encouraged to combine the clinical doctorate degree with additional

Selected students in the UAB optometry professional program are
—Dual Degree
Doctor of Optometry / Master of Science

Admission Requirements:
- See Master Degree Requirements
- OAT scores can be used in lieu of GRE requirement

Doctor of Philosophy Degree

Doctoral research training leading to the PhD degree in vision science is based upon completion of graduate course work, a qualifying examination, research accomplishments, and successful defense of a dissertation. There is considerable flexibility in the coursework for the PhD in vision science. Each student is required to take the first-year core curriculum for their respective track, as well as courses in statistics and the ethical conduct of research. Students then take three additional courses, selected by the student in consultation with their academic advisor, which can include a wide range of interdisciplinary topics. Other graduate level courses can be substituted so that students can take maximum advantage of offerings in other programs at UAB. Individuals with previous clinical training will have opportunities for further clinical development and research integration. Students are also required to gain teaching experience.

Admission Requirements:
- GRE Required (subject tests are optional)
- TOEFL and/or IELTS tests required for international students (see program website for minimum scores)
- Undergraduate GPA of 3.0 on a 4.0 scale (B average)
- Strong background in the biological, physical or health sciences
- Three letters of recommendation

Additional Information

Deadline for Entry Term(s): Summer and Fall (No Spring admission)

Deadline for All Application Materials to be in the Graduate School Office: January 15th

Number of Evaluation Forms Required: Three

Entrance Tests: GRE (TOEFL and TWE also required for international applicants whose native language is not English.) OAT is considered for combined degree programs, e.g. OD/MS.

Web site: http://www.uab.edu/vsgp/

For detailed information, contact the graduate program manager, Dr. Stefanie Varghese, UAB School of Optometry Vision Science Graduate Program, HPB 516, 1720 2nd Ave S., Birmingham, AL 35294-4390 (office location: Henry Peters Building, Room 516, 1720 University Blvd.).

Telephone 205-934-6743
E-mail sbvarghese@uab.edu
Web http://www.uab.edu/vsgp/
Courses

VIS 600. Clinical Vision Science Literature Review. 1 Hour.
Review, critical analysis and discussion of foundational literature and current topics in clinical vision science and evidence-based practice.

VIS 601. Fundamentals of Clinical Research. 2 Hours.
Introduction to fundamental principles of clinical research including: framing research questions, structured literature reviews, study design, sources of bias and their control, presentation and publication of research findings.

VIS 610. Ocular Anatomy and Biology. 4 Hours.
Anatomy, biochemistry, physiology, cellular and molecular biology of ocular tissues.

VIS 611. Biology and Pathology of Ocular Disease. 4 Hours.
Overview of ocular disease and pathology of the visual system including disease mechanisms and treatments.

VIS 612. Optics for Vision Science. 4 Hours.
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.

VIS 613. Visual Neuroscience. 4 Hours.
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.

VIS 615. The Body Electric: Electronics for Biologists. 3 Hours.
This course provides an overview of the fundamental concepts of electronics that are relevant to a biologist. The material is aimed at non-engineers who require a background in the circuit concepts needed for studying ion channels, electrophysiology, proper use of amplifiers and filters, and the use of computers to acquire and analyze data. There will be a mix of formal lectures and problem sets with practical hands-on experience.

VIS 617. Research Ethics for the Clinician Scientists. 3 Hours.
Training in the principles of scientific integrity and research ethics with exercises.

VIS 618. Introduction to Neurobiology/Marine Biology. 4 Hours.
Topics in basic and translational vision science.

VIS 619. Ocular Anatomy-Physiology and Biochemistry II. 3 Hours.
Anatomy of the eye. Biochemistry and physiology of ocular tissues, disease mechanisms and treatments. MRI in vision research.

VIS 620. Optics for Vision Science. 4 Hours.
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.

VIS 622. Advanced Orientation and Mobility Skills. 3 Hours.
Advanced orientation and mobility teaching techniques for travel in independent settings for multihandicapped and blind students.

VIS 623. Advanced Orientation and Mobility Seminar. 3 Hours.
Recent research practices and problem areas in special education. Focus on advanced orientation and mobility for people with multiple handicaps and blindness.

VIS 624. Orientation and Mobility Internship. 3-6 Hours.
Demonstrate skills in applying principles of special methods of teaching, designing instruction, conducting skills assessments, and in preparing written reports, and consulting and collaborating with professionals and parents to assure orientation and mobility programming for students with visual impairments.

