

Neuroscience, M.S., Ph.D.

Degrees Offered

- Master of Science (M.S.)
- Doctor of Philosophy (Ph.D.)
- Joint Doctor of Medicine and Doctor of Philosophy (M.D., Ph.D.)

Nature of the Program

The doctoral program in Neuroscience 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, writing, public speaking, and leadership. After completion of core coursework, students conduct an original research project culminating in a doctoral dissertation. Research experiences include evaluating scientific literature, identifying critical scientific issues, experimental design, grant and manuscript writing, publication of scientific papers, and presentations at national or international 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. Faculty members have appointments in basic and clinical departments with expertise that spans all neuroscience sub-disciplines, including structural, cellular, molecular, behavioral, and developmental.

The neuroscience graduate program emphasizes research on the function and dysfunction of the brain and nervous system. The program provides students with innovative approaches to understanding neural mechanisms responsible for diseases such as Alzheimer's disease, stroke, brain injury and repair, as well as a fundamental understanding of cellular and molecular neurobiology, motor and sensory systems, neural processing, cognition, behavior, and neural development.

Completion of the Ph.D. degree is realized when a minimum of one first-authored manuscript, based on dissertation research, is accepted in a peer-reviewed journal, another manuscript is accepted in a peer-reviewed journal (any order of authorship is acceptable), and the student successfully presents the research results to faculty of the graduate dissertation committee and program/department. Typically, four to five years are required to realize these goals. The doctoral program in Neuroscience 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, writing, public speaking, and leadership. After completion of core coursework, students conduct an original research project culminating in a doctoral dissertation. Research experiences include evaluating scientific literature, identifying critical scientific issues, experimental design, grant and manuscript writing, publication of scientific papers, and presentations at national or international 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. Faculty members have appointments in basic and clinical departments with expertise that spans all neuroscience sub-disciplines, including structural, cellular, molecular, behavioral, and developmental.

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Research Areas

Includes, but not limited to:

- *Sensory Neuroscience*: mechanisms of auditory and visual system development, inhibitory neural circuits in the brain stem and cortex, synaptic development of thalamocortical circuits, molecular genetic control of retinal development and neural patterning, cell biology of G-protein-mediated signal transduction in vertebrate photoreceptors, olfactory signal processing in the brain, post-translational modification of proteins and protein assembly.
- *Cognitive Neuroscience*: use-dependent plasticity in motor cortex after stroke, neurogenic communication disorders, or chemotherapy.
- *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*: plasticity in the brain, development of new compounds to treat neurological and psychiatric disorders, sleep and circadian rhythm 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,

FACULTY

GRADUATE PROGRAM DIRECTOR

- Bernard Schreurs - Ph.D. (University of Iowa)

ASSOCIATE GRADUATE PROGRAM DIRECTOR

- Zachary Weil - Ph.D. (Ohio State University)

For specific information on the following program, Please see the link to the right:

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