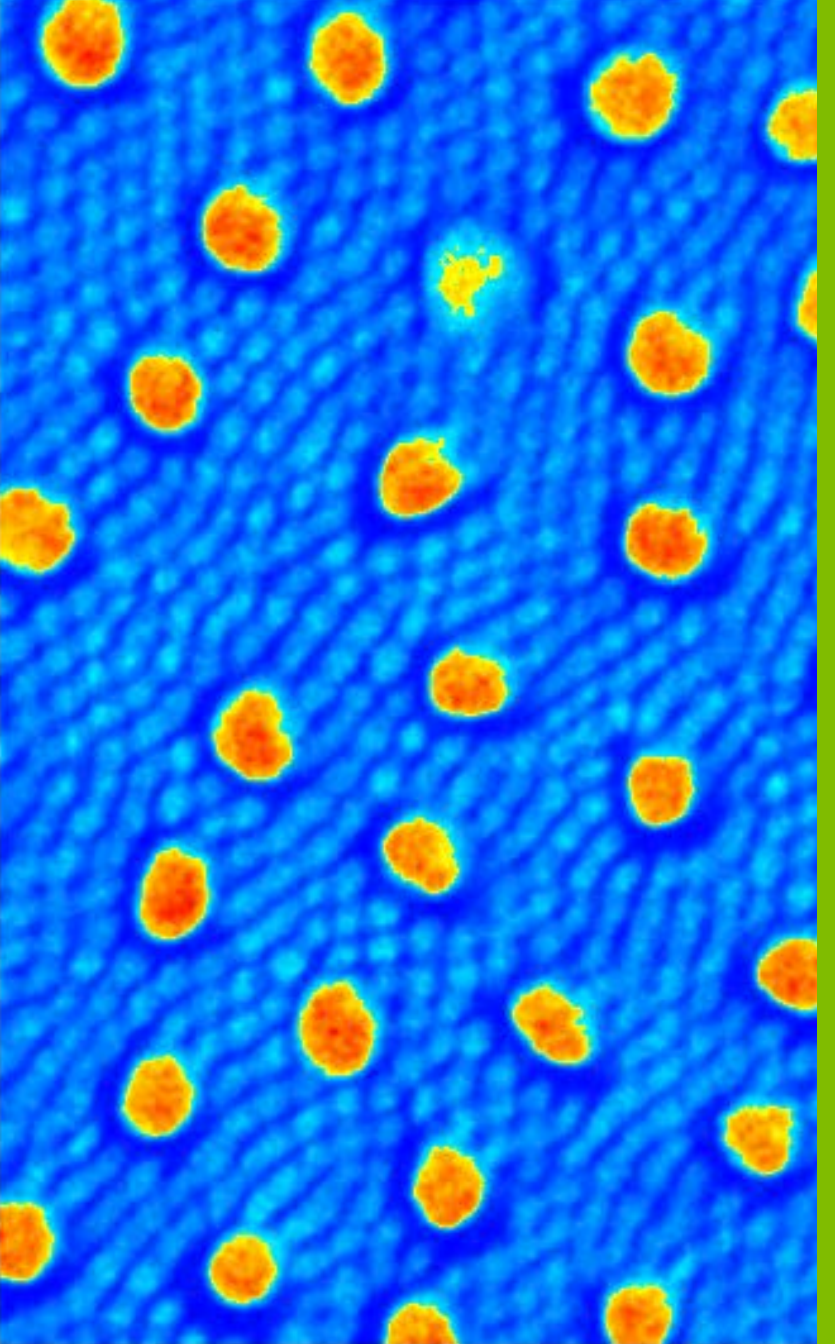
