Neuroscience

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Degrees Offered

• Doctor of Philosophy
• Joint Doctor of Medicine and Doctor of Philosophy

The interdepartmental neuroscience graduate program is committed to training the next generation of researchers and educators. Successful completion of degree requirements is based on research and scholarly achievement. Students will have opportunities to experience and acquire the skills needed for successful careers as independent scientists, including critical thinking, problem solving, and leadership. Research experiences include evaluating scientific literature, identifying critical scientific issues, experimental design, grant and manuscript writing, publication of scientific papers, and presentations at national meetings. Students with career interests in teaching will have the opportunity to gain experience in innovative teaching methods and techniques, including problem-based learning, computer-assisted learning, and integrated teaching approaches. The program faculty’s expertise spans all neuroscience sub-disciplines, including structural, cellular, molecular, and developmental. After completion of core coursework, students conduct an original research project culminating in a doctoral dissertation.

Current research areas include the following:


Cognitive Neuroscience: sound recognition, spatial hearing and sensory integration using fMRI, use-dependent plasticity in motor cortex after stroke, neurogenic communication disorders.

Neural Injury: functional and structural integrity of the blood brain barrier in health and disease, role of neuroinflammation in CNS pathologies, stroke pathophysiology and neuroprotection.

Behavioral Neuroscience: airway innervation and asthma, structural and functional changes in the hypothalamus of seasonal breeders, neurobiological pathways controlling food intake and obesity, plasticity in the amygdala, development of new compounds to treat neurological and psychiatric disorders, developmental aspects of sleep and sleep disorders, molecular psychopharmacology; learning, memory, and synaptic plasticity; signal transduction pathways involved in neurodegenerative and neuropsychiatric disorders.

Interdisciplinary research projects include: structure and transcriptional mechanisms controlling neural gene expression, molecular biology and molecular genetics of neural degeneration and regeneration in the central nervous system; developmental neurochemistry and environmental influences on brain development, especially nutrition; neuroanatomy and neurophysiology of somatosensory and auditory systems, structural plasticity of astrocytes and modulation of synaptic contacts in the central nervous system, developmental neurobiology of anxiety disorders, development of synaptic connections in the neocortex, developmental genetics of rodent behavioral mutants; neural basis of pulmonary diseases, especially asthma and occupational/environmental diseases; mechanisms regulating microcirculation under pathophysiological conditions.

Seminars and Journal Clubs

Students develop skills in formal presentation, critical thinking, and scientific analysis by participating in neuroscience seminars and journal clubs.

Faculty

Graduate Program Director
• Dr. Albert Berrebi

Ph.D. Candidacy

To be admitted to candidacy for the Ph.D. degree, the student must pass a preliminary examination and present a plan for the dissertation research project for approval by the candidate’s advisory committee.

Ph.D. Dissertation

To be recommended for the Ph.D. degree, each student must satisfactorily complete a dissertation based on original research and defend the dissertation at an oral examination. Success in the dissertation research is the core of the degree.