Program in Neuroscience
Ph.D. Student Handbook

1. Overview of Training
2. Advising and Tracking of Student Progress
3. Faculty
4. Program of Study
   A. First Two Years
      Registration and Advising
      Coursework
      Required Courses
      Descriptions of Required Courses
      Electives
   B. Qualifying Examination
   C. Thesis Years
      Typical Curriculum
      Doctoral Dissertation
      Dissertation Committee
      Dissertation Proposal
      Requirements for Ph.D. and Dissertation Defense
5. Other Important Information
   A. Student’s Attendance
   B. Graduate Student Association

Appendix 1 – Flow Chart of First Two Years
Appendix 2 – Forms for Laboratory Rotations
Appendix 3 – Pre-Candidacy Advisory Committee Meeting
Record Appendix 4 – Application for Admission to Candidacy
Appendix 5 – Post-Candidacy Committee Meeting
Record Appendix 6 – Thesis Proposal Form
Appendix 7 – Post Qualifying Forms
Appendix 8 – Summary of Requirements
Appendix 9 – Program in Neuroscience Training Committee
**Purpose of this document**

These guidelines are intended to supplement the regulations already given by the Graduate School of the University of Maryland, Baltimore and the Graduate Program in Life Sciences. We encourage you to study these regulations, which are described in the most recent graduate catalog and on their websites [http://www.graduate.umaryland.edu](http://www.graduate.umaryland.edu) and [http://lifesciences.umaryland.edu](http://lifesciences.umaryland.edu). Additional program-specific regulations and expectations are described in these Guidelines, and are designed to answer most questions you may have regarding our program and the course of study. If after reviewing these Guidelines you have any further questions, we encourage you to discuss them with us.
Overview of Training:

Research

- Laboratory rotations stress hands-on experience in a wide variety of state-of-the-art approaches and techniques in three different laboratories.
- To better inform rotation-level students about the research opportunities available in the PIN labs, there are a series of informal Professor’s Rounds in fall of the first year.
- By the middle of the Fall semester in your second year, you should have completed three laboratory rotations and have chosen a prospective mentor with whom you can conduct your thesis work.

Coursework

- The graduate curriculum gives Program in Neuroscience students a broad base of knowledge and is also tailored to meet student’s research interests and career goals.
- Every student is assigned an Advisory Committee which assists the student in choosing electives in addition to the required courses to help design their individual curriculum. The Advisory Committee also assists in helping choose rotation mentors.
- The first semester core course “Mechanisms in Biomedical Sciences: From Genes to Disease” provides a comprehensive overview of current knowledge in cellular, molecular, and structural biology. (MD/PhD students do not take this)
- The content of the first semester core course is supplemented with additional material in Topics in Cellular and Molecular Neuroscience
- An Informal Bioethics Course that meets monthly starting in the spring of the 1st year and lasting for a year.
- Systems and Cognitive Neuroscience in the Spring 1 semester. (MD/PhD students do not take this)
- Synaptic Physiology in the Spring 1 semester
- Biostatistics in the Fall 2 semester plus elective. (MD/PhD students take this in Fall 1)
- Proseminar in Fall 2 semester (Fall 1 for MD/PhD students)
- Journal Club (regular attendance at a broad-based journal club is required, and students must present at Journal Club at least once during their second year and one more time afterwards.)

Milestones

- 1 oral presentation at the end of a rotation period. (MD/PhD students are not required to do this for PIN, because they do it for the MSTP)
- Written and Oral Qualifying exam at the end of the Fall 2 semester. (This will happen at the end of Spring 1 for MD/PhD students).
Advising and Tracking of Student Progress

It is the responsibility of the student to advance toward the PhD degree in a timely fashion. To help the student achieve this goal, advice and counseling will be provided to the student as follows:

Advisory Committee
During the first and second years each student is assigned a three-person Advisory committee, at least one of whom is a member of the Program Training Committee (Appendix 9). The Advisory Committee meets with the student within the first few weeks of matriculation and at least once per semester thereafter and consults and approves course selections, research areas and laboratory rotations. Students are responsible for arranging a meeting with their Advisory Committee at the end of each semester (no later than November 1st and April 1st for the Fall and Spring semesters, respectively), to review their scholastic performance and to discuss their coursework and laboratory rotations for the coming semester. A brief report (see Appendix 3- Pre-Candidacy Advisory Committee Meeting Record) from each meeting prepared by the chair of the Advisory Committee will be sent to the PIN Director of Graduate Education and the Program Manager.

Upon successful completion of the qualifying exam a student will be advanced to candidacy and, in consultation with their chosen research mentor, form their thesis committee. This committee will meet semi-annually as arranged by the student. Brief reports of these meetings will be submitted to the PIN Director of Graduate Education and the Program Manager by the thesis mentor (Appendix 5.)

Faculty

We have over 100 faculty members in the Program in Neuroscience. Our faculty members are affiliated with 16 departments and schools:

Anatomy and Neurobiology
Anesthesiology
Biochemistry and Molecular Biology
Biomedical Sciences (Dental School)
Center for Marine Biotechnology
Epidemiology
Neurology
Neurosurgery
Ophthalmology and Visual Sciences
Oral and Craniofacial Biological Sciences
Organizational Systems and Adult Health (School of Nursing)
Pediatrics
Pharmacology and Experimental Therapeutics
Physical Therapy and Rehabilitation Science
Physiology
Psychiatry

These departments and schools contribute to the Program in Neuroscience by offering courses and sponsoring seminars in the Neurosciences as well as providing the space and intellectual atmosphere for students to carry out their research. The range of research interests within the faculty allow students to select from a broad array of research topics.
Program of Study

A. First Two Years

Registration and Advising
Upon entering the Program in Neuroscience, each student is assigned a three-person Advisory committee, at least one of whom is a member of the Program Training Committee (Appendix 9). The Advisory Committee meets with the student within the first few weeks of matriculation and at least once per semester thereafter and consults and approves course selections, research areas and laboratory rotations. Students are responsible for arranging a meeting with their Advisory Committee at the end of each semester (no later than November 1\textsuperscript{st} and April 1\textsuperscript{st} for the Fall and Spring semesters, respectively), to review their scholastic performance and to discuss their coursework and laboratory rotations for the coming semester.