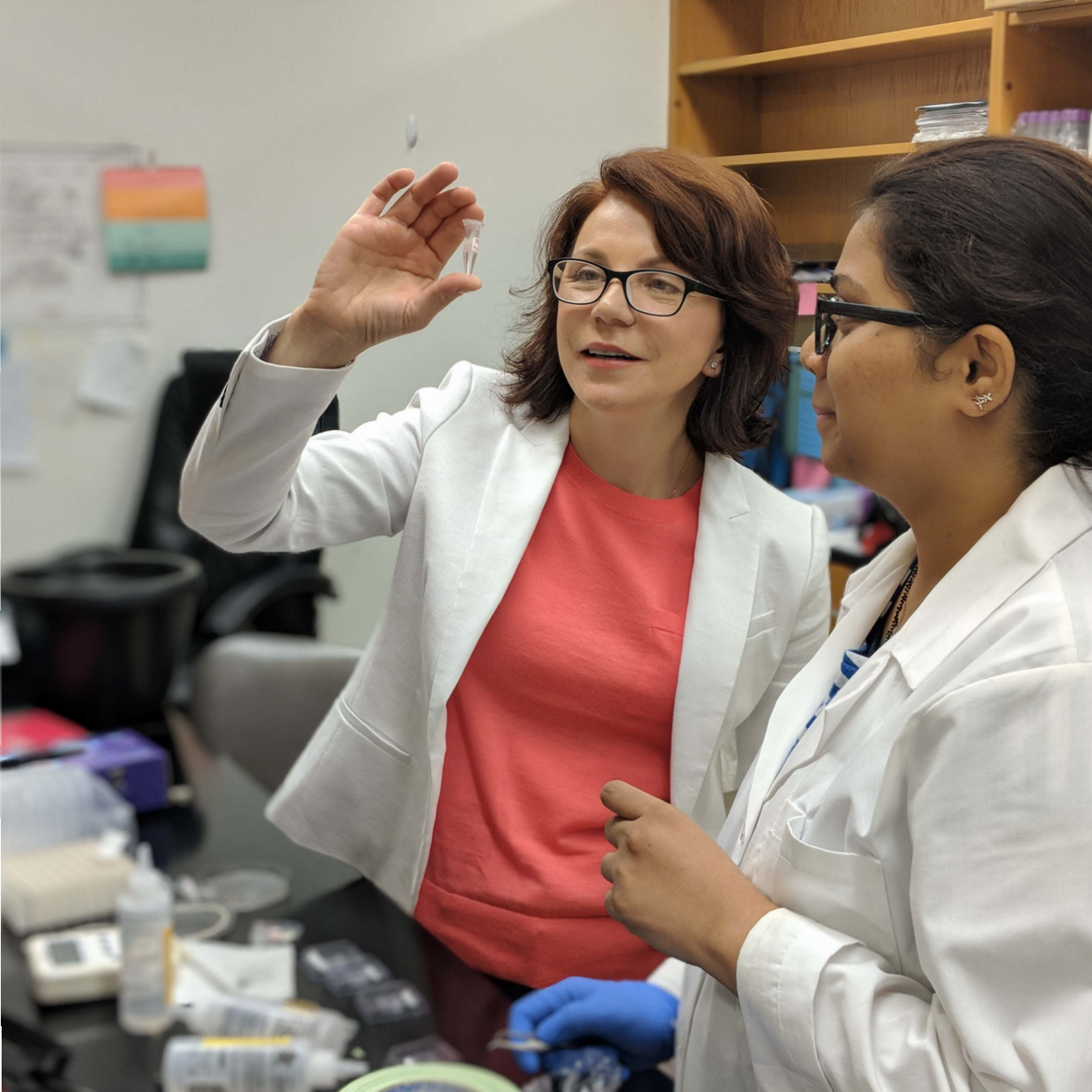


