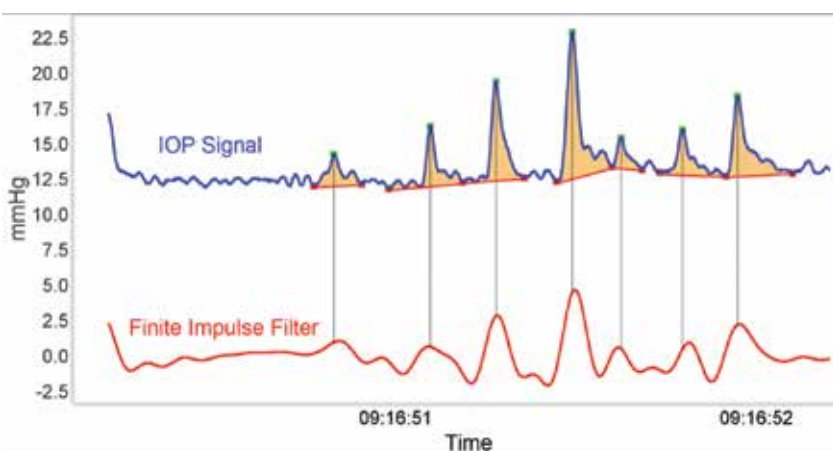
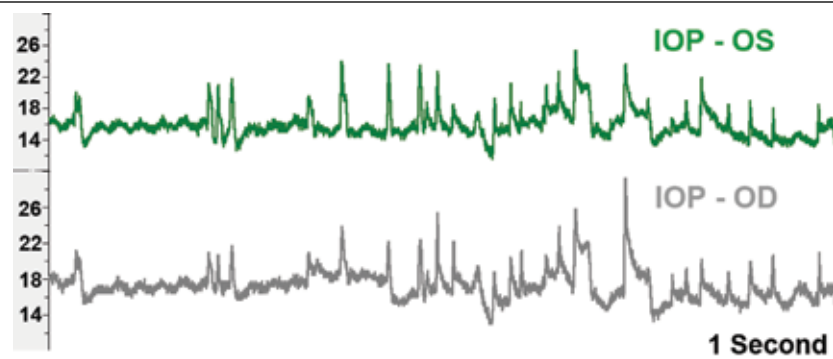
The Program for Ocular Biomechanics and Biotransport studies the eye as a mechanical pressure vessel using engineering-based experimental and computational approaches. Program Director J. Crawford Downs, Ph.D., performs eye inflation test experiments to determine the stiffness of load-bearing tissues for use in computational models. He developed a unique, implantable telemetry system to characterize the level of intraocular pressure (IOP) and blood pressure (BP) as they change throughout the day. The preclinical study measures aortic BP and IOP in both eyes 500 times a second, twenty-four hours a day, seven days a week.

“Computationally, we use multiscale computer models of individual eyes with realistic anatomic geometries to predict the forces and IOP-induced deformations of the ocular load-bearing tissues,” he says. “Now we are measuring the dynamic IOP loading, as well as tissue stiffnesses.”

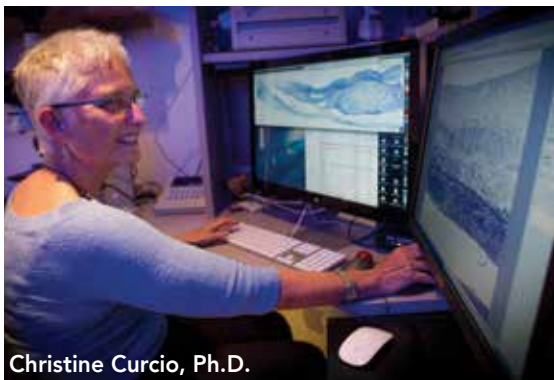
Through this system, the Program for Ocular Biomechanics and Biotransport discovered the eye is exposed to more than 10,000 short-term IOP spikes per hour during the day, which represents a significant but previously uncharacterized part of IOP energy. This consti-

tutes up to 16 percent of the total IOP exposure the eye must absorb.

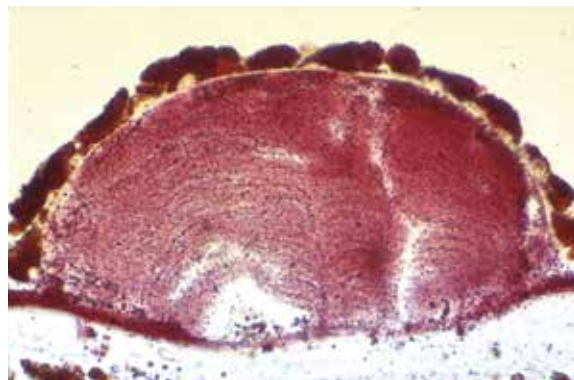
The dynamic nature of these spikes represents a different biomechanical insult than longer-term IOP fluctuations, and may be important in IOP-related diseases such as glaucoma. Currently, although elevated IOP is a principle risk factor for glaucoma, its role in the development and progression of the disease is still unclear. The Program for Ocular Biomechanics and Biotransport is focused on understanding IOP's role in glaucoma.



Top left: A screenshot of 12 seconds of bilateral IOP telemetry data showing the dynamic nature of IOP. Bottom left: IOP spikes are detected, counted, and their energy calculated (orange areas) relative to baseline IOP (2 seconds of data shown). Above: Mean hourly IOP spike energy as a percentage of total hourly IOP energy plotted as hourly means from midnight to midnight, averaged over all twelve 24-hour recording periods for each eye in 3 research subjects. Time is plotted on the 24-hour scale; waking hours are hours 7-18, and lights-out are hours 1-6 and 19-24.



Christine Curcio, Ph.D.



## Pioneering Research

*Department of Ophthalmology researchers have developed a novel tissue culture system to replicate drusen, the extracellular lesions associated with age-related macular degeneration, giving scientists the ability to test new treatments and cures on a large scale.*

Age-related macular degeneration (AMD) is a retinal disorder that attacks the macula of the eye, which is where the sharpest central vision occurs. It is one of the leading causes of irreversible blindness in the U.S.

AMD affects about 10 million Americans — which is twice the occurrence of Alzheimer's and equal to the number of all cancers. AMD grows more common with age, therefore as the overall U.S. population ages, the prevalence of this devastating disease is expected to double to 20 million cases during the next 10 years.

Despite its commonness, there are still gaps in scientists' knowledge about the disease, and treatments

target only complications of AMD, not its underlying pathology. The UAB Department of Ophthalmology is pioneering research to fill in those knowledge gaps and help develop more effective treatments.

Christine Curcio, Ph.D., a renowned AMD researcher, along with her team, first discovered that a fatty film collects on the flat vessel wall behind the retina, called Bruch's membrane. This film prevents nutrients from reaching the retina, causing cells to die and leading to the vision loss associated with AMD. As the film develops, it becomes thicker in some locations, which is what creates the visible drusen. "The film is just like an oil spill on the surface of water," says Dr. Curcio. "And the

drusen are like tar balls in the oil spill."

Through an in-depth natural history and biochemical studies on these deposits, Dr. Curcio and collaborators were able to determine that this oil spill is made up of apolipoprotein B-containing lipoproteins. A famous type of related lipoproteins is LDL (the bad cholesterol).

Further, they were able to conclude that these lipoproteins accumulate throughout adulthood to form the oil spill, and in some ways resemble plaque buildup as seen in the case of atherosclerosis. Dr. Curcio considers both of these factors good news in the development of treatments and cures for AMD.

"This fatty film starts accumulating prior to the occurrence of vision loss, and that gives us an opportunity to do something about it," she says. "Since we know the molecular basis is similar to that of plaque in atherosclerosis, we can borrow from the extensive research in that area when exploring treatment options for AMD."

A third key discovery was finding that the components that form this fatty film are actually made within the eye itself as part of a natural process. With this finding, Dr. Curcio and Clyde Guidry, Ph.D., in the UAB Department of Ophthalmology, began collaborating to replicate the fatty film in cell culture. They were successful, therefore creating a novel, reproducible model that scientists can use to test new treatments for AMD.

This is a significant breakthrough, because laboratory animals do not replicate AMD pathology, so previously there had been no way to conduct large-scale studies of AMD treatments. This system has already received attention from major pharmaceutical companies and

paves the way for the development of treatments that target the disease's underlying pathology.

With the help of this cell culture system, unique to UAB, researchers want to take multiple approaches to finding new treatments for AMD, including:

- Just as in an environmental oil spill, the flow of lipids out of retinal cells into drusen can be slowed down (Top Kill), or the lipids already in the oil spill can be removed with drugs that act like skimmers and dispersants.
- Implanted stem cells are currently being developed as an important surgical option for AMD patients. Lipid-cleansing drugs could be deposited in the eye with these cells, refurbishing the surgical bed and providing extra repair and renewal capability.
- Controlling fats by including components of omega-3 fatty acids or other nutrients in the diet may affect how the RPE processes fats, reducing the flow of lipoproteins.
- Knowing the molecular basis of AMD's oil spill advances the possibility of developing new drug-delivery options based on nanotechnology, or gene therapy.

In order to further accelerate this research, the UAB Department of Ophthalmology is exploring AMD from various angles. Currently the following scientists are working on different lines of AMD research:

**Dr. Curcio** is currently focused on clinical imaging and expanding the knowledge base for AMD. She and col-

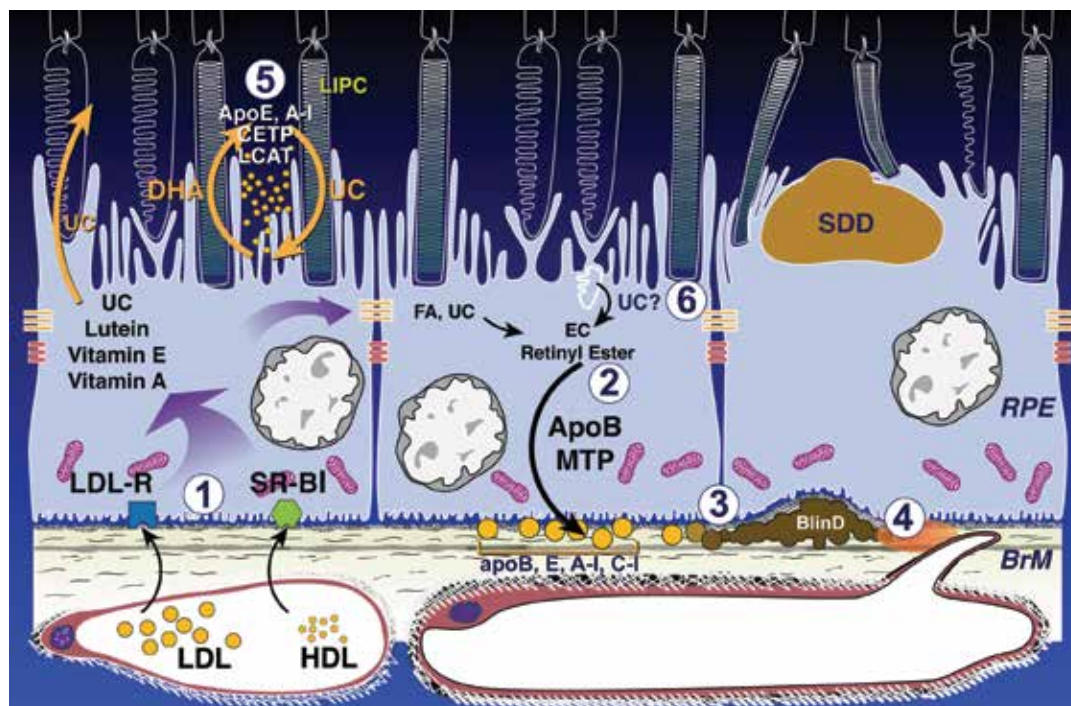
laborators have created Project Macula, a web resource that houses data and images on 132 eyes in a searchable database. Through her long-standing relationship with the Alabama Eye Bank, Dr. Curcio has access to large numbers of high-quality donated tissue, and Project Macula features eyes at varying stages of AMD.

This work provides diagnostic tools for the clinical management of AMD, and also establishes a quantitative framework for AMD pathology. Explore Project Macula at <http://projectmacula.cis.uab.edu/>.

Dr. Curcio has provided the first extensive laboratory data of sub-retinal drusen deposits (SDD) found in AMD eyes. These previously uncharacterized lesions

are drusen-like but they are located right next to the photoreceptors, unlike conventional drusen that localize under another cell layer, the retinal pigment epithelium. These newly described lesions are located in parts of the retina where rod photoreceptors are abundant, whereas conventional drusen seem to relate to the cone photoreceptors. This implies differences in the rod and cone physiology far upstream to AMD pathology and suggests further study is necessary.

The UAB Clinical Research Unit, under the direction of **Cynthia Owsley, Ph.D.**, and **Gerald McGwin, Ph.D.**, is performing clinical research on the risk factors and biomarkers that are related to the earliest emergence of AMD. The Alabama Study on Early Age-Related Macular



Biogenesis of sub-RPE and subretinal AMD lesions: model normal at left center and AMD at right. Described in Zweifel et al and Curcio et al.



Age-Related Macular Degeneration research team (from left to right): Cynthia Owsley, Ph.D.; Medha Prabhakar Manchekar, Ph.D.; Gerald McGwin, Ph.D.; Christine Curcio, Ph.D.; Yuhua Zhang, Ph.D.; Clyde Guidry, Ph.D.; Xincheng Yao, Ph.D.

Degeneration (ALSTAR) is following about 500 individuals for at least three years in hopes to provide clinical evidence of what causes the transition from a healthy macula to AMD.

**Yuhua Zhang, Ph.D.**, is an adaptive optics imaging expert with the Department of Ophthalmology. He develops advanced retinal imaging technology to facilitate the study of the retinal structure and function, with the goal of improving the understanding and treatment of human retinal diseases, like AMD.

His adaptive optics retinal imaging lab has developed a new-generation adaptive optics scanning laser ophthalmoscopy and optical coherence tomography (AO-SLO-OCT). This is an advanced high-resolution retinal imaging instrument that can obtain cellular-level retina

images in the living human eye in both en face and cross-section planes. He also developed and optimized the imaging strategy for study of elderly patients with AMD. Currently he is collaborating with Dr. Curcio and Dr. Owsley in research focusing on subretinal drusenoid deposits.

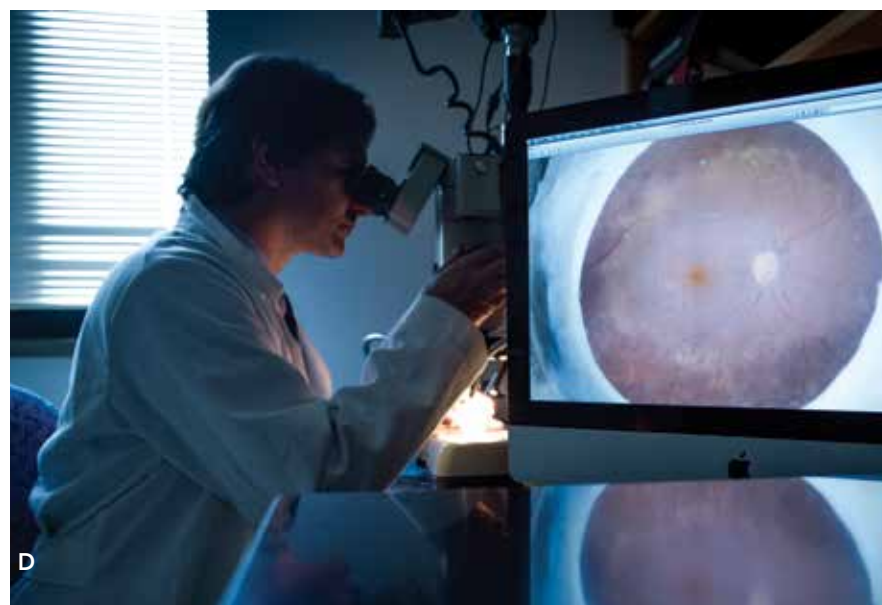
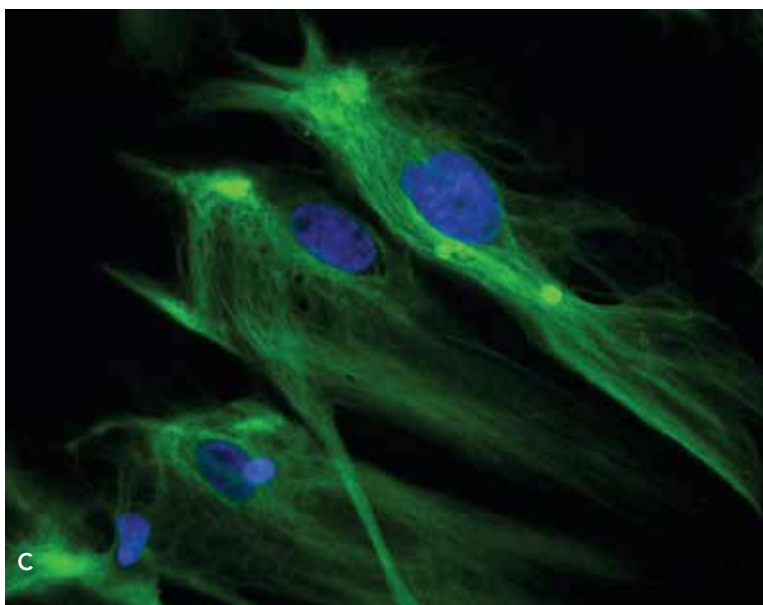
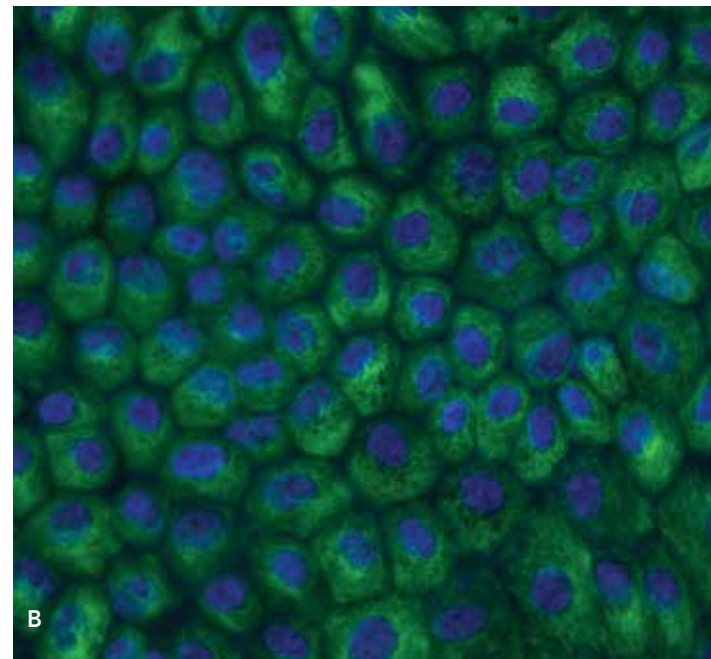
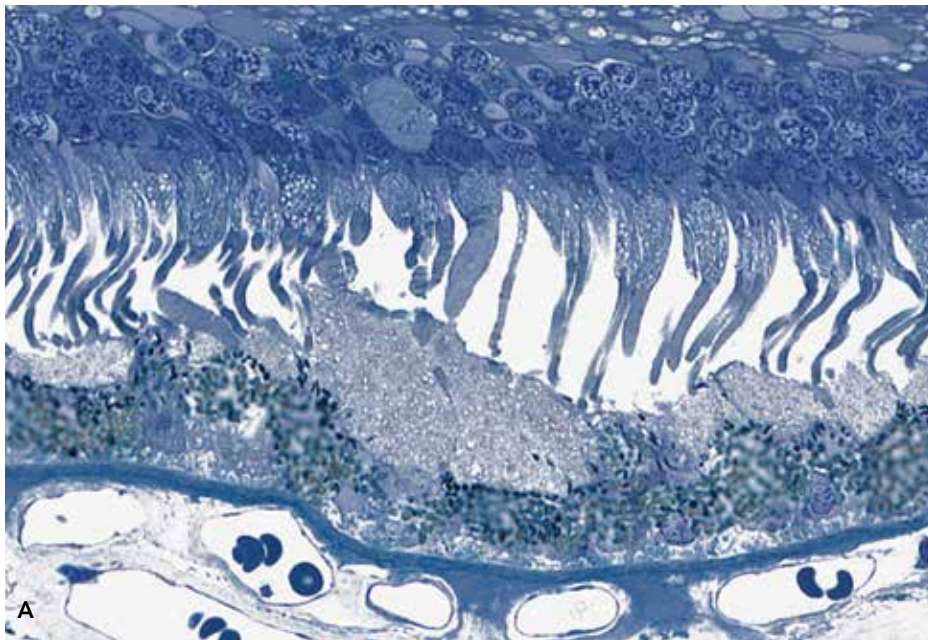
The Department of Ophthalmology is pursuing a multi-disciplinary approach to AMD research through collaboration with faculty in other UAB departments.

