NEUROSCIENCE

OVERVIEW
The Neuroscience Graduate Program is a university-wide, multidisciplinary, Ph.D. granting program that has more than 50 faculty mentors across 13 departments and 5 colleges. This program emphasizes rigorous training in neuroscience-related research, educates students about human health, and encourages interdisciplinary research projects.

DEGREES
- Neuroscience M.S.
- Neuroscience Ph.D.

FACULTY
Althoff, Robert; Associate Professor, Department of Psychiatry; MD, University of Illinois
Applebee, Angela; Clinical Associate Professor, Department of Neurological Sciences; MD, University of South Dakota School of Medicine, Vermillion, South Dakota
Ballif, Bryan; Associate Professor, Department of Biology; PHD, Harvard University
Barry, Jeremy; Assistant Professor, Department of Neurological Sciences; PHD, SUNY Downstate
Berger, Christopher Lewis; Professor, Department of Molecular Physiology and Biophysics; PHD, University of Minnesota Twin Cities
Bongard, Joshua C.; Professor, Department of Computer Science; PHD, University of Zurich
Bouton, Mark Earhart; Professor, Department of Psychological Science; PHD, University of Washington
Brewer, Matthias; Professor, Department of Chemistry; PHD, University of Wisconsin Madison
Cannizzaro, Michael S.; Associate Professor, Department of Communication Sciences; PHD, University of Connecticut
Cipolla, Marilyn Jo; Professor, Department of Neurological Sciences; PHD, University of Vermont
Corn brooks, Carson Justin; Associate Professor Emeritus, Department of Neurological Sciences; PHD, Virginia Commonwealth University
Dabertrand, Fabrice; Assistant Professor, Department of Pharmacology; PHD, University of Bordeaux, France
Dostmann, Wolfgang R. G.; Professor, Department of Pharmacology; PHD, University of Bremen, MD, University of Munich
Dumas, Julie Anna; Associate Professor, Department of Psychiatry; PHD, University of North Carolina
Ebert, Alicia; Assistant Professor, Department of Biology; PHD, Colorado State University
Eppstein, Margaret Jean; Professor, Department of Computer Science; PHD, University of Vermont
Erdos, Benedek; Assistant Professor, Department of Pharmacology; MD, PHD, Semmelweis University, School of Medicine, Budapest, Hungary
Falls, William A.; Dean, College of Arts and Science, Professor, Department of Psychological Science; PHD, Yale University
Flynn, Sean; Assistant Professor, Department of Neurological Sciences; PHD, University of Utah
Forehand, Cynthia Jean; Dean, Graduate College, Professor, Department of Neurological Sciences; PHD, University of North Carolina Chapel Hill
Francklyn, Christopher Steward; Professor, Department of Biochemistry; PHD, University of California Santa Barbara
Freeman, Kaley; Assistant Professor, Department of Surgery; MD/PHD, University of Colorado Boulder
Garavan, Hugh P.; Professor, Department of Psychiatry; PHD, Bowling Green State University
Green, John Thomas; Professor, Department of Psychological Science; PHD, Temple University
Hammack, Sayamwong E; Associate Professor, Department of Psychology; PHD, University of Colorado
Henry, Sharon Margaret; Professor, Department of Rehabilitation and Movement Science; PHD, University of Vermont (Emeritus)
Holmes, Gregory; Professor and Chair, Department of Neurological Sciences; MD, University of Virginia
Howe, Alan K; Associate Professor, Department of Pharmacology; PHD, Northwestern University
Hudziak, James Joseph; Professor, Department of Psychiatry; MD, University of Minnesota Twin Cities
Jacobs, Jesse; Assistant Professor, Department of Rehabilitation and Movement Science; PHD, Oregon Health & Science University
Jaworski, Diane Marie; Professor, Department of Neurological Sciences; PHD, Texas Woman’s University
Langevin, Helene M.; Professor, Department of Neurological Sciences; MD, McGill University
Li, Dawei; Assistant Professor, Department of Microbiology and Molecular Genetics; PHD, Shanghai Jiao Tong University
Lounsbury, Karen M.; Professor, Department of Pharmacology; PHD, University of Pennsylvania
Mackey, Michael Scott; Assistant Professor, Department of Psychiatry; PHD; McGill University, Montreal, Quebec
Mahoney, John Matthew; Assistant Professor, Department of Neurological Sciences; PHD, McGill University
Mawe, Gary Michael; Professor, Department of Neurological Sciences; PHD, University of Pennsylvania
May, Victor; Professor, Department of Neurological Sciences; PHD, Ohio State University
McCarthy, Sarah A.; Assistant Professor, Department of Neurological Sciences; PHD, Pennsylvania State University, College of Medicine
Morielli, Anthony D.; Associate Professor, Department of Pharmacology; PHD, University of California at Santa Cruz
Naylor, Magdalena Raczkowska; Professor, Department of Psychiatry; MD/PHD, Warsaw Medical Academy
**GRMD 353. Medical Fdns of Medicine. 3 Credits.**
Fundamental vocabulary, concepts, and methods of molecular genetics, cell physiology, biochemistry and metabolism including cell-cell and cell-environment communication, cell proliferation and cell death. Pre/co-requisite: Graduate standing; permission of the Instructor; six credits coursework plus two credits lab in Biology, general chemistry, organic chemistry and Physics.

