

NEUROSCIENCE GRADUATE PROGRAM

Program Handbook 2023-2024



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What to Expect

The Ph.D. Program in Neuroscience is designed to provide students with broad training in neurobiology and prepare them for careers in modern biomedical research. The Neuroscience Graduate Program (NGP) begins with 1 year of didactic course work. During this time, students rotate through three research laboratories. By the end of the first year, students have chosen a mentor.

In the second year, students take electives, advanced seminar courses, begin research, and explore research topics as preparation for the Area Paper/Qualifying Exam. Based on performance in course work, research rotations, and the Qualifying Exam, students are evaluated for Advancement to Candidacy during the third year. After advancing to candidacy, students concentrate on conducting independent research and formulating their Dissertation Proposal with the guidance of their mentor and Dissertation Committee. The culmination of the research endeavor is a public seminar and a written dissertation that is defended orally before a faculty committee.

Throughout their course of study, students participate in a bi-weekly student-coordinated journal club, weekly student seminar, and attend the Neuroscience Graduate Program Seminar Series. The NGP guarantees financial support for all Neuroscience Ph.D. students who remain in good standing throughout their course of study. This support includes payment of a stipend, remission of tuition and fees, and health insurance. Students' progress through the NGP is always guided by a committee of faculty advisors and is reviewed annually by NGP leadership committee (Director, Associate Director, and Program Administrator). Details of each aspect of the training experience are provided in this document, as are details of financial responsibilities of the NGP and participating faculty.

Checklist and Timetable of Student Activities

First Year Requirements

Strongly Recommended, Summer Term:

- ❑ Rotation #1

Fall Semester

- ❑ Core Course in Integrative Biosciences (CCIB)
- ❑ Seminar in Neuroscience
- ❑ Neuroscience Graduate Student Seminar Series
- ❑ Rotation #2
- ❑ 15 Minute Meeting with Graduate Advisory Committee

Spring Semester

- ❑ Seminar in Neuroscience
- ❑ Neuroscience Graduate Student Seminar Series
- ❑ Rotation #3
- ❑ Foundations of Neuroscience
- ❑ **Concentration #1: Molecular, Cellular & Developmental**
 - NESC 9010 Molecular Neuroscience
 - NESC 9012 Methods in Molecular, Cellular & Developmental Neuroscience

OR

- ❑ **Concentration #2: Synapses & Circuits**
 - NESC 9020 Foundations of Cellular Neurophysiology
 - NESC 9022 Tools for Modern Neurobiology

OR

- ❑ **Concentration #3: Neuroimmunology**
 - MICR 8200 Building Blocks of the Immune System
 - MICR 8202 Integration and Diversification of the Immune System

OR

- ❑ **Concentration #4: Independent Development Plan**
 - *Course work determined with mentor.*
- ❑ 15 Minute Meeting with Graduate Advisory Committee
- ❑ First Year Compact (due to Program Administrator)
- ❑ [Select Mentor](#) and Research Lab (due to Program Administrator)

Second Year Requirements

Fall Semester

- ❑ Seminar in Neuroscience
- ❑ Neuroscience Graduate Student Seminar Series
- ❑ Research in lab chosen for dissertation work
- ❑ 15 Minute Meeting with Graduate Advisory Committee or Area Paper Committee
- ❑ Optional BIMS Modules

Spring Semester

- ❑ Statistics in Biomedical Research
- ❑ Research Ethics
- ❑ Seminar in Neuroscience
- ❑ Neuroscience Graduate Student Seminar Series
- ❑ Research in lab chosen for dissertation work
- ❑ Optional BIMS Modules
- ❑ 15 Minute Meeting with Graduate Advisory Committee or Area Paper Committee
- ❑ Individual Development Plan with Mentor (Due to Program Administrator)
- ❑ Area Paper [Form](#) DUE BY APRIL 1ST (due to Program Administrator)
- ❑ Area Paper Defense [Form](#) DUE BY JUNE 15TH (due to Program Administrator)

Third Year Requirements

- ❑ Seminar in Neuroscience
- ❑ Neuroscience Graduate Student Seminar Series
- ❑ Optional BIMS Modules
- ❑ Solidify Dissertation Committee
- ❑ Committee Meeting by December 15th (or within 6 months of Area Paper Defense, [Form](#))
- ❑ Dissertation Proposal Defense by June 15th (or within 12 months of Area Paper Defense, [Form](#))
- ❑ Individual Development Plan with Mentor (Due to Program Administrator)

Fourth year and Beyond Requirements

- ❑ Seminar in Neuroscience
- ❑ Neuroscience Graduate Student Seminar Series
- ❑ Committee Meeting [Form](#) (once every 6 months required)
- ❑ Meeting with individual committee members at least once in between committee meetings (*strongly recommended*)
- ❑ Individual Development Plan with Mentor (Due to Program Administrator)
- ❑ Permission to Defend [Form](#)
- ❑ Thesis Defense and Final Exam [Form](#)

