

NEUROSCIENCE (SCIENCE)

Graduate Program Head	Sonia Cavigelli
Program Code	NERV
Campus(es)	University Park (Ph.D., M.S.)
Degrees Conferred	Doctor of Philosophy (Ph.D.) Master of Science (M.S.)
The Graduate Faculty	View (https://secure.gradsch.psu.edu/gpms/?searchType=fac&prog=NERV)

The Neuroscience (NERV) Graduate Program at University Park is an Intercollege Graduate Degree Program affiliated with the Huck Institutes of the Life Sciences, the Eberly College of Science, and the College of Engineering. The program provides pedagogical and research training in the field of neuroscience which is inherently interdisciplinary and spans from molecules to organisms and utilizes both animal and human models. Students receive training in research and communications skills to enable them to succeed in careers in biomedical research and other professional fields related to the discipline. The Neuroscience Graduate Program engages faculty from the Colleges of Agriculture, Engineering, Health and Human Development, Information Sciences and Technology, Liberal Arts, and Science. Students gain a broad understanding of Neuroscience as well as specific expertise in their focused area of research..

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (<https://gradschool.psu.edu/graduate-admissions/how-to-apply/>). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions Policies (<https://gradschool.psu.edu/graduate-education-policies/>).

Students are not accepted directly into the Neuroscience program as Master's degree candidates.

Prospective applicants should have a bachelor's degree in a biological, physical, or behavioral science and are expected to have taken undergraduate courses in biology, chemistry, physics, and mathematics. Applicants are expected to have a 3.0 (B) grade point average or better. Neuroscience courses are desirable but not essential and research experience is an advantage.

A complete application includes:

- completed online Graduate School application (<https://gradschool.psu.edu/graduate-admissions/how-to-apply/>) with personal statement of purpose for pursuing the degree;
- official transcripts from all post-secondary institutions attended (<https://gradschool.psu.edu/index.cfm/graduate-admissions/how-to-apply/new-applicants/requirements-for-graduate-admission/>)
- three letters of recommendation; and
- TOEFL/IELTS scores (if applicable).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students/>) for more information.

The application deadline is December 15 for admission in the following fall.

Qualified applicants generally will be offered a visit the UP campus for an interview. Admission is based on evaluation of the undergraduate transcript, personal statement of purpose, letters of recommendation, and performance at the interview. International students will typically be interviewed virtually.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

Students are not accepted directly into the Neuroscience program as Master's degree candidates. However, for various reasons, a student may need to discontinue their PhD program. Depending on the circumstances, the advisor and Thesis Committee may allow the student to finish the program by earning a Master's degree. During the first year, students complete three research rotations that expose them to the wide range of research interests of The Pennsylvania State University Graduate Faculty at the University Park Campus. These rotations serve to inform the students with regard to choosing an adviser and forming a committee. In addition, students are advised to take ethics, statistics and electives.

A minimum of 30 credits at the 400, 500, 600, or 800 level is required for the M.S., with least 18 credits at the 500 and 600 level, combined. A thesis is required, and a minimum of six (6) thesis research credits (NEURO 600 or NEURO 610) must be taken in Neuroscience. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Code	Title	Credits
Required courses		
NEURO 501	Neuroscience Seminar	4
NEURO 512	Comparative Neuroanatomy	4
NEURO 520	Cellular and Molecular Neuroscience	3
NEURO 521	Systems Neuroscience	3
NEURO 596	Individual Studies	3
MCIBS 591	Ethics, Rigor, Reproducibility and Conduct of Research in the Life Sciences	2
Electives		
The remaining elective credits may be chosen from a list of approved electives maintained by the program office.		5
Culminating Experience		
NEURO 600	Thesis Research	6
	or NEURO 610 Thesis Research Off Campus	
Total Credits		30

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

A minimum of 35 credits is required for the Ph.D. degree:

Code	Title	Credits
Required courses		
NEURO 501	Neuroscience Seminar	8
NEURO 512	Comparative Neuroanatomy	4
NEURO 520	Cellular and Molecular Neuroscience	3
NEURO 521	Systems Neuroscience	3
NEURO 596	Individual Studies	3
MCIBS 591	Ethics, Rigor, Reproducibility and Conduct of Research in the Life Sciences	2
Electives		
The remaining elective credits may be chosen from a list of approved electives maintained by the program office.		6
Culminating Experience		
NEURO 600	Thesis Research	6
	or NEURO 610 Thesis Research Off Campus	
Total Credits		35

In addition, Ph.D. students are required to complete 1 credit of NEURO 602; however, this 1 credit cannot be counted towards the minimum 35 credits required.

A student's Ph.D. committee can require additional course work depending on the student's background and research plans.

Ph.D. degree requirements include successful completion of the following:

- approved graduate course work,
- English Competence requirements,
- A qualifying examination, which entails oral and written components
- a comprehensive examination, and
- a final oral examination (the dissertation defense).

To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.

Minor

A graduate minor is available in any approved graduate major or dual-title program. The default requirements for a graduate minor are stated in Graduate Council policies listed under GCAC-600 Research Degree Policies (<https://gradschool.psu.edu/graduate-education-policies/>) and GCAC-700 Professional Degree Policies (<https://gradschool.psu.edu/graduate-education-policies/>), depending on the type of degree the student is pursuing:

- GCAC-611 Minor - Research Doctorate (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-611-minor-research-doctorate/>)
- GCAC-641 Minor - Research Master's (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-641-minor-research-masters/>)
- GCAC-709 Minor - Professional Doctorate (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-709-professional-doctoral-minor/>)
- GCAC-741 Minor - Professional Master's (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-741-masters-minor-professional/>)

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (<https://gradschool.psu.edu/graduate-funding/>) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (<https://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-901-graduate-assistants/>) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Students graduating from this program will be able to:

1. Explain the structure and function of the nervous system at the molecular, cellular, and systems levels with respect to:
 - a. Their role in generating behavior, cognition, and emotion.
 - b. The processes associated with neurodevelopment, homeostasis, and aging.
 - c. The development and expression of neurological and mental health diseases.
2. Describe the mechanisms by which neurons and other cells in the nervous system communicate via chemical and electrical signals.
3. Explain the experimental approaches that can be used to interrogate the anatomy, physiology, and function of the nervous system and how these can lead to dysfunction and disease.
4. Demonstrate the ability to develop and test hypotheses regarding the structure, function, and diseases of the nervous system.
5. Develop a rigorous experimental approach to test hypotheses about the function, anatomy, and physiology of the nervous system.
6. Conduct neuroscience research in which experiments are performed in a rigorous and ethical manner consistent with professional standards.
7. Develop the ability to communicate research results in a clear and comprehensive manner in both oral and written formats.

Contact

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