GET TO KNOW US

VISION SCIENCE GRADUATE PROGRAM

UAB THE UNIVERSITY OF ALABAMA AT BIRMINGHAM



CONTENTS

Left: Dr. Marina Gorbatyuk and Priyam Pitale, Ph.D. candidate, in the lab studying the molecular basis of retinal degeneration.

Right: Dr. Cameron Postnikoff, VSGP alumnus, conducting research on ocular tears.

Cover: Rod and cone photoreceptors in primate retina imaged with autofluorescence. Image from Drs. Sincich and Gamlin labs.

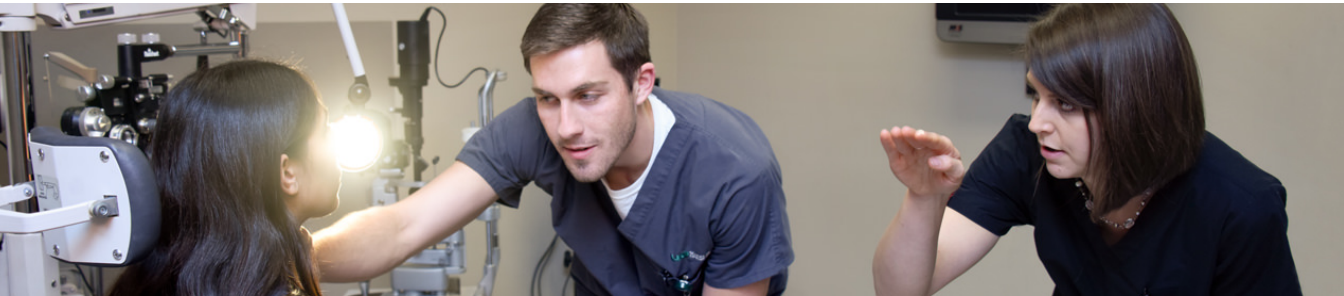
ABOUT VSGP

The Vision Science Graduate Program (VSGP) allows students to pursue a Master's or a Doctoral degree within a collaborative, multidisciplinary environment at the University of Alabama at Birmingham (UAB). Students are mentored by faculty from several academic disciplines, spanning multiple schools and departments, including optometry, ophthalmology, neurobiology, neurology, psychology, behavioral neuroscience, occupational-therapy, rehabilitation science and more. The VSGP is organized around four basic research themes: ocular biology, systems neuroscience, biomedical optics and patient-based vision science studies. The program also offers a combined clinical degree (O.D./M.S.) which prepares students for a career that blends clinical practice with vision science research.

O.D. graduates have also successfully matriculated through the VSGP Ph.D. program to become academic clinician-scientists. They have studied a host of patient-centered diseases and disorders leading to a better understanding of the mechanisms underlying ocular diseases such as dry eye, and, ultimately, improving patient care.

Education and training in vision science can open the door to successful careers in teaching, industry, clinical research and discovery, public policy or law. Graduates of the program include tenured professors, academic leaders in schools and colleges of optometry, physicians and directors of leading pharmaceutical companies and industry partners.

Dr. Jillian Ziemanski, Ph.D. candidate, instructing optometry students on clinical techniques.




The eye is the window to the world, and diseases affecting it impact the quality of life.
Kwaku Osei, Ph.D. Candidate

PROGRAM THEMES

OCULAR BIOLOGY

Within ocular biology, researchers at UAB are studying the many cellular and mechanical mechanisms that impact vision, including retinal anatomy and physiology, ocular biome, ocular surface, glaucoma, meibomian gland dysfunction, dry eye, neurobiology and ocular pharmacology.

I have used the electrical signals generated by the retina to assess how molecular deficits can degrade function in the early stages of diabetic retinopathy.

Marina Gorbatyuk, Ph.D.

PATIENT-BASED RESEARCH

By looking at health outcomes, access and social disparities in addition to safety, occupational and environmental vision, researchers gain a better understanding of how vision is tied to health. Clinical trials, studying ocular disease, dry eye, contact lens, epidemiology, myopia control, concussion and evidence-based practice fall under patient-based research.

My training in the clinical and basic sciences allows me to translate our results into information useful for the diagnosis and treatment of patients with dry eye disease.

Andrew Pucker, O.D., M.S., Ph.D.

PROGRAM THEMES

SYSTEMS NEUROSCIENCE

Faculty and students involved in systems neuroscience research are looking at eye movement and control, visual neuron response properties, neurodegeneration, anomalies of aging and development, perception, and traumatic brain injury.

Vision begins when photoreceptors absorb light and create an electrical signal. Such basic functions need to be fully known and compared to the same measures in diseased tissues to unravel the pathophysiology.

Timothy Kraft, Ph.D.

BIOMEDICAL OPTICS

Optics research remains a fundamental discipline in vision science. At UAB we have faculty who are using advanced optical designs to study myopia progression, improve retinal imaging, and assess the biomechanical properties of ocular tissues.

I use adaptive optics systems to help understand the anatomical basis of physiological responses in the early visual system, primarily in the thalamus and cerebral cortex.

Lawrence Sincich, Ph.D.

The opportunities available at UAB have allowed me to become a scholar and advocate for fellow vision researchers, ultimately enabling me to become the best possible vision scientist to aid in the research for patients suffering from debilitating ocular diseases.

