### 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
- **Ballif, Bryan A.**: Associate Professor, Department of Biology; PHD, Harvard University
- **Berger, Christopher Lewis**: Associate Professor, Department of Molecular Physiology and Biophysics; PHD, University of Minnesota Twin Cities
- **Bongard, Joshua C.**: Associate Professor, Department of Computer Science; PHD, University of Zurich
- **Bouton, Mark Earhart**: Professor, Department of Psychology; PHD, University of Washington
- **Braiden, Joseph Elliott**: Professor, Department of Pharmacology; PHD, University of Vermont
- **Brewer, Matthias**: Associate 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
- **Cornbrooks, Carson Justin**: Associate Professor, Department of Neurological Sciences; PHD, Virginia Commonwealth University
- **Delay, Eugene Raymond**: Associate Professor, Department of Biology; PHD, University of Georgia
- **Delay, Rona J.**: Associate Professor, Department of Biology; PHD, Colorado State University
- **Dostmann, Wolfgang R. G.**: Professor, Department of Pharmacology; MD, University of Munich
- **Dumas, Julie Anna**: Associate Professor, Department of Psychiatry; PHD, University of North Carolina
- **Eckstein, Felix**: Professor, Department of Neurological Sciences; PHD, University of Basel
- **Eppstein, Maggie**: Associate Professor, Department of Computer Science; PHD, University of Vermont
- **Falls, William A.**: Professor, Department of Psychology; PHD, Yale University
- **Forbush, Cynthia Jean**: Professor, Department of Neurological Sciences; PHD, University of North Carolina Chapel Hill
- **Franklyn, Christopher Steward**: Professor, Department of Biochemistry; PHD, University of California Santa Barbara
- **Freeman, Kalev**: Assistant Professor, Department of Surgery; MD, University of Colorado Boulder
- **Garavan, Hugh P.**: Associate Professor, Department of Psychiatry; PHD, Bowling Green State University
- **Gorman, Mark**: Professor, Department of Neurological Sciences; MD, Wayne State University
- **Green, John Thomas**: Associate Professor, Department of Psychology; 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
- **Higgins, Stephen Thomas**: Professor, Department of Psychiatry; PHD, University of Kansas
- **Holmes, Gregory**: Professor, 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 Y**: Assistant Professor, Department of Rehabilitation and Movement Science; PHD, Oregon Health Sciences 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
- **Lenck-Santini, Pierre-Pascal**: Assistant Professor, Department of Neurological Sciences; PHD, Universite de Provence
- **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
- **Mawe, Gary Michael**: Professor, Department of Neurological Sciences; PHD, Ohio State University
- **May, Victor**: Professor, Department of Neurological Sciences; PHD, Northwestern University
- **Morielli, Anthony D.**: Associate Professor, Department of Pharmacology; PHD, University of California Berkeley
- **Naylor, Magdalena Raczkowska**: Professor, Department of Psychiatry; MD, Warsaw Medical Academy
- **Nelson, Mark Tuxford**: Professor, Department of Pharmacology; PHD, Washington University in St Louis
- **Nishi, Rae**: Professor, Department of Neurological Sciences; PHD, University of California San Diego
- **Parsons, Rodney Lawrence**: Professor, Department of Neurological Sciences; PHD, Stanford University
- **Potter, Alexandra S.**: Assistant Professor, Department of Psychiatry; PHD, University of Vermont
- **Prelock, Patricia**: Professor, Department of Pediatrics; PHD, University of Pittsburgh
- **Schermhorn, Alice C**: Assistant Professor, Department of Psychology; PHD, University of Notre Dame
**Graduate Medical Courses**

**GRMD 353. Medical Cell & Molec Biology. 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 Struct & Function. 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, general chemistry, 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 225. Human Neuroanatomy. 0-3 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 302. Neuroscience. 4 Credits.
This course examines the structure and functions of the human nervous system, provides laboratory experience with dissected specimens and incorporates clinical information. Prerequisites: Open to graduate students in Physical Therapy and others with 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. 1 Credit.
In-depth examination of basic mechanisms and clinical aspects of one neurological disease per year. Disease examined 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 329. Topics in Excitable Membranes. 2 Credits.
This course is a graduate course designed to introduce the fundamentals of cellular electrophysiology through independent student reading and faculty-led group discussions of journal articles. Prerequisite: Instructor permission.

NSCI 330. Comparative Neurobiology. 2 Credits.
This course is designed to introduce students to the cellular mechanisms that underlie selective motor and sensory abilities that have evolved in various species. Pre/co-requisite: Instructor permission.

NSCI 381. Seminar in Neuroscience. 1 Credit.
Research presentations and critical review of the literature in various areas of anatomical and neurobiological sciences.