**Medha Prabhakar Manchekar, Ph.D.**, is an expert on the biology of apolipoprotein B (apoB). This large protein is an essential structural component of hepatic very low density lipoprotein (VLDL) particles, which are precursors to the well-known LDL particles, and the intestinal chylomicrons. VLDL and chylomicrons deliver

dietary lipids to cells throughout the body. Elevated concentrations of circulating apoB-containing lipoproteins are important risk factors for cardiovascular disease. Her studies focus on structure of apoB-containing lipoproteins and the involvement of key lipid transfer proteins in their assembly using cultured hepatocytes and mice that are genetically engineered to lack these proteins. RPE has been strongly implicated in the secretion of apoB-containing lipoproteins, thus leading to their retention in the BrM. She will use the primary porcine RPE cell culture system to study the biogenesis of basal linear deposits.

**Xincheng Yao, Ph.D.**, associate professor of biomedical engineering and vision sciences, and his research team are focused on optical instruments for advanced study of retinal morphology and physiology. They have developed a high-resolution optical coherence tomography (OCT) to investigate OCT correlates of outer retina. In-depth understanding of anatomic sources of the OCT signal is essential for accurate interpretation of clinical outcomes and is valuable for instrument optimization to enable reliable assessment of AMD and other eye diseases.

They are currently working on high-speed confocal and OCT imaging of intrinsic optical signal (IOS) response correlated with retinal physiological dynamics. Their recent experiments revealed transient phototropic change in retinal rod photoreceptors. They anticipate that further investigation of the rod-dominant phototropic effect can provide a high-resolution IOS biomarker to allow objective identification of rod dysfunction, thereby allowing early detection and easy treatment evaluation of eye diseases, such as AMD-associated photoreceptor degeneration.



A: Subretinal drusenoid deposits, also called pseudodrusen, are extracellular lesions between the photoreceptors and their support cells, the retinal pigment epithelium. Recently revealed in patients by high-resolution clinical imaging and recognized as important risk factors for AMD progression, Christine A. Curcio, Ph.D., provided the first extensive laboratory description of these lesions. B: RPE in Culture, Vimentin from the lab of Clyde Guidry, Ph.D. C: Muller cells, from the lab of Clyde Guidry, Ph.D. D: Research Associate Jeff Messinger, D.C., performing ex vivo color fundus photography of donor eyes with AMD.



## A Ticket to Ride

*UAB Department of Ophthalmology program opens doors to those who are sight impaired.*

To Dustin Jones, the bioptic driving program at the University of Alabama at Birmingham provides one very important benefit — freedom. Jones is a typical young professional. He's a 24-year-old recent UAB graduate who works in information technology. But he has a congenital eye disease called optic atrophy, which had prevented him from getting a driver's license at age 16. It's hard to function in American society without driving.

"My job is in Hoover, and without a driver's license, I would have to live within walking distance or use public transportation," says Jones. "I would be limited in my economic and social opportunities, and not really part of the community as I am today."

Optic atrophy is an inherited condition, and Jones' vision

gradually deteriorated from birth until finally stabilizing when he was about 11 years old. He graduated from the Alabama School of the Blind in Talladega before enrolling at UAB. His close-up vision is fine, but he has issues with distance.

"After a certain distance, it's kind of like looking through wax paper," he says. "I can see large objects, but I can't read a billboard at a distance as well as other people."

Jones got his driver's license when he was 19, with the aid of a bioptic telescope and the UAB Driving Assessment Clinic in the Department of Ophthalmology. The small telescope fits on the frame of a regular pair of glasses, providing the ability to sneak a quick peek at a distant object.

"Bioptic drivers don't use the telescope all the time to view the roadway when driving," says Cynthia Owsley, Ph.D., professor of ophthalmology and director of the Clinical Research Unit (CRU). "They use it to spot a far-away object, dipping their heads slightly to bring the bioptic into line so they can view a distant traffic light or oncoming vehicle. Then they return to viewing the road through their regular glasses."

Alabama law permits the use of a bioptic telescope, with some restrictions. The driver must meet minimum vision requirements, an ophthalmologist or optometrist must prescribe and fit the telescope and the driver must demonstrate competence in using the telescope off-road before proceeding to on-road training. The UAB Center for Low Vision Rehabilitation is the leading source for bioptic telescope prescription and training in Alabama.

"Bioptics must be properly fitted and adjusted for each individual patient," said Dawn DeCarlo, O.D., M.S., director of the UAB Center for Low Vision Rehabilitation. "As the leading source of bioptic prescriptions in the state, the CLVR has the expertise to be sure the needs of each patient are met. We also provide the training required for using the bioptic while sitting and walking before the patients advance to on-road instruction."

Drivers then must be approved by a certified driving rehabilitation specialist, such as UAB's Jennifer Elgin, OTR/L, CDRS.

Elgin teaches drivers how to use the telescope. First while simply walking, then while a passenger in a car, and finally while behind the wheel. It takes about a year of practice before she signs off on the appropriateness of their application for licensure under Alabama's bioptic driving rule.

Drivers then must pass the usual state driving exam.

Dr. Owsley says research shows that most bioptic drivers show good on-road driving performance. “Research from around the country and the world shows that there is no evidence that individuals with vision impairment who use bioptic telescopes on the road are any more unsafe than any other drivers,” she says.

Alabama has issued driver’s licenses to persons using a bioptic telescope as an aid since 2005. Over 40 states allow its use in some form. Elgin says she’s trained about 70 drivers, mostly young people with low vision. They are people for whom the ability to get a driver’s license means having the freedom to live a normal life.

“These are people who want to go to work, go to college, who want to take care of their families and do their own errands,” says Owsley. “Driving is the primary way we get around. They just want to be able to drive and live like everybody else.”

“Being mobile opens a lot more doors for you,” says Jones. “With a driver’s license, I can be my own person, and an entire individual. I’m not pigeonholed into a certain class or job or anything.”

In addition to training bioptic drivers, the UAB Driving Assessment Clinic provides in-depth evaluations of driving fitness for those with physical, visual, or cognitive impairments. These evaluations include both in-clinic and on-the-road components. The criteria were developed after years of pioneering research by the UAB Clinical Research Unit looking into the causes of elevated crash risk in drivers. Through their work, UAB researchers have found:

- Contrast sensitivity impairment and slowed visual processing speed are the most common visual causes of driving problems for older Americans;
- Impaired contrast sensitivity from cataract elevates collision risk, but successful cataract surgery reduces collision risk by 50%; and
- Screening tests can identify crash-prone drivers and can be useful in rescreening programs where older adults renew driver’s licenses; and
- Persons with moderate vision impairment often learn to compensate by eye and head movements and are capable of safe driving.

The next step in their research is to conduct “naturalistic driving” studies to understand how vision impairment impacts actual driver behavior and vehicle kinematics, or a vehicle’s movement characteristics through the environment.

“Our mission is to become the world’s leading experts on naturalistic driving as used to study visual requirements for safe driving,” says Owsley.

Naturalistic driving involves installing a high-tech data acquisition system in the vehicles of study participants, who keep their daily driving routine for several months with no research personnel with them. The system continuously collects data using multichannel video and sensor-based kinematics data. The data streams provide a river of information on driver behaviors and vehicle kinematic characteristics with which to compare drivers with impaired vision to those with normal vision.

The core vision and driving research team at UAB is Owsley, Elgin, and epidemiologist Gerald McGwin, Ph.D. The CRU plans to include human factors engineers, vehicle kinematic experts, and biostatisticians on their team. UAB will also partner with naturalistic driving pioneers at the Virginia Tech Transportation Institute for this research.

“These studies will help develop valid criteria for driving licensure for visually impaired drivers, as well as driving rehabilitation strategies for this population,” says Owsley.



Dustin Jones, 24, has a congenital eye disease called optic atrophy, which initially prevented him from getting a driver’s license. After going through training and rehabilitation with the UAB Driving Assessment Clinic, Jones was able to legally obtain a license.



# Increasing Access to Care

*UAB pilot program brings glaucoma screenings closer to home*

Glaucoma is a silent disease. It does not hurt, symptoms are slow to develop, and most people do not notice any loss of vision until it is too late. A project by ophthalmologists at the University of Alabama at Birmingham will examine whether a partnership with community-based optometrists will improve detection and treatment of glaucoma, especially for high-risk populations.

Glaucoma is a disease of the optic nerve, the cable that connects the eye to the brain. The nerve breaks

down in some people, usually older adults, causing irreparable vision loss.

“Glaucoma is much easier to treat when it is found in the early stages, and less likely to lead to blindness,” says Christopher Girkin, M.D., professor and chair of the UAB Department of Ophthalmology. “It’s like a river that ends in a waterfall. We want to catch people who are well upstream of the waterfall, where the river is moving slowly and it is easier to save them. Once they are at the top of the falls, it is much more difficult to prevent them from going over the edge.”

Glaucoma is the second-leading cause of blindness worldwide, and the leading cause of blindness in African-Americans, who are four or five times more likely to develop the disease than are people of European descent. Age, family history, and race are risk factors for glaucoma. Access to health care is also an issue, especially with older, rural, and disadvantaged populations.

“Our current model of eye care is simply not reaching one of the most at-risk populations for glaucoma: older African-Americans,” says Dr. Girkin. “Historically, this is an underserved population

less likely to seek professional eye-care services in a standard clinical setting. So we’re going to see if we can take appropriate vision care to them.”

UAB has launched a pilot program, funded by a two-year, \$1.9 million grant from the Centers for Disease Control and Prevention, to install sophisticated imaging machines in the offices of two central Alabama independent optometrists who are located adjacent to Walmart Vision Centers, with a centralized image-reading center housed at UAB.

The imaging devices, optical coherence tomography machines, provide high-resolution images of the back of the eye. An optometrist can detect the earlier stages of glaucoma in those images, even before symptoms appear. Images of a patient’s eyes are electronically transmitted from the imaging machines at the optometrist’s office to the UAB center for confirmation of the diagnosis.

UAB’s trained glaucoma specialists can then confer with the optometrist on complex cases to determine an appropriate treatment regimen. Patients who undergo the glaucoma testing also receive a dilated comprehensive eye exam and educational materials about glaucoma.

Sonia Nduna visited one of those optometrists, Frank LaRussa, O.D. The Birmingham woman grew up knowing she was at risk for glaucoma. Her father had it, and she was told as a child that the shape of the back of her eye put her at risk. As an adult, she got regular eye exams. One day, she accompanied her mother to Dr. LaRussa’s office.



Members of the research team (from left to right): Gerald McGwin, Ph.D., co-investigator; Lindsay Rhodes, M.D., co-investigator; Frank LaRussa, O.D., Birmingham, Ala., optometrist; Christopher Girkin, M.D., principal investigator; Stephen Menemeyer, Ph.D., co-investigator and faculty member in the UAB School of Public Health; Cynthia Owsley, Ph.D., co-principal investigator; Daniel Box, O.D., Tuscaloosa, Ala., optometrist.

“I brought my mother in for a checkup and thought I’d get my eyes checked, too,” Nduna said. “Dr. LaRussa said the pressure in my left eye was very high.”

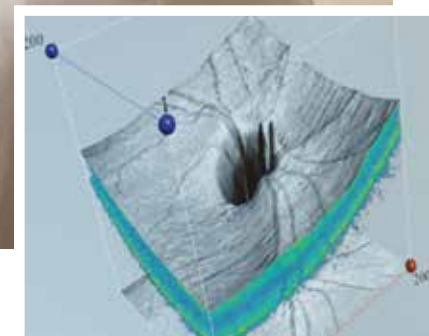
Dr. LaRussa’s examination determined that Nduna had glaucoma, which was confirmed with the imaging program. Nduna, who, at just 45 years old, is young for the onset of the disease. She is now on medication, taking drops to control the pressure in her eyes that will preserve her sight.

“It’s good that we discovered it early because you can’t feel glaucoma,” Nduna said. “You don’t notice the change, and there’s no pain.”

Drs. Girkin and LaRussa say the outreach program is an effective blend of UAB’s highly regarded glaucoma service and LaRussa’s community-based practice.

“With this program, we’re bringing education, detection and glaucoma treatment directly to the patient,” Dr. LaRussa says.

“Our current model of eye care is simply not reaching one of the most at-risk populations for glaucoma: older African-Americans,” said Dr. Girkin. “Historically, this is an underserved population. So we’re going to see if we can take appropriate vision care to them.”



Dr. LaRussa uses the OCT machine to monitor the progress of Sonia Nduna’s glaucoma. Nduna was diagnosed with glaucoma as part of this program. (Inset) One of the images taken by the OCT that helps the team make a glaucoma diagnosis. These studies are helping to understand the application of diagnostic imaging in a distance care model.

Dr. Girkin is a nationally recognized expert in glaucoma and has been studying the use of ocular imaging techniques in the diagnosis of the disease for 15 years.

“This is an excellent example of the value of translating technology that has been evaluated and fine-tuned in the research setting and employing it in the field for the betterment of patients,” he says. “This provides better access to care and better delivery of care within these hard-to-reach populations.”

Knowing for years that she was at risk meant Nduna was not scared of a diagnosis of glaucoma.

“To me, not knowing was the scariest thing,” she said. “I urge others to take advantage of this opportunity. It’s convenient. Just come in and get your eyes checked.”

Dr. Girkin hopes the combination of sophisticated imaging, expertise from UAB and easy access to health care will lead to an increase in early detection of glaucoma in high-risk groups, as well as increased compliance with treatment programs.

# Trauma Headquarters

*Through a Level 1 Ocular Trauma Center and the United States Eye Injury Registry, the UAB Department of Ophthalmology is focused on providing top-notch ocular trauma care.*

Each year in the U.S., there are approximately 2 million cases of ocular trauma that require medical treatment, and even though 90 percent of eye injuries are preventable with proper use of protective eyewear, it is the leading cause of monocular blindness in the nation.

The UAB Callahan Eye Hospital, home to the UAB Department of Ophthalmology, is a world-renowned leader in ocular trauma care. In 2011 the UAB Callahan Eye Hospital was designated as a Level 1 Ocular Trauma Center — one of only two locations with this designation in the country.



There are an estimated more than 30,000 sports-related eye injuries annually, with more than 1,000 of those from fishing accidents. Research has shown that the majority of those injuries could be prevented by proper use of protective eyewear.

“We’re a Level 1 Ocular Trauma Center, so we are equipped to treat minor trauma, such as corneal foreign bodies, eyelid lacerations, and infections in the emergency department. More extensive injuries receive initial care here before referral to our subspecialties and the operating room,” says Emergency Department Director Cecil J. McCollum, M.D.

The foundation for excellence in ocular trauma care started long before the 2011 designation. During the previous three decades, UAB physicians founded all major organizations representing the ocular trauma field — American Society of Ocular Trauma, the United States Eye Injury Registry, the International Society of Ocular Trauma, and the World Eye Injury Registry.

“We’re writing the book on eye trauma here in Birmingham,” said Brian Spraberry, President and CEO of UAB Callahan Eye Hospital.

The American Society of Ocular Trauma (ASOT) represents all eye injury specialists throughout the U.S. and is based in the UAB Department of Ophthalmology. The ASOT is an affiliated subspecialty organization of the American Academy of Ophthalmology (AAO).

The United States Eye Injury Registry (USEIR) is the main scientific project of the ASOT and is

## EYE TRAUMA CARE at UAB Callahan Eye Hospital

24/7

The Southeast’s only Level 1 Ocular Trauma Center with a 24/7 eye emergency room – as designated by the American Society of Ocular Trauma.

