



## The Graduate Program in Neurobiology & Behavior Program Requirements – Autumn 2009

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### **Introduction**

The goal of the Graduate Program in Neurobiology & Behavior is to produce the best neuroscientists possible. The breadth of our faculty allow us to provide interdisciplinary training drawing from a variety of topics, techniques and perspectives, including neuroanatomy, biochemistry, molecular biology, physiology, biophysics, pharmacology, computational modeling and behavior. A graduate of our program will be well versed in the Neurosciences, scholarly, and equipped to pursue a variety of career paths.

### **Curriculum**

*Core Sequence.* During the first year, students are required to take a series of six graduate level courses that provide exposure to core principles of neuroscience. NEUBEH 501, 502, 503 & 504 cover topics in cellular neurophysiology, cellular and molecular neurobiology, developmental neurobiology, neuroanatomy, neuropharmacology, systems neuroscience, cognition and behavior. NEUBEH 532 is a discussion course focusing on quantitative methods and modeling. NEUBEH 559 introduces students to a wide variety of neurological and psychiatric diseases.

*Seminar Series/Journal Club.* All students are expected to attend the Program seminar series (NEUBEH 510) throughout their graduate careers. First- and second-year students are required to participate in a seminar-linked journal club (NEUBEH 527) with student presentations. Students receive credit for this course during their first two years, but are encouraged to attend throughout the remainder of their graduate careers.

*Lab Rotations.* During the first year, students are required to complete three one-quarter laboratory rotations (NEUBEH 526). At the end of each rotation, students submit an abstract and deliver a short oral presentation describing their work. The rotation advisor will provide a written evaluation of the student's performance. Students should contact the Program Office at the beginning of each quarter with the name of their rotation advisor. All students in the Program are expected to attend the quarterly rotation talks.

*Electives.* Students typically complement their coursework with electives in areas of interest. Students must complete electives totaling at least 10 credits. These do not have to be graded credits. Single credit courses that represent lab meetings, departmental journal clubs, etc., do not fulfill the elective requirement. Entering graduate students will in general not be allowed to take elective courses in their first year, but may do so under special circumstances (e.g., a course is not offered every year) *with prior approval by the Program Directors*. More senior students should consult with their advisor to determine an appropriate curriculum of elective courses. The Program's Core Elective Course List provides an up-to-date listing of elective courses that do not require prior Program Director approval for credit. In addition, students may petition the Directors to receive credit for courses that are not part of the core list, but are deemed important for the student's dissertation project. Director approval for any elective not on the list is required *before* the student enrolls in the course. Students may also petition for credit for courses taken at other institutions while enrolled in the program, such as summer courses at Cold Spring Harbor or Woods Hole. Electives may be taken for a grade or on a pass/fail basis.

## N&B Program Requirements – Autumn 2009

### Required Graduate Student Courses

**NEUBEH 501: Introduction to Neurobiology: Molecular & Cellular Neurobiology.** (3) (Offered: A) Carlson

Concepts and techniques of molecular and cell biology as applied to understanding development and function of the nervous system. Required for all first year students.

**NEUBEH 502: Introduction to Neurobiology: Sensory & Motor Systems.** (5) (Offered: W) Sherk

Introduction to neuroanatomy and modules on sensory and motor systems, examination of macroscopic and microscopic neural tissues. Required for all first year students.

**NEUBEH 503: Cognitive and Integrative Neuroscience** (4) (Offered: Sp) Phillips

A discussion of higher neural processes like learning, memory, and decision making. Lecture and laboratory discussion of original literature, exercises in data analysis and quantitative reasoning. Required for all first year students.

**NEUBEH 504: Biophysics of Nerve, Muscle, and Synapse** (3) (Offered: A) Sullivan, Zagotta

Introduces biophysical properties of nerve and muscle cells. Topics include intrinsic electrical properties of neurons, ion channels, receptor signaling, calcium signaling, contraction of muscles, and synaptic function. Required for all first year students.

**NEUBEH 510: Seminar in Neurobiology** (0.5) (Offered: A, W, Sp)

Bi-weekly seminar on current topics in neuroscience. To be taken for credit throughout graduate training. Alt weeks with NEUBEH 527. Required for first and second year students

**NEUBEH 515: Teaching Practicum in Neurobiology & Behavior** (3-6) (Offered: A, W, Sp, S)

Supervised training in the teaching of neuroscience and related scientific topics. Teaching internships are assigned as part of the annual “match” or by approval by one of the Directors.

**NEUBEH 526: Introduction to Laboratory Research in Neurobiology & Behavior** (4) (Offered: A, W, Sp, S)

Students carry out research projects in the laboratories of different faculty members on a quarterly rotation basis.