The chair of the Advisory Committee is responsible for submitting to the Program Director of Graduate Education and the Program Manager written summaries of the committee’s meetings with the student. These reports are evaluated by the Director of Graduate Education and appended to the student’s official file. (Appendix 3- Pre-Candidacy Advisory Committee Meeting Record) Registration for courses and for laboratory rotations is contingent on timely submission of these reports.
Coursework

See Appendix 1 for a Flow Chart of First Two Years

Required Courses

Program in Neuroscience students receive a broad based education which is then tailored to the individual students’ research interests through a wide variety of electives. The following courses are required of all Program in Neuroscience students with noted exceptions:

1. **GPLS 601 Mechanisms in Biomedical Sciences (Fall 1) 8 Credits** (not MD/PhD students)
2. **GPLS 691 Topics in Cellular and Molecular Neuroscience (Fall 1) 1 Credit**
3. **Professor’s Rounds (1st year)** Mandatory during the first year of study (informal, non credit) (not MD/PhD students)
4. **Research Ethics (once a month starting in Spring 1 and lasting for one year)**
5. **GPLS 609 Laboratory Rotations (Start Winter 1 or Summer before matriculation) Minimum 3 rotations**
6. **Rotation Presentations** Students will pick 1 of their 3 rotation projects to present at the end of the rotation period. (not MD/PhD students who do this for the MSTP)
7. **GPLS 641 Systems and Cognitive Neuroscience (Spring 1) 4 credits** (not MD/PhD students)
8. **GPLS 620 Synaptic Physiology (Spring 1) 3 credits**
9. **GPLS 630 Biostatistics (Fall 2) 3 credits** (Fall 1 for MD/PhD students)
10. **GPLS 737 Proseminar (Fall 2) 2 credits** (Fall 1 for MD/PhD students)
11. **GPLS 629 Neuroscience Journal Club (Fall 2 and beyond) 1 Credit/ 2x**

All students must attain a grade of B- or better in all required courses. A student receiving a grade of C or less in a required course must retake that course or equivalent. Students who fail to maintain a 3.0 average overall are placed on academic probation. Students having two semesters with a cumulative GPA less than 3.0 may not take the Qualifying Exam, are subject to dismissal from the Graduate School, and are ineligible to be awarded a Master’s degree. Students must receive at least a B (not a B-) cumulative in Mechanisms in Biomedical Sciences: From Genes to Disease (GPLS 601) in order to continue in the program.

Courses meet either annually or biannually and virtually all students satisfy their course requirements within the first year and a half. Occasionally, a student will take a specialized course in later years for educational enrichment, but, after qualifying exams, the bulk of time is spent in laboratory research. Students are allowed to take a maximum of 10 credits per fall and spring semester.

Neuroscience Seminars (GPLS 608)

All students are required to attend the monthly Neuroscience Seminars throughout their graduate studies. A minimum of two semesters of GPLS 608 for credit is required of
each student. Credit will be awarded when a student presents her/his thesis proposal, and dissertation defense. To receive credit for these presentations, the student must coordinate her/his presentation with the Mentor and Thesis Committee and Program Director of Graduate Education.
Descriptions of Required Courses

FALL 1

Mechanisms in Biomedical Sciences: From Genes to Disease (GPLS 601- 8 Credits)
Also known as the GPILS Core Course, this class is a comprehensive overview of current knowledge in cellular, molecular, and structural biology. This modular course provides all of the background necessary for subsequent specialized studies in biomedical research in a concentrated program during the Fall semester. These are separated into three sections that are taken as a cohesive course: Molecular Biology and Genetics; Molecular Structure and Function; Cellular Structure and Function

Topics in Contemporary Cellular and Molecular Neuroscience (GPLS 691 – 1 Credit)
This 1 credit course is taught in parallel with the GPILS Core Course. Lecture topics are designed to complement those being covered in the Core Course in the various sections. Topics include neural development, neuronal and glial responses to trauma and stroke, neuroendocrinology, neuropharmacology, and quantal analysis. This course, in combination with the Core Course, will provide neuroscience-oriented students with a strong background in both molecular and cellular neuroscience and electrophysiological concepts that are necessary for advanced courses in neuroscience.

Neuroscience Journal Club (GPLS 629 – 1 Credit)
Prior to advancing to candidacy, students are required to attend all journal club meetings. Journal Clubs are presented by Program students, faculty and postdocs. Credit for Journal Club will be awarded only following a presentation of a paper by a student at the Program in Neuroscience Journal Club. A minimum of two semesters of GPLS 629 for credit (i.e., including presentations) are required from each student. Students give their first journal club presentation during the 2nd year of the program. The second presentation may be given after advancing to candidacy. Students must select a faculty member, approved by the Journal club Director of Graduate Education, to assist them in preparing their presentation. Students are required to notify the members of their Advisory Committee or their Thesis Committee of the time, date, and title. Invited speakers will be asked to suggest one or more of their manuscripts that are relevant to their talk. These manuscripts will be presented by one of the students at the Tuesday Journal Club preceding the Thursday seminar; this presentation may be used to fulfill the requirement for Journal Club presentations (GPLS 629). The faculty host of the speaker will act as the mentor for the student giving the Journal Club presentation. The grading system for the Journal Club is P/F
Systems and Cognitive Neuroscience (GPLS 641 – 3 credits)
This course allows for an in depth review of a range of neuroscience topics, from anatomy to chemical senses, motor systems, and higher functions such as learning and memory, language and disorders of thought.

Synaptic Physiology (GPLS 620 – 3 credits)
Emphasis is on electrophysiological analysis of synaptic transmission. Topics include ionic basis of excitatory and inhibitory postsynaptic potentials, equivalent circuits of transmitter action, mechanisms and regulation of transmitter release, fast and slow synaptic responses, and functional structural plasticity at synapses.

Laboratory Rotations (GPLS 609-1 Credit) & Choice of Mentor
An important feature of our training program is laboratory rotations. The rotations should expose the student to diverse aspects of neuroscience research. Students should consider lab rotations which prepare them to test specific hypotheses and/or predictions and to develop critical thinking skills as well as exposing them to new and novel techniques. Each trainee is expected to complete three laboratory rotations before choosing a mentor for thesis research.

A student must receive prior approval from his/her Advisory Committee and the Program Director of Graduate Education in order to begin thesis work with a mentor after completing only two laboratory rotations.

The student’s Advisory Committee is responsible for guiding the student into appropriate rotations. Prior to beginning a rotation, the students must receive approval from the proposed mentor, his/her Advisory Committee and the Program Director of Graduate Education (Laboratory Rotation Proposal Form). You should meet with the laboratory mentor to determine if there is room for you in the laboratory, to identify a likely project and its hypothesis, and to clarify expectations about your time commitment and his/her flexibility. The Laboratory Rotation Proposal Form (included in this packet) assists you in establishing these goals. This form should be turned into the Program Manager once the signatures have been received. Each rotation typically lasts 8 to 12 weeks; longer rotations must be approved by the Training Committee (or the Director of Graduate Education).

