



EMORY
LANEY
GRADUATE
SCHOOL



GRADUATE DIVISION OF BIOLOGICAL AND BIOMEDICAL SCIENCES

NEUROSCIENCE

Emory's doctoral program in neuroscience (NS) provides a multidisciplinary and collaborative atmosphere for the training of outstanding Ph.D.s interested in a broad spectrum of research — cellular, molecular, behavioral, developmental, computational and systems neuroscience.

COMMUNITY

The Emory Neuroscience program enjoys a strong sense of academic community and collegial leadership in which students are actively involved by serving alongside faculty on all program committees. Because of the high level of interaction between faculty and students, the mentoring system in place creates a friendly and highly rewarding atmosphere that supports success. Our program was ranked among the top for overall student satisfaction in the last National Doctoral Program Survey, in part due to the high level of interaction between faculty and students and a mentoring system that creates an atmosphere that supports success.

COLLABORATION

The Emory Neuroscience program is structured to encourage a collaborative, multidisciplinary approach to solving challenging research questions, with many interdisciplinary Center Grants and joint research programs with the neighboring Biomedical Engineering Department at Georgia Tech. A series of major Centers, including the Center for Neurodegenerative Diseases, The Alzheimer's Disease Research Center, the Center for Translational Social Neuroscience (CTSN), the UDALL Parkinson's Disease Center, the Center for Ethics, and the Centre for Mind, Brain and Culture, unite researchers from a variety of disciplines and universities to study the biological, genetic, and molecular foundations of complex behaviors and neurodegeneration.

PROFESSIONAL DEVELOPMENT

The Laney Graduate School offers a range of programs that encourages students to develop their professional skills, engage with broader professional communities, and prepare for their careers.

VISIT GS.EMORY.EDU TO LEARN MORE.

EXCELLENCE IN RESEARCH

Emory students work on the cutting edge of neuroscience: they regularly publish high-impact articles in the very best journals, and they achieve a high rate of success in national award competition. Doctoral students at Emory have access to a wealth of research resources, including sixteen high-tech research core facilities and a host of highly accomplished faculty, including four National Academy members and twelve members of the prestigious American College of Neuropsychopharmacology.

BREADTH

The NS faculty includes 140 neuroscientists drawn from 22 departments in the Schools of Medicine and Public Health, Emory College and the Yerkes National Primate Research Center. Together, they maintain active research programs across the breadth of contemporary neuroscience:

NEUROLOGICAL AND PSYCHIATRIC DISEASES

Faculty from Psychiatry and Behavioral Sciences, Neurology, and other departments utilize basic and clinical research to understand the neurochemical changes that underlie diseases such as schizophrenia, depression, autism and drug dependence. The Emory Neurology Department is acknowledged as a leader in the study of the pathogenesis, pathophysiology and experimental therapeutics of Parkinson's and Alzheimer's diseases, epilepsy, stroke, spinal cord injury, traumatic brain injury and amyotrophic lateral sclerosis. The Center for Neurodegenerative Diseases, the Alzheimer's Disease Center, the UDALL Center for Parkinson's Disease and CTNS provide unique resources for research in this field.

NEUROPHARMACOLOGY

Emory University is one of the world's premier universities in neurobiology and the treatment of neuropsychiatric disorders, substance abuse and epilepsy. Twelve faculty members in our program (more than any other university) are members of the prestigious American College of Neuropsychopharmacology (www.acnp.org). The main strengths of this field are expertise in the pharmacology of anxiolytics, antidepressants, antipsychotic drugs, drugs of abuse and glutamate receptors.

BEHAVIORAL NEUROSCIENCE

Strengths in this field include computational and functional imaging studies of brain alterations in drug dependence, neurobiology of learning and memory, alterations in cognitive function and aging, psychobiology of motivation and social behavior, regulation of neuroendocrine functions, molecular and neurochemical substrates of social behavior and fear conditioning. CTNS brings together scientists from Emory and other Atlanta colleges and universities to study the neurobiology of social behavior (affiliation, reproduction, aggression, and fear) and its translation to autism and related psychiatric disorders.

