

Neuroscience



EMORY

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GRADUATE
S C H O O L



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. Our program was ranked #1 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, multi-disciplinary approach to solving challenging research questions, with many interdisciplinary Center Grants and a joint program in Hybrid Neural Microsystems with neighboring Georgia Tech. Two major center grants, the Center for Behavioral Neuroscience and the Center for Neurodegenerative Diseases, unite researchers from a variety of disciplines and universities to study the biological foundations of complex behaviors and neurodegeneration.

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, twelve members of the prestigious American College of Neuropsychopharmacology, and faculty trained in the laboratories of Nobel Laureates.

Breadth

The NS faculty includes 120 neuroscientists drawn from 23 University and Medical School departments 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 the department of Psychiatry and Behavioral Sciences combine basic and clinical research to understand the neurochemical changes that underlie psychotic diseases such as schizophrenia, depression 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. The Center for Neurodegenerative Diseases, the Alzheimer's Disease Center and the Conte Center for Mental Illness provide unique resources for research in this field.

DISCOVER

the unexpected

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. The Center for Behavioral Neuroscience brings together scientists from eight Atlanta colleges and universities to study the neurobiology of social behavior (affiliation, reproduction, aggression, and fear).

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.

Molecular, Cellular and Developmental Neuroscience

Areas of interest include mechanisms of signal transduction by neuromediators, basic mechanisms of neurotransmitter release, synaptic transmission and vesicle trafficking, structure-function of ion channels, calcium signaling, synaptic plasticity, neuronal modeling, molecular substrates of drug addiction, schizophrenia and neurodegenerative diseases as well as mechanisms that regulate social behaviors and neuronal development. Other strengths include developmental studies of the spinal cord, the mammalian auditory organ and the enteric nervous system.

Computational Neuroscience

This area of research encompasses a diverse set of approaches in which mathematical and computational tools are used to understand the nervous system. Computational neuroscience is not located in a single department, but is a well-established community created through joint ventures and collaborations between faculty at Emory, Georgia Institute of Technology and Georgia State University.

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, www.emory.edu/neuroscience.

Students

NS students come from Ivy League schools such as Yale and Harvard, engineering schools such as Georgia Tech, liberal arts colleges 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.

Emory is currently tied with Johns Hopkins University in fourth place nationwide for funding of NRSA's. We are preceded only by Stanford, Harvard and UCSF.

More than 90% of our graduates choose academic research as a career. They are successfully competing for postdoctoral positions in the best U.S. research institutions and laboratories (Harvard, Johns Hopkins, UCSD, University of Pennsylvania, NIH etc.). Other career tracks students are taking after graduation include biotechnology, medicine, college teaching, and law.

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.

Curriculum

The NS program curriculum provides students with strong research skills and a broad formation in cellular, molecular, systems and translational neuroscience. 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: Students enroll in three major courses that provide them with basic knowledge in Neuroanatomy and Systems Neuroscience, Cellular, Molecular and Developmental Neurosciences and Biochemistry. They also take a short Techniques in Neuroscience course in which they visit faculty laboratories and are exposed to a broad range of modern neuroscience research techniques. Students enroll in three laboratory rotations, which are completed by the beginning of the second year. The first year is rounded out by introductory seminars and attendance at the Frontiers in Neuroscience seminar series.

Year 2: Training emphasizes research and development of the thesis proposal. Students are also required to take courses on Statistics/ Experimental Design and Grant Writing, in which they are trained in scientific writing and preparation of grant proposals. They also take an elective course and attend advanced seminars and Frontiers in Neuroscience.

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

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 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 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.



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About the GDBBS

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. Emory was recently named one of the 25 “New Ivies” by *Newsweek*, a testament to its quality and dedication to education.

The Graduate Division of Biological and Biomedical Sciences (GDBBS) has over 460 graduate students in eight interdisciplinary Ph.D. programs:

- Biochemistry, Cell and Developmental Biology
- Genetics and Molecular Biology
- Immunology and Molecular Pathogenesis
- Microbiology and Molecular Genetics
- Molecular and Systems Pharmacology
- Neuroscience
- Nutrition and Health Sciences
- 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:

- the American Cancer Society
- the U.S. Centers for Disease Control and Prevention
- Emory College
- the Robert W. Woodruff Health Sciences Center
- the Rollins School of Public Health
- The Carter Center
- the Winship Cancer Institute
- the Yerkes National Primate Research Center

Financial support includes a tuition scholarship, health insurance and stipend (\$24,500 for the 2009-2010 academic year). Funding is guaranteed as long as the student is making satisfactory progress toward their degree. The average time to degree is about 5.5 years. Training is interdisciplinary and students have the flexibility to work with GDBBS faculty outside their program. Students typically perform three rotations before affiliating with a faculty member for their dissertation research.

The application deadline is January 3rd for the following fall semester.



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Requests for Additional Information:

RECRUITMENT AND ADMISSIONS

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