

INTERDISCIPLINARY STUDIES: SPECIALIZATION IN TRANSLATIONAL NEUROSCIENCE (PHD)

Doctor of Philosophy in Interdisciplinary Studies, specialization in Translational Neuroscience

Unit: Graduate School (<http://louisville.edu/graduate/>) (GI)

Program Webpage (<https://louisville.edu/translational-neuroscience/>)

Academic Plan Code(s): IS_PHDSTN

Program Information

The Interdisciplinary Program in Translational Neuroscience is a PhD program designed to provide broad training in neuroscience to prepare students for careers in academic, clinical and translational research involving the nervous system including disease, trauma, and developmental disorders.

Students will be assigned advisors initially to help them with course selection, choosing laboratories to rotate in and finding research mentors. Committee members will be assembled from the participating professors/lecturers representing a broad range of both basic and clinical Neuroscience. Individualized curricula will emphasize basic genetic, molecular, cellular, and/or systems mechanisms that underlie a wide range of neurological and neuropsychiatric diseases and disorders.

Students who successfully complete the program will gain a strong academic background in the neurosciences and intellectual mastery of relevant scientific literature with a major emphasis either in the system/cognitive or cellular/molecular areas. They will gain a good understanding of the ethical issues involved in conducting translational research and receive outstanding training in how to conduct basic science research and/or clinical research with patients.

Areas of focus include:

- Spinal cord injury, motor systems, and rehabilitation
- Vision, retina, and visual pathways
- Sensory systems, autonomic nervous system, and pain
- Developmental neurobiology
- Behavioral & cognitive neuroscience
- Neuropharmacology and neurochemistry

Admission Requirements

- a. Complete graduate application (<http://louisville.edu/graduate/futurestudents/apply-materials/application/>) to the Graduate School (apply by December 15)
- b. 3.25 grade point average
- c. Three letters of recommendation from individuals who are able to comment on the student's academic abilities and potential for success in graduate studies
- d. Proof of a Baccalaureate Degree and official transcripts of all undergraduate and graduate course work
- e. International students for whom English is not their primary language must show English language proficiency by one of the following:

- i. TOEFL examination score of 213 (computer-based test), or 79 (internet-based test/iBT)
- ii. IELTS test score of 6.5 or higher
- iii. Duolingo score of 105
- iv. Demonstration of a degree award from an acceptable English language institution.

Program Requirements

To earn the Doctor of Philosophy in Interdisciplinary Studies: Specialization in Translational Neuroscience, a student is required to successfully complete the following:

- Core Courses
- Other required and elective courses as approved
- Qualifying examination
- Laboratory Rotations
- Original Investigation
- Dissertation and defense

Coursework

Code	Title	Hours
Core Courses		
ASNB 602	Fundamentals of Neuroscience	4
NSCI 600	Translational Neurosciences	3
BIOC 630	Responsible Conduct of Research: Survival Skills and Research Ethics	1
BIOL 650	Advanced Biostatistics	4
ASNB 606	Anatomy Seminar	1
Recommended and Elective Courses		17
<i>Recommended Courses</i>		
ASNB 605	Human Embryology	
ASNB 617	Seminar on Developmental Neurobiology	
ASNB 614	Molecular Neuroscience	
ASNB 666	Synaptic Organization of the Central Nervous System	
<i>Electives</i>		
PSYC 643	Principles of Neuroscience	
BIOL 611	Advanced Behavioral Endocrinology	
PSYC 642	Behavioral Neuroscience	
ASNB 601	Gross Anatomy	
ASNB 605	Human Embryology	
MBIO 602	Immunology	
BIOC 547	Advanced Biochemistry II or CHEM 547 Biochemistry II	
PHYS 605	Theoretical Mechanics	
Laboratory Rotations (at least two recommended, see below)		6
GS 699	Interdisciplinary Research	
Research		
GS 799	Doctoral Exam Prep (see below)	
Dissertation/Defense		
Minimum Total Hours		36

Laboratory Rotations

It is recommended that each student will complete two rotations in different laboratories prior to the start of his/her third semester. The rotations will expose the student to different approaches and areas of research and will help the student to choose a laboratory for his/her dissertation research. Rotations will count as a three (3) credit hour course (GS 699 Interdisciplinary Research). Rotations are graded on a pass/fail basis and a brief written rotation reports will be expected from each host investigator indicating a pass or fail grade.

