NEUROSCIENCE GRADUATE PROGRAM

The University of Vermont

Guidelines

Revised January 2019. Guidelines may be subject to change.

Philosophic Goals Statement:

The philosophical goal of this training program is to train individuals to become a Steward of the discipline of Neuroscience. We consider a Steward to be someone who is an expert in the field who is able to create new knowledge as well as promote, communicate, and teach the discipline to others. We define Neuroscience as the study of the nervous system that ranges from an understanding of the essential molecules and cells unique to neural tissue, to the understanding of how components of the nervous system are connected anatomically and functionally, through an appreciation of the output of the nervous system, which includes physiology, behavior, and human disease. We are committed to multidisciplinary training in Neuroscience.

Objectives:

- To establish a core knowledge in all students of the areas of molecular, cellular, developmental, systems and behavioral neuroscience
- To train individuals who can understand, create and undertake hypothesis-based approaches to research
- To train individuals in a variety of techniques and approaches to studying the nervous system
- To develop a keen sense of analytical thinking and logic in the evaluation of one's own work as well as that of others
- To create effective teachers and communicators of neuroscience
- To foster independence in thinking, laboratory work, teaching, and communicating

NGP Administration

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NGP Committees
Steering
Admissions
Tracking
Curriculum
*If a NGP faculty member is interested in participating in one of the committees listed above, they should contact the director and assistant director.

Required Coursework:

Required courses: Please see the Schedule of Courses for the most recent information regarding the courses below.

Year One by Semester	**Courses**
Fall	• 1 laboratory rotation (9 weeks) • MPBP 301: Human Physiology (4 cr) • NSCI 395: Human Structure and Function (3 cr) • PHRM 396: Integrated Physiology & Pharmacology (3 cr) • NSCI 381: Graduate Student Journal Club
Spring	• 2 Laboratory rotations: minimum duration of 7 weeks each • GRMD 357: Neural Science (6 credits) • NCSI 491: Research Credits (2 cr) • NSCI 382: Graduate Student Journal Club (1 Cr)
Summer	• 3rd/4th rotation (optional) or join thesis lab (must join thesis lab by August 31st) • NSCI 491: Research Credits (5 cr)
Year Two by Semester	**Courses**
Fall	• PSYS 304: Biostatistics or STAT 211: Statistical Methods (3 cr) • PSYS 315: Biobehavioral Proseminar (3 cr) • Advanced Neuroscience Selective (3 cr) • NSCI 381: Graduate Student Journal Club
Spring	• Advanced Neuroscience Selective (3 cr) • NSCI 327: Responsible Conduct in Research (1 cr) • NSCI 382: Graduate Student Journal Club (1 cr) • NSCI 491: Research Credits (4 cr)
Summer	• NSCI 491: Research Credits (5 cr)
Year Three by Semester	**Courses**
Fall	• NSCI 491: Research Credits (8 cr) • NSCI 381: Graduate Student Journal Club (1 cr)
Spring	• NSCI 491: Research Credits (8 cr) • NSCI 382: Graduate Student Journal Club (1 cr)
Summer	• NSCI 491: Research Credits (5 cr)

Year Four by Semester	Courses
Fall	• NSCI 491: Research Credits (9 cr) • NSCI 381: Graduate Student Journal Club
Spring	• NSCI 491: Research Credits (2 cr) • GRAD 902: Continuing Registration (7 cr) • NSCI 382: Graduate Student Journal Club
Summer	• GRAD 902: Continuing Registration (5 cr)
Year Five by Semester	**Courses**
Fall	• GRAD: 903: Continuing Registration (9 cr) • NSCI 381: Graduate Student Journal Club
Spring	• GRAD 903: Continuing Registration (9 cr) • NSCI 382: Graduate Student Journal Club
Summer	• GRAD 902: Continuing Registration (5 cr)

Selective course: (students must take at least 6 credit hrs; a student, in conjunction with their advisor, may request another course to fulfill the selective requirement. The request will need to be approved by the NGP Director. The curriculum committee will be consulted if content is questioned. Students should check the most recent Schedule of Courses for all available courses).