Graduate Advisory Committee

During the first two years, students meet at least twice a year for around 15 minutes with the Graduate Advisory Committee. This committee consists of the Director, the Associate Director, and the Program Administrator. This committee will serve to advise and guide student progress through the Training Program in the first two years. In the second year, the student may instead choose to meet with their Area Paper Committee if that has been arranged. These meetings are strictly confidential and provide the students an opportunity to voice concerns about coursework and rotations. Subsequent to that, guidance will largely be from the faculty mentor and the Dissertation Committee, although students are encouraged to continue to use the Graduate Advisory Committee as a resource. The Graduate Advisory Committee does require that all students submit various updates to the Program Administrator to track progress. These updates are kept on file and include, but are not limited to, IDP/first year compact, forms for the area paper, thesis proposal, and dissertation defense.

Seminars

Neuroscience Graduate Program Seminar Series

During the Fall & Spring Semester, scientists are brought in from academia and industry to present their research. The NGP Seminar Series is held on Tuesday afternoon at 3:15 pm. It is expected that students will attend these seminars whenever they are offered. The students may also have the opportunity to meet with the speakers to discuss research and postdoctoral opportunities. *Attendance at NGP Seminars is required of all students, even those who have completed classes.*

NGP Student Seminar

The Neuroscience Student Seminar (MINDS) provides an opportunity for students to learn how to present a seminar and how to critically evaluate important papers in the original literature. Papers are chosen for their relevance, quality of science, and novelty. Fellow students and the faculty advisor analyze presentations to provide feedback on how to improve future presentations. Senior students are offered the opportunity to present their own research. *Attendance and yearly presentation at this seminar are required of all students, even those who have completed classes.*

NGP Student Journal Club

Journal club is a student-organized opportunity for informal scientific discussion between peers. The journal club meets bi-weekly to discuss papers selected by the student presenting that week. Faculty are not involved in this program. Typically, someone in their second year is selected to organize the journal club. Their responsibilities include notification of the student

body about upcoming presentations and coordinating meeting times and places. There is administrative support for this program.

Laboratory Rotations

Incoming students are encouraged to begin their rotations during the summer before their coursework begins. This summer rotation allows the student time in the lab without the distractions of classes and seminars. Summer rotations can begin as early as July 1st. The NGP will assist incoming students with the selection of their summer rotation.

The rotation consists of a 4-8 week period wherein the student joins the research laboratory of one of the faculty mentors in the Neuroscience Graduate Program. Students may also desire and can request permission to, under certain circumstances, conduct short rotations in certain labs to gain training in a specific technique. Students may petition the Graduate Advisory Committee to perform a single rotation with a faculty member who is not a member of the NGP faculty; however, such faculty must be a member of the Graduate Faculty of the University. The purpose of the rotation experience is to acquaint the student with a particular area of research, a particular laboratory setting and/or a potential mentor. In cases where a student has extensive research experience (e.g., as a full-time laboratory technician), they may petition the committee to have this experience considered as a single laboratory rotation. Likewise, students may petition the committee to perform an additional (fourth) laboratory rotation or to have other academic experiences, e.g., an internship in an industrial setting, considered as laboratory rotations.

Students should contact faculty via email or telephone to arrange for individual appointments to discuss a possible lab rotation.

Choosing a Mentor

Dissertation research mentors are to be chosen from amongst the faculty participating in the Neuroscience Graduate Program.

Mentor/student partnership is by mutual agreement and is subject to approval by the Program Director in consultation with the Graduate Advisory Committee. The student is expected to have decided on a mentor and been accepted into that mentor's laboratory no later than the end of the second semester of study.

If a student selects a mentor who has not yet graduated a previous student in NGP, that student must additionally select a NGP faculty to serve as a senior advisor. The senior advisor will

help to navigate the student's PhD progress but cannot serve as a member on the student's thesis committee.

Academics

Consult the [School of Medicine Graduate Record](#), [Academic Rules](#), and [Degree Requirements](#) for the Neuroscience PhD for a complete up-to-date listing of the courses required.

Registration for courses takes place through the Student Information System (SIS). The Program Administrator will register all first and second year students for courses but it is up to the student to make sure that that registration is accurate. Students in their third year and later will register themselves for all courses.

Area Paper & Dissertation Committees

Area Paper Committee

Students in their second year who are preparing for their area paper qualifying exam must have an area paper committee. To ensure breadth of expertise, this committee must be made up of:

- **Chair** (from NGP Executive Committee)
- At least **3 members** of the NGP Faculty (only 2 of which can be from the same department)

The Primary Mentor may attend the Qualifying Exam as a “**silent member**”, participating only when called upon by the other members.

