

# NEUROSCIENCE GRADUATE PROGRAM



The University of Vermont

# Guidelines

Revised 2014. Guidelines may be subject to change.

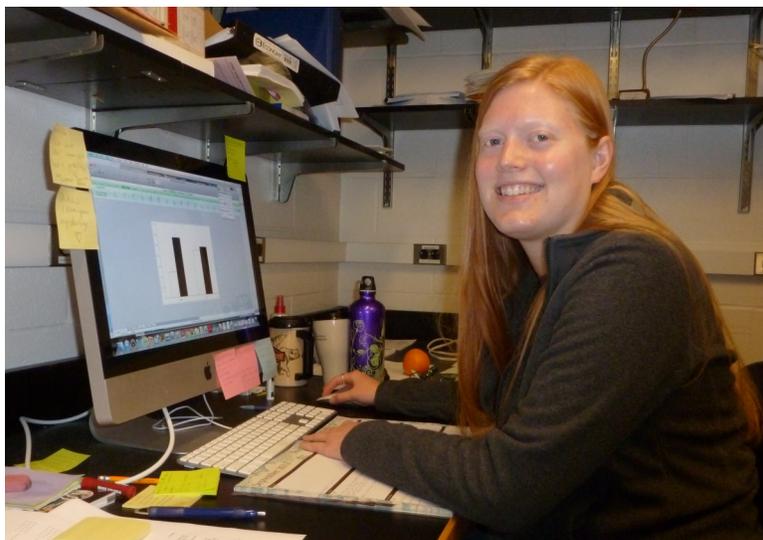
Philosophic Goals Statement:

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.



## Coursework:

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

GRMD 354 Human Structure and Function (6 credits)  
GRMD 357 Neural Science (6 credits)  
NSCI 306 Techniques in Neurobiology (3 credits)  
PSYC 303 Biobehavioral Proseminar (3 credits)  
GRMD 353: Cell and Molecular Biology (3 credits) or  
NSCI 327 Responsible Conduct in Research (1 credit) or  
BIOL 371: Scientific Integrity  
PSYC 340 Advanced Statistical Methods I (3 credits) or  
STAT 211 Statistical Methods (3 credits)  
NSCI 381/382 Seminar/Graduate Student Journal Club  
(must participate each semester after the first; 1 credit)

*Elective course: (students must take at least 6 credit hrs; other courses may meet the elective requirement upon approval of the Curriculum and Tracking Committee. 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)  
CLBI 301: Cell and Molecular Biology (3 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)



## General Time Distribution of Coursework.

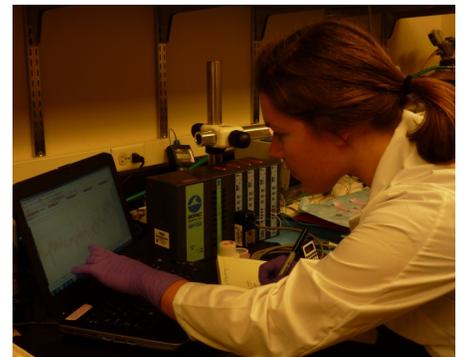
### *Year 1:*

- Fall
  - NSCI 306 Techniques in Neurobiology (3 credits)
  - GRMD 354: Human Structure and Function
- Spring
  - Laboratory rotations: 2 rotations minimum, 7 weeks each
  - GRMD 357: Neural Science
  - NSCI 382: Graduate Student Journal Club
- Summer
  - 3rd rotation (optional) or join dissertation lab; must join dissertation lab by end of summer

### *Year 2:*

- Fall
  - PSYC 340 Biostatistics or STAT 211 Statistical Methods
  - PSYC 303: Biobehavioral Proseminar
  - Advanced Neuroscience Selective (see list above)
  - NSCI 381: Graduate Student Journal Club
- Spring
  - Advanced Neuroscience Selective (see list above)
  - NSCI/PATH 327 Responsible Conduct in Research or BIOL 381a Integrity in Science
  - NSCI 382: Graduate Student Journal Club

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. First year students can complete a 7-week rotation upon arriving in July. There is a 14 week window in the spring, prior to the start of GRMD 357, during which a student may choose to do one 14 week rotation or two 7 week rotations. Students who did not do a rotation the summer prior to their first year may undertake a final 7 week rotation following the Neural Science course, but must join a dissertation lab by August 1st.



The qualifying examination for advancement to candidacy for the PhD must be taken during the third 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 representing three different sub-specialties of neuroscience (chosen from the following areas: Molecular & Cellular; Developmental, Plasticity & Repair; Behavioral, Cognitive & Systems; Human Neurobiology).

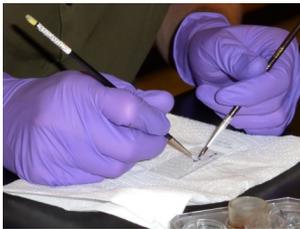
### Teaching

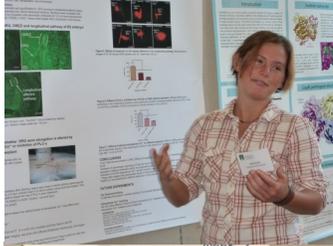
No teaching is required the first year. All students must complete teaching assignments in both their second and third years in the program. Teaching develops student knowledge of neuroscience and is required regardless of source of stipend support. Students must serve as a teaching assistant in one of the following neuroscience-related courses in the second year: NSCI 225, ANNB 301, or GRMD 357. Students in the third year teach in NSCI 225, ANNB 301, GRMD 357, or NSCI 110, or in other related courses including ANNB 201, BIOL 261 or 262, GRMD 354 and PSYC 221 or 222 (or any approved by the steering committee and home department).

### Research

*All students will be encouraged to rotate through 2-3 laboratories prior to choosing a dissertation advisor. Laboratory rotations involve a student spending full time undertaking a research project in the laboratory of a neuroscientist. If a student chooses to arrive by July 1 prior to the start of the first year of study, there is an opportunity to do one rotation. In Spring Term of the first year of study, there is a 14 week window between the end of Fall term and the start of GRMD 357 during which a student may choose to do one 14 week rotation or two 7 week rotations. Students who did not complete a summer rotation should plan to complete two separate rotations in the spring. A final opportunity for a research rotation is in the Summer Term following the first year of study. NSCI 491 (Neuroscience Research) will be assigned for credits as needed to maintain full time status. Research rotation evaluations will be completed by the student and the rotation advisor and submitted to the Tracking and Curriculum Committee.*

*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 the Neuroscience Seminar Series; and meeting with the student's dissertation advisory committee twice annually.*





Once the student has advanced to candidacy for the PhD, a Dissertation Studies Committee will be appointed. This committee shall consist of the mentor and two faculty members knowledgeable in the field of the dissertation research, and will be appointed by the Tracking and Curriculum Committee after consultation with the student's dissertation advisor and the student. The student will meet with the Dissertation Studies Committee to discuss development of their thesis research. Within six 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 in the home department of the student's thesis advisor. On 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 to the Tracking and Curriculum Committee. Submission of the proposal to the NIH or other funding agency is strongly encouraged. The Dissertation Studies Committee shall meet with the student at least twice a year to review and guide their research progress. Once the Committee has given the student approval to defend their dissertation, then the Defense Committee will consist of the members of the Dissertation Studies Committee together with member outside of Neuroscience who will be appointed to serve as the Chair of the Defense Committee.

#### Criteria for graduate student support

- 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 tuition remission, fees and assistance with health insurance
- 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