Jessica Jasien, Ph.D. Candidate

DEGREE PROGRAMS

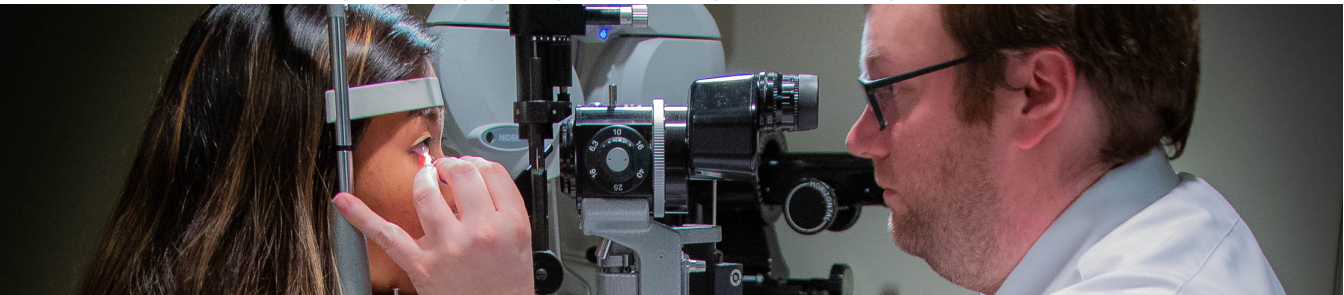
DOCTORATE OF PHILOSOPHY IN VISION SCIENCE

If you're seeking the greatest understanding of the eye, how it works, and how it connects to everything else we do, a Ph.D. in Vision Science could be the degree for you. We want to prepare you to work in vision-related industries; basic, translational and clinical research, academia, and more.

The Ph.D. program also welcomes O.D. graduates who are interested in becoming rigorously trained clinician-scientists. Many of these clinicians have held NIH K-awards to support their research and offset educational debts via NIH Loan Repayment Programs.

Doctoral students in the Vision Science Graduate Program (VSGP) are provided full financial support throughout their years as a student. This includes a fellowship stipend, full tuition and fees coverage, and health insurance. The VSGP supports students directly during their first year, while in subsequent years support generally originates with their faculty mentor. Fellowships can also be funded by the UAB Graduate School, the Department of Optometry & Vision Science, the National Eye Institute or other outside agencies. Students who qualify are encouraged to submit applications for extramural pre-doctoral fellowships. In addition, students and their mentors are encouraged to apply for any fellowships that may be available through training grants or the Vision Science Graduate Program.

Dr. Drew Gann conducting a clinical dry eye study in the Clinical Eye Research Facility at the UAB School of Optometry.