NSCI 320: Developmental Neurobiology (3 credits)
NSCI 323: Neurochemistry (3 credits)
NSCI 326: Basic Science of Neurological Disease (2 credits)
NSCI 328: Techniques in Optical Microscopy (3 credits)
NSCI 329: Excitable Membranes (2 credits)
NSCI 330: Comparative Neurobiology (2 credits)
BIOC 301: General Biochemistry (3 credits)
BIOL 262: Neurobiology Techniques (4 credits)
CSD 353: Adult Neuropathologies (3 credits)
MPBP 310: Molecular Basis of Biological Motility (3 credits)
PHRM 272: Toxicology (3 credits)
PHRM 290: Topics in Molecular and Cellular Pharmacology (3 credits)
PHRM 328: Introduction to Medicinal Chemistry (3 credits)
PSYC 305: Learning Theory (3 credits)
PSYC 380: Behavior/Neurobiology and Health (3 credits)
PSYC 380: Animal Minds (3 credits)
PSYC 380: Neurobiology of Learning and Memory (3 credits)
PSYC 380: Neuropsychopharmacology (3 credits)

Laboratory Rotations:

Laboratory rotations occur in the first year of the program, and involve a student spending full time undertaking a research project in the laboratory of a neuroscientist. All students must engage in two distinct rotations, although it is encouraged that students do three rotations to learn new techniques or explore more of what the program has to offer. Students present an oral summary of their rotation work in Student Journal Club in the spring semester. Written feedback from the advisor and the student is obtained using a standardized form and is reviewed by the instructor-mentors of the Student Journal Club (consisting of two faculty members), and then is provided to the student.

All First year students will complete a 9-week rotation upon arriving on July 1st or August 1st. There is a 15 week window in the spring, prior to the start of GRMD 357, during which a student may choose to do one 15 week rotation or two 7/8 week rotations. Students who choose to, may undertake a final 7 week rotation following the Neural Science course, but must join a dissertation lab by August 31st.

Teaching:
No teaching is required the first year. All students must complete teaching assignments in both their second and third years in the program. Teaching develops student knowledge of neuroscience and is required regardless of source of stipend support. Students must serve as a teaching assistant in one of the following neuroscience-related courses in the second year: NSCI 112, NSCI 225, NSCI 302, or GRMD 357. Students who have taken gross anatomy may have the opportunity to TA ANNB 201 during the summer. To TA any other course, the Steering Committee must be approved by the steering committee and home department.

Research:
A Dissertation Advisor will be chosen by the end of Summer Term following the first year of study. Original research towards a dissertation will be conducted in the dissertation advisor's lab. Additional responsibilities are likely to include attending lab meetings; reading relevant original research articles; reviewing recently published literature; attending local and national scientific meetings; attending Graduate Student Journal Club and neuroscience related seminars; and meeting with the student's dissertation advisory committee every six months.

Qualifying Exam:
The qualifying examination for advancement to candidacy for the PhD must be taken during the second year of study. This exam will consist of two portions, a research proposal and an oral defense of the research proposal to a committee of three faculty members. Students can pass, conditionally pass or fail this exam. If a student does fail the exam, they are offered one more chance to retake the exam before being asked to leave the program.

Proposal:
Within nine months of formation of the Dissertation Studies Committee, the student will submit a formal dissertation research proposal in the form of an NIH NRSA application to the committee and, two weeks after submission of the proposal, an oral presentation of the proposal to the Neuroscience community as a seminar. The day of the presentation, the Dissertation Studies Committee will approve the proposal or ask for modifications, which must be completed and approved within one month. Approval of the proposal will be submitted by the Dissertation Studies Committee and to the NGP Administrator. Submission of the proposal to the NIH or other funding agency is strongly encouraged, but not required.

Candidacy/Dissertation Studies

The dissertation studies committee at minimum shall consist of the mentor, committee chair (the chairperson must be from outside of the advisor's department, including primary and secondary appointments. The chair can be a member of the NGP faculty) and two NGP faculty members knowledgeable in the field of the dissertation

research. The student will meet with the Dissertation Studies Committee to discuss development of their thesis research, at minimum every six months. After each meeting the chair must submit a report to the NGP administrator with a progress report. Once the Committee has given the student approval to defend their dissertation (this must be in writing as well), the student needs to be in contact with the NGP administrator to go over procedure/timelines for graduation.

Criteria for graduate student support

Students must take 35 credits of didactic courses and complete 40 credits of dissertation research. Once students have earned 75 credits, they should then register for continuous registration.

- Students must hold a GPA of 3.00 or higher to be funded and to graduate.
- All graduate students will be supported for the first two years of study by a 12 month stipend from institutional funds or training grants available to the Program.
- The level of stipend support will be set at a fair and equitable level for all students through an annual review process.
- Support will include stipend, tuition remission, 100% health insurance and assistance with fees.
- After the first two years, students will be supported by research funds from the dissertation advisor, extramural fellowships, training grants, or funds supplied by the department or division in which the dissertation advisor holds their primary appointment.
- After the first two years of support from the program, students will be guaranteed support for a three years by the primary department of the student’s mentor