Neuroscience

Interdepartmental Graduate Group
Group Office: 450 Li Ka Shing, (510) 642-8915

Chair: Dan Feldman, PhD (Department of Molecular and Cell Biology)
Group Website: Neuroscience (http://neuroscience.berkeley.edu/grad)

Graduate Program

The Neuroscience Graduate Program at UC Berkeley is a unique, diverse PhD training program that offers intensive, integrated training in multiple areas of neuroscience research.

The program involves more than 50 faculty from different campus departments, with expertise ranging from molecular and cellular neuroscience, to developmental neuroscience, systems and computational neuroscience, and human cognitive neuroscience.

We provide a highly interdisciplinary, intellectually dynamic training environment of coursework, research training, and mentoring, within a strong research program that produces fundamental advances in knowledge and cutting-edge techniques.

We welcome highly qualified applicants to join us in better understanding the brain and its functions and disorders.

Faculty in the Neuroscience Graduate Program are involved in three broad research areas: Cellular, Molecular, and Developmental Neuroscience; Systems and Computational Neuroscience; and Cognition, Brain, and Behavior. Individual faculty may be involved in more than one research area.

Applicants to the program should have a bachelor's degree in science from a four-year college and at least one year of laboratory experience. Applicants are required to submit Graduate Record Examination (GRE) General Test scores, and are strongly encouraged to submit one GRE Subject Test score (in biochemistry and cell biology, chemistry, psychology, biology, computer science, or physics).

During the first two years in the program, each student is required to take a minimum of three 3- or 4-unit graduate (200-level) courses chosen from a wide range of specialized graduate courses. Graduate advisers help students tailor their coursework to their individual needs and interests. To ensure breadth in didactic coursework, however, students are required to choose courses that are distributed between at least two subdisciplines of neuroscience (i.e., cell, molecular, and developmental neuroscience; systems and computational neuroscience; and cognition, brain and behavior).

Note: Students, with approval from the graduate adviser, may take courses in other specialized areas important for developing their research foundation, such as biochemistry, genetics, statistics, physics, bioengineering, etc. Independent research in different laboratories starts at the beginning of the first year.

Students are also required to serve as graduate student instructors for at least two semesters during their first three years of study. Graduate students advance to candidacy for the PhD by passing a qualifying examination at the end of the second year in the program. Students are expected to finish their degree within 5 to 6 years.

For detailed information on the graduate program, visit the website, (http://neuroscience.berkeley.edu/grad/home) email tleonard@berkeley.edu , or mail your inquiries to Graduate Student Affairs, Neuroscience Institute, UC Berkeley, 450 Li Ka Shing, Berkeley, CA 94720-3370.

Neuroscience PhD Progress through Degree (http://neuroscience.berkeley.edu/grad/current/pdf/Progress_through_degree.pdf) **(PDF)**

The Neuroscience Graduate Program has no designated lecture courses, but various affiliated departments offer a wide range of options. A selection is listed below. (For more details, see individual course descriptions.)

General/Survey Courses: Responsible Conduct of Research (MCB 293C).

Cellular, Molecular, and Developmental Neuroscience Courses: Advanced Cellular and Molecular Neurobiology (MCB 261), Advanced Cell Biology (MCB 230), Advanced Genetics (MCB 240), Biochemistry and Molecular Biology (MCB 200), Advanced Developmental Neurobiology (MCB 263), and Advanced Developmental Biology (MCB 231).

Systems and Computational Neuroscience Courses: Advanced Topics in Systems Neuroscience (MCB 262), Functional Neuroanatomy and Laboratory (IB 245 and IB 245L), Behavioral Neuroscience (Psych 210B), Sensory Systems (Psych 210C), Neuronal Mechanisms of Learning and Memory (Psych 290Z), and Neural Computation (VS 265).

Cognition, Brain, and Behavior Neuroscience Courses: Cognitive Neuroscience (Psych 210A), Learning and Memory (Psych 210D), Thought and Language (Psych 210E), Hormones and Behavior (Psych 211), Functional MRI Methods (Psych 214), Proseminar: Biological, Cognitive, and Language Development (Psych 240A), and Biological and Public Health Aspects of Alzheimer's Disease (PH C217).