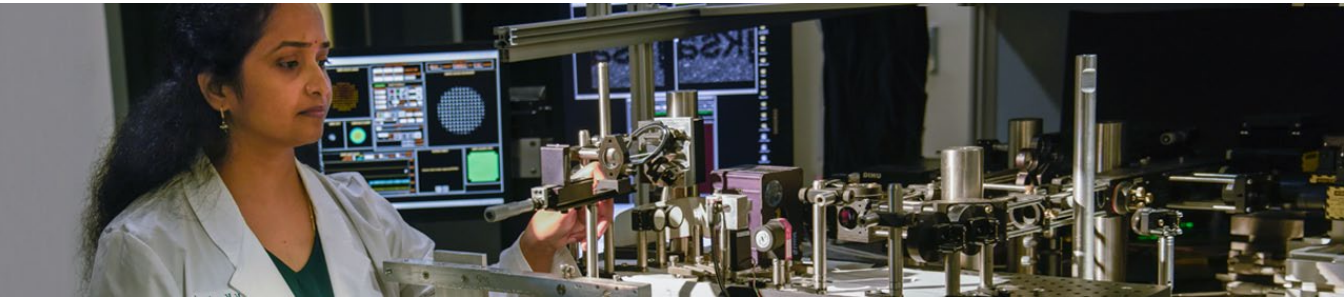
DEGREE PROGRAMS

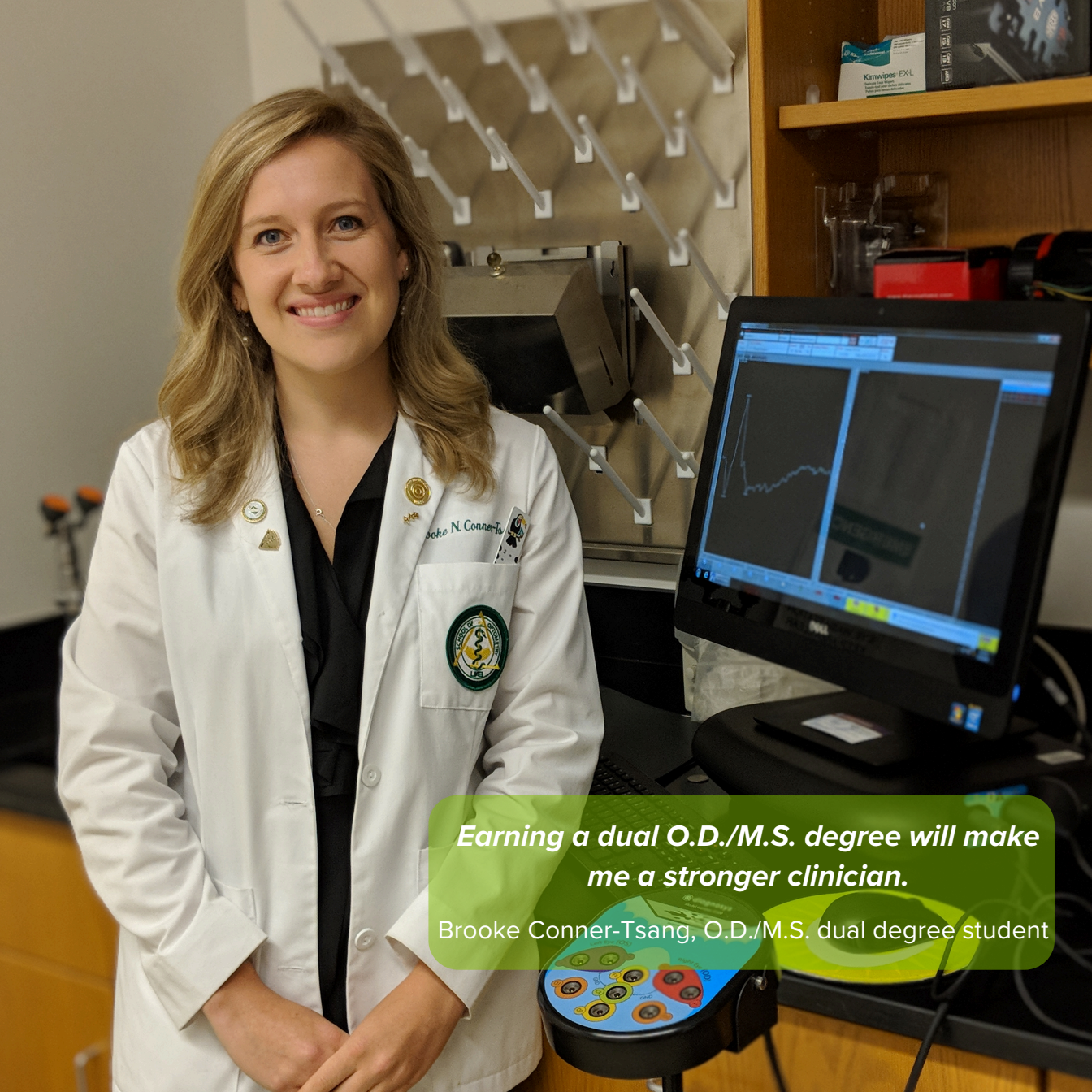
O.D./M.S. DUAL DEGREE

Dive into the study of the eye and how it connects with the rest of the body—and learn how to provide quality eye care. You can simultaneously earn your O.D. while researching topics such as dry eye disease, vision therapy (pediatric and contact lens) and translational research such as traumatic brain injury, leading to a career as a clinician scientist, researcher, advanced eye care provider or industry specialist.

These are two challenging degree programs, but we've designed the curriculum so you can earn each degree side-by-side in the four years it takes you to complete optometry school. Your optometric education will start with classroom work, where you'll study topics such as optics, gross anatomy, eye movements, public health, optometry, and pediatric eye care. Then you'll spend lots of time in the clinic, learning by practicing on actual patients at UAB and off-site clinics. Meanwhile, you will work closely with a faculty mentor to develop your goals for completing your M.S. thesis in one of the VSGP themes in ocular biology, systems neuroscience, biomedical optics, or patient-based research. Before you graduate, you will defend a thesis based on your research. In the end, we want you to be a true vision expert and clinician scientist.

Dr. Vasantha Kanukuntla, O.D./M.S. dual degree graduate, working with adaptive optics imaging.





Earning a dual O.D./M.S. degree will make me a stronger clinician.

Brooke Conner-Tsang, O.D./M.S. dual degree student

UAB has the strong faculty and cutting-edge infrastructure needed to facilitate my passion of undertaking retinal and vision research.