SYSTEMS NEUROSCIENCE

This area comprises a broad range of scientists interested in learning and memory in primates using functional brain imaging and *in vivo* electrophysiology. It also includes studies of basal ganglia and spinal cord mechanisms that control muscles, motor control in invertebrates, cross-modal interactions between sensory systems, mechanisms of vestibular and visual integration into control of eye movements, and central regulation of autonomic functions. The Yerkes National Primate Research Center is a unique resource in the field of non-human primate research. The MRI and PET imaging core facilities at the Yerkes Primate Center and on the Emory campus are key resources in this field of neuroscience research.

MOLECULAR, CELLULAR AND DEVELOPMENTAL NEUROSCIENCE

Areas of interest include molecular mechanisms involved in the development, plasticity, regeneration and repair of the nervous system; structure-function of receptors and ion channels; signal transduction; calcium signaling; neurotransmitter release and vesicle trafficking; neuronal cytoskeleton;



protein and mRNA trafficking; axon guidance; and synapse development. Other areas of interest include molecular mechanisms of neurodevelopmental and neurodegenerative diseases, mechanisms of drug addiction, and social behaviors. Other strengths include neurogenetics and animal models for the study of gene function.

COMPUTATIONAL NEUROSCIENCE

This area lies at the interface of neuroscience and machine learning applied mathematics, biophysics, and other quantitative disciplines, employing a diverse set of approaches to understand the nervous system. There is a well-established computational neuroscience community at Emory, including around two dozen faculty members that work on topics ranging from sensory coding and social behavior to neuroimaging and brain-machine interfaces.

FACULTY

The number of neuroscience faculty at Emory has more than doubled during the past decade providing students with unique opportunities for training in a broad range of neuroscience disciplines. The multidisciplinary expertise of our faculty and the lack of inter-departmental barriers provide a perfect environment for collaborations and interactions between students and faculty.

A complete list of Neuroscience faculty members, with links to publications, grants and other information, is on the Neuroscience website, https://biomed.emory.edu/PROGRAM_SITES/NS/



STUDENTS

NS students come from private universities schools such as Yale and Harvard, engineering schools such as Georgia Tech and Stanford, liberal arts col-leges such as Smith and Oberlin, and state universities such as Michigan State and the University of Georgia. Admission is highly competitive, and only students who have excellent academic credentials combined with solid research experience are accepted. Each year, approximately 15 new students are admitted.

A majority of our graduates choose academic research as a career. After completing their PhD, these students typically go on to complete postdoctoral fellowships at other major research institutions and laboratories, then enter tenure-track academic positions. Other popular career tracks include the pharmaceutical and biotechnology industries, medicine, medical writing, clinical trials, and patent law, among others.

Students actively participate in the program leadership and are involved at all levels of decision-making. Two students sit on the admission committee, executive committee and curriculum committee. These provide them with the opportunity to share their thoughts with faculty members regarding various aspects of the program activities.

The Emory neuroscience program is committed to education and training of students from diverse ethnic backgrounds and students with disabilities.

CURRICULUM

The NS program curriculum provides students with strong research skills and a broad foundation in cellular, molecular, systems and translational neuroscience. In addition, students receive a rigorous training in grant writing, neuroscience communication and ethics. The curriculum is reviewed and evaluated on a yearly basis. Student input is a major source of information for the continued improvement in the quality of our courses.

A typical curriculum is as follows:

Year 1: Neuroanatomy and Systems Neuroscience (7 cr)
 Cellular, Molecular and Developmental Neuroscience (7 cr)
 Professional Development, Communication and Ethics (2 cr)
 Techniques in Neuroscience (2 cr)
 Frontiers in Neuroscience (1 cr)
 3 laboratory rotations

Year 2: Statistics and Experimental Design (4 cr)
 Advanced Graduate Seminar (2 cr)
 One elective course (4 cr min.)
 Frontiers in Neuroscience (1 cr)
 Dissertation research

Years 3 and up: These years are almost totally devoted to research. Students usually complete and defend their thesis by year 5 or 6.

Neuroethics and Scholar Integrity: During the course of their training, neuroscience students receive a solid education in neuroethics and scholar integrity that prepare them to handle their education and research career responsibly based on solid ethical values.

