

# Neuroscience

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## Overview

The Neuroscience Graduate Group is a unique, diverse PhD training program that offers intensive, integrated training in multiple areas of neuroscience research. The program involves more than 55 faculty from different campus departments, with expertise ranging from molecular and cellular neuroscience to developmental neuroscience, systems and computational neuroscience, and human cognitive neuroscience.

The group provides a highly interdisciplinary, intellectually dynamic training environment of course work, research training, and mentoring within a strong research program that produces fundamental advances in knowledge and cutting-edge techniques. The program welcomes highly qualified applicants to join 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.

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

## Undergraduate Program

There is no undergraduate program in Neuroscience.

## Graduate Program

Neuroscience (<http://guide.berkeley.edu/archive/2020-21/graduate/degree-programs/neuroscience/>): PhD

## Neuroscience

Expand all course descriptions [+] Collapse all course descriptions [-]

## NEUROSC C217D Biological and Public Health Aspects of Alzheimer's Disease 3 Units

Terms offered: Spring 2017, Spring 2015, Spring 2014, Spring 2013

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.

Biological and Public Health Aspects of Alzheimer's Disease: Read More [+]

### Rules & Requirements

**Prerequisites:** Graduate standing or consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

**Instructor:** Jagust

**Also listed as:** PB HLTH C217D

Biological and Public Health Aspects of Alzheimer's Disease: Read Less [-]

## NEUROSC C261 Cellular and Developmental Neurobiology 3 Units

Terms offered: Fall 2021, Fall 2020, Fall 2019

This course covers the molecular/cellular basis of neuron excitability (membrane potentials, action potential generation and propagation, ion channels), synaptic transmission and plasticity, sensory receptor function, and developmental neurobiology.

Cellular and Developmental Neurobiology: Read More [+]

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

**Also listed as:** MCELLBI C261

Cellular and Developmental Neurobiology: Read Less [-]

## NEUROSC C262 Circuit and Systems Neurobiology 3 Units

Terms offered: Spring 2021, Spring 2020, Spring 2019

Advanced coverage of current research problems in systems-level neuroscience, and experimental and computational techniques used for these studies.

Circuit and Systems Neurobiology: Read More [\[+\]](#)

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

**Also listed as:** MCELLBI C262

Circuit and Systems Neurobiology: Read Less [\[-\]](#)

## NEUROSC C265 Neural Computation 3 Units

Terms offered: Prior to 2007

This course provides an introduction to the theory of neural computation. The goal is to familiarize students with the major theoretical frameworks and models used in neuroscience and psychology, and to provide hands-on experience in using these models. Topics include neural network models, supervised and unsupervised learning rules, associative memory models, probabilistic/graphical models, and models of neural coding in the brain.

Neural Computation: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Calculus, differential equations, basic probability and statistics, linear algebra, and familiarity with high level programming languages such as Matlab

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

**Instructor:** Olshausen

**Also listed as:** VIS SCI C265

Neural Computation: Read Less [\[-\]](#)

## NEUROSC 290 Neuroscience First Year Research 2 Units

Terms offered: Spring 2017, Spring 2016, Spring 2015

Seminar on the presentation and evaluation of research results for first-year neuroscience graduate students. During the first weeks, faculty present their research (FERPS); later, students present individual research results and evaluate their own and each other's work. Course enrollment limited to 15.

Neuroscience First Year Research: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Graduate standing in Neuroscience Graduate Group; concurrent enrollment in 291A-291B

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

**Instructor:** Ngai

Neuroscience First Year Research: Read Less [\[-\]](#)

## NEUROSC 290A Neuroscience Research Design and Analysis 1 Unit

Terms offered: Fall 2021, Fall 2020, Fall 2019

Professional core competency training for graduate students involved in neuroscience research at Berkeley. Includes survey of modern research methods, and professional skills including principles of experimental design and data reproducibility.

Neuroscience Research Design and Analysis: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Restricted to 1st year PhD students in Neuroscience-related PhD Programs (Neuroscience PhD Program, MCB PhD Program, Psychology PhD Program, Biophysics PhD Program), or permission of instructor

### Hours & Format

**Fall and/or spring:** 8 weeks - 1.5 hours of lecture per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructors:** Feldman, Neuroscience Graduate Advisors, Guest faculty speakers

Neuroscience Research Design and Analysis: Read Less [\[-\]](#)

## NEUROSC 290B Neuroscience Career Skills 1 Unit

Terms offered: Spring 2021, Spring 2020, Spring 2019

Professional core competency training for graduate students involved in neuroscience research at Berkeley. Includes training in giving scientific presentations, scientific writing, and project management.