Recommended Statistical Methods Courses: Data Analysis (Psych 205), Linear Systems Theory (EECS 221A), Random Processes and Systems (EECS 226A), Information Theory and Coding (EECS 229), Analysis of Time Series (Stat 248), and Statistical Learning Theory (Stat 241A).

Other selected seminar courses include: Graduate Seminar on Specialized Neuroscience Topics (MCB 290 series), Graduate Seminar on Specialized Topics in Biological and Cognitive Psychology (Psych 290 series), and Special Seminars in Vision Science (VS 298 series).

The Neuroscience Graduate Program also sponsors an annual campuswide Neuroscience retreat, weekly seminar series, and a graduate student Neuroscience Journal Club.

NEUROSC C129/PB HLTH C129 The Aging Human Brain 3 Units
Department: Neuroscience; Public Health
Course level: Undergraduate
Term course may be offered: Fall. Offered odd-numbered years.
Grading: Letter grade.
Hours and format: 2 hours of Lecture and 1 hour of Discussion per week for 15 weeks.
The course will survey the field of the human brain, with introductory lectures on the concepts of aging, and brief surveys of normal neuroanatomy, neurophysiology, neurochemistry, and neuropsychology as well as methods such as imaging, epidemiology, and pathology. The neurobiological changes associated with aging will be covered from the same perspectives: neuropsychology, anatomy, biochemistry, and physiology. Major neurological diseases of aging including Alzheimer's and Parkinson's disease will be covered, as will compensatory mechanisms, neuroendocrine changes with aging, depression and aging, epidemiology of aging, and risk factors for decline.
Instructor: Jagust

NEUROSC C160/MCELLBI C160 Introduction to Neurobiology 4 Units
Department: Neuroscience; Molecular and Cell Biology
Course level: Undergraduate
Terms course may be offered: Fall and spring
Grading: Letter grade.
Hours and format: 3 hours of Lecture and 1 hour of Discussion per week for 15 weeks.
Prerequisites: 102 or 100, Biology 1A and 1AL, Physics 8A-8B.
An introductory course designed to provide a general understanding of the nervous system including how it functions, how it develops, and how it changes with learning and memory. Analysis from the level of molecules to cells to simple circuits to complex networks to higher brain functions.

NEUROSC C217D/PB HLTH C217D Biological and Public Health Aspects of Alzheimer's Disease 3 Units
Department: Neuroscience; Public Health
Course level: Graduate
Term course may be offered: Spring
Grading: Letter grade.
Hours and format: 2 hours of seminar/discussion per week.
Prerequisites: Graduate standing or consent of instructor.
This course will survey the field of Alzheimer's disease (AD) from a biological and public health perspective by reading original research papers in the fields of medicine, neuroscience, and epidemiology. The course will begin with a historical survey of the concept of AD, followed by a description of clinical and neuropathological features. Subsequent classes will cover the genetics and molecular biology of the disease, as well as biomarkers, epidemiology, risk factors, treatment, development of new diagnostic approaches, and ethical issues. The course will also serve as a model for the analysis of complex diseases with multiple genetic and environmental causes, and late onset neurodegenerative diseases. The course will also serve as a model for the analysis of complex diseases with multiple genetic and environmental causes and late-onset neurodegenerative disease.
Instructor: Jagust

NEUROSC C260/MCELLBI C260 Introduction to Neurobiology 4 Units
Department: Neuroscience; Molecular and Cell Biology
Course level: Graduate
Term course may be offered: Fall
Grading: Letter grade.
Hours and format: 3 hours of Lecture and 1 hour of Discussion per week for 15 weeks.
An introductory course designed to provide a general understanding of the nervous system including how it functions, how it develops, and how it changes with learning and memory. Analysis from the level of molecules to cells to simple circuits to complex networks to higher brain functions.