Neuroscience

Chairperson
Lorna Role, Life Sciences Building 573, (631) 632-8616

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Degree Awarded
Ph.D. in Neuroscience, MA in Biological Sciences and MS in Biomedical Science (Neuroscience track)

Description of the Department of Neuroscience

The Graduate Program in Neuroscience, in the College of Arts and Sciences, offers doctoral training in the rapidly expanding field of neuroscience. Through coursework and independent research, students are trained to approach research problems in neuroscience with a broad perspective. Expertise in the areas of molecular and biochemical control of development, properties of receptors and ion channels in relation to cellular physiology, the cellular basis of integrative functions, and the structural basis for communication among neurons are available to all students in the program. Graduate students will receive in-depth research training in molecular, biochemical, physiological, behavioral, or anatomical sciences. In addition the Program offers unique opportunities to draw from one or more of these disciplines through multidisciplinary, cosponsored research projects. A program of highly interactive faculty and students provides an exciting focus for research training.

The MS in Biomedical Science (Neuroscience track) program prepares students to conduct, analyze and communicate Neuroscience research. Students will be exposed to advanced neuroscience research techniques, approaches and theory culminating with the MS degree. Core concepts and skills are taught through a series of required core courses, with the remaining coursework consisting of advanced electives and special topics courses. Expertise in the areas of molecular and biochemical control of development, properties of receptors and ion channels in relation to cellular physiology, the cellular basis of integrative functions, and the structural basis for communication among neurons are available to all students in the program. Students will receive in-depth research training in molecular, biochemical, physiological, behavioral, computational or anatomical sciences. A program of highly interactive faculty and students provides an exciting focus for research training.

Admission details for the Department of Neuroscience

Students are expected to fulfill basic requirements of the Graduate School: a bachelor’s degree from a recognized university, a grade point average corresponding to B or higher, evidence of the capacity to do satisfactory graduate work as evidenced by scores on the Graduate Record Examination (GRE - only required for PhD applicants), and the recommendations of three former instructors. In addition, all non-native speakers of English must score a minimum of 600 (paper), 250 (computer) or 100 (iBT) on the Test of English as a Foreign Language (TOEFL). The Program in Neuroscience has the following additional requirements: one year of calculus, physics, and chemistry, demonstrated proficiency in biological sciences, and laboratory research experience. Deficiencies in these requirements do not preclude admission, and special consideration will be made to promising applicants.

Application Deadline: March 15 for MS applications, January 15 for PhD applications

Applicants do not need to send their official transcripts until they are offered admission into the program.

In addition to the minimum requirements of the Graduate School, the following are suggested requirements:

A. BS or BA degree in a life science related field, with a minimum undergraduate grade point average of 3.00.

*Pre-requisites: Successful MS and PhD candidates have often completed college level courses in physics, mathematics, organic and inorganic chemistry and advanced biology. It is recommended that students will have undergraduate neuroscience coursework. However, students are also accepted into the program without all necessary pre-requisites. These students may be asked to take the appropriate preparation course(s) prior to undertaking specific graduate level courses.

B. Three letters of recommendation.

C. Personal statement.

Facilities of the Department of the Neuroscience

Program faculty are located in the Life Sciences Building, the Psychology Building, Centers for Molecular Medicine, and Health Sciences Center on the SUNY Stony Brook campus, and at Brookhaven National Laboratory and the Cold Spring Harbor laboratory. Molecular facilities provide for analysis of protein and DNA biochemistry, including microsequencing, peptide mapping, synthesis of oligonucleotides and peptides, cellular transfection, and production of transgenic animals. Wide-ranging facilities for cellular and integrative electrophysiology exist for studies on dissociated neurons, brain slice preparations, neurons in situ, and genetically engineered cells in culture. Imaging facilities permit anatomical reconstruction, fluorescence measurements, and the use of ion-sensitive indicators on both conventional, confocal, and multi-photon microscopes.
An image analysis core is linked to a scanning and transmission electron microscopy facility. Separate behavioral testing core facilities for mice and rats are also available.

Requirements for Admission

The Graduate Program in Neuroscience does not accept a student whose goal is a M.A. degree. In exceptional instances, a student already in the Program may be awarded a M.A. degree upon completion of an approved course of study, including 30 graduate credit hours, a comprehensive examination, a research thesis, and the minimum requirements of the Graduate School.