5,600  
EYE EMERGENCIES  
ANNUALLY

9 OPERATING ROOMS  
DEDICATED TO EYES

also based in the UAB Department of Ophthalmology. USEIR began in the 1980s as an Alabama-wide project, and has now expanded nationally as the largest eye injury database in the U.S. It was also the model for the World Eye Injury Registry (WEIR).

All of these organizations are permanently located in Birmingham and complement the strong emergency department at the UAB Callahan Eye Hospital. It is one of the busiest eye emergency departments in the U.S.

Temporary Keratoprosthesis Vitrectomy (TKP), considered the most advanced form of eye trauma reconstructive surgery, was pioneered and perfected at UAB. There are only a few centers in the U.S. that attempt this procedure, and none perform it as routinely as the surgeons at the UAB Callahan Eye Hospital. The department also has the highest success rates in the country for this procedure.

“Eye trauma surgeons at the eye hospital have developed unprecedented expertise through the volume of patients treated,” said Doug Witherspoon, M.D., director of the Ocular Trauma Center at the eye hospi-

tal. “New techniques and specialized tools have been created. Surgeons here have demonstrated that cases deemed hopeless by others may be at least partially repairable.”

The UAB Department of Ophthalmology has become a robust ocular trauma resource, interested in more than just the initial treatment and care of patients. Major rehabilitation resources have also been established in

the department, creating a multidisciplinary approach to the treatment of ocular trauma cases.

The department provides on-site, psychological and crisis counseling services. The fear of vision loss has been consistently listed second only to the fear of cancer by Americans in public opinion polls. The accommodations that must be made in everyday life after vision loss are significant, and learning to cope with those changes is

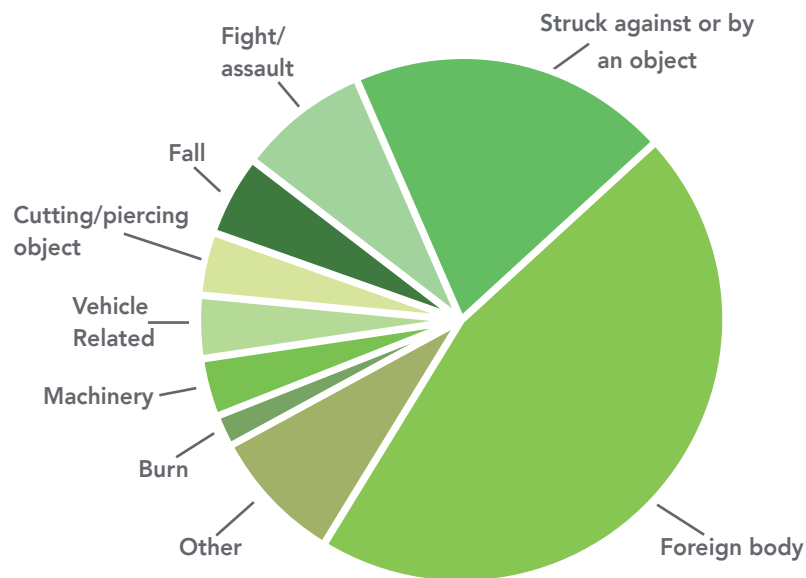
an important part of patient rehabilitation and recovery.

Especially in cases of sudden vision loss, often associated with ocular trauma, the rehabilitation expertise offered by the UAB Department of Ophthalmology is critical to patient success. With this multidisciplinary response, eye trauma patients receive the most comprehensive care available.

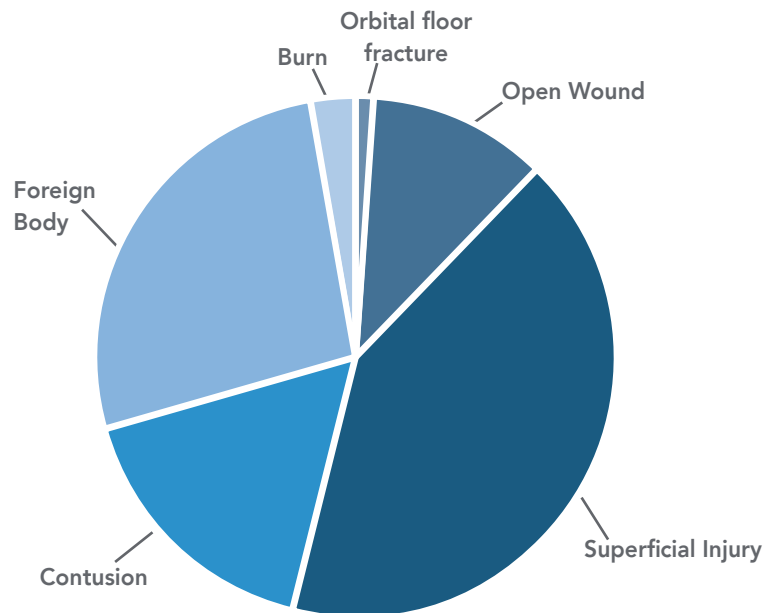
## NATIONAL EYE TRAUMA STATISTICS

These statistics were compiled from the National Ambulatory Medical Care Survey, the National Hospital Ambulatory Medical Care Survey, and the National Hospital Discharge Survey to provide a comprehensive look at eye injuries in the United States. In addition to the common causes and types of eye injury, data showed that eye injury rates were highest among individuals in their 20s, males, and whites.

**Causes of Eye Injury**



**Types of Eye Injury**



Gerald McGwin Jr, MS, PhD; Aiyuan Xie, MS; Cynthia Owsley, PhD, MSPH. Rate of Eye Injury in the United States. Arch Ophthalmol. 2005;123(7):970-976. doi:10.1001/archophth.123.7.970.



Back row, left to right: Carter Kirk, M.D.; Jonathan Zoghby, M.D.; Jewel Sandy, M.D.; Jack Parker, M.D.; Ryan Burton, M.D.; Stephen Cross, M.D.; Deepthi Reddy, M.D.; Jennifer Doyle, M.D.; Front row, left to right: David Neely, M.D.; Kevin Bray, M.D.; Rushil Rao, M.D.; Michael Neimkin, M.D.; Shawn Agee, M.D.; Pooja Godara, M.D.; Katherine Donnithorne, M.D.; Jay Glover, M.D.; Richard Arceneaux, M.D.

## RESIDENTS

### *3rd year residents*

Richard Arceneaux, M.D., *chief resident*

Stephen Cross, M.D.

Jennifer Doyle, M.D.

Michael Neimkin, M.D., *chief resident*

Deepthi Reddy, M.D.

### *2nd year residents*

Ryan Burton, M.D.

Katherine Donnithorne, M.D.

Jay Glover, M.D.

Rushil Rao, M.D.

Jewel Sandy, M.D.

### *1st year residents*

Kevin Bray, M.D.

Pooja Godara, M.D.

Carter Kirk, M.D.

David Neely, M.D.

Jack Parker, M.D.

## FELLOWS

### *Glaucoma*

Jonathan Zoghby, M.D.

### *Retina*

Shawn Agee, M.D.

Daniel Bennett, M.D.

Charles Clark, M.D.

Nicholas Tosi, M.D.

### *Oculoplastics*

Shannon Cox, M.D.

With the only ophthalmology residency and fellowship programs in the state, the UAB Department of Ophthalmology is committed to training the next generation of ophthalmologists.

Residents and fellows receive instruction from knowledgeable ophthalmologists and have the benefit of working with the most advanced technology and treatments at the UAB Callahan Eye Hospital — one of only two Level 1 Ocular Trauma Centers in the nation.

Each year the department receives more than 300 resident applications and accepts only five. Fellowship opportunities are available in the glaucoma, retina, and oculoplastics subspecialties.

Upon graduation, these ophthalmologists and specialists are highly skilled in treating a wide variety of medical and surgical eye disorders.

In 2013, the Max and Lorayne Cooper Professorship in Ophthalmology was created by a generous donation from Mr. Max Cooper. This professorship provides an endowed chair for the director of resident education.

The residency program at the UAB Callahan Eye Hospital is the backbone of our facility, says Chair Christopher Girkin, M.D., M.S.P.H. This endowment will provide critical mission support for the residency training director, enabling him or her to oversee, manage, and administer the residency program.

The department also enhanced its residency program this year by giving incoming residents the option to participate in an in-depth clinical or basic research program of their choice. Starting with the current class of first-

year residents, two residency paths are available — the traditional clinical path and the more research-intensive academic path. Both paths provide training in research methodology, but residents who choose the academic path will have protected research time during their second year, allowing them to complete an 18-month research project.

This will provide more intensive research experience than previously possible for the department's residents.

“Our goal is to enhance our residents' exposure to research methodology so that, regardless of their eventual career path, they will be able to critically assess the biomedical literature that will guide them in their practice of ophthalmology as knowledge changes and expands,” says Russell W. Read, M.D., Ph.D., residency program director.



Russell W. Read, M.D., Ph.D., residency program director, with one of the department's former residents. Dr. Read says one of the program's strengths is that residents are treated as colleagues from day one.

# Basic Research Division

The basic research division is a critical component in the overall growth of the UAB Department of Ophthalmology. Currently, the division is undergoing targeted growth amplifying its strengths in both traditional and emerging areas of basic science research.

The division is focused on forming collaborative, multidisciplinary research groups that can tackle the complex problems associated with blinding disease. Bringing together scientists with different areas of expertise creates an environment that produces a greater impact than simply a sum of the parts.

The importance of this magnified impact cannot be overstated. Many of the most prevalent diseases, such as glaucoma and age-related macular degeneration, are still poorly understood and without a cure. These two diseases affect more than two million Americans each, and that number is only expected to rise in the coming decade.

A single-discipline approach is simply not producing adequate results in terms of developing an understanding of the underlying pathology of these diseases. Without a clear picture of how each disease

Bringing together scientists with different areas expertise creates an environment that produces a greater impact than simply a sum of the parts.

develops and progresses, it is not possible to develop targeted diagnostic tests, treatments, and cures.

The UAB Department of Ophthalmology's basic science research division is focused on filling in these knowledge gaps. Much of the division's disease-specific research focuses on glaucoma and age-related macular degeneration. Additionally, myopia and keratoconus are being studied.

The division also has experts in the fields of imaging, ocular biomechanics and biotransport as well as ocular motor reflex. Expertise in these areas is the foundation of the division's multidisciplinary groups. These areas provide critical knowledge and skills that can inform research across diseases and provide a robust approach to basic science research.

For example, optic imaging expert **Yuhua Zhang, Ph.D.**, and world-renowned AMD researcher **Christine Curcio, Ph.D.**, have collaborated to characterize subcellular drusenoid deposits, a previously uncharacterized symptom of AMD. Neither scientist could have made this discovery without the expertise of the other.

In 2013 the basic research division added four new faculty members as a part of this targeted approach. Each brings a unique background to the department and strengthens the multidisciplinary research efforts.

**J. Crawford Downs, Ph.D.**, joins as the founding director of the Program for Ocular Biomechanics and Biotransport. Dr. Downs is one of only a handful of experts in ocular biomechanics, and his research focuses on the impact of intraocular pressure in the develop-

ment and progression of glaucoma.

**Paul Gamlin, Ph.D.**, is an accomplished vision scientist and previously served as the director of the UAB Vision Science Research Center. His research focuses on the role of eye movements in health and disease. Dr. Gamlin is also developing novel gene therapies to treat individuals with photoreceptor loss due to disease or injury.

**Rafael Grytz, Ph.D.**, is a biomechanical engineer whose work focuses on growth and remodeling mechanisms in myopia, keratoconus, and glaucoma. Dr. Grytz uses experimental and computational methods to study the remodeling tissue structures of the living eye at different length scales, from the collagen fibril to the organ.

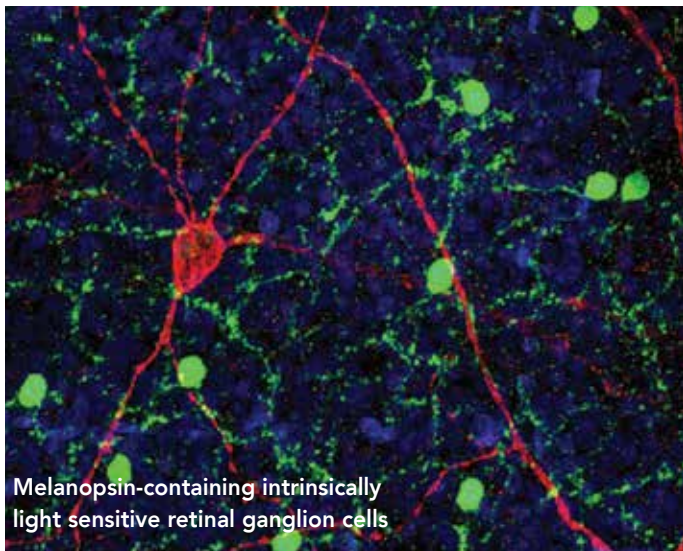
**Brian Samuels, M.D., Ph.D.**, is a clinician-scientist specializing in glaucoma. Dr. Samuels' research is focused on understanding the central nervous system's role in controlling intraocular and intracranial pressure. As a clinician, Dr. Samuels provides patients with comprehensive care informed by new scientific discoveries.

The expertise of these recent recruits synergizes with the existing knowledge base within the department and provides the foundation for the formation of numerous multidisciplinary collaborative research groups.

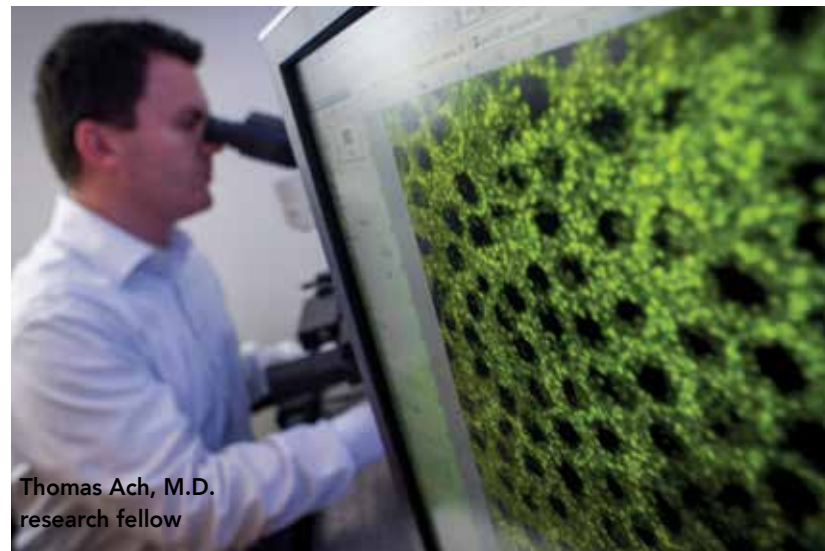
In 2014 the division plans to continue on the current trajectory and recruit several new scientists to further advance its strengths.



Basic Science Research Division



Melanopsin-containing intrinsically light sensitive retinal ganglion cells



Thomas Ach, M.D.  
research fellow



# Clinical Research Division



The Clinical Research Division of the UAB Department of Ophthalmology is focused on facilitating the clinical studies necessary to translate fundamental discoveries from basic science research into treatment and practice.

Many current treatments for common eye disorders are inadequate, and strategies for preventing or arresting eye disorders are lacking. The way to improve treatments is by building on the knowledge gained in basic science research through clinical research and trials.

The division is well established as a leader in the field since 2002. Ongoing priorities include:

**Aging-related eye problems and vision impairments**

— Many of the most common eye disorders are more prevalent among the elderly. That number of adults with eye conditions and vision impairment will continue to increase as the U.S. population ages. The UAB Clinical Research Division is dedicated to studying the relationship between eye disorders and aging, and strives to identify what factors associated with aging predispose the emergence of eye diseases.

One example of this research is the Alabama Study on Early Age-Related Macular Degeneration (ALSTAR), which looks at risk factors and biomarkers for the earliest emergence of age-related macular degeneration (AMD). Currently, not much is known about the transition from a healthy macula to AMD, and clinical researchers believe studying the transition will inform new treatments.

**Health Services Research** — There are also high rates of eye disease in populations that traditionally have poor access to health care. The division is researching novel care-delivery models to increase access to care for these underserved populations.

Through the Eye Care Quality and Accessibility Improvement in the Community (EQUALITY) study, the UAB Clinical Research Unit is seeking to increase the accessibility of comprehensive eye care for adults who are at high risk for glaucoma, a disease of the optic nerve. Read more about this project on pages 16 and 17.

**Pediatric Vision Impairment** — It is rare for children to have permanent vision impairment, however it is highly significant because it is a lifelong impairment. Dawn DeCarlo, O.D., M.S., is undertaking work addressing the visual focusing and reading abilities of children with vision impairment.

**Rehabilitation** — Unfortunately, many vision disorders are not yet preventable, so the division also places emphasis on the development of rehabilitation efforts to help improve quality of life for those with irreversible vision loss, as well as their families. The division works closely with the multidisciplinary UAB Center for Low Vision Rehabilitation, which provides state-of-the-art care for persons with vision impairment not correctable with glasses, contact lenses or other treatments. The Center helps persons with low vision lead more satisfying and productive lives.

Additionally, faculty member and psychologist Laura Dreer, Ph.D., is focused on examining ways to facilitate

adjustment to irreversible vision impairment, developing interventions to improve health outcomes and adjustment, and evaluating competency-related issues, such as medical decision-making and management of finances, for patients with irreversible vision impairment.

**Vision and Driving Research** — The UAB clinical research team is a well-known leader in the field of vision and driving research. The team has published more than a dozen large studies on this topic, establishing causes of increased crash risk, evaluating how vision-screening programs can identify crash-prone adults, and showing that some persons with moderate vision impairment are capable of safe driving.

Moving forward the department will undergo naturalistic driving studies to understand how vision impairment impacts actual driver behavior behind the wheel.

In 2013, the Clinical Research Division welcomed two talented clinician-scientists into the division. **Lina Nagia, D.O.**, is a neuro-ophthalmologist who plans to pursue research focused on non-glaucomatous optic neuropathies. **Lindsay Rhodes, M.D.**, is a glaucoma specialist who is exploring techniques for providing high-quality, cost-effective glaucoma care to a rapidly growing aging population. She is participating in the aforementioned EQUALITY program.