Yvonne Adu-Agyeiwaah, Ph.D. Candidate

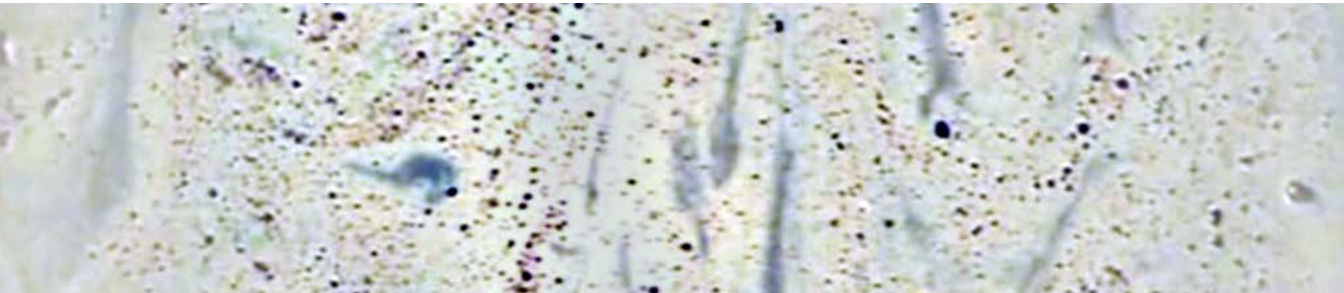
DEGREE PROGRAMS

MASTER OF SCIENCE IN VISION SCIENCE

Vision scientists have an in-depth knowledge of the eye's inner workings and how it informs our visual world. Through the Master's degree program, you can study problems such as dry eye disease, myopia, cataract, retinal degeneration, and more, which can prepare you for education, research, policy, or jobs in the optometric or ophthalmological industries.

To select a research topic, your education begins with three 10-week lab rotations to determine what field and mentor is most suitable. Before you start your research, you'll sit down with your faculty mentor to discuss your goals and determine which courses and lab experiences are best for you. In the VSGP, we have four research themes: ocular biology, systems neuroscience, biomedical optics, and patient-based vision research. Your classes will include Optical Imaging, Ocular Biology, Mechanisms of Ocular Disease, and Visual Neuroscience. You will also take non-vision courses, such as Statistical Methods I and Principles of Scientific Integrity. Finally, you'll complete your degree by defending your chosen thesis project.

In-vivo tear film lipid layer topography from the lab of Dr. Jason Nichols.



CURRICULUM

The VSGP curriculum covers topics relevant to our four major research themes. Required courses are offered through the Department of Optometry and Vision Science and are taught by research faculty with guest lecturers from across other academic departments at UAB.

Ocular Anatomy and Biology

Covers the basic anatomy, biochemistry, physiology, cellular and molecular biology of ocular tissues, with a focus on the normal function of all these aspects.

Biology and Pathology of Ocular Disease

Overview of ocular disease and pathology of the visual system, from cornea to retina to brain, including disease mechanisms and treatments.

Optics for Vision Science

Advanced topics in optics related to the eye and vision including paraxial, wave, and quantum optics, light safety, refraction, reflection, aberrations, interference, diffraction, polarization, Fourier optics, lasers, and fluorescence. The course will include applications for optical system design, biomedical imaging, microscopy, and clinical assessment of the eye and visual system.

Visual Neuroscience

Vision begins with photons and ends in the brain. How does it all work? This course introduces the student to the anatomical and physiological underpinnings of visual perception, stepping from single photoreceptors in the retina on through the cortical neural circuits devoted to capturing every facet of seeing the world. Lectures are supplemented with hands-on sessions where students can test their own vision.

HOW TO APPLY

- Applications are submitted and processed through the UAB Graduate School.
- Access the application by visiting www.uab.edu/vsgp, or visit the UAB Graduate School website at www.uab.edu/graduate and click on Apply Now.
- The application fee is **$50** for domestic applicants and **$60** for international applicants.
- Admission to the program is for Summer/ Fall entry, though exceptions can be requested.
  - Priority Application Deadline: **December 15th**
  - Application Deadline: **January 15th**

Admission Requirements

- Minimum undergraduate GPA of at least a B (3.0) average.
- Official transcripts from undergraduate degrees along with transcripts from other institutions where transfer credits were obtained.
- Three letters of recommendation.
- Personal statement/essay.
- Resume or curriculum vitae.
- The Graduate Record Examination (GRE) is optional.
- A strong background in biological, physical or health sciences is highly recommended.
- Previous research experience is strongly encouraged.
- International applicants are required to submit English proficiency scores to demonstrate a command of written and spoken English. Minimum English proficiency scores required by the UAB Graduate School are TOEFL (80), IELTS (6.5) or PTEA (53).

SCHOOL OF OPTOMETRY

The University of Alabama at Birmingham