VIS 625. Ocular Anatomy and Physiology. 3 Hours.
Anatomy of the eye. Biochemistry and physiology of ocular tissues, including tears, cornea, aqueous humor, lens, vitreous and sclera.

VIS 626. Ocular Anatomy-Physiology and Biochemistry of Anterior Serment. 3 Hours.
Anatomy of the eye. Biochemistry and physiology of ocular tissues, including tears, cornea, aqueous humor, lens, vitreous and sclera.

VIS 627. Ocular Anatomy-Physiology and Biochemistry II. 3 Hours.
Continued examination of ocular anatomy, biochemistry and physiology.
VIS 755. Electronic for Biologists. 3 Hours.
This course provides an overview of the fundamental concepts of electronics that are relevance to a biologist. The material is aimed at non-engineers who need a backgroun in the circuit concepts needed for studying ion channels, electrophysiology, the basic s of the proper use of amplifier and filter, and the use of computers to acquire and analyse data. There will be a mix of formal lectures and problem set with practical hands-on experience.

VIS 756. Visual Neuroscience. 4 Hours.
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.

VIS 757. Functional MRI. 3 Hours.
In this course, we will explore the history of fMRI, design of fMRI experiments, and the analysis of fMRI data. We will also discuss several related techniques that are used in neuroimaging research. When designing fMRI experiments, it is important to know what techniques and statistical methods are available. It is also important to understand the kinds of hypotheses that can be tested with fMRI. By the end of this class, students will understand what led to the development of fMRI, when to use fMRI or related methods, limitations of experiments involving this technology, and different techniques for analyzing fMRI data. This class will be ‘hands-on’; each student will be required to design and execute an fMRI experiment.

VIS 760. Sensory Impairment Lit Review. 1 Hour.
Sensory Impairment and Deafblind literature review and presentation.

VIS 770. Advanced Graduate Seminar in Ocular Biology. 1-3 Hour.
Advanced graduate seminar in biology of the eye and visual system that will include critical review analysis, and discussion of fundamental literature and current topics.

VIS 771. Advanced Graduate Seminar in Ocular Surface. 1-3 Hour.
Review, analysis and discussion of current literature topics of ocular surface physiology and disease.

VIS 772. Advanced Graduate Seminar in Cornea and Anterior Segment. 1-3 Hour.
Advanced graduate seminar on topics related to the cornea and anterior segment that will include critical review and discussion of fundamental literature and current topics.

VIS 773. Advanced Graduate Seminar in Retinal Research. 1-3 Hour.
Advanced graduate seminar on topics related to retinal research that will include critical review, and discussion of fundamental literature and current topics.

VIS 774. Advanced Graduate Seminar in Visual Neurobiology. 1-3 Hour.
Advanced graduate seminar in visual neurobiology that will include critical review and discussion of fundamental literature and current topics.

VIS 775. Advanced Graduate Seminar in Ocular Motor Systems. 1-3 Hour.
Advanced graduate seminar in ocular motor systems that will include critical review analysis, and discussion of fundamental literature and current topics.

VIS 776. Advanced Graduate Seminar on Refractive Error. 1-3 Hour.
Advanced graduate seminar on topics related to refractive error, ocular growth, and development that will include critical review, and discussion of fundamental literature and current topics.

VIS 777. Advanced Graduate Seminar in Public Health and Vision. 1-3 Hour.
Advanced graduate seminar on topics in public health issues with a focus on visual disorders that will include critical review and discussion of fundamental literature and current topics.

VIS 778. Advanced Graduate Seminar on Vision Rehabilitation. 1-3 Hour.
Advanced graduate seminar on topics in visual rehabilitation, orientation and mobility that will include critical review and discussion of fundamental literature and current topics.

VIS 779. Advanced Graduate Seminar in Interdisciplinary Sciences. 1-3 Hour.
Advanced graduate seminar on topics related to research that spans faculty and student interests across traditional academic disciplines or boundaries. The course will include critical review, and discussion of fundamental literature and current topics relevant to the participants.

VIS 790. Individual Topics and Advanced Topics. 1-3 Hour.
Lab/research hours for doctoral students who have not entered into candidacy.

Lab/research hours for doctoral students who have entered into candidacy.

Prerequisites: GAC Z