**NEUBEH 527: Current Topics in Neurobiology & Behavior** (1) (Offered: A, W, Sp) Sullivan

Presentations by students on current scientific literature; complements the topics in the seminar series. To be taken for credit throughout the first two years; attendance is encouraged throughout graduate training. (This course is concurrent with NEUBEH 510, alt weeks) Required for first and second year students.

**NEUBEH 532: Discussion in Cell Signaling and Molecular Physiology.** (2) (Offered: W) Rieke

Discussion of fundamental issues in cell excitability and molecular and cellular physiology. Focuses on problem solving and reading from original literature. Emphasizes student participation. Required for all first year students.

**NEUBEH 559 Neurobiology of Disease** (3) (Offered: S) Garden

Introduces medically important neurological and psychiatric diseases and experimental approaches to understanding the basis for diseases and their treatments. Covers stroke, epilepsy, autoimmune diseases of the CNS, neurodegenerative diseases, autism, psychosis, anxiety disorders and mood disorders. Required for all first year students.

**NEUBEH 600: Neurobiology & Behavior Research/Independent Study.** (Variable-max 10 cr.) (Offered: A, W, Sp, S)

Independent research. Taken prior to General Examination.

**NEUBEH 800: Doctoral Dissertation** (Variable-max 10 cr.) (Offered: A, W, Sp, S)

Dissertation Research. Taken after completion of General Examination. Limited to graduate students in the program.

## N&B Program Requirements – Autumn 2009

### Graduate School Minimum Requirements

It is the responsibility of the student to meet the following minimum graduate school requirements. Most are met by the program requirements but they should be considered when selecting your elective courses.

1. At least 18 credits of your course work must be at the graduate level and must be completed prior to scheduling your General Exam. The Graduate School accepts numerical grades in 400-level courses approved as part of the major and all 500-level courses.
2. A minimum cumulative GPA of 3.00 is required for a graduate degree. The Graduate School provides the N&B Program with a quarterly Low Scholarship Report which lists the names of graduate students whose GPA's fall below 3.0 either cumulatively or for that quarter. The N&B Program reviews the status of each student on the low scholarship printout and sends to the Graduate School a specific recommendation--i.e. no action, warn, probation, final probation, or drop--for each case. A "no action" or "warn" recommendation does not appear on the student's permanent record. The Registrar will record only those actions recommending probation, final probation, and drop.
3. The student must pass the General Exam. Registration as a graduate student is required the quarter the exam is taken.
4. The student must prepare a doctoral dissertation on a topic in neuroscience. The topic and scope of the dissertation are developed with guidance from the dissertation advisor and thesis committee. There is no clear-cut definition of a minimum requirement for a thesis. However, the dissertation should describe original research that advances the field of neuroscience and clearly indicates training in research. A reasonable goal for many students is two first-author articles targeted for professional, peer-reviewed journals, such as The Journal of Neuroscience. Credit for the dissertation ordinarily should be at least one-third of the total credit. The Candidate must register for a minimum of 27 credits of dissertation over a period of at least three-quarters.
5. The student must pass a Final Examination, usually devoted to the defense of the dissertation. The General and Final Examinations cannot be scheduled during the same quarter. Registration as a graduate student is required the quarter the exam is taken and the degree is conferred.
6. Completion of all work for the doctoral degree must be done within ten years of matriculation. This includes quarters spent On-Leave or out of status as well as applicable work from the master's degree from the University of Washington.
7. Registration must be maintained as a full- or part-time graduate student at the University for the quarter in which the degree is conferred.
8. A student must satisfy the requirements that are in force at the time the degree is to be awarded.

## N&B Program Requirements – Autumn 2009

### Supervisory Committee

Students must establish a Supervisory Committee by Winter Quarter of the second year in the Program. This Committee serves several important functions, including evaluating the student's progress, advising the student on their research, and conducting the student's General Exam. Students can meet with their Supervisory Committees as often as necessary, but a minimum of one meeting per year is required to ensure adequate and timely progress toward the PhD degree. It is expected that the first meeting will take place soon after the committee has been formed, well before the General Exam is scheduled. These meetings are not examinations. They consist of a presentation on progress and future plans and extensive discussion. The Committee should approve the student's progress before the General Exam is scheduled.