Students are required to do one 15-20 minute presentation discussing the outcomes of their rotation project. Presentations should include a brief synopsis of the overarching research topic and question and significance (i.e., background), a statement of the hypothesis or predictions tested, and a discussion of the findings. Students should be prepared to answer questions posed by the audience. Faculty will provide useful feedback following these presentations (an example form included in this packet).

Additionally, both the student and the mentor must complete an evaluation form (both included in the rotation packet). Feedback from the mentor and the presentation will result in a pass/fail grade for the rotation.
Students are not permitted to do laboratory rotations during the Year 1 Fall semester, because of the course load (not true of MD/PhD students). However, students are strongly encouraged to visit the laboratories of Program faculty during this semester.

To better inform rotation-level students about the research opportunities available in the PIN labs, there are a series of Professor’s Rounds in the Fall 1 semester. The scheduling for these rounds is done in advance, and is emailed to all first year students. Each session has 2 faculty presenters and lasts about one hour, each giving an informal “chalk talk” about their laboratory research. Students in their first year are required to attend these presentations.

In addition to the PIN Professor’s Rounds, there are also the Membrane Professor’s Rounds in the Fall, which PIN students are encouraged to attend. A list of faculty in the Program in Neuroscience may be found at http://neuroscience.umd.edu/faculty
Fall 2

**Biostatistics (GPLS 630 – 3 credits)**
This course covers most of the basic types of analysis procedures used for continuous and discrete variables. These topics include statistical inference (p-values, confidence intervals, and hypothesis tests), t-tests, chi-square tests, power calculations, nonparametric methods, simple and multiple linear regression, ANOVA, logistic regression, and survival analysis.

**Proseminar in Hypothesis Testing and Experimental Design (GPLS 737- 2 credits)**
This course focuses on experimental design, the scientific method and hypothesis testing. One of the goals of Proseminar is to hone the students’ analytical and hypothesis-generating skills.

Spring 1-Fall 2

**Research Ethics**
The ethical conduct of science is increasingly under the spotlight from the public, media, and national regulatory bodies. The National Institute of Health recently released a notice requiring “…all trainees, fellows, participants, and scholars receiving support through any NIH training, career development award (individual or institutional), research education grant, and dissertation research grant must receive instruction in responsible conduct of research”.

In this course various aspects of research ethics will be examined, including data collection and ownership, issues in the use of human and animal subjects, responsibilities of authorship, identifying and handling conflicts of interest, scientific misconduct, the peer review system, collaborative research in academia and industry, mentor/mentee relationships, contemporary ethical issues, and the role of the scientist as a responsible member of society. Each session has a readings list assigned and involves in depth small group discussions of relevant cases with faculty in small group discussions. Postdoctoral fellows, and students not needing the credit, may sign up for the course informally, but will still be expected to participate fully in order to receive a letter of course completion. Grading will be based on group participation and leadership of at least one group discussion.
Electives - (not every elective is offered every semester/year)

**Neuropharmacology (GPLS 604 – 3 credits)**
This course presents basic and applied neuropharmacology in a functional context, emphasizing the neuroanatomical and neurochemical basis of drug development for treatment of neurological, neurodegenerative and psychiatric disorders that afflict millions worldwide. The course is divided into two sections. In the first section, emphasis will be given to specific receptors and pathways that mediate the actions of specific neurotransmitters and neuromodulators. For each system covered, a lecture will be presented that will detail the synthesis, anatomical pathways, receptors and other key aspects of the neuromodulatory systems. The lectures will be followed by student presentation of primary research papers addressing that week’s topic. The second part of the course will place all this knowledge in perspective of basic and applied research toward pharmacological therapeutics for numerous disease conditions. Students will actively participate in the second part of the course, by presenting and discussing state-of-the-art research for that week’s topic. Student presentations will take place on the class day following the lecture presented on that week. Students will work with a mentor to design a testable hypothesis, experimental protocol(s) to properly address the hypothesis, and discuss expected outcomes. Students will then present in class their mentored work. This will be a highly interactive, hands-on course, from which students will learn how to apply the basic principles of neuropharmacology.

**Neuroendocrinology (GPLS 613 – 3 credits)**
This course takes an integrative approach to the topic of Neuroendocrinology. Didactic lectures review in detail the cellular and molecular mechanisms of steroid and peptide hormones. These processes are placed in the context of the control of female and male reproductive physiology and extended to the hormonal control of behavior. Other topics include the hormonal basis of and responses to stress, circadian rhythms and seasonality and feeding behavior. In addition to these lectures, each student will make one in-depth presentation on a topic of their choice that is relevant to the field of neuroendocrinology. Grades are based on this presentation, a midterm exam, a final exam and class participation. Offered in the Spring of every other year.

**Biological Signal Analysis (GPLS 615 – 3 credits)**
This course covers the origin and analysis of various biological signals, especially those arising from the nervous system. Emphasis is on the measurement and interpretation of these signals by techniques such as spectrum analysis, average evoked responses, single-unit histograms, and pattern recognition. Students establish theoretical background of random processes. Prerequisites: differential and integral calculus. Offered in the Spring semester, every other year.
Molecular Mechanisms of Signal Transduction (GPLS 616 – 3 credits)
This is a lecture and discussion course that meets twice weekly and focuses on the molecular mechanisms of action of hormones, growth factors, cytokines, extracellular matrix components, and other signaling molecules on target cells. Offered in the Fall of every year.
Prerequisite: completion of GPILS core curriculum. GPLS 601, 602 and 603.

Membrane Transport: Ion Channels (GPLS 625 – 3 credits)
This course covers the role of voltage- and receptor-gated ion channels in cell function. Although the emphasis is on structure and function of channels in excitable tissues such as nerve and muscle, students gain insight into the rapidly developing field of ion channel function in non-excitable cells such as lymphocytes, transformed cells, and glial cells, and the roles of ion channels in development. Offered in the Spring of every other year.

Developmental Neurobiology (GPLS 627 – 3 credits)
This course introduces students to developmental neurobiology, approached at the cellular and molecular levels. Topics include neurulation; glial and neuronal cell lineage; trophic factors and their mechanisms of action; cell death, neuronal differentiation, and the role of tropic and trophic interactions; axonal transport, synaptogenesis, and synaptic differentiation; neuron-glia interactions; and regeneration and plasticity. Each class consists of a lecture and a discussion of readings. Offered in the Spring of every other year.

Nociception, Pain and Analgesia (GPLS 642 – 2 credits)
This course is designed for graduate students in all health disciplines. The focus is on the basic science and research aspects of nociception, pain and analgesia. Topics include the neuroanatomy, neurophysiology, neuropharmacology, and the psychophysics of nociception and pain. This course is offered in the Fall semester.