Qualifying exams: To advance to candidacy, students must pass two qualifying exams. The written exam, held in August between year 1 and 2, assesses knowledge gained in the core neuroscience courses. The oral exam, held in the fall semester of year 3, assesses the student's knowledge of their thesis project.

Teaching and mentoring: Students are required to act as a teaching assistant for one course in year 2 and they mentor second year students in the preparation and defense of their thesis proposal for the oral qualifying exam in year 3. All Emory doctoral students attend a three-day workshop through the Teaching Assistant Training and Teaching Opportunity Program (TATTO) administered by the Graduate school. Additional teaching and mentoring opportunities that provide stipend supplement are available for students who wish to develop a strong teaching curriculum during their Ph.D. training.

Additional information about the neuroscience program curriculum can be found on the program website: www.emory.edu/neuroscience.

CONTACT INFORMATION:

Robert C. Liu, PhD
 Director
robert.liu@emory.edu

Rosalyn Lightfoot
 Program Administrator
rlightf@emory.edu

NS@emory.edu

About Emory:

Emory University is one of the major biological research and medical referral centers in the Southeast and is among the fastest growing Medical Centers in the United States. Emory is consistently ranked in the top 20 institutions nationally for NIH research support and ranks at or near the top of institutions for students with NIH predoctoral fellowships. Emory is recognized as a leader in higher education in sustainability and has won numerous awards. The Best Colleges has placed Emory in the top 10 in the nation in the categories of greenest universities and the most beautiful college campuses.

The Graduate Division of Biological and Biomedical Sciences (GDBBS) has around 400 graduate students in eight interdisciplinary Ph.D. programs:

- Biochemistry, Cell and Developmental Biology
- Cancer Biology
- Genetics and Molecular Biology
- Immunology and Molecular Pathogenesis
- Microbiology and Molecular Genetics
- Molecular and Systems Pharmacology
- Neuroscience
- Population Biology, Ecology and Evolution

Over 330 world-renowned researchers mentor students admitted to these programs, giving them a unique opportunity to train with faculty at:

- American Cancer Society
- the U.S. Centers for Disease Control and Prevention
- Children's Healthcare of Atlanta, Inc.
- Emory College
- the Robert W. Woodruff Health Sciences Center
- the Rollins School of Public Health
- The Carter Center
- Veterans Administration Medical Center, Atlanta
- the Winship Cancer Institute
- the National Primate Research Center

Financial support includes a tuition scholarship, health insurance and a competitive stipend - Training is interdisciplinary and students have the flexibility to perform their thesis work with GDBBS faculty outside their chosen program. Students typically perform three rotations before affiliating with a faculty member for their dissertation research.

The application deadline is December 1st for the following fall semester.



Requests for Additional Information:

Recruitment and Admissions
James T. Laney School of Graduate Studies

(404) 727-2547
gdbbs@emory.edu

biomed.emory.edu
biomed.emory.edu/program_sites/ns

LANEY GRADUATE SCHOOL DEGREE PROGRAMS

Anthropology	Biostatistics	Computer Science and Informatics	French	Immunology and Molecular Pathogenesis*	Molecular and Systems Pharmacology*	Philosophy
Art History	Business (PhD)	Development Practice	Genetics and Molecular Biology*	Islamic Civilizations Studies	Neuroscience*	Physics
Behavioral Sciences and Health Education	Cancer Biology*	Economics	Health Services Research and Health Policy	Mathematics	Neuroscience and Animal Behavior (Psychology)	Political Science
Biochemistry, Cell and Developmental Biology*	Chemistry	English	Hispanic Studies	MD/PhD	Nursing	Population Biology, Ecology, and Evolution*
Bioethics	Clinical Psychology	Environmental Health Sciences	History	Microbiology and Molecular Genetics*	Nutrition and Health Sciences	Religion
Biomedical Engineering	Cognition and Development (Psychology)	Environmental Sciences				Sociology
	Comparative Literature	Epidemiology				Women's, Gender, and Sexuality Studies

*The Graduate Division of Biological and Biomedical Sciences is home to eight interdisciplinary graduate programs.