Requirements for the PhD in Neuroscience

A. Course Requirements
1. Core courses in neuroscience (BNB 561, BNB 562, BNB 563, BNB 564). A four-semester series taught by members of the Program; the student is introduced to a broad variety of topics. These will be taken in the Fall and Spring semesters of the first and second years.
2. Neuroanatomy (BNB 560), Developmental Neuroscience (BNB 565), and Neurobiology of Disease (BNB 566). These are required short courses elaborating on fundamental topics in Neuroscience.
3. Laboratory Rotations in Neuroscience (BNB 555). A two-semester course in the Fall and Spring semesters of the first year. Students conduct research rotations in laboratories of three program members and present oral reports on their research.
4. Writing Neuroscience (BNB 551). This course is taught in the Fall semester of the first year. It provides training in the basics of scientific communication, with a strong emphasis on writing and revision. Practical exercises are designed to give experience and feedback in commonly needed aspects of scientific writing.
5. Advanced Neurobiology and Behavior Seminar (BNB 697). Seminar presentations delivered by faculty, students, associates, and visiting speakers.
6. Electives. At least two additional graduate-level courses in various biological, physical, or mathematical sciences must be selected by the student in consultation with the student’s advisor. Students may take additional elective courses if they desire.

B. Thesis Proposal
At the end of the second year of study, each student must successfully propose and defend an outline of their thesis research. The proposal consists of a written document and an oral presentation.

C. Advancement to Candidacy
The faculty will recommend a student to the Graduate School for advancement to candidacy upon satisfactory completion of all course requirements and passing their thesis proposal.

D. Student Seminars
All students who have advanced to candidacy are required to give a departmental seminar on their dissertation work annually.

E. Ph.D. Dissertation
A dissertation that constitutes an original and significant contribution to the field of neuroscience is required for the Ph.D. The work must be of a quality acceptable for publication in a recognized scientific journal. At the end of the first year, students initiate a dissertation research program in a Program faculty’s laboratory. After advancement to candidacy, the student and advisor will assemble an advisory committee to guide the dissertation research. Upon completion of the dissertation research, the student will present a seminar based on the dissertation. Following this the student will be given an oral examination on the dissertation research and related areas by the dissertation committee.

F. Teaching Requirements
To gain experience in teaching, the Program requires that all students serve as teaching assistants for two semesters during the first two years of study. Students who enter the program from the medical school’s MSTP program are required to serve as TA’s for one semester. Usually, TA assignments are to courses taught by Program faculty. Assignments are made to minimize impact on research productivity in the second year of study.

G. Residence Requirement
The University requires at least two consecutive semesters of full-time study. The demands of the course of study necessitate a longer period of residence.

H. Academic Standing
All students must maintain a 3.0 grade point average at all times. Due to the importance of BNB 561, BNB 562, BNB 563, and BNB 564 as the basis for advanced study in Neuroscience, students who have a grade of less than a B in these courses must remediate or repeat them satisfactorily prior to defending the thesis proposal and advancing to candidacy. Any student who fails to receive a grade of B or better in more than one required course will be reviewed for possible termination from the Program. Research (BNB 599 and BNB 699) is graded on a satisfactory/unsatisfactory basis. Any student who receives a grade of U in a research course will be reviewed for possible termination from the Program.

Requirements for the MA in Biological Sciences

Completion of this track will require 30 credits from the approved PhD curriculum in Neuroscience and a thesis.
Requirements for the MS in Biomedical Science

A total of at least 30 graduate credits with a cumulative GPA of 3.0 or greater are required for the MS degree. Of this, at least 8 credits must be earned in core courses in cellular, molecular and systems neuroscience. Students must also complete 4 credits in seminar courses designed to enhance reading, writing and presentation skills.

Research skills are at the center of the program and all students are required to complete a minimum of 14 credits of research related courses comprised of Introduction to Neuroscience Research, Neuroscience research practicum and Neuroscience Thesis work. A research thesis is required at the culmination of the program.

Core Curriculum:

- NEU 501: Introduction to Neuroscience Research (Summer II, 3 credits)
- NEU 502: Reading, writing and speaking Neurobiology (Fall, 2 credits)
- NEU 521: Introduction to cellular neuroscience (Fall, 3 credits)
- NEU 522: Introduction to molecular neuroscience (Fall, 3 credits)
- NEU 531: Sensory and motor systems (Spring, 2 credit)
- NEU 532: Neural Plasticity, Learning and Memory (Spring, 2 credit)
- NEU 533: Neural systems, emotion and cognition (Spring, 2 credit)
- BNB 560 Introduction to Mammalian Neuroanatomy (Spring, 1 credit)
- BNB 697: Neuroscience Seminar Series (Fall, Spring, 1 credit)
- NEU 548: MS Research Practicum in Neuroscience 3-5 credits (Fall, Spring, Summer)
- NEU 549: MS Thesis Research in Neuroscience

Students must complete at least 8 credits from NEU521, NEU522, NEU531, NEU532, NEU533 and BNB560.