Neurobiology of Nociception and Pain (GPLS 643 – 3 credits)
This course is designed for neuroscience graduate students interested in the neurobiology of nociception and pain. While GPILS 642 provides a general background in this field, GPILS 643 provides a solid foundation of knowledge through a combination of lectures, directed reading and discussion of the primary literature. The focus is on the most contemporary views of nociceptive processing. This course will be offered every year in the Spring semester.

Topics in Molecular Medicine (GPLS 750 – 2 credits)
This course is aimed at developing skills necessary for understanding and discovering how changes in gene function cause human disease. The course revolves around a series
of topics that use inherited disease processes to illustrate the physiological consequences of molecular, cellular, genetic phenomena. Recent breakthroughs in the identification of disease-related genes are presented and extended to a discussion about their impact on cell and organ function. Critical reading and discussion of landmark and/or timely papers are stressed. In this way, students learn interesting state-of-the-art material while developing skills and expertise in integrative biology and molecular medicine. Two or three one-hour classes per topic consist of interactive discussions following assigned readings and brief lectures. Offered in the Fall semester.

**Recording Neural Activity: Modern Methods (GPLS 778 – 2 credits)**
This course is a comprehensive tutorial of the major, state-of-the-art electrophysiological and imaging approaches used in neuroscience. The course focuses on an understanding of the principles underlying these approaches, and the advantages and potential pitfalls of each. The course consists of lectures and demonstrations. Offered in the Fall of every other year.

**Neurobiology of CNS Diseases (GPLS 780 – 3 credits)**
This course covers the clinical and basic science aspects of major central nervous system diseases. Topics include apoptosis and excitotoxicity, genetic analysis of human disease, Alzheimers, Parkinsons, Huntingtons, epilepsy, multiple sclerosis, amyotrophic lateral sclerosis, stroke, Creutzfeldt- Jakob and Prion diseases, pain transplantation and stem cells, AIDS and infections of the CNS, and migraines and headaches. The course includes student presentations and at least one neurology rounds style presentation by neurologists. Offered in the Spring semester of every other year.

**Biological Psychiatry (GPLS 781 – 3 credits)**
This course provides students with a strong background in both the clinical and neurobiological aspects of mental illness, including schizophrenia, depression and bipolar disorder, obsessive-compulsive disorder, attention deficit hyperactivity disorder, autism, and drug abuse. Psychiatrists from the School of Medicine introduce the clinical symptoms and treatments for each disease. The clinical and neuroscience faculty at the Maryland Psychiatric Research Center present current research on the neurobiology behind each illness. Offered in the Spring semester of every other year.
Credit for Previous Courses or Research

Students who received a B or better grade in equivalent courses at other schools or programs may request a waiver from the Training Committee from attending similar courses. Students who have had extensive, documented research experience prior to joining the Program in Neuroscience may receive partial credit toward the Laboratory Rotations requirements, subject to approval by their Advisory Committee and the Training Committee.

MD/PhD students at UMB may be credited for laboratory rotations performed at UMB prior to entering the Program in Neuroscience.

Master of Science Degree

The Program in Neuroscience does not have a Masters program and does not admit students who wish to obtain an M.S. degree. Masters degrees are not awarded at an intermediary point in the program. However, if a student leaves the program after the second year for compelling reasons or is asked to leave the program, the Training Committee may consider recommending the awarding of a terminal M.S. degree. This will not be considered unless the student has completed two years of coursework and laboratory rotations (totaling 30 credit hours) and is in good academic standing.

B. Qualifying Examination

Context:
Graduate students in the Program in Neuroscience at the University of Maryland, Baltimore are expected to develop a number of skills as they prepare to embark on their thesis research. These include the ability to synthesize and critically evaluate data described in scientific literature, formulate clearly testable hypotheses, design experiments to test these hypotheses and evaluate results from proposed experiments. These skills will be developed through didactic course-work and participation in journal clubs and seminar series and laboratory rotations.

Purpose of the qualifying exam:
1) To establish that students have acquired academic tools necessary to a) formulate a testable hypothesis that addresses a particular problem in neurobiology, b) formulate a series of experiments designed to test the hypothesis, c) discuss potential outcomes of the proposed experiments particularly those relevant to the acceptance or rejection of the hypothesis, d) discuss future directions for their proposed line of investigation. 2) To establish that students have obtained a solid foundation in the principles of neuroscience.

Mechanism:
The exam will consist of two parts: written and oral. The written portion will be in the form of a written proposal over a set of specific aims that the student has designed which can be related to, but cannot be the thesis research aims. The oral portion will consist of an examination based on, but not restricted to the written document during which students will be given the opportunity to clarify and/or expand upon issues raised in the written portion of the exam.
A student on academic probation (i.e. GPA less than 3.0) will not be permitted to sit for the Qualifying exam unless the GPA is above 3.0 at the end of the Fall semester.

**Evaluation and outcomes:**
This will be a two-stage process. Following completion of the written portion of the exam, it will be evaluated by the examiners. If the written portion is judged satisfactory, then the student will proceed to schedule the Oral exam. If the written is judged unsatisfactory then the student will have the opportunity to rewrite and resubmit the written exam for re-evaluation. Students will be evaluated on their performance on both the written and oral components of the exam. Students will be advanced to candidacy if 3 out of 4 members of the examining committee judge that the overall performance of the student was adequate. If less than 3 out of 4 members of the committee feel that the overall performance of the student was adequate, students will have to re-take both written and oral portions of the exam. Under these circumstances, students will be assigned a committee of 3 faculty members who will work with the student to address deficiencies identified in the exam process. Students will be given 3 months in which to address deficiencies and re-take their exam. Students must pass this second attempt in order to remain in the program.

**Admission to Candidacy**

Admission to candidacy means that the student has completed and successfully passed the Qualifying Examination and the course requirements of the Program in Neuroscience and is now ready to begin thesis research leading to thesis proposal and dissertation defense. Students must submit the Application for Admission to Candidacy to their faculty mentor and program Director of Graduate Education for signature, and, subsequently, to the Program Manager, who will then keep a copy in the student’s file and forward the original on to the Graduate School for final review. A copy of the student’s transcript delineating all course work taken by the student in fulfillment of degree requirements must accompany each copy of the application for admission to candidacy.

Doctoral students are expected to complete their degree requirements in a timely manner. The Graduate School requires that the thesis defense takes place within four years of admission to candidacy.