Dissertation Committee

The dissertation committee may be comprised of the members from the area paper committee but does not have to be. Only two members of the 3 required should be from the same department. It must contain:

- **Chair** (from NGP Executive Committee)
- At least **2 members** of the NGP Faculty
- **1 additional member** (who does not have to be in NGP, but can be)

Key Dates

Please note that these are the latest dates on which these milestones are to be completed. It is recommended that you achieve these before these deadlines.

1st year

Second Semester BIMS Degree and Mentor Declaration Form **due**

2nd year

Fall Semester Organize advisory committee for area paper

April 1st Area Paper Information Form **due**

June 15th Area Paper Defense Form **due**

3rd year

Fall Semester Organize dissertation committee

December 15th Committee Meeting Form **due**

June 15th Dissertation Proposal Defense Form **due**

4th year and beyond

Fall Semester Committee Meeting Form **due**

Spring Semester Committee Meeting Form **due**

Variable Permission to Defend Form **due**

Variable Dissertation defense and Final Exam Form **due**

All the forms can be found on the NGP Student Resource folder in UVA Box that all students have access to.

Advancement to Candidacy

Upon completing the required coursework, the student is eligible to take the Qualifying Examination, which is also called the Area Paper (see detailed description below). The student will apply to take the examination by submitting to the Executive Committee the Area Paper Information Form, which indicates that the student has successfully completed the course requirements (via an unofficial transcript) and lists the members of the examining committee, a tentative title, and an outline for the Area Paper. Upon approval from the Executive Committee, the student will arrange meetings with committee members to discuss the proposed outline for the Area Paper.

The student will be advised immediately following the Qualifying Exam as to the outcome, of which three are possible: Pass, Conditional Pass or Fail. After passing the examination (or upon satisfying the remaining conditions for passing) the student's record over the first two years will

be evaluated by the Executive Committee in order to determine if the student may advance to candidacy. This evaluation will consider performance in coursework and in the laboratory, as well as the recommendations of the Examining Committee and any endorsements from the student's mentor. *A passing performance in the Qualifying Examination is necessary, but not sufficient for advancement; satisfactory performance in all areas is required for advancement to candidacy.*

Requirements to Advance to Candidacy:

- Completion of all core coursework
- Qualifying Examination (Area Paper)
 - o Area Paper Information Form
 - o Unofficial Transcript
 - o Outline for Area Paper
 - o Area Paper (at least 20 pages, with 1 page of Specific Aims)
 - o Oral defense of Area Paper
 - o Area Paper Defense Form (upon completion of examination)
- Evaluation by Executive Committee

Qualifying Examination (Area Paper)

The means to evaluate the academic capabilities of the student are provided by the Qualifying Exam. At the end of the second year of graduate work the students are expected to complete the requirements for advancement to candidacy. In particular, the core course work must be completed, a major area paper must be written, and the Qualifying Exam must be taken. The purpose of the Qualifying Exam is to evaluate the student on intellectual capabilities that are not revealed by formal course work and success in laboratory research. In essence, the exam and its antecedents (the written work described below) are to examine the student's ability to synthesize information from original sources, identify the critical questions/problem areas, criticize existing work in a creative fashion, and propose experiments that would resolve the remaining issues.

Students are expected to organize a faculty area paper committee during the fall semester of the second year. This committee is to include a member of the **Executive Committee** or designee and **three other members of the Neuroscience Graduate Program** (no more than two of which may be from the same department). This rule is intended to ensure breadth in the Committee. The Primary Mentor may attend the Qualifying Exam as a "**silent member**", participating only when called upon by the other members.

The responsibility of this advisory committee is to: (1) Ensure that the student is making satisfactory academic progress in the program and has completed or is in the process of completing all course requirements, (2) Determine an appropriate written instrument (see

below) for the advancement to candidacy, and (3) Meet periodically (approximately every other month) with the student during the completion of the written work to evaluate progress, and re-direct the student if problems are encountered. After the completion of the written work, the candidate defends the work to the committee. The combination of the completed core course work, **laboratory research**, Major Area Paper and the oral defense are the requirements for the advancement to candidacy.

The **written portion** of the Qualifying Exam is a scholarly review of a well-defined field of research. The paper should identify the research themes and the goals, evaluate the state of knowledge of the field, and identify areas where further work is needed. **A particularly important aspect is the critical but creative evaluation of the literature.** Additionally, there should be a 'Specific Aims' portion (1 page) of your research overview for context. This document should be approximately 20 pages long.

The **oral defense** is meant to evaluate the student's ability to utilize all facets of their previous training during interchanges like those encountered at scientific forums. They should be able to verbally present material in a manner that is understandable and succinct. They should be able to defend their ideas in a professional manner and should be able to accept and react positively to criticism. The students should, at this point, behave as an emerging professional scientist capable of expressing and exchanging ideas with colleagues. They also should be capable by this stage of evaluating evidence and distinguishing between data and interpretation.