The division plans to continue its growth in 2014 and is seeking additional Ph.D. faculty members to create a balanced clinical research team. Clinicians and Ph.D. scientists bring unique strengths and experiences to their research, and the division believes it is important to maintain a multidisciplinary balance.

# Glaucoma Division

The UAB Department of Ophthalmology's Glaucoma Division has grown since its inception in 1999 from its single founding member, Christopher Girkin, M.D., M.S.P.H., to include seven fellowship-trained glaucoma specialists and a busy clinical fellowship. The division is focused on delivering tertiary care for patients with advanced high-risk glaucomatous damage.

In addition, the division has developed an extensive portfolio, including basic research in fundamental mechanisms of intraocular pressure (IOP) regulation and variation within novel models of this blinding disease, extensive evaluation of the morphology and biomechanical behavior of the optic nerve using human donor tissues, multi-center collaborative imaging studies examining the structure and function of the optic nerve in patients, and a novel health services research program in telemedicine for glaucoma management funded through the Centers for Disease Control.

Glaucoma is the leading cause of irreversible blindness, and due to the aging population its prevalence is

These statistics are even more striking in the regions served by the UAB Callahan Eye Hospital, where there is an expected 50 percent increase in surgical glaucoma needs during the next five years and that need is expected to double in the next decade.

expected to more than double by 2050. These statistics are even more striking in the regions served by the UAB Callahan Eye Hospital, where there is an expected 50 percent increase in surgical glaucoma needs during the next five years and that need is expected to double in the next decade.

This rapid growth presents unique challenges in the management of this condition, and the UAB Glaucoma Division is focused on developing strategies to treat this disease through basic and translational research mechanisms in addition to designing new eye care-delivery models that bring these research findings into practical use in the care of patients across the region.

With the faculty expansion during the past 18 months, four new glaucoma specialists have joined the faculty to help accommodate this increased patient load.

**D. Wade Joiner, M.D.**, and **Andrew Mays, M.D.**, joined the department from their private practice located in Vestavia Hills, Alabama. Dr. Joiner is a long-standing glaucoma specialist in the region, specializing in surgical management of advanced glaucoma. Dr. Mays has been in private practice with Dr. Joiner over the last decade.

**Lindsay Rhodes, M.D.**, and **Brian Samuels, M.D., Ph.D.**, joined the department in 2013 as assistant professors of ophthalmology. Both are clinician-scientists who will see patients and conduct research for the department. Dr. Rhodes recently completed her fellowship at UAB and is interested in health services research and telemedicine approaches to distributed glaucoma care.

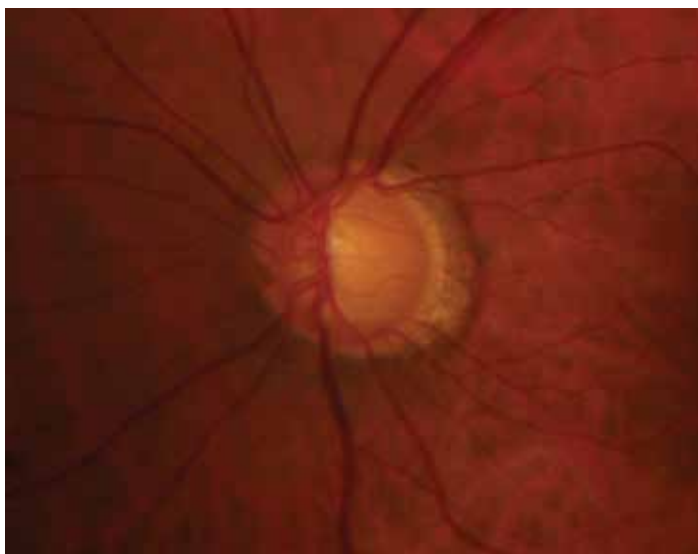
Dr. Samuels was most recently a faculty member at Eugene and Marilyn Glick Eye Institute at Indiana University.

Prior to that he completed a clinical and research fellowship at the Duke University Eye Center. Dr. Samuels is funded by the National Institute of Health to investigate how central neural mechanisms control the intraocular pressure.

Also in 2013, the department recruited a well-known researcher in the biomechanics of glaucoma, **J. Crawford Downs, Ph.D.** Dr. Downs was recruited to UAB to develop the Program for Ocular Biomechanics and Biotransport. He brought three ocular biomechanical engineers, **Rafael Grytz, Ph.D.**, **Massimo Fazio, Ph.D.**, and **Vincent Libertaux, Ph.D.**, to expand our understanding of the biomechanics of the optic nerve head and sclera in glaucoma, myopia, and related diseases.

Furthermore, Dr. Downs brings a major advancement to UAB with his novel IOP telemetry system. This unique monitoring system allows these researchers to deepen our understanding of fluctuations in IOP and may help clarify IOP's role in the development of progressive glaucomatous injury. For more about this new program please see page 6.

Building on its recruitments in ocular biomechanics, the department has received a \$1,000,000 grant from the EyeSight Foundation of Alabama to develop a multidisciplinary collaboration between three schools and five departments at UAB. This research acceleration grant includes an international collaboration with Colm O'Brien at the University College Dublin. This team of biomedical engineers, molecular and cellular biologists, and scientists are using these funds to study the underpinnings of remodeling of the sclera and lamina cribrosa, which remains one of the fundamental unknowns in glaucoma pathophysiology.



# Retina Division



The Retina Division in the UAB Department of Ophthalmology is active in striving to reach the clinical, education, and research goals of the department.

Clinically, the division treats retinal disorders, including diabetic retinopathy, retinal detachment, and age-related macular degeneration as well as provides renowned ocular trauma care.

The division's clinicians have earned a strong reputation as leaders in the treatment of complex retinal disorders. The division routinely receives referrals for complicated cases due to a demonstrated ability to provide the best care in even the most complex cases. C. Douglas Wither- spoon, M.D., also specializes in cases that are a result of complications from previous procedures.

The close relationship between the UAB Department of Ophthalmology and the UAB Callahan Eye Hospital provides clinicians with outstanding access to resources including equipment, operating rooms, and operating and paramedical personnel. Read more about this relationship and the Level One Ocular Trauma Center on page 18.

The division is also committed to the educational mission of the university and features a first-class clinical fellowship focused on the retina subspecialty. In this two-year

The UAB Retina Division has earned a strong reputation as a leader in the treatment of complex retinal disorders.

program fellows receive intense clinical training and are also encouraged to pursue research interests.

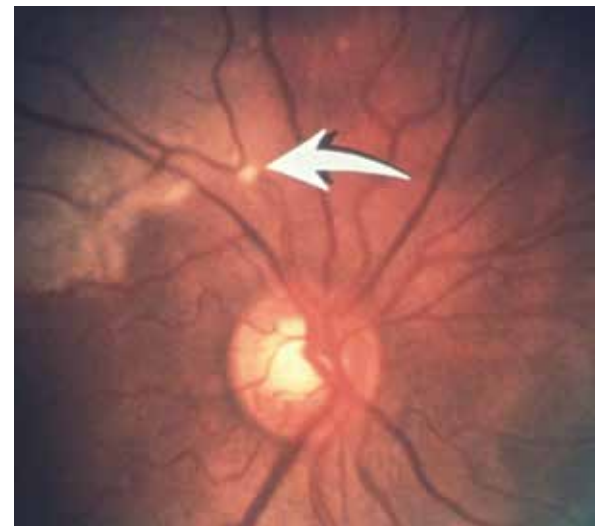
Retinal disorders are also a research focus for the department. Age-related macular degeneration is a common retinal disorder for which there is no cure. Read more about the department's multidisciplinary research efforts aimed at age-related macular degeneration on page 10.

In addition to basic research, the department is also involved in clinical research efforts focusing on age-related macular degeneration, diabetic retinopathy, and other disorders of the retina.

In line with goals to enhance primary eye care and increase accessibility to care, the department is engaged in the Innovative Network for Sight Research (INSIGHT) program, a CDC-funded collaborative vision research network of investigators at the Johns Hopkins University, University of Miami, University of Alabama at Birmingham, and Wills Eye Institute. INSIGHT's focus is to assess and evaluate system-level and individual-level factors that influence access to eye care, and the quality of eye care received. Participating centers engage in network-wide projects as well as site-specific studies.

One of UAB's INSIGHT studies are focused on a high-risk yet underserved adult population, namely African Americans residing in Jefferson County, Alabama. Rates of vision impairment and eye disease among African Americans are two times higher than those of whites, especially glaucoma and diabetic retinopathy.

The public health challenge is that if these conditions are detected early, much of this disease and vision impairment is reversible and preventable with currently avail-



Retinal photograph showing an occlusion of a large retinal artery due to an intravascular embolus (arrow).

able ophthalmic treatments. We have a unique resource to address this issue, through a partnership between the University of Alabama at Birmingham and the Cooper Green Hospital/Jefferson Health System (CGH/JHS). CGH/JHS serves residents of Jefferson County regardless of their ability to pay. Over 60 percent of adults seen at the CHS/JHS clinics have diagnoses of glaucoma and/or diabetes.

Using the CGH/JHS administrative database and studies involving individual patients in the clinics, our research center will provide system- and individual-level information on how to improve access to and quality of eye care for this underserved population. Studies will focus on diabetic retinopathy and other eye disorders.

The strong combination of clinical care, research and education in the Retina Division provides patients with access to comprehensive, cutting-edge care for all types of retinal disorders.

# GROWING FOR FUTURE CLINICAL DEMAND

*Growth of the clinical faculty has been a top priority for department Chair Christopher Girkin, M.D.*

The UAB Department of Ophthalmology has grown rapidly in both faculty size and research efforts in the nearly two years since Christopher Girkin, M.D., M.S.P.H., was named chair.

This growth is critical to meet the increasing demand for ophthalmologic services expected with our aging population and to position the department as a leader in translational vision research.

“Projections indicate that during the next five years we expect a 55 percent increase in glaucoma surgeries, 30 percent increase in retinal surgeries, and an overall

growth of 20 percent in the surgical procedures for ophthalmology,” says Dr. Girkin. “In a 10-year period those numbers more than double.”

In total, the department has added 12 new faculty members and developed four new clinics since Dr. Girkin succeeded Lanning Kline, M.D., in April 2012. As a result, total clinical volume for the department has increased more than 35 percent in the past year.

“We’ve recruited top-notch physicians to add to the breath of services we provide,” Dr. Girkin says. “This positions us to be a leader in the development of new

care-delivery models that can handle an increased patient volume while still providing high-quality care.”

The department has also bolstered its research efforts through a targeted approach that focuses on areas that maximize strengths. In basic research, the focus has been on ocular biomechanics and visual neuroscience. For more about growth in basic research and clinical research see pages 22 and 24, respectively.

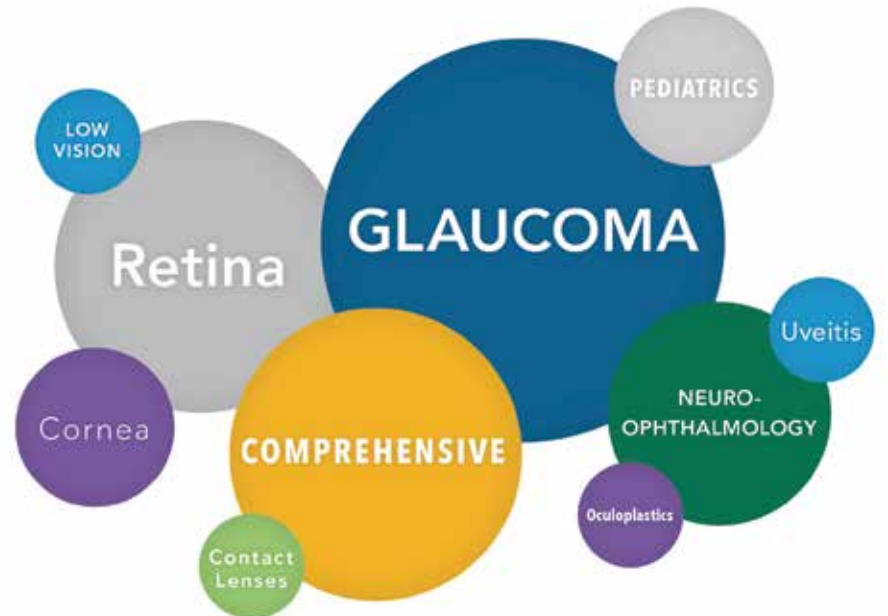
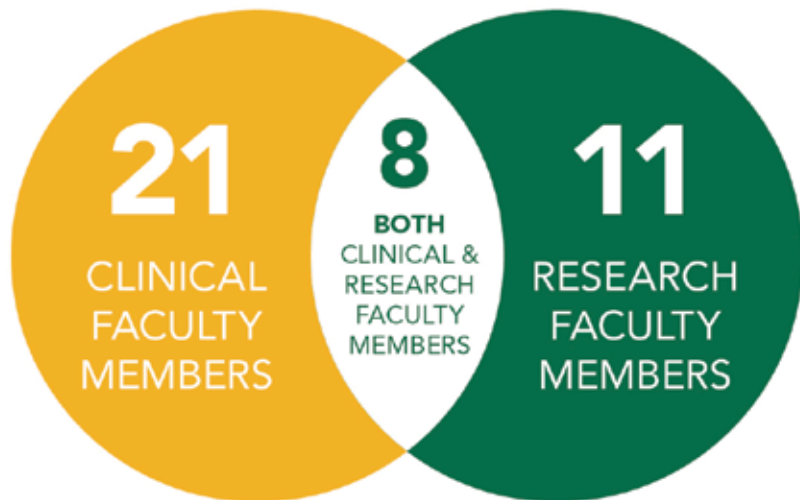
In clinical research the department’s focus is on finding novel biomarkers for blinding diseases and developing more efficient care-delivery models. These efforts have thus far brought three new grants from the National Eye Institute.

New faculty members and their subspecialties:

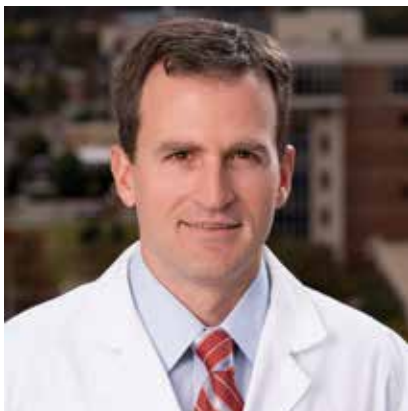
- Rita Armitage, M.D., *comprehensive*
- J. Crawford Downs, Ph.D., *ocular biomechanical engineering*
- Priscilla Fowler, M.D., *cornea*
- Paul Gamlin, Ph.D., *visual neuroscience*
- Rafael Grytz, Ph.D., *ocular biomechanical engineering*
- D. Wade Joiner, M.D., *glaucoma*
- Andrew Mays, M.D., *glaucoma*
- Cecil J. McCollum, M.D., *cornea*
- Sara Mullins, M.D., *comprehensive*
- Lina Nagia, D.O., *neuro-ophthalmology, clinical research*
- Lindsay Rhodes, M.D., *glaucoma, clinical research*
- Brian Samuels, M.D., Ph.D., *glaucoma, visual neuroscience*



New UAB Department of Ophthalmology physician faculty members (from left to right): Lina Nagia, D.O.; D. Wade Joiner, M.D.; Brian Samuels, M.D., Ph.D.; Sara Mullins, M.D.; Lindsay Rhodes, M.D.; Andrew Mays, M.D.; Priscilla Fowler, M.D.; Cecil J. McCollum, M.D.







## Michael Albert, Jr., M.D.

*Associate Professor*

### AREAS OF INTEREST

diagnostic evaluation, treatment and surgical management of diseases of the vitreous, retina, macula, and choroid

Dr. Albert is certified by the American Board of Ophthalmology. He is a retina specialist and vice president of Retina Consultants of Alabama.

He completed his residency training at the UAB Callahan Eye Hospital, followed by a two-year vitreoretinal disease and surgery fellowship at Retina Consultants of Alabama.

Dr. Albert has been awarded the American Academy of Ophthalmology Honor Award and the American Society of Retina Specialists Honor Award.

He has authored and coauthored numerous journal articles; has participated in several clinical trials; and has presented scientific posters, platform presentations, scientific videos, and instruction courses at state, national, and international ophthalmology societal meetings.



## Ann Marie Arciniegas-Bernal, M.D.

*Associate Professor*

### AREAS OF INTEREST

comprehensive pediatric ophthalmology, adult strabismus, pediatric cataracts

Dr. Arciniegas-Bernal's clinical practice is focused on providing comprehensive pediatric ophthalmology care as well as adult strabismus evaluations and treatments.

Dr. Arciniegas-Bernal is currently involved in collaborative clinical research with other UAB divisions, including a clinical trial regarding cystic fibrosis with the division of pulmonary, allergy, and critical care medicine, as well as a clinical trial that involves retinopathy of prematurity (ROP) with the neonatology division in the department of pediatrics.

Dr. Arciniegas-Bernal is a Birmingham native and received a Bachelor of Arts in history from Duke University. She attended the UAB School of Medicine. She completed her internship and ophthalmology residency at Henry Ford Hospital in Detroit, Mich. She then completed a fellowship in pediatric ophthalmology and strabismus at the University of Michigan in Ann Arbor, under the mentorship of Monte Del Monte, M.D., and Steven Archer, M.D.

Dr. Arciniegas-Bernal is board certified in ophthalmology and is a member of the American Academy of Pediatric Ophthalmology and Strabismus and the American Academy of Ophthalmology.



## Rita Armitage, M.D.

*Associate Professor*

### AREAS OF INTEREST

comprehensive ophthalmology, cataract surgery, posterior capsule opacification

Dr. Armitage is a comprehensive ophthalmologist specializing in laser surgery for posterior capsule opacification, which is the most common complication of cataract surgery occurring in more than 50 percent of patients. In addition to post-operative cataract exams, she also performs complete eye exams and follow-up visits for anterior segment surgery complications.

Dr. Armitage has been practicing in Bessemer, Ala., for more than 20 years and was a clinician at Medical West prior to joining the faculty in 2013. She has helped the department establish its new satellite clinic at Medical West.

A Kentucky native, Dr. Armitage graduated from the University of Kentucky School of Medicine. Following graduation, she relocated to Birmingham for an internship at the Carraway Medical Center, and then completed her residency and fellowship training with the UAB Department of Ophthalmology. She is board certified by the American Board of Ophthalmology.