**Following successful completion of the Qualifying Exam and Admission to Candidacy:**
It is expected that by the middle of Fall semester of their second year in graduate school, students will have chosen a lab in which to complete their thesis research.
By the end of the Spring of their second year, students should have assembled a thesis committee and already have had one committee meeting.

Through the fall of their 3rd year, students are expected to have developed a potential thesis project with their mentor and thesis committee to the point that they are able to generate an NRSA style proposal. Students who are able to submit such a proposal to either the NIH or another funding institution, are expected to do so by the spring of their third year in graduate school.

Students are expected to present their thesis proposal as a written document and an oral presentation by the end of their 3rd year in order to remain in good standing in the program. It is understood that this proposal is not binding and that the goals of the research project may be modified in consultation with the thesis committee and the mentor as data is generated.

C. Thesis Years

TYPICAL YEAR TWO, THREE AND FOUR CURRICULUM

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<tr>
<th>FALL SEMESTER</th>
<th>Credit</th>
<th>SPRING SEMESTER</th>
<th>Credit</th>
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<td>Research Credit (GPLS 899)</td>
<td>3</td>
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<tr>
<td>Neuroscience Seminars (thesis proposal presentation) (GPLS 608)</td>
<td>1</td>
<td>Neuroscience Seminars (thesis defense) (GPLS 608)</td>
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Doctoral Dissertation

Students must demonstrate the ability to do independent research by presentation of an original dissertation on a topic approved by the thesis committee and the PIN Training committee in both written and oral formats. During the preparation of the dissertation, all candidates for the doctoral degree must register for a minimum of 12 credit hours of doctoral dissertation research (GPLS 899) at the University of Maryland, Baltimore.

A Ph.D. student must establish and maintain a professional relationship with a member of the Graduate Faculty with the appropriate knowledge and expertise to serve as his or her research adviser. If no appropriate Graduate Faculty member is available or no appropriate Graduate Faculty member agrees to be the student’s research adviser, the student cannot continue in the Ph.D. program.
Doctoral students are expected to complete their degree requirements in a timely manner. Students must be admitted to candidacy within two years of admission to the doctoral program, and submit an approved thesis proposal at least two full sequential semesters or sessions (spring, summer, or fall) before graduating. All degree requirements, including the doctoral dissertation and final doctoral examination, must be completed within four years of admission to candidacy and no more than nine years after admission into the doctoral program. Failure to complete all requirements within the time allotted requires another application for admission to the Graduate School with the usual requisites as decided by the program Training Committee. The Graduate School grants extensions of time only under the most unusual circumstances.

**Dissertation Committee**

A **Dissertation Committee** is formed after a student passes the **Qualifying Exam**, and selects a mentor in whose laboratory the dissertation research will take place. The Dissertation Committee, formed in consultation with the mentor and student, is the formal supervisory body that oversees the progress of the dissertation. It has the responsibility to act as a resource for the student and mentor, providing recommendations, advice and guidance and monitoring the student's progress.

The Committee consists of **5 voting members** who hold the doctoral degree. Three must be Program in Neuroscience faculty members, and at least three must be Regular members of the Graduate Faculty. One committee member must fulfill the criteria for being an external member. This individual must be from a program, department or discipline separate from that of the candidate and must hold a doctoral degree. The external member may be from within the university or may be a scholar from another institution. Students **are encouraged** *(but not required)* to include a scientist from another institution on their Dissertation Committee. The committee must be approved by the Director of Graduate Education, and, once approved, changes in Committee membership must be requested in writing. Two committee members are designated as readers. When the dissertation is completed to the satisfaction of this committee at least 14 days before the defense, the adviser and both readers sign the form saying that the dissertation is ready for defense.

To take full advantage of the Dissertation Committee's expertise, students are required to provide the committee a progress report **at least every 6 months**. The student and mentor can provide this report during meetings with individual Dissertation Committee members; however, students must convene the entire Dissertation Committee **at least once a year** to present their progress in a seminar format. In addition, the student has the option of meeting with the Dissertation Committee members individually, or as a group in the absence of the Mentor, should the need arise.

The student’s mentor is responsible for submitting to the Director of Graduate Education a written summary of the Dissertation Committee's meeting with the student. If the student's progress is found inadequate, a request to meet with the student and mentor to discuss the student's progress and suggest remedial actions may be made.
Dissertation Proposal

As part of the requirements of the doctorate, students present and defend a dissertation proposal. It is strongly recommended that defense of the dissertation proposal take place approximately one year after the student begins working with an approved Dissertation Mentor. However, the defense must take place at least 12 months before the Dissertation Defense.

The defense of the dissertation proposal consists of three parts:

1. A research proposal written in the format of an NIH grant submitted to the Dissertation Committee.
2. An oral defense of the proposal to the Dissertation Committee, which convenes at least two weeks after submission of the proposal. If the committee approves the proposal, a formal, public, dissertation proposal presentation is held.
3. The public defense seminar describes the general hypothesis being tested, the data generated so far and the proposed experiments remaining to be conducted to bring closure to the project.

If the dissertation proposal defense is successful, the student proceeds with the dissertation work. If it is unsuccessful, the proposal must be revised and defended again. Successful defense of the proposal is a requisite for meeting the Program's academic requirements.

Requirements for Ph.D. and Dissertation Defense

A student's progress in the dissertation-research years is monitored during regular meetings (at least once every semester; see Dissertation Committee) with their Dissertation Committee. The Dissertation Committee also serves as the "Final Doctoral Examining Committee."

As part of their role as the Examining Committee, the Dissertation Committee is responsible for deciding when the dissertation is ready for defense. This decision is based on a detailed evaluation of the student's research progress-- including all tables, figures and data analyses--and on a closed-door seminar presented by the student. The Dissertation Committee will determine if additional research or training is required, or whether the student is ready to defend her/his dissertation. Students may schedule their formal, Public Dissertation only after receiving written approval from the Dissertation Committee and the Program Director of Graduate Education.

The Dissertation is a scholarly document that consists of an Introduction, several chapters presenting research results and a Discussion. The Introduction includes a thorough review of the literature and a general justification for the current research. Students are strongly encouraged to publish their data in peer reviewed journals prior to the final preparation of the dissertation. Published manuscripts can serve as the framework for data chapters when appropriate. Each chapter should include an introduction and justification for that particular experiment, unique methods, results and a discussion. A comprehensive discussion should review the findings presented in the chapters, integrate them with each other and place them in the larger context of the existing literature. Questions left unanswered or identified for future exploration should be elucidated. Methods that are
common to many or all experiments can be collated into one chapter entitled **General Methods**. References should be made to the primary literature (not reviews or books); references should be numbered, and can appear at the end of each chapter, or as a single list at the end of the Dissertation.