Thesis Proposal

After advancement to candidacy and after the student has made sufficient progress in research to begin formulating a possible dissertation project, the student, in consultation with the advisor, finalizes a dissertation committee. The role of this committee is threefold: (1) To aid the student in developing a dissertation proposal, (2) To be the examining body for the presentation and defense of the dissertation proposal, and (3) To serve as the examining body for the presentation and defense of the completed dissertation. The philosophy of the Neuroscience Graduate Program is to *organize these committees early and have them meet with the students often*. The dissertation committee should be comprised of **one member of the executive committee and four faculty members including the student's mentor**. Of those three remaining faculty choices, it is recommended that two are from the NGP but the last one may be from another department or from outside UVa. No more than two faculty of the three may be from the same department. **The dissertation committee may be comprised of the members of the faculty advisory committee that the student assembled for advancement to candidacy but need not be.** In general, meetings with the dissertation committee take place at least once each semester.

The dissertation proposal itself has two parts. The first part should represent an introduction to the research area, a presentation of the outstanding problems, and an historical perspective indicating the importance of the work. It should in fact represent the first chapter of the dissertation. This introduction may represent a part of the document prepared for

advancement to candidacy if appropriate or may evolve from that document. The second portion of the dissertation proposal should describe in detail the specific experiments to be carried out, anticipated results, and possible interpretations. The defense of the proposal will involve an evaluation of the student's grasp of the problem area, their research methodology, and their understanding of the possible interpretations of any data that may be obtained. The dissertation proposal should follow exactly the format of a National Research Service Award (NRSA) application for individual predoctoral funding, such as an F30 or F31 or similar. Guidelines for such a format can be found [here](#) and [here](#). Students should consult with their mentors regarding the specific type of application to model.

First Author Publication

The program requires the student to have at least one peer-reviewed publication in which they are the first author. This publication must be approved by the student's thesis committee to be of enough scientific merit to be awarded a degree.

Successfully defending the dissertation (i.e., dissertation defense) is required for earning a PhD and for graduation. The dissertation defense always includes both a private and a public component. The private defense is attended only by the student's PhD committee, whereas the public defense is attended by both the PhD committee and the general public.

A student may hold a private dissertation defense prior to – but within 14 days of – their public dissertation defense. The private dissertation defense may only occur following the ACCEPTANCE of a peer-reviewed, first author manuscript by a publishing journal; only primary research studies, not reviews or commentaries, are considered for this requirement. Co-first authored publications can be considered but are at the discretion of the PhD committee. The dissertation committee will advise the student on a realistic time frame for receiving reviews, carrying out revisions and resubmission, and determine a reasonable defense date. The student may schedule their private defense before manuscript acceptance but if the manuscript is not formally accepted by the scheduled date of the private defense, then the student must cancel the defense and reschedule after formal acceptance.

If the student chooses to hold both their private and public dissertation defense on the same day, then the private defense will be held after the public defense.

The Dissertation and Defense

The student must complete an independent research project under the close supervision of the primary mentor. The student's dissertation committee must be consulted regularly regarding progress, meeting at least once every six months. Timelines and assessment of progress should be explicitly discussed at each committee meeting. The research must constitute an original and significant contribution to the field and is to be fully presented in the candidate's dissertation. As evidence of this level of achievement, the Graduate Program expects that students will author research papers, including some as first author, and these papers will appear in recognized, peer-reviewed journals. Specifically, the program requires at least one primary

peer-reviewed research paper on the student's dissertation project with the student as first author to graduate.

As part of the requirements for graduation, the student must write and orally defend a dissertation. The dissertation defense is constituted in two required parts, a public dissertation seminar (should be attended by the members of the dissertation committee and is open to all members of the University of Virginia and the community as a whole) and a private dissertation defense (must be attended by the members of the dissertation committee). The two portions of the defense do not have to take place on the same day but may. Notice of the dissertation defense seminar must be given at least two weeks in advance of the public seminar. This notification must originate from the Program Administrator so that all individuals involved in the program are properly notified.

Before a student schedules the defense, s/he needs to obtain explicit permission to defend the dissertation work. This permission must be granted to the student by the dissertation committee via a committee meeting and a signed Permission to Defend Form. The signed form indicating permission to defend must be returned to the Neuroscience Graduate Program office.

Biomedical Sciences and School of Medicine Graduation Requirements

Please see the Program Administrator or the [BIMS program website](#) to make sure you are following **all the required steps to graduate**.

Financial Support, Student Life, Awards, and More

The [BIMS website](#) and handbook contain information about your financial support, health insurance, and more.