

Neuroscience

Nicole Dudukovic, Director
neuro@uoregon.edu
541-346-7225

Neuroscience is the interdisciplinary study of neural function, development, and behavior. The University of Oregon offers an undergraduate major in Neuroscience. The graduate training program in neuroscience is centered in the Institute of Neuroscience (ion.uoregon.edu (<https://ion.uoregon.edu>)). Affiliated faculty members in the undergraduate major as well as participating faculty members in the graduate training program are drawn from the Departments of Biology, Human Physiology, and Psychology, along with the Phil and Penny Knight Campus for Accelerating Scientific Impact.

Graduate Studies

Curriculum

First-year graduate students take one of two core sequences:

1. cellular, systems, and cognitive neuroscience
2. developmental, molecular, and genetic neuroscience

The core sequences are taught cooperatively by the faculty. Most students also take elective courses in a variety of subjects.

Faculty-Student Seminars

Faculty members and graduate students participate in weekly informal seminars that feature lively discussion of research papers in specific areas of neuroscience. Students and faculty members also participate in the neuroscience seminar, a weekly series featuring visiting scientists. The purpose of the neuroscience seminar is to keep both the faculty and students abreast of current developments in this broad field.

Research

Students are encouraged to participate in laboratory research from the very beginning of their graduate training. A laboratory rotation program is directed toward this objective. In the rotation program, new students take part in the activities of a different laboratory group during each of the three terms of the first year. Participation may include a research project, ongoing experiments, or other activities. This program allows students to learn firsthand about different approaches to the study of neuroscience before choosing an area of concentration.

Doctoral Study

Students who want to enter the neuroscience program should apply to the PhD program of a participating department and indicate their interest in neuroscience. Typically, students interested in cognitive neuroscience apply to the psychology department; students interested in molecular, cellular, developmental, or systems neuroscience apply to the biology department. Such applications are reviewed by the neuroscience faculty as well as the departmental admission committee. Answers to specific questions about prerequisites and deadlines may be obtained by writing directly to one of the participating departments, University of Oregon, Eugene, Oregon 97403. Additional information about the Institute of Neuroscience may be obtained from the institute website. See also the Institute of Neuroscience section in the Research Centers and Institutes (<http://catalog.uoregon.edu/research/>) area of this catalog.

Courses

Biology. Cell Biology (BI 322), Sensory Physiology (BI 353), Animal Physiology (BI 356), Neurobiology (BI 360), Special Studies: [Topic] (BI 399) (Cellular Biology of the Senses), Experimental Course: [Topic] (BI 410) (Computational Neuroscience), Protein Toxins in Cell Biology (BI 422), Systems Neuroscience (BI 461), , Developmental Neurobiology (BI 466), Experimental Course: [Topic] (BI 510) (Computational Neuroscience), Protein Toxins in Cell Biology (BI 522), Systems Neuroscience (BI 561), , Developmental Neurobiology (BI 566), Experimental Course: [Topic] (BI 610) (Advanced Cellular Neuroscience)

Human Physiology. Motor Control (HPHY 333), Experimental Course: [Topic] (HPHY 410) (Neurophysiology of Concussion), Experimental Course: [Topic] (HPHY 510) (Neurophysiology of Concussion), Experimental Course: [Topic] (HPHY 610) (Advanced Systems Neuroscience)

Psychology. Biopsychology (PSY 304), Brain Mechanisms of Behavior (PSY 445), Cognitive Neuroscience (PSY 449), Brain Mechanisms of Behavior (PSY 545), Cognitive Neuroscience (PSY 549), Experimental Course: [Topic] (PSY 610) (Advanced Cognitive Neuroscience)

Affiliated Faculty

Elliot Berkman, psychology

Melynda Casement, psychology

Robert Chavez, psychology

Paul Dassonville, psychology

Chris Doe, biology

Sarah DuBrow, psychology

Judith Eisen, biology

Tim Gardner, Knight Campus

Ian Greenhouse, human physiology

Tory Herman, biology

Benjamin Hutchinson, psychology

Adrienne Huxtable, human physiology

Santiago Jaramillo, biology

Brice Kuhl, psychology

Shawn Lockery, biology

Michelle Marneweck, human physiology

Ulrich Mayr, psychology

Luca Mazzucato, biology

David McCormick, biology

Adam Miller, biology

Kate Mills, psychology

James Murray, biology

Cris Niell, biology

Jennifer Pfeifer, psychology

Jonathan Reeder, Knight Campus

Margaret Sereno, psychology

Matt Smear, psychology

Nicki Swann, human physiology

Emily Sylwestrak, biology

Terry Takahashi, biology

Nash Unsworth, psychology

Philip Washbourne, biology

Michael Wehr, psychology

Monte Westerfield, biology

Dasa Zeithamova, psychology

Neuroscience

As outlined below, the Neuroscience majors consists of the following components: 1) foundation courses in the natural sciences; 2) math and statistics coursework; 3) life science fundamentals; 4) a core neuroscience sequence; 5) upper-division elective courses; and 6) advanced skills courses and/or research experience. The total number of credits is 104-107 (depending on whether majors complete the General Biology Sequence or the Biology Honors Sequence).