In accordance with Graduate School guidelines, the Dissertation Committee must receive the final doctoral dissertation at least two weeks before the Public Dissertation Defense. In accordance with Graduate School guidelines, at least ten working days before the Public Dissertation Defense, students must file a form entitled "Certification of Completion of the Doctoral Dissertation" in company with the "Announcement of Doctoral Dissertation Defense."

The Public Dissertation Defense before the Graduate Faculty is a one-hour seminar open to the public that summarizes the dissertation research. Following the defense, the Examining Committee meets in private for further discussion with the student and to deliberate and vote on whether the student has successfully completed the requirements for a dissertation defense. The normal rules established by the Graduate School of UMB governing grading of the dissertation defense apply. A successful defense merits the awarding of the Ph.D.

The candidate may take the final oral defense only twice. A failure on the second attempt means the Ph.D. degree is forfeited. Specific rules on the procedures for the final defense are detailed in the document “Procedures for Examination of the Doctoral Dissertation” available online and as an appendix here.

Students and mentors are encouraged to consult the Graduate School's detailed instructions for dissertation preparations and defense. (See attached)
Other Important Information

A. Student’s Attendance
Program in Neuroscience students are full-time graduate assistants. Every student is entitled to a two-week vacation per year, to be arranged with and approved by the chairperson of the student’s advisory or thesis committee. Students in the Program in Neuroscience are responsible for being familiar with the pertinent rules and regulations stipulated by the University of Maryland Graduate School and this document.

The Program in Neuroscience mandates a number of activities deemed critical to the professional development of our students, including, but not limited to, participation in journal clubs, seminars, and professional development courses. Students are expected to attend all activities designated by the Training Committee as mandatory. Students who are unable to attend a particular activity are required to receive prior approval from the PIN Director of Graduate Education. **Failure to attend three mandatory activities in a given semester will be considered as a failure to meet academic standards, and will result in a recommendation to the Graduate School to place the student on academic probation. Students who do not satisfy the probationary terms dictated by the Graduate School may be dismissed from the Program.**

B. Graduate Student Association (GSA)
You are encouraged to participate in several programs for incoming graduate students and current graduate students offered by the GSA. For more information regarding the GSA and the names of the Program in Neuroscience representatives, please consult the GSA web site [http://www.graduate.umaryland.edu/gsa/index.html](http://www.graduate.umaryland.edu/gsa/index.html).

The GSA also offers special services for graduate students, including grants for lab supplies, travel fellowships, and use of laptop computers. If you are interested in becoming an active member or representative in the GSA, please contact the Program Manager for more information.
Appendix
Appendix 1

Typical study course for PIN PhD Students (2016)

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core Course: Mechanisms in Biomedical Science (8)</td>
<td>Systems and Cognitive Neuroscience (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Molecular Neuroscience and Biophysics (1)</td>
<td>Synaptic Physiology and Pharmacology (3)</td>
<td>Lab Rotation (1)</td>
</tr>
<tr>
<td>Summer</td>
<td>2nd Lab Rotation (1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fundamentals of Biostatistics (2)</td>
<td>Qualifying Exam</td>
</tr>
<tr>
<td></td>
<td>Elective (2-4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Lab Rotation (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research Ethics</td>
</tr>
</tbody>
</table>
Appendix 2
Program in Neuroscience
Laboratory Rotation Proposal Form

Please print and complete this form, have it signed by the proposed mentor and by your Advisory Committee, and forward it to Renee Cockerham.

Student's name: _________________________
Lab-Head name: ________________________

Mentor's name and position (if different than above): ____________________________

Rotation dates: ___________________________

Please provide a hypothesis for your project:
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

Please provide a summary of the overarching research that encompasses your project:
___________________________________________________________________________
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___________________________________________________________________________

The goals of this rotation are:
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
Signatures:

Student: ______________________ Date: ______________

Mentor: ______________________ Date: ______________

Chair, Advisory Committee: ______________________ Date: ______________
Program in Neuroscience
Student's Laboratory Rotation Evaluation Form

NOTE: THE INFORMATION PROVIDED ON THIS FORM WILL BE REVIEWED ONLY BY MEMBERS OF THE TRAINING COMMITTEE, AND WILL REMAIN CONFIDENTIAL!

Please print and complete this form, and forward it to Renee Cockerham as soon as the rotation is over. Your will not receive credits for the rotation without this form!

Student's name: _________________________
Lab-Head name: _________________________
Mentor's name and position (if different than above): _________________________
Rotation dates: _________________________

The goals of the rotation were:
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

Which of these goals were accomplished?
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

I gained experience with the following techniques:
________________________________________________________________________
________________________________________________________________________

Did you receive adequate training and guidance? Please explain:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Rate your overall experience in this laboratory, using the following scale: 1 (very positive) to 5 (poor): ________
Would you recommend this laboratory to other students? Please explain:

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

Use the space below for additional comments or suggestions (use additional pages if necessary):
Rotation Presentation Evaluation Sheet

Presenter’s Name:

Was the question asked (hypothesis) explained clearly?
Comments:

Was sufficient background provided to explain why this question is interesting?
Comments:

Did you understand the methods used?
Comments:

Were the data explained clearly?
Comments:

Was the talk effective?
--showed enthusiasm and maintained audience contact
--avoided jargon & abbreviations
--slides titled with take away message
--interacted well with slides, pointing to and explaining each element
--spoke slowly, clearly, and loudly enough
Comments:

Slides
--avoided long lists and paragraphs
--avoided tables
--avoided complicated figures
--figures were clearly labelled
--avoided too many slides
Comments:

Were the questions answered clearly and briefly?
Comments:

Overall Comments:
Program in Neuroscience

Mentor's Laboratory Rotation Evaluation Form

Please print and complete this form, and forward it to Renee Cockerham as soon as the rotation is over. Your student cannot receive credits for the rotation in your laboratory without this form. **Please remember to include written comments on the next page!**

**Student's name:** _______________________

**Mentor's name:** _______________________

**Rotation dates:** _______________________

Rate the student relative to other individuals of similar training and experience with whom you have been associated. Please use the following scale:

1 (top 5th percentile), 2 (10th percentile), 3 (20th percentile), 4 (30th percentile), 5 (40th percentile)

<table>
<thead>
<tr>
<th>Research Ability and Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written and Verbal</td>
</tr>
<tr>
<td>Communication</td>
</tr>
<tr>
<td>Perseverance in Pursuing Goals</td>
</tr>
<tr>
<td>Self-reliance and Independence</td>
</tr>
<tr>
<td>Laboratory Skills and Techniques</td>
</tr>
<tr>
<td>Originality</td>
</tr>
<tr>
<td>Accuracy</td>
</tr>
<tr>
<td>Scientific Background</td>
</tr>
<tr>
<td>Familiarity with Research Literature</td>
</tr>
</tbody>
</table>

**Overall Evaluation**

Final Grade Awarded: (Pass or Fail) ___________

Would you consider recruiting this student to your laboratory? ________________

Use the space below for additional comments, including strengths and weaknesses that should be considered in evaluating a student’s research career (use additional pages if necessary):

---

Mentor's signature:
Please print and complete this form, have it signed by the head of your Advisory Committee, and forward it to Renee Cockerham. All students must meet with their Advisory Committees in the Fall and Spring semesters (by November 1st and April 1st respectively) This form is needed to register for the upcoming semester.

