

NEUROSCIENCE & BEHAVIOR

415P Milbank
212-851-9943
Program Administrator, Michele Miozzo

Mission

The Neuroscience and Behavior major provides a strong background in the neural underpinnings of behavior and cognition. It is intended for students who plan to pursue a research career in neuroscience or a related discipline. Students electing this major are exposed to basic courses in biology, psychology and statistics, and to advanced courses in neuroscience and behavior.

All majors engage in two semesters of independent research during the senior year while taking the Senior Research Seminar. In the junior year, majors must begin developing a plan for the senior research project.

Student Learning Goals

Students graduating with a major in Neuroscience and Behavior should be able to attain the following outcomes:

- acquire a strong intellectual foundation in neuroscience
- develop competence in the interpretation and evaluation of neuroscience research
- understand the role of experimentation in neuroscience
- learn basic methods of experimental design and hypothesis testing
- acquire effective oral presentation skills
- demonstrate a capability to write a scientific paper
- understand statistical approaches to data analysis.

Student Learning Outcomes

Upon successfully completing the major, students should have the ability to

- discuss neuroscience phenomena from many different levels of organization (e.g., explain how the destruction of myelin in people with multiple sclerosis leads to cognitive and motor deficits);
- describe the basic features of nervous system development, organization, signaling, integration, and higher-level processing;
- explain the neural basis of sensory-motor integration, learning and the generation of complex behaviors;
- conceive of, implement, and present an original research project;
- generate a testable hypothesis and develop a controlled experimental design;
- perform modern scientific measurement techniques;
- write an original research paper.

As an alternative to the Neuroscience and Behavior major, students may pursue an interdisciplinary program by majoring in either Biology or Psychology and taking a minor in the other discipline.

Core Faculty: Peter Balsam (Chair), Kara Pham (Departmental Representative), Elizabeth Bauer, BJ Casey, Maria de la Paz Fernandez, John Glendinning, Gabrielle Gutierrez, Russell Romeo, Rae Silver, Alex White

The new NSBV curriculum requires the completion of a minimum of 13 courses (5 core neuroscience courses; 3 introductory courses from

cognate disciplines; 3 elective courses; a year-long research seminar counting as 2 courses) and a senior thesis. All NSBV majors must take 5 core neuroscience courses that provide foundational knowledge and laboratory training. No more than 2/5 core neuroscience courses can be taken outside the NSBV Department, including Columbia University or other institutions. For many courses, NSBV majors have multiple options. Reflecting the interdisciplinary nature of our discipline, students can select introductory and elective courses offered in other departments either at Barnard or Columbia. Furthermore, students have the option of selecting elective courses in one suggested track – cognitive/behavioral, computational, or molecular.

Five Core Neuroscience Courses

NSBV BC1001	INTRODUCTION TO NEUROSCIENCE
NSBV BC2001	LABORATORY IN NEUROSCIENCE
NSBV BC3001	SYSTEMS AND BEHAVIORAL NEUROSCIENCE
BIOL BC3362	MOLECULAR & CELLULAR NEUROSCIENCE
NSBV BC2002	STATISTICS AND EXPERIMENTAL DESIGN

Three Introductory Courses from Other Disciplines

One course must be Introduction to Cellular and Molecular Biology (BIOL BC1502 + lab BIOL BC1503); the other courses (1lect; 1lect+lab) from cognate disciplines (Biology, Chemistry, Computer Science, Physics, or Psychology)

Senior Research Seminar

Seniors can choose among three options: Senior Research Seminar (NSBV BC3593-4), Neuroscience Guided Research (NSBV BC3591-2) or Neuronal Circuits (NSBV BC3590)

Three Elective Courses

Approved electives are listed on the [department webpage](#). One elective course must be a 3000-level seminar.

Fall 2024

NSBV BC1001	INTRODUCTION TO NEUROSCIENCE
NSBV BC2001	LABORATORY IN NEUROSCIENCE
NSBV BC2002	STATISTICS AND EXPERIMENTAL DESIGN
NSBV BC2004	Fundamentals in Computational Neuroscience Models
NSBV BC3376	PSYCHOBIOLOGY OF INFANT DEVELOPMENT
NSBV BC3386	THE NEURAL CODE
NSBV BC3387	TOPICS IN NEUROETHICS
NSBV BC3388	MODELS OF NEUROPSYCHIATRIC DISORDERS
NSBV BC3389	Hallucinations, illusions, dreaming and imagination
NSBV BC3392	PSYCHOBIOLOGY OF STRESS
NSBV BC3393	HOW WE LEARN: AN EDUCATIONAL NEUROSCIENCE PERSPECTIV
NSBV BC3591	NEUROSCIENCE GUIDED RESEARCH
NSBV BC3593	RSRCH/SEM-NEUROSCNCE#BEHAVIOR
NSBV BC3099	INDEPENDENT STUDY

Spring 2024

NSBV BC1001	INTRODUCTION TO NEUROSCIENCE
NSBV BC2001	LABORATORY IN NEUROSCIENCE

NSBV BC2002	STATISTICS AND EXPERIMENTAL DESIGN
NSBV BC2006	MIND/BRAIN DISORDERS
NSBV BC2154	HORMONES AND BEHAVIOR
NSBV BC3001	SYSTEMS AND BEHAVIORAL NEUROSCIENCE
NSBV BC3387	TOPICS IN NEUROETHICS
NSBV BC3389	Hallucinations, illusions, dreaming and imagination
NSBV BC3391	NEURONAL CIRCUITS: NEUROGENETICS AND PRINCIPLES OF NEURONAL CONNECTIVITY
NSBV BC3392	PSYCHOBIOLOGY OF STRESS
NSBV BC3398	PSYCHOBIOLOGY OF SLEEP
NSBV BC3592	NEUROSCIENCE GUIDED RESEARCH
NSBV BC3594	RSRCH/SEM-NEUROSCNC#BEHAVIOR
NSBV BC3099	INDEPENDENT STUDY

Past Courses

(Courses not offered in fall '23 and spring '24))

NSBV BC2003	Neuroendocrinology of Stress
NSBV BC2005	FLAVOR PERCEPTION AND THE HUMAN DIET
NSBV BC2008	ADAPTIVE OR ARRESTED DEVELOPMENT OF THE ADOLESCENT BRAIN
NSBV BC3105	Neuroimmunology Seminar
NSBV BC3394	Neurobiology of Social Behaviors