**GRMD 354. Medical Human Struc & Fctn. 4-8 Credits.**
Combination of gross anatomy, histology, embryology, physiology and medical imagine to present an integrated overview of the human body. Pre/co-requisites: Graduate standing; Instructor permission; six credits coursework, plus two credits lab in Biology, general chemistry, organic chemistry and Physics; graduate coursework in Cell Biology or Biochemistry.

**GRMD 355. Medical Attacks & Defenses. 4 Credits.**
Principles of hematology, immunology, microbiology, toxicology, pathology, pharmacology, and neoplasia as a foundation to pathophysiology and therapeutics. Pre/co-requisite: Graduate standing; Instructor permission; six credits coursework plus two credits lab in Biology, general chemistry, organic chemistry and Physics; graduate coursework in Cell Biology or Biochemistry and Anatomy & Physiology.

**GRMD 356. Medical Nutr, Metab, & GI Syst. 5 Credits.**
Organizes studies in nutrition, organ systems metabolism and the gastrointestinal and endocrine systems through integrated lessons in cell biology, biochemistry, normal and pathologic anatomy, pharmacology, physiology, pathophysiology and microbiology. Pre/co-requisite: Graduate standing; permission of the Instructor; six credits coursework plus two credits lab in Biology, Anatomy & Physiology, and an introduction to immunology, microbiology, toxicology, pathology and pharmacology.

**GRMD 357. Medical Neural Science. 6 Credits.**
Organize study of the human nervous and behavioral system through lessons that integrate cell metabolism, endocrinology, normal and pathologic anatomy, pharmacology, physiology, pathophysiology and psychopathology. Pre/co-requisite: Graduate standing; permission of the Instructor; six credits coursework plus two credits lab in Biology, general chemistry, organic chemistry and Physics; Graduate coursework in Cell biology or Biochemistry, human anatomy & physiology, and an introduction to immunology, microbiology, toxicology, pathology and pharmacology.

**GRMD 358. Medical Connections. 1 Credit.**
Introduction to musculoskeletal and integumentary systems that integrates cell metabolism, endocrinology, normal and pathologic anatomy, physiology and pathophysiology, and pharmacology. Pre/co-requisite: Graduate standing; Instructor permission; six credits coursework plus two credits lab in biology, general chemistry, organic chemistry and physics; graduate coursework in cell biology or biochemistry, human anatomy and physiology, and an introduction to immunology, microbiology, toxicology, pathology, and pharmacology.

**GRMD 359. Medical Cardio,Resp,Renal Syst. 6 Credits.**
Organizes studies in the cardiovascular, respiratory and renal system through lessons that integrate cell metabolism, endocrinology, normal and pathologic anatomy, pharmacology, physiology and pathophysiology. Pre/co-requisite: graduate standing; permission of the Instructor; six credits coursework plus two credits lab in biology or biochemistry, human anatomy and physiology, and an introduction to immunology, microbiology, toxicology, pathology and pharmacology.
GRMD 360. Medical Generations. 5 Credits.
Organizes studies in reproduction, development and aging through lessons that integrate behavioral development, cell and molecular biology, endocrinology, normal and pathologic anatomy, pharmacology, physiology and pathophysiology. Pre/co-requisite: Graduate standing; permission of the Instructor; six credits coursework plus two credits lab in biology, general chemistry, organic chemistry and physics; graduate coursework in cell biology or biochemistry, human anatomy and physiology, and an introduction to immunology, microbiology, toxicology, pathology and pharmacology.