## Martin S. Cogen, M.D.

*Chief, Division of Pediatric Ophthalmology and Strabismus; Professor*

### AREAS OF INTEREST

pediatric ophthalmology, strabismus

Dr. Cogen is chief of the division of pediatric ophthalmology and strabismus. He treats pediatric patients for all types of ophthalmologic conditions, including simple refractive errors, as well as numerous medical and surgical diseases affecting children's vision (*i.e.*, strabismus, amblyopia, and congenital cataracts). Dr. Cogen also specializes in complicated cases of adult strabismus.

Dr. Cogen actively participates in charitable outreach programs with organizations such as Sight Savers America, in underserved regions of Alabama. Through these programs he sees pediatric patients who have already failed an eye exam signaling they

may have a vision issue. He is then able to make a diagnosis and prescribe the appropriate treatment.

Dr. Cogen has been a member of the UAB Department of Ophthalmology since 1989 and is a member of the American Academy of Ophthalmology and the American Association for Pediatric Ophthalmology and Strabismus. He received his medical degree from the UAB School of Medicine. He completed his internship in the UAB Department of Medicine and his residency with the UAB Department of Ophthalmology. He completed a fellowship in pediatric ophthalmology and strabismus with Zane Pollard, M.D., at the James Hall Eye Center at Scottish Rite Children's Hospital in Atlanta, Ga.



## R. Jeffrey Crain, M.D.

*Director, Birmingham Veterans Affairs Medical Center Ophthalmology Service; Associate Professor*

### AREAS OF INTEREST

comprehensive ophthalmology, cataract surgery, resident education, veterans affairs

Dr. Crain serves as the director of the Birmingham Veterans Affairs Medical Center Ophthalmology Service. He manages the daily operations of this clinic, which sees about 11,500 patients annually. Dr. Crain also participates in the department's resident training program.

He is specifically interested in teaching cataract surgery. In most of the 450 cataract surgeries the Veterans Affairs Clinic performs annually, a third-year resident serves as the primary surgeon,

with Dr. Crain or Andrew Everett, M.D., attending.

In order to advance training methods in cataract and other ophthalmic surgeries, Dr. Crain has embarked on a project to develop synthetic eye models. Dr. Crain believes these models can serve a purpose similar to that of flight simulators, but notes they will only be useful if the synthetic eyes are anatomically correct and behave as a human eye during surgical procedures. Currently, he is assembling a multidisciplinary team for this project.

Dr. Crain is certified by the American Board of Ophthalmology and is a member of the American Academy of Ophthalmology.



## Christine A. Curcio, Ph.D.

*Eminent Scholar in Retina; Director, AMD Histopathology Laboratory; Professor*

### AREAS OF INTEREST

aging and age-related macular degeneration — pathogenesis, image validation, and genomics

Dr. Curcio's research focuses on pathobiology and imaging correlates of chorioretinal pathology associated with age-related macular degeneration, capitalizing on an outstanding local resource for human eye tissues, the Alabama Eye Bank. She has authored or coauthored more than 90 peer-reviewed journal articles and given more than 150 invited lectures.

Dr. Curcio trained in neurobiology of aging and vision at the University of Wisconsin-Madison, University of Rochester (Ph.D.), Boston University, and University of Washington. She was awarded the Roger H. Johnson Prize in Macular Degeneration Research from University of Washington (2002); Association for Research in Vision and Ophthalmology Silver Fellow (2009) and Gold Fellow (2010); and Prix Soubrane de la Recherche en Ophtalmologie (2011).



## Dawn DeCarlo, O.D., M.S.

*Director, Center for Low Vision Rehabilitation; Associate Professor*

### AREAS OF INTEREST

low vision rehabilitation, pediatric vision impairment

Dr. DeCarlo is Director of the Center for Low Vision Rehabilitation (CLVR), where she treats patients with decreased vision that cannot be corrected medically or surgically. She is nationally known for both her clinical care of patients with low vision and her research related to vision impairment. She is a Diplomate in the Low Vision Section of the American Academy of Optometry, the highest clinical honor in her field.

Dr. DeCarlo has received National Eye Institute and EyeSight Foundation of Alabama funding to study vision impairment due to age-related macular degeneration, as well as pediatric vision

impairment. Her current project addresses the accommodative system, attention, and reading abilities of children with permanent vision impairment. She also runs a successful support group for visually impaired children and their families with the support of Songs for Sight.

She earned her Doctor of Optometry, Master of Science in Physiological Optics, and Master of Science in Public Health from UAB. She completed residency training in rehabilitative and hospital-based optometry at the Hines Central Blind Rehabilitation Center and the Chicago West Side Veterans Administration Medical Center. She is a member of the Vision Science Research Center and the Comprehensive Neuroscience Center.



## J. Crawford Downs, Ph.D.

*Vice Chairman, Basic Research; Director, Program of Ocular Biomechanics and Biotransport; Professor*

### AREAS OF INTEREST

glaucoma, ocular biomechanics

Dr. Downs joined the department as the founding director of the Program for Ocular Biomechanics and Biotransport. His research focuses on understanding how intraocular pressure (IOP) leads to the development and progression of glaucoma.

He uses a combination of engineering- and imaging-based approaches in eyes from both human donors and animal models to study the biomechanical response of the optic nerve head to IOP as it relates to age, racial background, and glaucomatous injury.

He has authored or co-authored more than 160 journal articles, conference abstracts, and book chapters.

Dr. Downs is a Ph.D. biomechanical engineer who trained at Tulane University and the Louisiana State University Eye Center. He is internationally recognized as one of the leaders in ocular biomechanics, especially as it relates to the optic nerve head, sclera, and glaucoma. Dr. Downs holds secondary appointments as a professor of biomedical engineering with UAB, Tulane University, and Oregon Health and Science University. He also holds a secondary appointment as professor of computer and information sciences at UAB.



## Laura Dreer, Ph.D.

*Director, Psychological & Neuropsychology Clinical Research Services; Assistant Professor*

### AREAS OF INTEREST

adjustment to chronic health conditions; development of health promotion interventions for patients and family caregivers

Dr. Dreer's areas of clinical research concentration are three fold: (1) examining the role of social cognitive (e.g., problem-solving abilities) and lifestyle factors on adjustment to chronic health conditions, (2) development of health promotion and lifestyle interventions to improve health outcomes and adjustment, and (3) evaluating competency-related issues (i.e., medical decision-making, management of finances, driving). She holds secondary appointments in the departments of Physical Medicine and Rehabilitation, Neurology, and Psychology.

Dr. Dreer has two subspecialty areas of postdoctoral training in rehabilitation psychology (UAB) and neuropsychology (Duke University). Her doctorate is in clinical psychology from Central Michigan University.

She has been awarded several grants through the National Institutes of Health, the National Institute on Disability and Rehabilitation Research, Research to Prevent Blindness, the Brain Tumor Network, and the EyeSight Foundation of Alabama. She has also received numerous awards in recognition of her research and service. Lastly, she serves as an associate editor for the *Journal of Clinical Psychology in Medical Settings* and is on the editorial board for *Rehabilitation Psychology*.



## Andrew W. Everett, M.D.

*Assistant Professor*

**AREAS OF INTEREST**

glaucoma, cataract surgery, veterans affairs

Dr. Everett is a glaucoma specialist with the Birmingham Veterans Affairs Medical Center Ophthalmology Service. Dr. Everett is active in the department's resident education program. He focuses on training residents in cataract surgery and the medical and surgical treatment of glaucoma.

A native of Conyers, Ga., Dr. Everett completed his undergraduate studies at Auburn University and obtained his medical degree at the University of South Alabama College of Medicine. He completed a medical internship at Baptist Health Systems in Birmingham, followed by an ophthalmology residency at UAB. Dr. Everett also completed a glaucoma fellowship at UAB. He is a member of the American Academy of Ophthalmology.



## Richard M. Feist, M.D.

*Associate Professor*

**AREAS OF INTEREST**

diagnostic evaluation, treatment, and surgical management of diseases of the vitreous, retina, macula, and choroid

Dr. Feist is certified by the American Board of Ophthalmology. He is the president of Retina Consultants of Alabama. He completed his residency training at the University of Illinois Eye and Ear Infirmary, followed by a two-year vitreoretinal disease and surgery fellowship at the University of Iowa.

Dr. Feist has been awarded the American Academy of Ophthalmology Honor Award and the American Society of Retina

Specialists Honor Award. He has authored and coauthored numerous journal articles; has participated in several clinical trials; and has presented scientific posters, platform presentations, scientific videos, and instruction courses at state, national, and international ophthalmology societal meetings during his twenty-five year practice.

Dr. Feist annually participates in the Friends of Rudy (FOR) Nicaragua Health Mission, where he volunteers to provide surgical training for Nicaraguan ophthalmologists.



## Priscilla G. Fowler, M.D.

*Director, UAB Cornea Service; Assistant Professor*

**AREAS OF INTEREST**

cornea and external disease; refractive cataract surgery

Dr. Fowler is the director of the UAB Cornea Service and specializes in refractive cataract surgery, endothelial keratoplasty, infectious diseases of the cornea, and severe dry eye/ocular surface disease. Prior to joining UAB Callahan Eye Hospital Clinics in 2012, Dr. Fowler successfully practiced comprehensive ophthalmology for nearly eight years in Destin, Fla.

She serves on the medical advisory board for Global Sight

Network and strives to increase public knowledge about eye diseases and blindness prevention by participating in health fairs and other community events.

Dr. Fowler completed her fellowship training in cornea and external disease/refractive surgery at the Wills Eye Institute in Philadelphia, Pa., and is a member of the American Academy of Ophthalmology, the American Society of Cataract and Refractive Surgeons, the Cornea Society, the Alabama Academy of Ophthalmology, and the American Medical Association.



## Paul Gamlin, Ph.D.

*Professor*

### AREAS OF INTEREST

neural control of eye movements, retinal and central visual processing, circadian rhythms and autonomic control of the eye, gene therapy to treat blinding diseases

Dr. Gamlin's research focuses on the visual system and eye movements in health and disease. He is currently investigating the neural pathways involved in coordinated movement of the eyes and the non-image forming retinal pathways involved in circadian rhythms, light-evoked pupillary responses, sleep, migraine, and mood. He is also developing novel gene therapy techniques to treat individuals with photoreceptor loss due to

disease or injury. He has authored or coauthored more than 140 journal articles, abstracts, and book chapters.

Dr. Gamlin trained in zoology (University of Cambridge) and neurobiology and behavior (Stony Brook University). He previously served as director of the UAB Vision Science Research Center, the UAB Neuroscience Graduate Program, and the Center for the Development of Functional Imaging, as well as chair of the Department of Vision Sciences. His research program has been funded continuously by grants from the National Eye Institute since 1989. He is a past recipient of the UAB President's Award for Excellence in Teaching.



## Christopher A. Girkin, M.D., M.S.P.H.

*EyeSight Foundation of Alabama, Professor and Chair; Chief Medical Officer, UAB Callahan Eye Hospital*

### AREAS OF INTEREST

surgical management of adult and pediatric glaucoma; complex cataract

Dr. Girkin's research focuses on racial variation in clinical measures of optic nerve structure, along with basic research investigating the effects of age, race and glaucomatous injury on the morphology and biomechanical behavior of the lamina cribrosa and sclera. He has authored or coauthored more than 200 journal articles, abstracts, and book chapters.

Dr. Girkin is subspecialty trained in both neuro-ophthalmology (Johns Hopkins' Wilmer Eye Institute) and glaucoma (Heed Fellow, Shiley Eye Center, University of California, San Diego).

He has been awarded the American Glaucoma Society Clinician-Scientist Award (2003 and 2004), the Research to Prevent Blindness Physician-Scientist Award (2005), and the Ronald Lowe Medal (2008). He has been selected as one of the "Best Doctors in America" yearly since 2003.



## Rafael Grytz, Ph.D.

*Assistant Professor*

### AREAS OF INTEREST

growth and remodeling mechanisms in myopia, keratoconus, and glaucoma

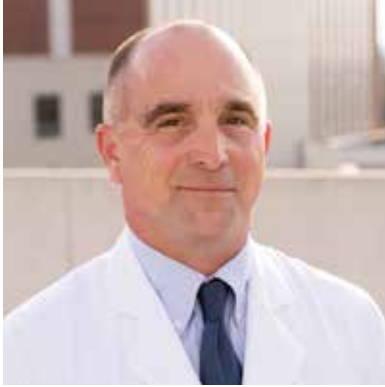
Dr. Grytz's research focuses on the development of experimental and computational methods to quantify and simulate growth and remodeling in the eye.

His experimental work involves the imaging of collagen remodeling in the living eye tissue. The experimental observations are translated into predictive simulation tools, which involve the

development of computational multiscale methods at various length scales, from the molecule to the organ.

Dr. Grytz has presented and published his research work across different research disciplines in more than 30 abstracts, 10 invited lectures, two book chapters, and 10 journal articles in premier conferences and journals related to ophthalmology, bioengineering, and computational mechanics.

Dr. Grytz also holds a secondary appointment in the UAB Department of Biomedical Engineering as an assistant professor.



## Clyde Guidry, Ph.D.

*Associate Professor*

AREAS OF INTEREST  
cell biology, retina

Dr. Guidry's studies are directed toward understanding the cell biology of acute (retinal tears and detachment) and chronic (diabetic retinopathy) fibroplastic changes in the retina.

Dr. Guidry completed his undergraduate studies at the University of Texas, Arlington (1981) and graduate studies in Cell Biology at the University of Texas Health Science Center Dallas (1986). After postdoctoral studies in biochemistry at UAB, Dr. Guidry joined the Department of Ophthalmology in 1992.



## D. Wade Joiner, M.D.

*Associate Professor*

AREA OF INTEREST  
glaucoma

Dr. Joiner is a member of the UAB Glaucoma Service. He has an interest in treating complicated glaucoma cases, as well as teaching residents and fellows. He sees patients at the UAB Callahan Eye Hospital and at the clinic's Vestavia and Gadsden locations.

He ran a successful glaucoma practice in the Birmingham area

for more than 20 years before joining the department in 2013. Dr. Joiner is an active member of both the Alabama and American academies of ophthalmology.

A graduate of the University of South Alabama College of Medicine, Dr. Joiner interned at Carraway Methodist Medical Center in Birmingham and completed his ophthalmology residency at UAB. Dr. Joiner is fellowship trained in glaucoma from the New York Eye and Ear Infirmary.



## Judith A. Kapp, Ph.D.

*Professor Emeritus*

AREAS OF INTEREST  
age-related macular degeneration, immunological tolerance

Dr. Kapp is professor emeritus in the UAB Department of Ophthalmology. Her research interests include identifying mechanisms of antigen-specific immunological tolerance to develop novel therapies for preventing ocular allograft rejection of retinal pigment epithelial cells (RPE) without the continuous use of immunosuppressive drugs. Dr. Kapp is also studying the transplantation of RPE cells as a treatment for AMD.

Dr. Kapp joined UAB in 2004 and was previously on faculty at Emory University, Texas Tech University, and the University of Washington. A native of Akron, Ohio, she received a B.A. from

Miami University in Oxford, Ohio, and then completed an M.S. in microbiology at Indiana University Medical School. She completed doctoral studies in immunology at Harvard University, where she received a Ph.D. in 1976.

Although Dr. Kapp no longer maintains an active research laboratory, she continues to serve the research community as a volunteer on a subcommittee for establishing online forms for the UAB Institutional Animal Care and Use Committee. In addition, she serves as a reviewer for several scientific journals and as an ad hoc peer reviewer for the Diseases and Pathophysiology of the Visual System (DPVS) study section for the National Institutes of Health.



## Lanning B. Kline, M.D.

*Professor*

AREA OF INTEREST  
neuro-ophthalmology

Dr. Kline's clinical practice encompasses all aspects of neuro-ophthalmology. In his practice, Dr. Kline collaborates with neurologists and neurosurgeons to provide comprehensive diagnosis and treatments of neurological disorders. This includes abnormal eye movement, blepharospasm, brain tumors, double vision, multiple sclerosis, myasthenia gravis, optic nerve disease, stroke affecting vision, and thyroid eye disease.

Dr. Kline is the author of *Neuro-Ophthalmology Review Manual*, which released its seventh edition in 2013. He is also the editor-in-chief of the *Journal of Neuro-Ophthalmology*.

From 1998-2011 Dr. Kline served as chair of the department, and

his leadership transformed the department into a well-respected academic department.

Dr. Kline is certified by the American Board of Ophthalmology, is a member of the North American Neuro-Ophthalmology Society, and a Fellow of the American College of Surgeons. He is a Director of the American Board of Ophthalmology. Dr. Kline has been named as one of the "Best Doctors in America" yearly since 1992, the first year the list was published.

Dr. Kline is a native of Edmonton, Alberta. He graduated from the Duke University School of Medicine, where he also did his internship. His residency training was at McGill University, Montreal. He completed fellowships in neuro-ophthalmology at the Montreal Neurological Institute and at the Bascom Palmer Eye Institute, Miami, Fla.



## Virginia Lolley, M.D., F.A.C.S.

*Assistant Professor*

AREA OF INTEREST  
refractive cataract surgery

Dr. Lolley practices comprehensive ophthalmology with a special interest in refractive cataract surgery. She was the first ophthalmologist at the UAB Callahan Eye Hospital to become certified on the new LenSx®, by Alcon, laser for cataract surgery. Dr. Lolley's more than 15 years of experience in LASIK eye surgery and premium intraocular lenses enables her to focus on obtaining the best post-operative visual results for her patients using the

latest technology.

Dr. Lolley joined the department in 1998. She is a member of the American Academy of Ophthalmology, the American Society of Cataract and Refractive Surgery, Alabama Academy of Ophthalmology, and the American College of Surgeons. Dr. Lolley has been selected as one of the "Best Doctors in America" yearly since 2007. She currently serves as President of the Medical Staff for the UAB Callahan Eye Hospital.



## John O. Mason, M.D.

*Director, Retina Service; Associate Professor*

AREAS OF INTEREST  
diagnostic evaluation, treatment, and surgical management of diseases of the vitreous, retina, macula, and choroid

Dr. Mason is vice president of Retina Consultants of Alabama. He is certified by the American Board of Ophthalmology. He completed his residency training at the UAB Callahan Eye Hospital followed by a two-year vitreoretinal disease and surgery fellowship at Wills Eye Hospital in Philadelphia, Penn.