Student Name: ___________________________ Meeting Date: ______________

Note: Comments should address student’s progress regarding goals and accomplishments and provide specific directives with benchmarks the student is expected to meet by the next meeting. Whenever possible, a timeline should be included. Please use the back of the form if more room is needed.

Comments: ____________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Courses proposed for next semester:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Rotations Completed or Planned: ___________ Semester/Year ___________ Faculty Name ___________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Mentor/Thesis Advisory Chosen: __________________________________________

Signatures:

Student: ___________________________ Date: ______________

Chair, Advisory Committee: ___________________________ Date: ______________

Chair, Training Committee: ___________________________ Date: ______________
Application for Admission to PhD Candidacy

- Read the requirements for the Doctor of Philosophy degree in the Graduate School catalog
- Familiarize yourself with the specific PhD requirements established by your program
- Complete this application
- Obtain approval signatures from your primary adviser and graduate program director
- Attach your unofficial transcript printed from SURFS to this application; cross out courses that will not count toward this PhD degree
- Submit this application and transcript to: Graduate School Dean’s Office, 620 W. Lexington St., fifth floor

<table>
<thead>
<tr>
<th>Last Name:</th>
<th>Title</th>
<th>First Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ms.</td>
</tr>
<tr>
<td>Student ID Number:</td>
<td>E-mail address:</td>
<td></td>
</tr>
<tr>
<td>@</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Mailing Address: |
| Street |

<table>
<thead>
<tr>
<th>City</th>
<th>State</th>
<th>ZIP</th>
</tr>
</thead>
</table>

| Graduate Program: |

| Date admitted to Graduate Program: |

| Number of credits earned toward this PhD Degree (not including 899): |

| List course(s) in which a incomplete (I) or no mark (NM) was earned: |

| List course(s) earned at other institutions which will count towards this PhD degree (grade earned must be ≥B, attach official transcript): |

**APPROVAL SIGNATURES**

Please type and sign

<table>
<thead>
<tr>
<th>Adviser:</th>
<th>Signature:</th>
<th>Graduate Faculty Status:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Regular, Associate, Special</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graduate Program Director:</th>
<th>Signature:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Graduate School Associate Dean:</th>
<th>Signature:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dr. Erin Golembewski</th>
<th>Submit application to Graduate School Dean’s Office for</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date:</th>
</tr>
</thead>
</table>


Please print and complete this form, have it signed by your mentor and forward it to Renee Cockerham. All students must meet with their Thesis Committees in the Fall and Spring semesters (by November 1st and April 1st respectively) This form is needed to register for the upcoming semester.

Student Name:_______________________________ Meeting Date:________________

Note: Comments should address student’s progress regarding goals and accomplishments and provide specific directives with benchmarks the student is expected to meet by the next meeting. Whenever possible, a timeline should be included. Please use the back of the form if more room is needed.

Project Title:____________________________________________________________
Mentor:________________________________________________________________

Comments:______________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Committee Members:  
Chair/Mentor: __________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Outside member __________________________________________________________

Thesis Proposal Scheduled: Yes/No  If yes, tentative date___________________
Thesis Defense Scheduled: Yes/No  If yes, tentative date___________________

Signatures:
Student: _______________________________ Date: ______________________
Mentor: _______________________________ Date: ______________________
Graduate Program Director: ___________________________ Date: ________________
Program in Neuroscience
Thesis Proposal

Proposal Date: __________________________

Student Name: _________________________

Title of Research Proposal:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Thesis Committee Members
Name Signature 1. ____________________________________________________________

Committee Chair
2. __________________________________________

3. __________________________________________

4. __________________________________________

5. __________________________________________

6. __________________________________________

7. __________________________________________

Recommendations:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

(Provide additional pages as required)

Graduate Program Director Signature: __________________________________________

Please print and complete this form, have it signed by your mentor and committee and forward it to Renee Cockerham
Nomination of Members for Final Doctoral Examination Committee

1. File this form with the Graduate School at least six months before your final examination.
2. The chair and at least two committee members must be **Graduate Faculty Regular Members.
3. The committee must have between five and seven members, all of whom must hold a doctoral degree.
4. At least one committee member must be from outside the candidate's program.
5. Designate the chair and two other members as "readers". Two weeks before the final examination, the readers must certify that the doctoral dissertation is complete and ready to be defended by filing the Certification of Completion of the Doctoral Dissertation Form with the Graduate School.
6. For proposed examiners who are not members of the **Graduate Faculty, provide a curriculum vitae.
7. Submit this form to Dr. Golembewski, Associate Dean, Graduate School, 620 W. Lexington St., fifth floor

E-mail address:

Student Last Name: Student First Name: Student ID Number: 

Dissertation Committee

<table>
<thead>
<tr>
<th>Committee Chair (1):</th>
<th>Reader</th>
<th>Department:</th>
<th>**Graduate Faculty Status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Associate</td>
<td>Yes No</td>
<td>Special</td>
<td>None (CV attached)</td>
</tr>
<tr>
<td>Committee Member (2):</td>
<td>Reader</td>
<td>Department:</td>
<td>**Graduate Faculty Status:</td>
</tr>
<tr>
<td>Regular Associate</td>
<td>Yes No</td>
<td>Special</td>
<td>None (CV attached)</td>
</tr>
<tr>
<td>Committee Member (3):</td>
<td>Reader</td>
<td>Department:</td>
<td>**Graduate Faculty Status:</td>
</tr>
<tr>
<td>Regular Associate</td>
<td>Yes No</td>
<td>Special</td>
<td>None (CV attached)</td>
</tr>
<tr>
<td>Committee Member (4):</td>
<td>Reader</td>
<td>Department:</td>
<td>**Graduate Faculty Status:</td>
</tr>
<tr>
<td>Regular Associate</td>
<td>Yes No</td>
<td>Special</td>
<td>None (CV attached)</td>
</tr>
<tr>
<td>Committee Member (5):</td>
<td>Reader</td>
<td>Department:</td>
<td>**Graduate Faculty Status:</td>
</tr>
<tr>
<td>Regular Associate</td>
<td>Yes No</td>
<td>Special</td>
<td>None (CV attached)</td>
</tr>
<tr>
<td>Committee Member (6):</td>
<td>Reader</td>
<td>Department:</td>
<td>**Graduate Faculty Status:</td>
</tr>
<tr>
<td>Regular Associate</td>
<td>Yes No</td>
<td>Special</td>
<td>None (CV attached)</td>
</tr>
</tbody>
</table>