Neuroscience Courses

NSCI 222. Cellular Neurophysiology. 3 Credits.
Fundamentals of cellular neurophysiology through lecture, independent student reading and faculty-led group discussions of journal articles. Prerequisites: NSCI 110 or, NSCI 111 and NSCI 112, or Instructor Permission.

NSCI 225. Human Neuroanatomy. 0 or 3 Credits.
Functional anatomy of the human nervous system and its cells. Focus on both peripheral and central nervous system. Lectures and laboratory (gross and microscopic anatomy). Prerequisite: Instructor permission.

NSCI 280. Glia: Not Just Neuron Glue!. 3 Credits.
Interdisciplinary course in which students engage in a focused, in-depth exploration of how glial cells contribute to neurological and psychiatric disorders. Prerequisites: NSCI 111; Course director approval. Pre/Co-requisites: NSCI 111; Course Director permission.

NSCI 300. Intro Functional Neuroimaging. 3 Credits.
Functional neuroimaging may be the most exciting recent development in cognitive neuroscience. Students will learn about neuroimaging, and work in small groups to develop experiments, acquire and analyze functional MRI data an MRI scanner.

NSCI 302. Neuroscience. 4 Credits.
Functional anatomy of the human nervous system. Lectures and laboratory providing learning experience with dissected specimens, gross and microscopic anatomy. Incorporates clinical information from physician-scientists. Prerequisite: Physical Therapy major or Instructor permission.

NSCI 306. Techniques in Neurobiology. 3 Credits.
Discussion of techniques used to study the nervous system. Experience with light, fluorescence, electron microscopy; microsurgical procedures; electrophysiological stimulating, recording techniques; neuronal tracing techniques. Prerequisite: Permission of the Instructor.

NSCI 320. Developmental Neurobiology. 3 Credits.
Provides fundamental knowledge of cell-to-cell interactions necessary for proper development and organization of the nervous system. Topics include pattern formation, neuronal differentiation, axon guidance, and target interactions. Prerequisite: Permission of the Instructor. Alternate years.

NSCI 323. Neurochemistry. 3 Credits.
Biochemistry of the nervous system. Topics include ion channels, synaptic function, neurotransmitters and neuropeptides, signal transduction, and hormones in brain function. Prerequisite: Permission of the Instructor.

NSCI 326. Basic Sci-Neurologic Disease. 3 Credits.
In-depth examination of basic mechanisms and clinical aspects of a related subset of neurological disorders, e.g. neurodegenerative disease or disorders of neurotransmission. Disease group changes every year. Prerequisite: Advanced Graduate Students, Neuroscience Faculty and Residents in Neurology, Neurosurgery and Psychology.

NSCI 327. Resp Conduct in Biomed Rsch. 1 Credit.
Topics in Scientific Integrity surrounding responsible conduct and practices in biomedical research. Prerequisites: Advanced Graduate students, postdoctoral fellows and assistant professors in the biological or biomedical sciences.

NSCI 328. Techniques in Microscopy. 3 Credits.
Topics shall include practical background in microscopy, including brightfield, epifluorescence, confocal, multi-photon, deconvolution, atomic force and electron microscopy. Prerequisite: Instructor permission.

NSCI 330. Intro Functional Neuroimaging. 3 Credits.
In-depth examination of basic mechanisms and clinical aspects of a related subset of neurological disorders, e.g. neurodegenerative disease or disorders of neurotransmission. Disease group changes every year. Prerequisite: Advanced Graduate Students, Neuroscience Faculty and Residents in Neurology, Neurosurgery and Psychology.

NSCI 331. Seminar in Neuroscience. 1 Credit.
Research presentations and critical review of the literature in various areas of anatomical and neurobiological sciences.

NSCI 332. Seminar in Neuroscience. 1 Credit.
Research presentations and critical review of the literature in various areas of anatomical and neurobiological sciences.

NSCI 391. Master's Thesis Research. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

NSCI 395. Advanced Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles. Prerequisite: Instructor permission.
NSCI 491. Doctoral Dissertation Research. 1-18 Credits.
NSCI 492. Independent Study. 1-18 Credits.
NSCI 496. Advanced Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.