Dr. Mason has been awarded the American Academy of Ophthalmology Honor Award and the American Society of Retina Specialists Honor Award. He has been selected as one of the "Best Doctors in America" yearly since 2009. Dr. Mason has authored and coauthored numerous journal articles and book chapters; has participated in several clinical trials; and has presented scientific posters, platform presentations, scientific videos, and instruction courses at state, national, and international ophthalmology societal meetings during his twenty years of practice.



## Andrew Mays, M.D.

*Associate Professor*

AREA OF INTEREST  
glaucoma

Dr. Mays joined the faculty as part of the UAB Glaucoma Service in 2013. Dr. Mays treats glaucoma patients at UAB Callahan Eye Hospital as well as at the clinic's Vestavia location. He is an active participant in the department's residency program and helps train residents interested in glaucoma.

Prior to joining the faculty Dr. Mays was in private practice in the Birmingham area. He is a member of the American Glaucoma

Society, the Academy of Ophthalmology, the Alabama Academy of Ophthalmology and the Medical Association of the State of Alabama.

Dr. Mays is a graduate of the UAB School of Medicine. He served an internship at Carraway Methodist Medical Center, Birmingham, completed a residency in ophthalmology at UAB and a fellowship in glaucoma at the University of Florida.

Dr. Mays is also an accomplished pianist, and won the Van Cliburn International Amateur Pianist Competition in 2007.



## Cecil J. McCollum, M.D.

*Director of Emergency Services and Ocular Trauma; Clinical Assistant Professor*

AREA OF INTEREST  
ocular trauma

Dr. McCollum is the director of emergency services and ocular trauma for the UAB Callahan Eye Hospital. He sees patients with ocular emergencies, supervises the medical care of the department, and works together with other staff in planning and evaluating the work of the department.

He is active in global outreach efforts to bring ophthalmic

services to underserved communities. From 1998-2012, Dr. McCollum worked on childhood eye care projects in the Central Asian countries of Uzbekistan and Kyrgyzstan.

Dr. McCollum is subspecialty trained in cornea and external disease from Duke University. He recently earned a Certificate in Global Health Studies from the Sparkman Center at UAB. He is a fellow in the American Academy of Ophthalmology and currently serves on committees for health records implementation and patient care at the UAB Callahan Eye Hospital.



## Gerald McGwin, M.S., Ph.D.

*Associate Director of the Clinical Research Unit; Professor*

AREA OF INTEREST  
epidemiology

Dr. McGwin is vice chairman and professor in the UAB Department of Epidemiology and holds a secondary appointment in the Department of Ophthalmology, where he currently serves as the associate director for the UAB Clinical Research Unit. He is also director of advanced enterprise analytics for UAB Health System and the biostatistics, epidemiology, and research design component of the UAB Center for Clinical and Translational Science.

Dr. McGwin has authored or coauthored over 450 peer-reviewed manuscripts, with an emphasis on the epidemiology of injury, aging, eye disease and vision impairment and systemic lupus erythematosus.

Dr. McGwin is an expert in the design and analysis of epidemiologic studies and in the design, operation, and analysis of clinical data registries. He oversees the UAB Trauma and Burn Registry and the United States Eye Injury Registry.





## Sara Mullins, M.D.

*Clinical Instructor*

### AREAS OF INTEREST

comprehensive ophthalmology, cataract surgery

Dr. Mullins is a comprehensive ophthalmologist who provides a wide array of clinical services for conditions including cataracts, dry eye, diabetes, glaucoma, macular degeneration, and contact lenses as well as trauma and emergency services. Dr. Mullins primarily sees patients daily at the department's satellite clinic located on the campus of St. Vincent's, and performs cataract and other outpatient surgeries at the UAB Callahan Eye Hospital.

She completed her residency at UAB and served as chief resident during her last year of training. A native of Louisiana, Dr. Mullins received her medical degree from Louisiana State University Health Sciences, Shreveport, and is a member of Alpha Omega Alpha, the American Academy of Ophthalmology, the American Society of Cataract and Refractive Surgery, and the Alabama Academy of Ophthalmology.



## Lina Nagia, D.O.

*Assistant Professor*

### AREAS OF INTEREST

neuro-ophthalmic diseases

Dr. Nagia joined the faculty as an assistant professor of ophthalmology in 2013. Dr. Nagia completed her ophthalmology residency training at Valley Hospital Medical Center in Las Vegas, Nev., followed by a fellowship in medical retina at Koch Eye Associates in Warwick, R.I. She then concluded a second fellowship in neuro-ophthalmology at Michigan State University.

In addition to her clinical practice, Dr. Nagia is pursuing research focused on non-glaucomatous optic neuropathies. Her research will focus on utilizing imaging modalities to investigate structural changes within the optic disc resulting from ischemic, compressive, and other injury mechanisms.



## Cynthia Owsley, Ph.D.

*Nathan E. Miles Chair of Ophthalmology; Director, Clinical Research Unit; Vice Chair for Clinical Research; Professor*

### AREAS OF INTEREST

aging-related vision impairment and eye disease; vision and driving; improving eye care access and quality for underserved, vulnerable populations

Dr. Owsley's research focuses on the impact of aging on vision. Her studies address why some older adults in normal macular health transition to age-related macular degeneration, the leading cause of blindness in older adults in the U.S. Dr. Owsley's research also addresses the relationship between vision and driving and strategies that can improve routine eye care utilization among populations at risk for eye disease and vision

impairment. She is particularly interested in the translation of research findings into public policy in these arenas.

Dr. Owsley has been continuously funded by the National Institutes of Health since 1983. She is the recipient of the Glenn A. Fry Award from the American Optometric Foundation and the Bartimaeus Award from the Detroit Institute of Ophthalmology. She is a Gold Fellow of the Association for Research in Vision and Ophthalmology, a Senior Scientific Scholar at Research to Prevent Blindness Inc., and a member of the Board of Directors of Prevent Blindness.



## Russell W. Read, M.D., Ph.D.

*Director, Uveitis/Ocular Inflammatory Disease Service; Director, UAB Ophthalmology Residency Program; Professor*

### AREAS OF INTEREST

ocular inflammatory diseases, including uveitis, iritis, and scleritis; role of complement in ocular diseases, including uveitis, macular degeneration; resident education

Dr. Read is the director of the uveitis/ocular inflammatory disease service and the director of the ophthalmology residency program. Dr. Read's clinical practice and research focuses on uveitis and ocular inflammatory disease. In his research, Dr. Read's goal is to understand the underlying reasons for health

disparities among patients with uveitis. To accomplish this goal, current areas of focus are two-fold. First, clinical data from patient care clinics is used to establish patient characteristics that predict worse disease severity and outcomes. Secondly, using an animal model of uveitis, Dr. Read is exploring the effect of melanin on disease severity.

Dr. Read has authored or coauthored more than 120 papers, book chapters, and abstracts.



## Lindsay Rhodes, M.D.

*Assistant Professor*

### AREAS OF INTEREST

cataract surgery; medical and surgical management of adult glaucoma

Dr. Rhodes' clinical research interests include understanding and developing new strategies, such as provider extenders and telemedicine, to provide quality, cost-effective glaucoma care to a rapidly growing aging population. She is currently involved in a demonstration program funded by the Centers for Disease Control, named EQUALITY, that aims to increase detection and treatment of glaucoma among an at-risk population using a novel telemedicine approach. Patients receive comprehensive

eye exams and imaging of the optic nerve at community-based optometrist offices. The exam and imaging data are then electronically sent to the UAB Optic Nerve Imaging Center for review and diagnosis by a fellowship-trained glaucoma specialist. For more about the project see page 16.

She has an interest in advocating for ophthalmology and her patients, and as such, serves on the Board of Directors of the Alabama Academy of Ophthalmology as well as on the Young Ophthalmologist Advocacy Subcommittee of the American Academy of Ophthalmology. Dr. Rhodes received her subspecialty training in glaucoma at UAB.



## Carol Rosenstiel, O.D., F.A.A.O.

*Director, Contact Lens Service; Associate Professor*

### AREAS OF INTEREST

contact lenses; primary eye care

Dr. Rosenstiel joined the faculty in 1992 and is the director of the contact lens service and an associate professor of ophthalmology. She holds a secondary appointment in the School of Optometry.

Dr. Rosenstiel is a primary eye care practitioner with an emphasis in contact lenses. She treats patients with a variety of complex conditions that require custom contact lenses. Dr. Rosenstiel has more than 20 years experience fitting scleral,

rigid gas permeable, multi-focal, and astigmatic contact lenses. She routinely treats patients with keratoconus, ocular trauma, corneal transplants, dry eye conditions, aphakia, and medical conditions that require contact lens treatment.

She is an active member of the American Optometric Association and a fellow of the American Academy of Optometry.

Dr. Rosenstiel was an investigator in the 10-year Collaborative Longitudinal Evaluation of Keratoconus study, which characterized the progression of keratoconus over a broad spectrum of disease severity.



## Brian C. Samuels, M.D., Ph.D.

*Assistant Professor*

### AREAS OF INTEREST

medical and surgical treatment of glaucoma, including laser therapy; comprehensive ophthalmology, including cataract surgery; research and development of glaucoma devices; role of the central nervous system in the development and progression of glaucoma

Dr. Samuels' research interest is in understanding how the central nervous system controls both intraocular and intracranial pressure. In addition, he hopes to better understand how alterations in the translaminal pressure gradient cause the development and progression of glaucoma and other eye diseases. As a clinician-scientist, Dr. Samuels' ultimate goal is to bridge the gap

between current clinical knowledge and new scientific discoveries to ensure that patients at UAB receive the most comprehensive and up-to-date care available.

Dr. Samuels is subspecialty trained in glaucoma, having completed a two-year clinical and research fellowship in glaucoma at Duke University. During fellowship, he was awarded the Hornaday Fellowship Award (2010) for his outstanding work. In addition, Dr. Samuels has been awarded an American Glaucoma Society Clinician-Scientist Award (2010), the Indiana CTSI Young Investigator Award (2011), and the ARVO/Alcon Early Career Clinician-Scientist Research Award (2013).



## Jennifer Scruggs, M.D.

*Director, Division of Oculoplastic Surgery; Associate Professor*

### AREAS OF INTEREST

ophthalmic plastic, reconstructive, orbital and cosmetic surgery

Dr. Scruggs' clinical practice is focused on the surgical treatment of eyelid, lacrimal, and orbital disorders in adults and children. Her practice includes both reconstructive and cosmetic surgery.

As director of the division of oculoplastic surgery, she is also involved in teaching resident physicians both fundamental and advanced surgical techniques in ophthalmic plastic surgery.

Dr. Scruggs joined the UAB Department of Ophthalmology in 2006. She is subspecialty trained in oculoplastic surgery, having completed a two-year fellowship accredited by the American Society of Ophthalmic Plastic and Reconstructive Surgery at New York University, Columbia University, New York Eye and Ear Infirmary, and Manhattan Eye, Ear and Throat Hospital. She completed her ophthalmology residency at Emory University following an internship at the Mayo Clinic, Jacksonville, Fla.



## Harold Skalka, M.D.

*Professor*

### AREAS OF INTEREST

ophthalmic ultrasound, psychophysics, visual electrophysiology

Dr. Skalka's clinical practice focuses on diagnostics and he has been a member of the UAB Department of Ophthalmology since 1973. He served as chair of the department from 1981 to 1997.

Dr. Skalka is certified by the American Board of Ophthalmology (1972). He is a fellow of the American Academy of Ophthalmology, the American College of Surgeons, and the American College of Nutrition. He is a member of the American Academy of Ophthalmology, the Association for Research in Vision and

Ophthalmology, and Research to Prevent Blindness.

A native of New York City, Dr. Skalka received his Bachelors of Arts from Cornell University, Ithaca, NY, in 1962. He received his medical degree from New York University School of Medicine in 1966. Following internship at Greenwich Hospital, Greenwich, Conn., Dr. Skalka completed an ophthalmology residency at NYU Medical Center in New York. He then completed a fellowship in retinal electrophysiology and ultrasonography at NYU Medical Center. Following military service as Chief of Ophthalmology at Maxwell Air Force Base in Montgomery, Dr. Skalka joined the UAB Department of Ophthalmology.



## Jason Swanner, M.D.

*Medical Director, Clinical Services; Fellowship Director, UAB Glaucoma Service; Associate Professor*

### AREAS OF INTEREST

glaucoma, anterior segment surgery, cataract surgery

Dr. Swanner's clinical practice focuses on glaucoma, anterior segment surgery, and cataract surgery. He also serves as the medical director for clinical services and the fellowship director for the UAB Glaucoma Service.

Dr. Swanner joined the faculty in 2003, and has been named one of "America's Best Doctors" in 2012 and 2013. He is a member of the American Academy of Ophthalmology, the Chan-

dlar-Grant Glaucoma Society, American Glaucoma Society, and a fellow in the American College of Surgeons.

An Alabama native, Dr. Swanner completed his undergraduate studies at Samford University and obtained his medical degree at the University of South Alabama College of Medicine. He completed a medical internship at Baptist Health Systems in Birmingham, Ala., followed by an ophthalmology residency at UAB. His glaucoma fellowship training was performed at the Massachusetts Eye and Ear Infirmary, Harvard School of Medicine.



## Martin Thomley, M.D.

*Associate Professor*

### AREAS OF INTEREST

diagnostic evaluation, treatment, and surgical management of diseases of the vitreous, retina, macula, and choroid

Dr. Thomley is vice president of Retina Consultants of Alabama. He is certified by the American Board of Ophthalmology. He completed his residency training at the Bascom Palmer Eye Institute in Miami, Fla., followed by a two-year vitreoretinal disease and surgery fellowship at Bascom Palmer.

Dr. Thomley has authored and coauthored numerous journal articles; has participated in several clinical trials; and has presented scientific posters, platform presentations, scientific videos, and instruction courses at state, national, and international ophthalmology societal meetings during his twenty year practice. Dr. Thomley supports the World Gospel Mission and has volunteered to provide ophthalmic surgical training to physicians in Kenya.



## Michael S. Vaphiades, D.O.

*Chief, Neuro-Ophthalmology and Electrophysiology Services; Professor*

### AREA OF INTEREST

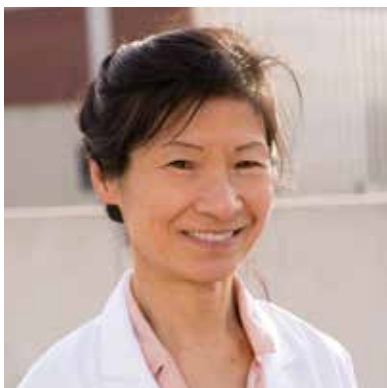
neuro-ophthalmology

Dr. Vaphiades evaluates and treats patients with visual dysfunction referable to the central nervous system. He holds joint appointments as professor of neurology and professor of neurosurgery.

He completed a medical internship at Brown University, followed by a neurology residency at Loyola University, Chicago.

His neuro-ophthalmology fellowship training was performed at Michigan State University. Dr. Vaphiades joined the UAB Department of Ophthalmology in 2002.

Dr. Vaphiades has been selected as one of the "Best Doctors in America" yearly since 2003. He has received the American Academy of Ophthalmology Achievement Award and Senior Achievement Award, and has also been published in multiple peer-reviewed publications.



## Shu-Zhen Wang, Ph.D.

*Professor*

### AREAS OF INTEREST

photoreceptor regeneration in the mammalian eye

Dr. Wang's lab investigates a novel approach to generating photoreceptor cells in the mammalian eye — reprogramming the retinal pigment epithelium (RPE) with a pro-photoreceptor gene to channel RPE's well-known capacities of proliferation and plasticity toward photoreceptor production in situ in the eye. The ultimate goal is to repopulate the retina afflicted with photoreceptor degeneration with new cells generated in situ/on site, without involving cell transplantation and associated risks and complications.

Dr. Wang joined the faculty in 1995. Her vision research began at the Wilmer Eye Institute of Johns Hopkins University and has been supported by the National Eye Institute/NIH, the EyeSight Foundation of Alabama, the International Retinal Research Foundation, Research to Prevent Blindness and other private foundations.

Dr. Wang has served on various national and international research grant review panels. She has reviewed manuscripts for a number of scientific journals and recently served as editor of *Retinal Development: Methods and Protocols, Methods in Molecular Biology, Springer Protocols* (Humana Press).



## Douglas Witherspoon, M.D., F.A.C.S.

*Director, Vitreoretinal Fellowship Program; Professor*

### AREAS OF INTEREST

vitreoretinal surgery, ocular trauma, microsurgical instrument development, translational research, retinal gene therapy

Dr. Witherspoon is an experienced vitreoretinal and ocular trauma surgeon and has been a member of the UAB Department of Ophthalmology since 1982. Dr. Witherspoon is certified by the American Board of Ophthalmology and is a fellowship-trained subspecialist in the fields of vitreoretinal surgery and ocular trauma. He is the co-founder of the United States Eye Injury Registry. Dr. Witherspoon is also a former president of the American Society of Ocular Trauma (ASOT) and current executive director and board member of ASOT.

He has received the American Society of Retina Specialists' Honor Award and both the Honor Award and Senior Honor Award from the American Academy of Ophthalmology. He has been awarded more than a dozen U.S. patents, either individually or jointly, for the development of novel instrumentation related to vitreoretinal microsurgery. He has authored or coauthored more than 50 scientific journal articles and book chapters in the field of vitreoretinal surgery. Dr. Witherspoon has been selected as one of the "Best Doctors in America" yearly since 1996 and is currently listed in both the subspecialty categories of vitreoretinal surgery and ocular trauma surgery.



## Jeff Yee, M.D.

*Medical Director, Lions Eye Clinic; Associate Professor*

### AREA OF INTEREST

comprehensive ophthalmology

Dr. Yee joined the faculty in 2002 and has since served as the medical director of the Lions Eye Clinic. From 2002-2012 he also served as the medical director for the UAB Callahan Eye Hospital Emergency Department. Dr. Yee's clinical focus is comprehensive ophthalmology.