Approval Signatures

<table>
<thead>
<tr>
<th>Committee Chair:</th>
<th>Signature:</th>
<th>Date:</th>
</tr>
</thead>
</table>

Graduate Program Director: Signature: Date: 

Graduate School Associate Dean: Submit application to Graduate School Dean's Office for signature: Date: 

Dr. Erin Golembewski

Dean’s Representative

Graduate School assigned Dean’s Representative:
University of Maryland Graduate School, Baltimore

Certification of Completion of the Doctoral Dissertation

*The Announcement of Doctoral Dissertation Must Accompany this Form

University of Maryland

Baltimore

Date:

To: Associate Dean of the Graduate School

From: (dissertation committee chair) (program)

The undersigned members of the student's dissertation committee hereby certify that the dissertation written by:

Student's Name: (last) (first)

Student ID Number: @

entitled:

is ready for defense.

Signatures:
Dissertation Committee Chair: (date)

Dissertation Reader 1: (date)

Dissertation Reader 2: (date)

Graduate Program Director: (date)

Date of Final Examination*: (month) (day) (year)

*The examination committee must have sufficient time to review the thesis and return the form to the Graduate School at least two weeks (10 working days) before the examination.

Updated: May 2006
Announcement of Doctoral Dissertation Defense: 
http://www.graduate.umaryland.edu/Current-Students/Announcement-of-Defense-/
Summary of Requirements for Neuroscience Ph.D. Students

Year 1 Fall

- Meet with Advisory Committee at least twice per year, until Dissertation Committee is formed
- Complete Core Course (GPLS 601) with a grade of B or better (not MD/PhD students)
- Complete Molecular Neuroscience (GPLS 691) with a grade of B- or better
- Attend Program in Neuroscience Professor’s Rounds in the 1st Year (not MD/PhD students)

Year 1 Spring

- Complete Systems and Cognitive Neuroscience (GPLS 641) (not MD/PhD students) with a grade of B- or better
- Complete Synaptic Physiology (GPLS 620) with a grade of B- or better
- Complete Ethics course (not for credit and lasts one year)
- Complete three Laboratory Rotations (GPLS 609)
- Complete one Rotation Presentation (not MD/PhD students)
- Find a mentor in whose laboratory you can do your thesis research and who can fund you by 14 months after you begin the program.
- Strongly encouraged to submit an NRSA or a grant to a private foundation.
- Strongly encouraged to take an elective

Year 2 Fall

- Complete elective courses, as per Advisory Committee recommendations
- Complete Proseminar (GPLS 737) with a grade of B- or better
- Complete Biostatistics (GPLS 621) with a grade of B- or better
- Complete 1 credit of Journal Club Course (GPLS 629)
- Choose mentor and notify the Neuroscience Director of Graduate Education
- Pass Qualifying Examination
- After passing exam, apply to Graduate School for Admission to Candidacy (See Appendix 4). This must be within 3 years of admission to doctoral program and at least 2 full sequential semesters before expected graduation date. No more than 4 years must fall between Admission to Candidacy and graduation date.

Years 3-5

- Begin dissertation research;
- Form Dissertation Committee and hold initial meeting within 3 months after Admission to Candidacy; meet at least twice each year with committee
- Complete 1 credit of Journal Club Course (GPLS 629)
- Submit written Thesis Proposal to mentor and dissertation committee
- Register for Seminar in Neuroscience (GPLS 608) and present thesis proposal as a program seminar. Meet with your committee either one month before or one month after the proposal. It is recommended to meet with your committee immediately after your proposal.
- Complete at least 12 credits of Doctoral Thesis Research (GPLS 899)
• Submit Nomination of Members for the Final Doctoral Examination Committee form to Graduate School at least 6 months prior to dissertation defense.
• Register for Seminar in Neuroscience (GPLS 608) for semester in which thesis defense is anticipated.
• Submit Application for Diploma to Graduate School within the first 3 weeks of the semester in which degree is expected.
• Complete research, prepare dissertation, and submit to Committee at least 2 weeks prior to final meeting with Dissertation Committee. Consult the Graduate School’s instructions for preparing doctoral dissertations.
• Meet with Dissertation Committee for final oral exam and certification of completion of doctoral dissertation. Public defense of thesis then scheduled.
• Submit Certification of Completion of Doctoral Dissertation and Announcement of Ph.D. Dissertation Defense to Graduate School 2 weeks prior to public defense.
• Present public defense.
Training Committee Members

Members

Jessica Mong, Ph.D. (Director of Graduate Education, Program in Neuroscience, Pharmacology & Experimental Therapeutics)
Thomas W. Abrams, Ph.D. (Pharmacology & Experimental Therapeutics)
Joseph Cheer, Ph.D. (Anatomy and Neurobiology)
Renee Cockerham, Ph.D. (Neuroscience, Staff)
Greg Elmer, Ph.D. (Psychiatry, MPRC)
Reha Erzumruli, Ph.D. (Anatomy and Neurobiology)
Bruce Krueger, Ph.D. (Physiology)
Marta Lipinski, Ph.D. (Anesthesiology)
Mary Kay Lobo, Ph.D. (Anatomy and Neurobiology)
Frank L. Margolis, Ph.D. (Anatomy & Neurobiology)
Brian Mathur, Ph.D. (Pharmacology and Experimental Therapeutics)
Sarah Ransom Metzbower (Neuroscience, Student Representative)
Paul Shepard, Ph.D. (Psychiatry, MPRC)
David Seminowicz, Ph.D. (Neural and Pain Sciences, Dental School)
Matthew Trudeau, Ph.D. (Physiology)

Ex-officio

Michael T. Shipley, Ph.D. (Director of Graduate Education, Program in Neuroscience & Chair, Anatomy & Neurobiology)
Joel Greenspan, Ph.D. (Director of Graduate Education, DDS/Ph.D. Program, Biomedical Sciences, Dental School)
Terry B. Rogers, Ph.D. (Director of Graduate Education, M.D./Ph.D. Program, Biochemistry & Molecular Biology)