Neuroscience Career Skills: Read More [+]

### Rules & Requirements

**Prerequisites:** Restricted to 1st year PhD students in Neuroscience-related PhD Programs (Neuroscience PhD Program, MCB PhD Program, Psychology PhD Program, Biophysics PhD Program), or permission of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

**Instructors:** Feldman, Neuroscience Graduate Advisors, Guest faculty speakers

Neuroscience Career Skills: Read Less [-]

## NEUROSC 291A Neuroscience Introduction to Research 4 - 12 Units

Terms offered: Fall 2021, Fall 2020, Fall 2019

Closely supervised, intensive laboratory experimental research under the direction of an individual faculty member. For first-year neuroscience graduate students, this course will provide an introduction to experimental methods and research approaches in the different areas of neuroscience. Grade awarded on completion of sequence, which includes 3 ten-week laboratory rotations spread out over the fall and spring semesters.

Neuroscience Introduction to Research: Read More [+]

### Rules & Requirements

**Prerequisites:** Graduate standing in Neuroscience Graduate Group; consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 20-40 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade. This is part one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series.

**Instructor:** Ngai

Neuroscience Introduction to Research: Read Less [-]

## NEUROSC 291B Neuroscience Introduction to Research 4 - 12 Units

Terms offered: Spring 2021, Spring 2020, Spring 2019

Closely supervised, intensive laboratory experimental research under the direction of an individual faculty member. For first-year neuroscience graduate students, this course will provide an introduction to experimental methods and research approaches in the different areas of neuroscience. Grade awarded on completion of sequence, which includes 3 ten-week laboratory rotations spread out over the fall and spring semesters.

Neuroscience Introduction to Research: Read More [+]

### Rules & Requirements

**Prerequisites:** Graduate standing in Neuroscience Graduate Group; consent of instructor

### Hours & Format

**Fall and/or spring:** 15 weeks - 20-40 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series.

**Instructor:** Ngai

Neuroscience Introduction to Research: Read Less [-]

## NEUROSC 292 Neuroscience Graduate Research 3 - 12 Units

Terms offered: Fall 2021, Summer 2021 10 Week Session, Spring 2021

For graduate students in neuroscience in their second or later years. During the summer, the course will count for 3-6 units. Individual research under faculty supervision. In this course each graduate student conducts basic thesis and dissertation research after successful completion of the first-year laboratory rotation, Neuroscience 291A-291B. Laboratory work provides the basis for students' thesis research, preparation for the preliminary examination, and continued progress toward completion of Ph.D. dissertation.

Neuroscience Graduate Research: Read More [+]

### Rules & Requirements

**Prerequisites:** Graduate standing in the Neuroscience Graduate Group; advanced approval from instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 10-40 hours of laboratory per week

**Summer:** 10 weeks - 15-60 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

Neuroscience Graduate Research: Read Less [-]

## NEUROSC 293 Neuroscience Research Review 2 Units

Terms offered: Spring 2009, Fall 2008, Spring 2008

For graduate students in neuroscience in their second or later years.

Two hours of seminar per week which complements the individual laboratory work under faculty supervision. Seminar will review current scientific literature and discuss original research performed by faculty, postdoctoral fellows, scientists, and graduate students in individual faculty laboratories.

Neuroscience Research Review: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Concurrent enrollment in 292; graduate standing in the neuroscience program; consent of instructor

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Summer:

6 weeks - 5 hours of seminar per week

8 weeks - 3.5 hours of seminar per week

10 weeks - 3 hours of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Offered for satisfactory/unsatisfactory grade only.

Neuroscience Research Review: Read Less [\[-\]](#)

## NEUROSC 294 Neuroscience Graduate Student Presentation Seminar 1 Unit

Terms offered: Fall 2021, Spring 2021, Fall 2020

This course will encompass three important facets of graduate education in the neurosciences: 1) Development of research presentation skills: fourth and fifth year graduate students will present seminars based on their ongoing dissertation research. Preparation and critiques of presentations will focus on organization of conceptual issues, data presentation, and summarization. 2) Exposure to current topics in neuroscience: faculty speakers will present on current issues and topics relevant to scientific development in the neurosciences, such as technical methods, application of analytical and statistical techniques, and organization and preparation of competitive fellowship and other grant applications. 3) Seminar preparation: a crucial aspect of graduate education is the interaction of students with invited seminar speakers - who are often leaders in their fields. A selected number of class meetings will be devoted to the review of scientific articles published by upcoming seminar speakers and/or other related articles in the field.

Neuroscience Graduate Student Presentation Seminar: Read More [\[+\]](#)

### Rules & Requirements

**Prerequisites:** Graduate student standing

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1 hour of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

Neuroscience Graduate Student Presentation Seminar: Read Less [\[-\]](#)

## NEUROSC 299 Seminars 1 - 3 Units

Terms offered: Spring 2021, Spring 2020, Spring 2019

Course that focuses on topical subjects in specific fields of neuroscience.

Seminars: Read More [\[+\]](#)

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit without restriction.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1-3 hours of seminar per week

### Additional Details

**Subject/Course Level:** Neuroscience/Graduate

**Grading:** Letter grade.

Seminars: Read Less [\[-\]](#)