Dr. Yee served in the U.S. Air Force from 1998 to 2002. He received his medical degree from the University of California, Irvine, and completed his ophthalmology residency training at the University of South Florida. Dr. Yee was fellowship trained at the Cullen Eye Institute with the Baylor College of Medicine in Houston, Texas.

## Yuhua Zhang, Ph.D.

*Assistant Professor*

### AREAS OF INTEREST

adaptive optics high-resolution retinal imaging, age-related macular degeneration

Dr. Zhang's research focuses on the development of advanced retinal imaging technology to facilitate study of the retinal structure and function in the living mammalian eye at the cellular and subcellular levels, with the promise of improving the understanding and treatment of human retinal diseases.

Dr. Zhang has substantial experience in adaptive optics retinal imaging. He developed the first clinically deployable micro-electrical-mechanical system based adaptive optics scanning laser ophthalmoscope and demonstrated that this instrument is a promising tool for monitoring disease progression and

response to therapy. He received a prestigious R&D 100 Award in 2007 for this invention.

Dr. Zhang joined the UAB Department of Ophthalmology in 2008 and established his adaptive optics retinal imaging lab. His research has been supported by the National Eye Institute, the EyeSight Foundation of Alabama, and the International Retinal Research Foundation.

Dr. Zhang received his Ph.D. in precision instrumentation engineering from Tianjin University, China, and received further training in adaptive optics high-resolution retinal imaging at University of California, Berkeley, supervised by Austin Roorda, Ph.D., a pioneer who developed adaptive optics scanning laser ophthalmoscopy.



## CLINICAL FACULTY

Kristin C. Bains, M.D.

Michael A. Callahan, M.D.

Britton Carter, M.D.

William Cox

Susan Eiland, M.D.

Frederick J. Elsas, M.D.

Christopher Kelly, M.D.

Stephen Kelly, M.D.

James Kimble, M.D.

Ferenc Kuhn, M.D.

Tyler Hall, M.D.

Elmar Lawaczeck, M.D.

John Alva Long, M.D.

Michael Massey, M.D.

Nancy Medeiros, M.D.

Thomas H. Metz, M.D.

Marc Michelson, M.D.

John Morgan, M.D.

Robert E. Morris, M.D.

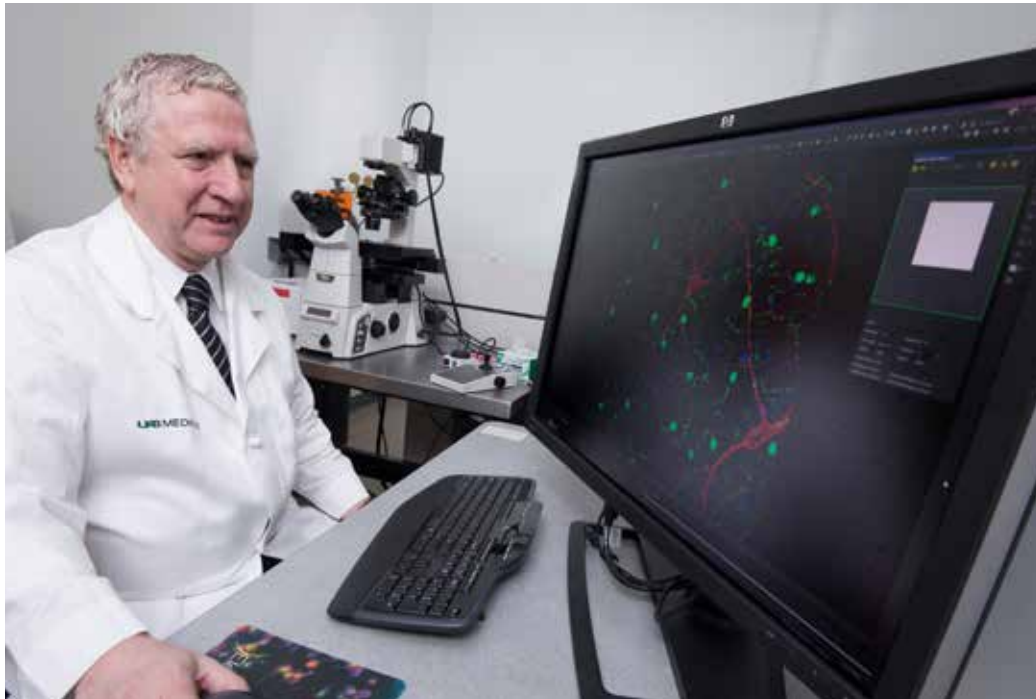
John Owen, M.D.

Roswell Pfister, M.D.

Matthew Sapp, M.D.

Wayne Taylor, M.D.

Matthew G. Vicinanzo, M.D.





# Publications

## Epidemiology

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## Glaucoma

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We strive to translate new research into clinical practice. To do so we promote a collaborative relationship between our physician and research faculty.



As one of only a few of serious ocular biomechanics labs and home to the largest group of ocular bioengineering specialists in the world, UAB is at the forefront of this developing field.

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### Ocular Inflammatory Disease/Uveitis

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## Ocular Motor Reflexes

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## Pediatrics

**DeCarlo DK**, Bowman EL, Monroe C, Kline R, **McGwin G**, **Owsley C**. Prevalence of Attention Deficit Hyperactivity Disorder among children with vision impairment. *Journal of the American Academy of Pediatric Ophthalmology and Strabismus*, in press.

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## Public Health

MacLennan PA, **McGwin G Jr**, Heckemeyer C, **Lolley VR**, Hullett S, Saaddine J, Shrestha SS, **Owsley C**. Eye Care Use Among a High-Risk Diabetic Population Seen in a Public Hospital's Clinics. *JAMA Ophthalmol*. 2013 Dec 5. doi: 10.1001/jamaophthalmol.2013.6046.

**Owsley C**, **McGwin G Jr**, Searcey K, Weston J, Johnson A, Stalvey BT, Liu B, **Girkin CA**. Effect of an eye health education program on older African Americans' eye care utilization and attitudes about eye care. *J Natl Med Assoc*. 2013 Spring;105(1):69-76.

## Rehabilitation

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## Retina

**Feist RM Jr**, King JL, Morris R, **Witherspoon CD**, **Guidry C**. Myofibroblast and extracellular matrix origins in proliferative vitreoretinopathy. *Graefes Arch Clin Exp Ophthalmol*. 2013 Nov 26.

**Wang S-Z**, **Yan R-T**. The RPE: a Convenient Source of New Photoreceptor cells? *JOVR (Journal of Ophthalmic & Vision Research)*. Accepted.

**McGwin G Jr**, Mitchell B, Searcey K, **Albert MA**, **Feist R**, **Mason JO 3rd**, **Thomley M**, **Owsley C**. Examining the association between age-related macular degeneration and motor vehicle collision involvement: a retrospective cohort study. *British Journal of Ophthalmology* 2013; 105: 69-76.

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“ Our goal is to enhance our residents' exposure to research methodology so that they will be able to critically assess the biomedical literature that will guide them in their practice of ophthalmology as knowledge changes and expands.”  
- Russel W. Read, M.D., Ph.D.

**Zhang Y**, Wang X, Wang Y, Liu Y, Xia M. Supplementation of cyanidin-3-O- $\beta$ -glucoside promotes endothelial repair and prevents enhanced atherogenesis in diabetic apolipoprotein E-deficient mice. *J Nutr*. 2013 Aug;143(8):1248-53. doi: 10.3945/jn.113.177451.

**Yan RT**, Li X, **Wang SZ**. Photoreceptor-like cells in transgenic mouse eye. *Invest Ophthalmol Vis Sci*. 2013 Jul 16;54(7):4766-75. doi: 10.1167/iovs.13-11936.

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**Curcio CA**, Messinger JD, Sloan KR, **McGwin G**, Medeiros NE, Spaide RF. Subretinal drusenoid deposits in non-neo-

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### Vision & Driving

**Owsley C**, **McGwin G Jr**, Elgin J, Wood JM. Visually Impaired Drivers Who Use Biotopic Telescopes: Self-Assessed Driving Skills and Agreement with On-road Driving Evaluation. *Invest Ophthalmol Vis Sci*. 2013 Dec 26. pii: iovs.13-13520v1. doi: 10.1167/iovs.13-13520.

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Blunck H, **Owsley C**, MacLennan PA, **McGwin G**. Driving with pets as a risk factor for motor vehicle collisions among older drivers. *Accid Anal Prev*. 2013 Sep;58:70-4. doi: 10.1016/j.aap.2013.04.019. Epub 2013 Apr 30.

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Wood JM, **McGwin G Jr**, Elgin J, Searcey K, **Owsley C**. Characteristics of on-road driving performance of persons with central vision loss who use biotopic telescopes. *Invest Ophthalmol Vis Sci*. 2013 May 1;54(5):3790-7. doi: 10.1167/iovs.12-11485.

**Owsley C**, **McGwin G Jr**, Searcey K. A population-based exam-

ination of the visual and ophthalmological characteristics of licensed drivers aged 70 and older. *J Gerontol A Biol Sci Med Sci*. 2013 May;68(5):567-73. doi: 10.1093/gerona/gls185. Epub 2012 Sep 14.

Sandlin D, **McGwin G Jr**, **Owsley C**. Association between vision impairment and driving exposure in older adults aged 70 years and over: a population-based examination. *Acta Ophthalmol*. 2013 Apr 22. doi: 10.1111/aos.12050.

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Mennemeyer ST, **Owsley C**, **McGwin G Jr**. Reducing older driver motor vehicle collisions via earlier cataract surgery. *Accid Anal Prev*. 2013 Jan 11. doi:pii: S0001-4575(13)00007-9. 10.1016/j.aap.2013.01.002.

Many current treatments for common eye disorders are inadequate, and strategies for preventing or arresting eye disorders are lacking. The way to improve treatments is by building on the knowledge gained in basic science research through clinical research and trials.

# \$ Grants

## **Christine Curcio, Ph.D.**

Quantitative Analysis of Aging Retina, NIH/NEI, 08/01/10-05/31/14

Immunolocalization of Amyloid and Apolipoproteins in Histologically Characterized Non Neovascular AMD Eyes, Pfizer, 12/10/12-12/09/14

RPE Lipoprotein Research, Genentech, 01/28/13-01/27/14

Hyperspectral Imaging of the Normal and Age-Related Macular Degeneration, NEI/NYU, 04/01/13-03/31/14

## **Dawn DeCarlo, O.D., M.S.**

Reading and Pediatric Vision Impairment, NIH/NEI, 04/01/09-3/31/2014

Reading and Pediatric Vision Impairment, EyeSight Foundation of Alabama, 07/01/10-06/30/14

## **J. Crawford Downs, Ph.D.**

IOP-Related Force and Failure in the Optic Nerve Head, NEI/Legacy, 11/15/12-06/30/16

Age- and Race-related Differences in Optic Nerve Head Structure and Biomechanics, NIH/NEI, 04/01/13-03/31/16

## **Laura Dreer, Ph.D.**

Career Development Award, Research to Prevent Blindness, 01/01/09-12/31/13

Evaluation of the Lakeshore Foundation Lima Foxtrot Programs for Injured Military, Lakeshore Foundation, 08/01/11-09/30/14

Continuation: Mental Health Services for Persons and Family with Vision Impairments, EyeSight Foundation of Alabama, 07/01/2012-06/30/14

Cognitive Behavioral Therapy (CBT) for Caregivers of Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) Service Members with Traumatic Brain Injury (TBI), DOED/NIDRR, 10/01/12-09/30/15

## **Paul Gamlin, Ph.D.**

Targeting Foveal Cones Using Novel Delivery Methods and Novel AAV Serotypes, UF, 06/30/12-06/29/14

Motor Unit Diversity in Horizontal Eye Movement Control, NIH/NEI, 08/01/12-07/31/17

## **Christopher Girkin, M.D., M.S.P.H.**

UAB Subaward - Admixture Mapping of Glaucoma Genes in African Americans, NIH/Duke University, 09/01/08-08/31/13

Vision Science Research Center P30 Core Grant - Electronics Module, NIH/NEI, 08/01/09-07/31/14

African Descent and Glaucoma Evaluation (ADAGES) II: Glaucoma Progression, NIH/University of California, San Diego, 02/01/10, 01/31/15

Clinical Evaluation of the SOLX Gold Shunt for the Reduction of Intraocular Pressure (IOP) in Refractory Glaucoma, SOLX, INC., 07/15/11-07/04/14

Multi-Center Study for Normal Database of Optic Nerve Head, Retinal Nerve Fiber Layer, and Macula Parameters with the Heidelberg Spectralis OCT, Heidelberg Engineering, 06/25/12-06/24/13

Proficient Glaucoma Care Delivery Model Based on Automated Structural and Functional Assessment of the Optic Nerve, CDC, 09/30/12-09/29/14

EyeSight Foundation of Alabama Research Acceleration Grants 1 & 2, 10/01/12-09/10/15

Unrestricted Grant, Research to Prevent Blindness, 01/01/13-12/31/13

## **Clyde Guidry, Ph.D.**

Muller Cell Proliferation in Proliferative Diabetic Retinopathy, IRRF, 10/01/12-11/01/14

## **Gerald McGwin, M.S., Ph.D.**

Expanding Quality of Care for Glaucoma through a Provider-Patient Partnership, NIH Federal Pass through from Duke

University, 09/30/07-07/31/13

## **Cynthia Owsley, Ph.D.**

Aging and ARM: Dark Adaptation Impairment, NIH/NIA, 03/15/08-02/28/14

Older Drivers: An Evidence-basis for Licensure Standards, NIH/NEI, 04/01/08-03/31/14

A Randomized, Double-Blind, Placebo-Controlled Study to Evaluate the Ocular Safety of SCH 530348 in Subjects Participating in the Schering-Plough P04737 Study (RASM Secondary Prevention Ocular Safety Study), Schering Plough Corporation, 10/30/08-06/30/14

Inflammatory, Cholesterol and Genetic Characteristics in Older Adults in Normal Retinal Health as Potential Biomarkers for the Incident Development of Early Age-Related Maculopathy, EyeSight Foundation of Alabama, 07/01/10-06/30/13

AMD, Genotyping and Blood Chemistry Analyses, NIH/NIA (ALSTAR - Supplement), 09/15/10-02/28/14

Improving Access to and Quality of Eye Care in an At-Risk, Underserved Population, CDC, 09/30/10-09/29/15

Many of the most prevalent diseases, such as glaucoma and age-related macular degeneration, are still poorly understood and without a cure. These two diseases affect more than two million Americans each, and that number is only expected to rise in the coming decade.

Evaluating Rod and Cone Function in Relation to Colocalized Retinal and RPE Structure to Define Different Phenotypes of Early AMD, Retina Foundation of the SouthWest/Beckman, 07/01/12-06/30/14

Natural History of Dark Adaptation in Participants with Intermediate Age-Related Macular Degeneration, Genentech, 10/19/12-04/18/16

### **Russell Read, M.D., Ph.D.**

Research to Prevent Blindness Physician Scientist Award, Research to Prevent Blindness, 01/01/07-12/31/13

A Prospective, Multi-Center, Randomized, Double-Masked, Positive-Controlled Phase 3 Clinical Trial Designed to Evaluate the Safety and Efficacy of Iontophoretic Dexamethasone Phosphate Ophthalmic Solution Compared to Prednisolone Acetate (1%) in Patients with Non-Infectious Anterior Segment Uveitis, EyeGate Pharmaceuticals, Inc., 04/10/12-04/09/15

### **Brian Samuels, M.D., Ph.D.**

Hypothalamic Control of IOP, ICP, and the Translaminar Pressure Gradient, NIH/NEI, 09/30/13-07/31/17

Microgravity-Driven Optic Nerve/Sheath Remodeling Simulator, Georgia Institute of Technology/NASA, 09/13/2013-07/31/201

### **Michael Vaphiades, D.O.**

Case-Crossover Study of PDE5 Inhibitor Exposure as a Potential "Trigger Factor" for Acute NAION, ICRI Pfizer, Inc., 09/15/08-09/14/14

A Multi-Center, Double-Blind, Randomized, Placebo-Controlled Study of Weight-Reduction Diet Plus Acetazolamide vs. Diet Plus Placebo in Subjects with Idiopathic Intracranial Hypertension with Mild Vision Loss, NIH St. Luke's/Roosevelt Hospital, 08/17/10-01/31/14

### **Shu-Zhen Wang, Ph.D.**

Generating Photoreceptors by Reprogramming RPE Cells, NIH/NEI, 01/01/11-12/31/15

### **Yuhua Zhang, Ph.D.**

Supplemental Package for Recruitment of Yuhua Zhang, PhD to the Department of Ophthalmology at UAB, International Retinal Research Foundation, 07/01/08-03/01/14

In-Vivo Study of Age-Related Macular Degeneration with High-Resolution, High-Fidelity and Wide-Spectra Adaptive Optics Scanning Laser Ophthalmoscopy, EyeSight Foundation of Alabama, 03/01/11-06/30/14

Adaptive Optics Parallel Confocal Scanning Ophthalmoscope (AO-PCSO), NIH/NEI, 09/01/11-08/31/14

Near Infrared Detector for Advanced Ophthalmoscopy, Radiation Monitoring Devices Inc., 09/01/12-06/30/14

## Lectures

### **Christine Curcio, Ph.D.**

"Lipoproteins and AMD's Specific Lesions: The Oil Spill in Bruch's Membrane and Beyond," Distinguished Lecturer, Jules Stein Eye Institute, University of California at Los Angeles, Los Angeles, Calif., January 2013

Projections indicate that during the next five years we expect a 55 percent increase in glaucoma surgeries, 30 percent increase in retinal surgeries, and an overall growth of 20 percent in the surgical procedures for ophthalmology.