Faculty of Neuroscience Graduate Program

Stony Brook Faculty


Aguirre, Adan5, Ph.D., 2002, Centro de Investigacion y de Estudios Avanzados IPN (CINVESTAV-IPN), Mexico: Cellular and molecular biology of neural stem/progenitor cells during normal development and after brain injury or disease.


Bowen, Mark6, Ph.D., 1998, University of Illinois, Chicago Medical Center: Coordination of post-synaptic glutamate receptor signaling by the MAGUK family of scaffolds.

Brink, Peter, P.h.D., 1976, University of Illinois: Biophysical properties of transporting epithelia.


Colognato, Holly5, Ph.D., 1999, Rutgers University: Molecular mechanisms that control oligodendrocyte function during nervous system development and during disease.

Czaplinski, Kevin1, Ph.D., 1999, UMDNJ-Robert Wood Johnson Medical School: Post transcriptional control of gene expression in the nervous system.

Dill, Kenneth, P.h.D., UCSD, La Jolla: Properties of Proteins.Dubnau, Josh10, Ph.D., 1995, Columbia University: Genetic dissection of memory in Drosophila

Evinger, Leslie Craig, Ph.D., 1978, University of Washington: Motor control and learning; Movement disorders.


Fontanini, Alfredo, M.D., Ph.D. 2002, University of Brescia, Italy: Behavioral electrophysiology of taste and olfaction.

Ge, Shaoyu, Ph.D., 2002, University of Science and Technology of China: Development of new neurons in the adult brain.

Halegoua, Simon, Ph.D., 1978, Stony Brook University: Neuronal Growth Factor Signaling and the Control of Phenotype and Survival.

Kernan, Maurice, Ph.D., 1990, University of Wisconsin: Mechanosensory transduction in Drosophila; TRP channel function; ciliary mechanisms.

Kritzer, Mary, Ph.D., 1989, Yale University: Effects of gonadal hormones on the cerebral cortex.
LaCamera, Giancarlo, Ph.D., 2003, University of Bern: Learning and decision making; Theoretical Neuroscience.

Levine, Joel M., Graduate Program Director, Ph.D., 1980, Washington University: Molecular biology of nerve regeneration; nerve-glia interactions.

Maffei, Arianna, Ph.D., 2002, University of Pavia (Italy): Experience-dependent plasticity of neocortical circuits.

Matthews, Gary G., Ph.D., 1975, University of Pennsylvania: Cellular and molecular neurobiology of the retina.

McKinnon, David, Ph.D., 1987, Australian National University: Evolution and robustness of electrophysiological systems.

McLaughlin, Stuart, P.h.D., 1968, University of British Columbia, Canada: Biophysics of signal transduction.


Morin, Lawrence P., Ph.D., 1974, Rutgers University: Neural circuitry regulating mammalian sleep and circadian rhythms.


Parsey, Ramin, P.h.D, University of Maryland at Baltimore: Depression, Dementia and brain imaging technologies such as Positron Emission Tomography.

Puopolo, Michelino, P.h.D., University of Ferrara, Italy: Cellular neurophysiology of nociceptor (pain-sensing) neurons.

Role, Lorna, Ph.D., Chairperson, 1981, Harvard University: Neurobiology and pathology of cortico-limbic circuits.


Sirotkin, Howard, Ph.D., 1996, Albert Einstein College of Medicine: Molecular genetics of vertebrate neural development.

Solomon, Irene C., Ph.D., 1994, University of California, Davis: Molecular control of respiratory motor output and fast oscillatory rhythms.

Talmage, David A., Ph.D. 1981 University of Minnesota: Neuregulin signaling and synaptic homeostasis

Tsirka, Styliani-Anna (Stella) E., Ph.D., 1989, University of Thessaloniki: Neuronal-microglial interactions in the physiology and pathology of the central nervous system.

Van Nostrand, William, Ph.D., 1985, University of California, Irvine: Molecular pathogenesis of CNS amyloid accumulation.

Wollmuth, Lonnie, Ph.D., 1992, University of Washington: Molecular mechanisms of synaptic transmission.

1) Primary appointment with Biochemistry
2) Primary appointment with Biomedical Engineering
3) Primary appointment with Neurosurgery
4) Primary appointment with Pediatrics
5) Primary appointment with Pharmacology
6) Primary appointment with Physiology and Biophysics
7) Primary appointment with Psychiatry

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.