Mentor and Advisory Committee

Once a student selects a mentor, he or she will form an Advisory Committee consisting of the mentor plus four additional members of the program faculty. The faculty members composing the Advisory Committee will represent a minimum of three different participating departments and include at least one faculty member with primary clinical expertise relevant to the student's research area. The Advisory Committee may be reformulated with the permission of the Executive Committee as the student progresses towards completion of the degree.

Research Hours

Upon completion of the mandatory course work, laboratory rotations and mentor selection, research hours are taken as Original Investigation (GS 699 Interdisciplinary Research) until and after the student enters candidacy by successfully completing his/her Research Proposal and Qualifying exam.

Research Proposal and Qualifying Examination

Upon completion of course work, each student is required to prepare a Research Proposal that will be presented and defended before the end of the fall semester of year three. The Research Proposal will consist of an NIH F31 format grant proposal that describes the student's planned research.

Preparation and defense of the proposal will consist of the following steps:

- a. Develop a specific aims page and outline of the proposed experiments and present this aims page to the Advisory Committee for approval.
- b. Based on the approved specific aims page and outline, prepare a Research Proposal in the F31 format.
- c. Distribute the Research Proposal to the Advisory Committee at least two weeks before the presentation and defense.
- d. Present the proposal in a 30-40 minute seminar, plus a question and answer period, attended by all the members of the Advisory Committee and other faculty/trainees from representative departments.
- e. Appropriately answer any questions from the committee members regarding the proposal and defense.
- f. Appropriately answer one written question from each committee member presented to the student during the question/answer period of the proposal presentation. These questions should be prepared by each committee member prior to the defense and should be designed to explore the various clinical/translational/basic science aspects of the proposed work and the underlying biological concepts. Each committee member will indicate on the document if the student answers the member's question appropriately. If not, the student will be given two weeks to prepare a one-to-two-page written answer that will be submitted, along with the question, to that committee member. The committee member will submit both the question and answer

to the mentor indicating whether or not the student's answer was appropriate and sufficient.

Overall success or failure will be determined by majority vote of the committee.

A student who fails the Research Proposal and Qualifying Examination will have two months to prepare for a second presentation with written questions that will be presented to the committee only. Failure on the second attempt will result in a recommendation of dismissal from the program. Upon successful completion, a Proposal Defense/Qualifying Examination form will be filled out by the mentor stating the outcome and will be signed by each member of the Advisory Committee. This evaluation form will become part of the student's permanent academic record.

Annual Presentations

Each student who has completed class work is required to give a research update presentation to either the home department of the mentor or as part of the research update seminar series for the Kentucky Spinal Cord Injury Research Center. Notification of the seminar should be dispersed to the entire Neuroscience community.

Dissertation Defense

The candidate must complete all requirements for the degree of Doctor of Philosophy within four calendar years after passing the qualifying examination. The dissertation should contain data sufficient for approximately three publishable manuscripts. Upon completion of a draft of the student's dissertation and prior to scheduling of his/her defense, the student must distribute a copy to each Advisory Committee member. The committee will have two weeks to read and approve the completed draft of the dissertation or recommend major changes that need to be completed prior to scheduling a defense date.

Once the dissertation is approved by the committee, the student will schedule a Dissertation Defense and distribute an edited copy to each committee member. The Graduate School requires that an announcement of the defense be made at least two weeks prior to the scheduled date. The defense will consist of a public oral presentation (approximately 45 minutes in length) of the research completed during the student's graduate training. Non-committee members in the audience will be allowed to ask questions. The general audience will then be dismissed and the student will defend the dissertation before the committee. Upon completion, a written report stating the outcome of the defense will be completed by each committee member and will become a permanent part of the student's record.

Approval by the majority of Advisory Committee members will signify successful completion of the PhD degree.