"The Oil Spill in Bruch's Membrane: Setting the Stage for Choroidal Neovascularization," Angiogenesis, Exudation, and Degeneration, Miami, Fla., February 2013

Roy H. Steinberg Lecture, Department of Ophthalmology/Beckman Vision Center, University of California at San Francisco, San Francisco, Calif., March 2013

"AMD Histopathology in the Era of Multimodal Imaging," Morning Rounds, University of Iowa, Iowa City, Iowa, April 2013

"The Oil Spill Strategies for AMD: Pathobiology and Model System," Department of Ophthalmology Annual Clinical and Research Symposium, University of Alabama at Birmingham, Birmingham, Ala., May 2013

"Atrophic AMD: An Experimentally and Therapeutically Approachable Vascular Disease," Lasker/International Retinal Research Foundation, Initiative for Innovation in Vision Science Restoring Vision to the Blind, July 2013

"Age-related Macular Degeneration: Pathogenesis and Image Validation," Health System Administrators Forum, University of Alabama at Birmingham, Birmingham, Ala., August 2013

"What OCT Does and Does Not Show About AMD Pathobiology," 13<sup>th</sup> EURETINA Congress (European Society of Vitreo-retinal Specialists), Hamburg, Germany, September 2013

"Subcellular Basis of Optical Coherence Tomography: Why it Matters What We Call the Bands," International Spectralis Symposium, New York, N.Y., October 19, 2013

"Drusen, Pseudodrusen, and Sub-retinal Drusenoid Deposits," Advanced Retinal Therapies annual meeting, Medical University of Vienna, November 30, 2013

### **J. Crawford Downs, Ph.D.**

"Lessons from IOP Monitoring in the Nonhuman Primate," 5<sup>th</sup> World Glaucoma Congress, Vancouver, Canada, July 18, 2013

"Optic Nerve Head Biomechanics," 5<sup>th</sup> World Glaucoma Con-

gress, Vancouver, Canada, July 19, 2013

“Optic Nerve Head Biomechanics in Glaucoma Pathogenesis: A Complicated Story,” Korean Glaucoma Society Symposium, 5<sup>th</sup> World Glaucoma Congress, Vancouver, Canada, July 18, 2013

“Intraocular Pressure Telemetry and Ocular Biomechanics in the Nonhuman Primate Model of Glaucoma,” Sixteenth Vision Research Symposium, Treating Ocular Diseases in Animal Models, University of Florida, Gainesville, Fla., October 28, 2013

### **Laura Dreer, Ph.D.**

“How to Conduct Problem Solving Therapy (PST),” Department of Psychology, University of Alabama, Tuscaloosa, Ala., March 2013

“Motivational Interviewing Workshop: Part 1,” Department of Nutrition Sciences, University of Alabama at Birmingham, Birmingham, Ala., September, 2013

“Motivational Interviewing Workshop: Part 2,” Department of Nutrition Sciences, University of Alabama at Birmingham, Birmingham, Ala., October 2013.

“Neuropsychology Mock Internship Workshop — Practice Makes a Perfect Interview. Part 2: Skills building via working groups,” Division 40 (Neuropsychological Society) of the American Psychological Association, Honolulu, Hawaii, August 2013.

“From Model Ts to Modern Times: Emerging Trends in Brain Injury. Traumatic Brain Injury and Military Families: Resources, Challenges, and Keys for Successful Collaborations Across State, Federal, and Local Agencies,” 24th Annual State of the States in Head Injury Annual Meeting for the National Association of State Head Injury Administrators, Detroit, Mich., October 2013.

### **Paul Gamlin, Ph.D.**

“Intrinsically-Photosensitive Ganglion Cells in Primate Retina: Molecules to Behavior,” University of Manchester, Manchester, United Kingdom, January 2013

“Global Health and Vision Research: The Future of Interna-

tional Collaborations and Impacts. The Role of Non-Human Primates in Global Research,” Association for Research In Vision and Ophthalmology; Seattle, Wash., May 2013

“Intrinsically-Photosensitive Ganglion Cells in the Primate Retina: Anatomy, Physiology, and Behavioral Roles,” OSA Fall Vision Meeting, Houston, Texas, October 4-6, 2013

### **Christopher Girkin, M.D.**

Moderator, Free Paper session. American Glaucoma Society Meeting 2013, San Francisco, CA. March 1, 2013.

“Spectral Domain OCT and Optic Nerve. Basic/Clinical Lecture: Optical Biopsy of Ocular Tissues: Recent Advances and Future Directions,” ARVO 2013 annual meeting. May 5, 2013.

“State of the UAB Department of Ophthalmology Overview,” Annual Clinical and Research Symposium University of Alabama at Birmingham, Birmingham, Ala., May 1, 2013.

“Racial Variations in Optic Nerve Structure: Implications for Disease Detection & Susceptibility,” Southeast Regional Meeting of the Alabama Ophthalmology Association, July 25, 2013.

“The Implications of Variation in Three-Dimensional Morphometry of the Human Lamina Cribosa on the Pathogenesis of glaucoma,” Southeast Regional Meeting of the Alabama Ophthalmology Association. July 25, 2013.

“Glaucoma and Ocular Trauma,” Glaucoma Subspecialty Day, Annual Meeting of the American Academy of Ophthalmology. New Orleans, La., November 16, 2013.

“SDOCT Imaging for Glaucoma: Clinical and Histopathologic Correlates,” Zimmerman Lecture Symposium: The Optical Biopsy: Ocular Imaging Modalities & Correlation w/Histopathology, Annual Meeting of the American Academy of Ophthalmology, New Orleans, La., November 18, 2013.

“The Implications of Variation in Three-Dimensional Morphometry of the Human Lamina Cribosa on the Pathogenesis of glaucoma,” Prevent Blindness America Vision Summit Meeting. Birmingham, Ala., November 22, 2013.

“Overview of the Eye Care Quality and Accessibility Improvement in the Community (EQUALITY) PROJECT,” Centers for

“We’ve recruited top-notch physicians to add to the breath of services we provide,” Dr. Girkin says. “This positions us to be a leader in the development of new care-delivery models that can handle an increased patient volume while still providing high-quality care.”

Disease Control and Prevention, Vision Health Initiative, Glaucoma Detection Project SYMPOSIUM, Centers for Disease Control, Atlanta, Ga., December 6, 2013.

### **Rafael Grytz, Ph.D.**

“Glaucoma and Growth and Remodeling Mechanisms in the Human Eye,” Department of Biomedical Engineering, University of Alabama at Birmingham, Birmingham, Ala.

“Computational Biomechanics — A Chance for Vision Science,” Department of Vision Science, University of Alabama at Birmingham, Birmingham, Ala.

“Biomechanical Mechanisms of Scleral and Lamellar remodeling,” 5<sup>th</sup> World Glaucoma Congress, Vancouver, Canada.

“Computational Modeling of Keratoconus Progression,” Annual Clinical and Research Symposium by UAB Department of Ophthalmology, Birmingham, Ala.

### **Lanning Kline, M.D.**

Invited speaker at Alamo City Ophthalmology Clinical Conference, University of Texas Health Science Center, San Antonio Military Medical Center, San Antonio, Texas, April 2013

Guest Professor: New York University Department of Neurology, Grand Rounds, New York, N.Y., May 2013

Guest Speaker: “Cavernous Sinus Syndrome and Neuro-Ophthalmology of Systemic Disease,” The Korean Society of

Neuro-Ophthalmology, Seoul, Korea, October 4-5, 2013

**Lina Nagia, D.O.**

“Giant Cell Arteritis,” JCAHPO ACE 2013 Neuro-Ophthalmology Sub-Specialty Session, New Orleans, La., November 11, 2013.

**Cynthia Owsley, Ph.D.**

Invited Speaker and Moderator, Focus on Vision Summit, organized by Prevent Blindness America, District of Columbia, June 18, 2013

“Vision Impairment and Driving,” Virginia Tech Transportation Institute, Blacksburg, Va., February 12, 2013

“Characteristics of On-Road Driving By Persons With Central Vision Loss Learning to Drive with the Assistance of a Bioptic Telescope,” The Eye, The Brain, and The Auto World Congress, Dearborn, Mich., September 17, 2013.

**Russell Read, M.D., Ph.D.**

“Ethnic Disparities in Uveitis Epidemiology in the Southeastern United States,” Health Disparities Research Symposium, University of Alabama at Birmingham, Birmingham, Ala., February 28, 2013

“As part of the UAB School of Medicine, education is woven through everything we do. We provide robust training for the next generation of ophthalmologists in our residency and fellowship programs, which are the only ones of their kind in the state.”

- Christopher Girkin, M.D., M.S.P.H.

“Terminology and Anatomic Classification of Intraocular Inflammation,” International Workshops on Granulomatous Uveitis and Ocular Behcet’s Disease and Asia-Pacific Intraocular Inflammation Study Group, Kaohsiung, Taiwan, April 12-14, 2013

“Sympathetic Ophthalmia,” Triservice Ocular Trauma Course, Walter Reed National Military Medical Center, Bethesda, Md., May 21, 2013

“Treatment of Uveitis,” Walter Reed National Military Medical Center Bethesda, Md., May 22, 2013

**Jennifer Scruggs, M.D.**

“Evaluation and Management of Ptosis,” School of Optometry, University of Alabama at Birmingham, February 6, 2013.

**Michael Vaphiades, D.O.**

American Academy of Ophthalmology Meeting 2013 Neuro-imaging Skills Transfer Course, Co-lead Instructor.

“Neuro-Ophthalmology, Afferent and Efferent,” Philadelphia College of Osteopathic Medicine, Georgia Campus, Suwanee, Ga., April 1, 2013.

“Pituitary Apoplexy: A Neuro-Ophthalmologists Perspective,” UAB Multidisciplinary Pituitary Disorders Conference, University of Alabama at Birmingham, Birmingham, Ala., April 13, 2013.

“Visual Loss with a Normal Fundus”, Breakfast with the Experts, American Academy of Ophthalmology Meeting 2013

“Optic Vascular Anomaly,” Platform Presentation, Neuro-Ophthalmology Subspecialty Day, American Academy of Ophthalmology Meeting 2013

“Approach to the Patient with Diplopia,” Platform Presentation, JCAHPO Annual Meeting 2013

“Pituitary Apoplexy,” Platform Presentation, JCAHPO Annual Meeting 2013

Neuro-ophthalmology Subspecialty day organizer and lead instructor, JCAHPO Annual Meeting 2013

“Sacramentum Gladiatorium,” Platform Presentation, Annual Frank B. Walsh/NANOS Meeting 2013

**Shu-Zhen Wang, Ph.D.**

Visiting Speaker, Retinal Diseases Interest Group (RDIG) of the National Eye Institute/NIH, Bethesda, Md., August 21-23, 2013

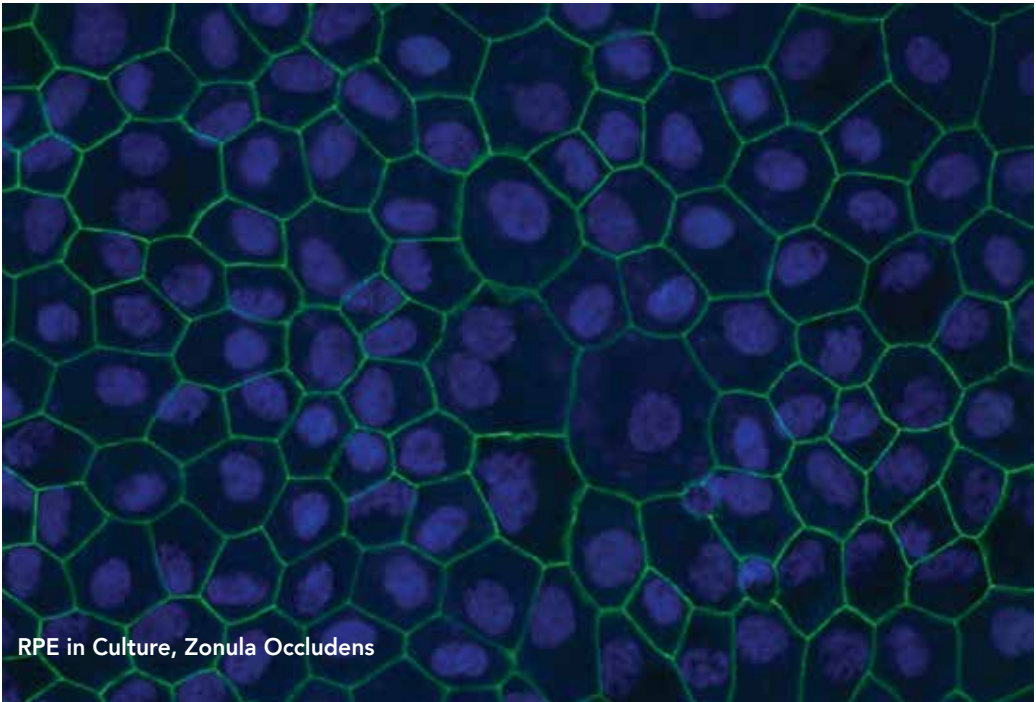
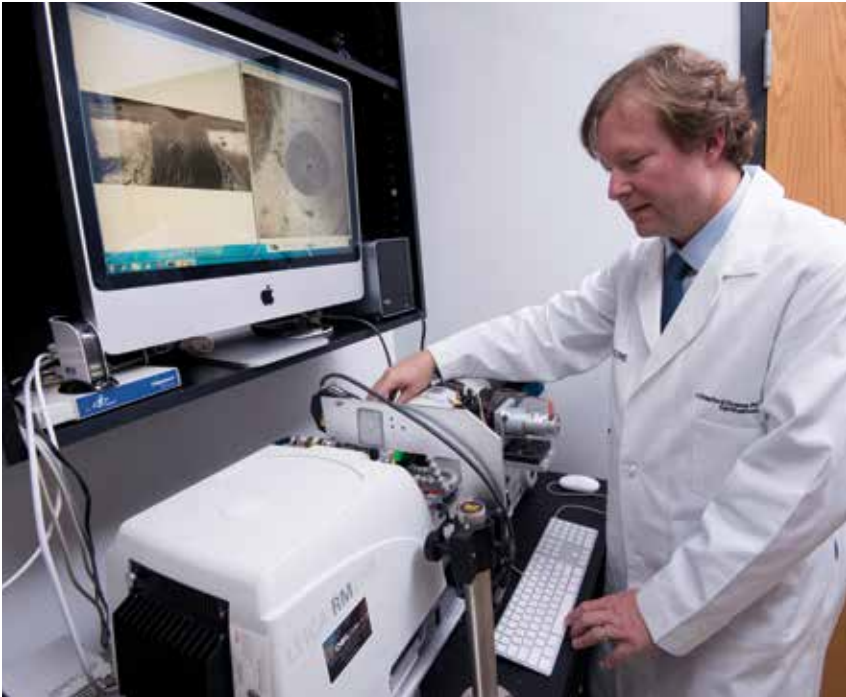
“RPE for Photoreceptor Regeneration in Mouse Eye,” ARVO Annual Meeting, Seattle, Wash.

“Photoreceptor-like Cells in Transgenic Mouse Eye.”, FEASEB, Steamboat Springs, Colo.

**Yuhua Zhang, Ph.D.**

“Adaptive Optics Scanning Laser Ophthalmoscopy (AOSLO),” Engineering Graduate School, Tokyo Institute of Technology, Tokyo, Japan, February 28, 2013

“Adaptive Optics Scanning Laser Ophthalmoscopy (AOSLO) for In-vivo Study of the Retinal Structure and Function at the Cellular Level,” International Colour Vision and Visual Optics Symposium, Tokyo Institute of Technology, Tokyo, Japan. March 1, 2013



RPE in Culture, Zonula Occludens





# The Power of Partnerships

*Accelerating Breakthroughs, Advancing Toward a Cure*

Eye disorders have been identified as the fifth most prevalent condition among those age 65 years and over (affecting 23 percent of the population) and seventh across all age groups (affecting 11.2 percent of the population).

These statistics magnify the importance of the UAB Department of Ophthalmology's mission to conduct groundbreaking research for the treatment and cure of the world's blinding diseases, provide patients with the highest quality care, and successfully train the next generation of ophthalmologists. We cannot accomplish this mission without the generous support from our philanthropic partners.

This year, their support allowed the department to retain and recruit top faculty members, accelerate some of its most promising lines of basic and clinical research, and enrich the department's residency program. We plan to build upon our success, and with transformational philanthropic support, we can further expand the depth and breadth of our efforts to find cures for blinding diseases.

The UAB Department of Ophthalmology is uniquely positioned to take the lead in research and development of disease-modifying therapies that may preserve vision for millions in the near future. To accomplish our goal, we seek visionary philanthropic partners to provide critical support to help accelerate our efforts and propel us to the next phase of development — expanded clinical and laboratory research programs.

Our goal is to ensure that our scientists have the necessary resources to conduct as many promising lines of research as possible. The more expansive the research

efforts, the greater the probability of making the next significant breakthrough. With philanthropic investment, we can recruit and retain the best and brightest physicians and scientists to UAB. Top recruits often bring significantly funded research projects with them, which in turn enables UAB to recruit more top prospects, creating a cycle of success.

UAB President Ray Watts has set a goal for UAB to be one of the most dynamic and productive universities of the 21st century and attain our vision to be an internationally renowned research university — a first choice for education and health care. A leading goal of the Campaign for UAB: Give Something, Change Everything, is the creation of endowments that attract faculty at the top of their fields to UAB.

The department's campaign goal is attracting additional faculty at the top of their fields to join and strengthen our research and clinical mission. This represents the critical next step in our fight against blinding disease. The following areas are where **we believe philanthropic support will provide the greatest impact on the future of vision preservation:**

- Endowed Chair for **Retinal Research**
- Endowed Chair for **Ocular Biomechanics**
- Endowed Chair for **Glaucoma Research**
- **Research Acceleration Fund** to help ensure opportunities for ground breaking discoveries are not missed due to lack of NIH funding
- Funds to establish a **Translational Research Center**
- **Clinician-Scientist Fund** to facilitate the career development of junior clinician-scientists.

## A Special Thank You

The UAB Department of Ophthalmology greatly appreciates the support of our foundation partners. The following foundations have provided generous philanthropic support to the department.

### *The EyeSight Foundation of Alabama*

A long-time philanthropic partner, the EyeSight Foundation of Alabama supports the clinical, research, and educational goals of the department. Through its leveraged giving the EyeSight Foundation of Alabama has spurred the success of the department in all areas of its core mission.

### *International Retinal Research Foundation*

The funding provided by the International Retinal Research Foundation will allow the department to pursue promising lines of research into retinal disorders such as age-related macular degeneration and diabetic retinopathy. The department focuses both basic and clinical research resources on retinal disorders, and the philanthropic support of the International Retinal Research Foundation has been invaluable to that research and will be used to recruit world-class retinal scientists.

For more information on giving to the department, please visit our website [www.eyes.uab.edu](http://www.eyes.uab.edu) or contact our development office.

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