Code	Title	Credits
Foundation Courses in Natural Sciences:		46-49
BI 211 & BI 212 & BI 214	General Biology I: Cells and General Biology II: Organisms and General Biology IV: Mechanisms	
or BI 281H & BI 282H & BI 283H	Honors Biology I: Cells, Biochemistry and Physiology and Honors Biology II: Genetics and Molecular Biology and Honors Biology III: Evolution, Diversity and Ecology	
CH 221 & CH 222 & CH 223	General Chemistry I and General Chemistry II and General Chemistry III	
or CH 224H & CH 225H & CH 226H	Advanced General Chemistry I and Advanced General Chemistry II and Advanced General Chemistry III	
PHYS 201 & PHYS 202 & PHYS 203	General Physics and General Physics and General Physics	
or PHYS 251 & PHYS 252 & PHYS 253	Foundations of Physics I and Foundations of Physics I and Foundations of Physics I	
CH 227 & CH 228 & CH 229	General Chemistry Laboratory and General Chemistry Laboratory and General Chemistry Laboratory	
or PHYS 204 & PHYS 205 & PHYS 206	Introductory Physics Laboratory and Introductory Physics Laboratory and Introductory Physics Laboratory	
PSY 201	Mind and Brain	

Math and Statistics Courses:	8
MATH 246	Calculus for the Biological Sciences I or MATH 25 Calculus I
PSY 302	Statistical Methods in Psychology or MATH 425 Statistical Methods I or ANTH 470 Statistical Analysis of Biological Anthropology
Life Science Fundamentals:	8
HPHY 211	Medical Terminology
HPHY 212	Scientific Investigation in Physiology
Core Neuroscience: Sequence order is recommended but not required	18
HPHY 321 & HPHY 322	Human Anatomy I and Human Physiology I (Fall)
PSY 304	Biopsychology (Winter)
BI 360	Neurobiology (Spring)
Upper Division Electives: ¹	16
Molecular/Cellular/Developmental	
BI 320	Molecular Genetics
BI 322	Cell Biology
BI 328	Developmental Biology
BI 356	Animal Physiology
BI 422	Protein Toxins in Cell Biology
BI 427	Molecular Genetics of Human Disease
BI 466	Developmental Neurobiology
HPHY 337	Clinical Pharmacology
HPHY 432	Neural Development
Systems	
BI 353	Sensory Physiology
BI 399	Special Studies: [Topic]
BI 410	Experimental Course: [Topic]
BI 461	Systems Neuroscience
HPHY 333	Motor Control
HPHY 412	Sleep Physiology
HPHY 433	Neurophysiology of Concussion
HPHY 434	Movement Disorders
HPHY 436	Clinical Neuroscience
PSY 445	Brain Mechanisms of Behavior
PSY 450	Hormones and Behavior
Cognitive	
BI 410	Experimental Course: [Topic] (Neural Basis of Cognition)
PSY 305	Cognition
PSY 348	Music and the Brain
PSY 383	Psychoactive Drugs
PSY 433	Learning and Memory
PSY 436	Human Performance
PSY 438	Perception
PSY 440	Psycholinguistics
PSY 449	Cognitive Neuroscience
PSY 458	Decision-Making
PSY 475	Cognitive Development
Advanced Skills Courses and Research Experience	8
BI 401	Research: [Topic]

BI 403	Thesis
BI 407	Seminar: [Topic]
BI 410	Experimental Course: [Topic] (Introduction to Programming for Biologists)
BI 410	Experimental Course: [Topic] (Matlab for Biologists)
BI 410	Experimental Course: [Topic] (Analysis Neural Data)
BI 485	Techniques in Computational Neuroscience
CIS 372M	Machine Learning for Data Science
CIS 472	Machine Learning
HPHY 401	Research: [Topic]
HPHY 403	Thesis
PSY 401	Research: [Topic]
PSY 403	Thesis
PSY 412	Applied Data Analysis
Total Credits	104-107

¹ 16 required credits with at least 12 credits from 400-level courses; at least one course from each of the three area

All courses counted towards the Neuroscience Major requirements must be taken for a letter grade and passed with a grade of C or better.

At least 34 credits of coursework applied to the major must be taken at the University of Oregon.

Criteria for Honors

To graduate with Honors in Neuroscience, the following requirements must be met:

1. A completed Neuroscience Honors application with signature of a faculty research advisor from BI, HPHY or PSY
2. Completion of all Neuroscience major requirements
3. A minimum 3.5 GPA in all courses applied to the major
4. At least three credits in BI 403, HPHY 403, or PSY 403 Thesis (*These credits may be applied to the advanced skills courses and research experience requirement*).
5. Completion of an honors thesis under supervision of a committee, consisting of one BI, HPHY, or PSY faculty member and at least one other committee member (Ph.D. student, postdoctoral scholar, or faculty) from BI, HPHY, or PSY.