The Committee is made up of Faculty that the student selects, in consultation with the Supervisor, and with approval of the Program Directors. The Supervisory Committee must contain at least three individuals who are members of the Program training faculty. At least one member of the Committee should represent an area of neuroscience outside the student's immediate area of research. A criterion for "outside" status is membership in a focus group outside the field of the dissertation advisor. In addition, the student will select a Graduate School Representative (GSR) to the Supervisory Committee. The GSR represents the interests of the student and should not have a primary appointment in the Supervisor's home department, nor be part of the N&B list in Graduate Faculty Locator. It is suggested that the Committee contain at least four members (in addition to the GSR) to avoid having to cancel the General Exam if a committee member cannot attend. While it is not always possible to have all of the Supervisory Committee members attend each meeting, it is a requirement of the Graduate School that the advisor(s) and the GSR attend the General Exam. **NOTE: The Supervisory Committee must be appointed at least 1 month before the warrant request to schedule the exam is submitted on-line to the Dean of the Graduate School. Contact the N&B Program Office to request Committee approval from the Directors and the Graduate School.**

### General Examination

Students are encouraged to take the general exam by the end of Summer Quarter of their second year, and *must* take it by the end of the Autumn Quarter of their third year. If the student's advisor (or other critical committee member) plans to be on sabbatical or family leave during the Autumn Quarter of the student's third year, then the student is expected to take the exam *before* the advisor (or other committee member) goes on leave. The General Exam consists of two written components and two oral sections. The written parts consist of a brief research proposal and answers to questions on prepared topics. The oral sections consist of a 20 minute presentation on the thesis proposal and questioning about topics related to the area of the dissertation and general knowledge. Details on the format of the General Exam are provided below. Specific details regarding the General Exam policy and procedures are located in the "Supervisory Committee and General Examination Process" document available via the N&B website.

Prior to the Examination, the student should designate a member of the Committee to serve as the General Examination Administrator, who will be responsible for administering the General Examination.

Note: In order to schedule your General Exam, you will need to submit a warrant request on-line to the Dean of the Graduate School. You can submit a warrant request on-line at MyGradProgram (<http://www.grad.washington.edu/mygrad/student.htm>).

**Warrant requests must be submitted on-line to the Graduate School and approved by the N&B Program at least 3 weeks before the General Exam**

### Dissertation and Final Exam

The Dissertation and Final Exam will proceed according to the rules of the Graduate School (<http://www.grad.washington.edu/stsv/checklist.html>). For the Neurobiology & Behavior Program, all dissertation students are required to submit preliminary copies of their dissertation to their Supervisory Committee for review six (6) weeks before their planned defense date. Students must establish their Reading Committee (advisor/s, plus two members of their Supervisory Committee) at least two (2) months before their defense. As with the General Examination, **all warrant requests for the Final Examination must be submitted on-line at least 3 weeks before Final Exam.**

## **N&B Program Requirements – Autumn 2009**

### **Training and Teaching**

We expect our students to develop proficiency in teaching neurobiology to undergraduate and/or graduate students. A minimum of two teaching quarter credits (total of 6 course credits) are required for graduation (Teaching Practicum, NEUBEH 515). At the end of year 1 and until this requirement is completed, each student selects his or her preferences for teaching internships for the following academic year. The faculty conduct a “match” to optimize these preferences in light of the opportunities available and demand. Students have the option to postpone teaching one year if there are compelling reasons. A list of the current opportunities can be found on the N&B website under “Teaching Requirements.” Students must fulfill their teaching requirement through the match.

### **Student Evaluations/Progress Reports**

At the end of each academic year, all students who have been in a dissertation lab for the past year must have an evaluation completed by their dissertation advisor(s). (First year students are evaluated during their rotations.) The advisor and student must complete the evaluation form, sign and return it to the Program Office by the established deadline. Each student must complete a brief summary of their progress during the past year. The progress report must also be signed by the student and his/her advisor(s). The evaluations and progress reports are reviewed by the Graduate Training Committee and any concerns and/or problems are referred to the Directors.

### **Satisfactory Progress**

Satisfactory progress is not just a matter of maintaining a satisfactory (3.0) GPA. The N&B Program also expects that students enter a dissertation laboratory by the end of their third rotation (a fourth rotation will be allowed at the approval of the Directors), and that the student will reach their academic milestones (see N&B Milestones document, available via N&B website) in a timely manner. Each student will be expected to meet with their Supervisory Committee at least once a year. Each student will be evaluated by their advisor and this evaluation will be reviewed by the Graduate Training Committee. Any student who is judged not to be making satisfactory progress may be reviewed by the Graduate Training Committee and the Directors at any time, and action will be taken to address the lack of progress. Failure to meet established milestones can result in a Program Probation and if not resolved to the satisfaction of the Directors, may result in formal sanctions and removal from the Program. The requirements are in place to facilitate progress toward the dissertation and a successful graduate school experience. We encourage students to perceive them not as hurdles but as stepping stones.

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### **Additional Program Requirement Documentation**

The following referenced documentation is available via the N&B website

[http://depts.washington.edu/behneuro/current\\_students/index.html](http://depts.washington.edu/behneuro/current_students/index.html)

Forms:

- Supervisory Committee Appointment
- Doctoral Supervisory Committee – Post-General Exam Meeting
- Doctoral Supervisory Committee – Annual Meeting
- Teaching Requirement Fulfillment Form

Policies/Lists

- Supervisory Committee & General Examination Process
- 2009-2010 Core Electives
- Milestones