

# NEUROSCIENCES, PHD

**Degree:** Doctor of Philosophy (PhD)

**Field of Study:** Neurosciences

## Program Overview

The Neurosciences graduate program has a strong emphasis on cellular and molecular mechanisms that mediate the function and development of the nervous system. Admission to the Neurosciences PhD program may be obtained through the integrated Biomedical Sciences Training Program or via the Medical Scientist Training Program. To earn a PhD in Neurosciences, a student must complete rotations in at least three laboratories, followed by selection of a research advisor, and complete Core and Elective coursework including responsible conduct of research as described in the plan of study, below. In general, students must be registered for a total of 9 credit hours each fall and spring semester until they advance to candidacy, at the end of their 2<sup>nd</sup> year. Students who previously completed relevant coursework, for example, with a Master of Science, may petition to complete alternative courses. Each graduate program follows the overall regulations established and described by the School of Graduate Studies.

## Admissions

Students are admitted to this PhD program through the Biomedical Sciences Training Program (BSTP) or the Medical Scientist Training Program (MSTP).

### Biomedical Sciences Training Program (BSTP)

The BSTP offers a common entry point to most of the School of Medicine's biomedical PhD programs. BSTP students can choose among research mentors in many different PhD programs in the School of Medicine.

### Medical Scientist Training Program (MSTP)

Students in the MSTP earn the dual MD/PhD degree. MSTP students also have the choice of mentors in many different PhD programs. The admission requirements of those programs can be viewed on their pages in the Bulletin. Program requirements for the dual can be found on the Medical Scientist Training Program, PhD/Medicine, MD program page.

## PhD Policies

For PhD policies and procedures, please review the School of Graduate Studies section of the General Bulletin.

## Program Requirements

Each student must successfully complete a qualifying exam for advancement to candidacy. This exam is split into two parts: Part 1 is taken in the spring of the student's first year during enrollment in NEUR 402. This section of the exam is a comprehensive component that will take the form of a 45-minute oral exam based on material from NEUR 402 and is administered by its Course Directors. Part 2 is taken in the spring semester of the 2nd year and serves as the completion of the exam. Part 2 is in the form of a short grant proposal with an oral defense. Once successfully completed, a student advances to candidacy during which time they work on their dissertation. During the dissertation period, students are expected to meet every 6 months with their thesis

committee, present seminars in the department, and fulfill journal publication requirements. Throughout the doctoral training, students are expected to be enthusiastic participants in seminars, journal clubs, works-in-progress presentations, and research meetings in the lab and program. Completion of the PhD degree will require 36 credit hours of coursework (24 credit hours of which are graded); for students who entered the program with an approved master's degree, 18 credit hours of coursework (12 credit hours of which are graded) are required. In addition, all students must complete 18 credit hours of NEUR 701.

## Coursework

Students take integrated courses in Cell and Molecular Biology (IBMS 453, IBMS 455). They also complete a course in biostatistics (IBMS 450) and a literature based reading course (IBMS 456A). These four courses, offered in the fall semester, emphasize the molecular approaches that form the basis of modern biology. We also seek students with strong quantitative training who may have majored in physics or math, and offer alternative courses for these students to acquire foundations in biology. Qualified students also may take more specialized elective courses. All students take IBMS 500 On Being a Professional Scientist: The Responsible Conduct of Research.

## Research Rotations

The research rotations allow students to explore research areas and become familiar with faculty members and their laboratories. The main purpose of these rotations is to aid students in selecting a laboratory for their thesis work. Students are encouraged to begin their rotations in July. Doing so gives them the opportunity to complete rotations during the summer before classes begin at the end of August. Students must complete at least three rotations.

## Choosing a Thesis Advisor

During the first year, students select an advisor for their dissertation research. Each student also joins the PhD program with which their advisor is affiliated. Once students choose a PhD program, the requirements of that program are followed to obtain the PhD. The emphasis of the PhD work is on research, culminating in the completion of an original, independent research thesis and publishing the results in the scientific literature. PhD programs also focus on educating students to work as professional scientists.

## Sample Plan of Study

First Year		Credit Hours
Fall		
IBMS 453	Cell Biology I	3
Choose one of the following:		1
NEUR 601	Research in Neuroscience	
BSTP 400	Research Rotation in Biomedical Sciences Training Program	
MSTP 400	Research Rotation in Medical Scientist Training Program	
IBMS 455	Molecular Biology I	3
IBMS 457	Basics of AI and Data Science in BioMedicine	2
<b>Credit Hours</b>		<b>9</b>
<b>Spring</b>		
Elective Graduate Course		3
NEUR 415	Neuroscience Seminars	1

NEUR 601	Research in Neuroscience	1
NEUR 402	Principles of Neural Science	3
IBMS 500	On Being a Professional Scientist: The Responsible Conduct of Research	1
Complete Part 1 of the Qualifying Exam at the conclusion of NEUR 402		
Begin Thesis Research		
<b>Credit Hours</b>		<b>9</b>
<b>Second Year</b>		
<b>Fall</b>		
PHRM 526	Grant Writing Tutorial	2
Elective Courses		6
NEUR 601	Research in Neuroscience	1
<b>Credit Hours</b>		<b>9</b>
<b>Spring</b>		
NEUR 419	Critical Thinking in Neuroscience	3
Elective Courses		3
NEUR 601	Research in Neuroscience	3
Complete Part 2 of the Qualifying Exam		
Form Thesis Committee		
Research		
Prepare Individual Fellowship Application		
<b>Credit Hours</b>		<b>9</b>
<b>Third Year</b>		
<b>Fall</b>		
NEUR 701	Dissertation Ph.D.	1 - 9
Thesis Committee Meetings every 6 months		
<b>Credit Hours</b>		<b>9</b>
<b>Spring</b>		
NEUR 701	Dissertation Ph.D.	1 - 9
Thesis Committee Meetings every 6 months		
<b>Credit Hours</b>		<b>9</b>
<b>Fourth Year</b>		
<b>Fall</b>		
NEUR 701	Dissertation Ph.D.	1 - 9
Thesis Committee Meetings every 6 months		
<b>Credit Hours</b>		<b>9</b>
<b>Spring</b>		
NEUR 701	Dissertation Ph.D.	1 - 9
Thesis Committee Meetings every 6 months		
<b>Credit Hours</b>		<b>9</b>
<b>Fifth Year</b>		
<b>Fall</b>		
NEUR 701	Dissertation Ph.D.	1 - 9
Thesis Committee Meetings every 6 months		
<b>Credit Hours</b>		<b>9</b>
<b>Spring</b>		
NEUR 701	Dissertation Ph.D.	1 - 9
IBMS 501	Responsible Conduct of Research for Advanced Trainees <sup>a</sup>	0

Thesis Committee Meetings every 6 months	
<b>Credit Hours</b>	<b>9</b>
<b>Total Credit Hours</b>	<b>90</b>

a IBMS 501 Responsible Conduct of Research for Advanced Trainees is offered every spring semester (beginning 2020). The SOM requires that PhD students who are 4 years beyond their initial RCR training in IBMS 500 On Being a Professional Scientist: The Responsible Conduct of Research, register for IBMS 501.