BIOLOGY, PHD

Graduate Program Director

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Faculty

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Program Description

The Department of Biology is committed to research-oriented graduate training of the highest quality. A wide variety of disciplines are offered within the areas of biochemistry, developmental biology, genetics, molecular and cellular biology, neuroscience, ecosystem ecology, behavioral ecology, and evolution. Many students pursue research questions that span two or more of these traditional subdisciplines. Each student's program is individually structured to provide the maximum flexibility in the choice of coursework consistent with high quality graduate scholarship.

The Department currently averages 50 full-time graduate students (Ph.D. and M.S.). About 75 percent of the students enroll directly following their undergraduate work; others come with a master's degree earned elsewhere.

Program graduates are encouraged to pursue a variety of career paths after obtaining their degrees. Our recent graduates have found employment in universities and colleges as postdoctoral researchers, eventually going on to faculty positions in a variety of institutions. Other recent graduates have found employment in industry, in medical settings, and in environmental education, among other fields.

Admissions

Successful applicants generally have a minimum undergraduate average (GPA) of B (3.0). High scores on the verbal, quantitative and analytical writing tests of the Graduate Record Examinations (GRE) may strengthen an application, although GRE scores are not required.

Applicants must also have earned a B.S. or a B.A. degree, and should have at least a minimal background in both physical and biological sciences, including the following: two years of biology, one year each of introductory chemistry, organic chemistry with laboratory, physics, and college-level calculus. Although not required, a year of biochemistry is desirable for students interested in cell and molecular biology, and training in statistical analysis is desirable for all students.

Special consideration is given to students who have conducted undergraduate research and whose recommendations attest to their skills in the laboratory or field and promise in research. Applicants whose scholarly interests are confluent with those of our Graduate Faculty (https://artsandsciences.syracuse.edu/biology/graduate-overview/graduate-faculty/?_gl=1*seeo6b*_gcl_au*MTYzNTgxODMwNS4xNzQxMjAyODU4*_ga*MTg5MzIyMTM3
will also receive priority consideration.

Student Learning Outcomes

1. Demonstrated ability in scientific methods and research - ability to independently approach the design and execution of experiments to robustly address biological research questions.
2. Possess sufficient knowledge in a subfield of the biological sciences to formulate and address contemporary biological research questions.
3. Ability to explain and analyze concepts from other related subfields of the biological sciences.
4. Develop communication and synthetic skills for presentation in oral, poster and written formats.
5. Demonstrate an awareness of matters associated with the ethical and responsible conduct of research.

Ph.D. in Biology

The Biology Ph.D. program requires a minimum of 48 credits of formal coursework and Dissertation credits (BIO 999 Dissertation). Students entering the program with a B.A. or B.S. degree will complete a minimum of 24 credits of formal coursework (at least 18 credits at the 600-level or above). Students entering the program with an M.S. degree will complete a minimum of 18 credits of formal coursework (at least 14 credits at the 600-level or above). The distribution of formal coursework and dissertation credits will vary among students and will be based on recommendations by the student's Research Committee.

Seminar Requirements for Ph.D. students:

- BIO 608 Quantitative Methods for Life Scientists (3 credits)
- BIO 704 Scientific Writing for Graduate Students in the Life Sciences (3 credits)
- BIO 705 Graduate Research Seminars (0 to 1 credit) required each semester (fall and spring) in year 1, 2, 3 of program
- BIO 799 Seminar in General Biology (1 credit) required each semester (fall and spring) in year 1 and 2 of program
- Students are required to take 2 additional 3 -credit graduate research seminars in biology numbered 600 or 700 for 6 total credits

Biology Ph.D. students must also pass a two-part (oral and written) qualifying examination by the end of their fourth semester, submit at least one manuscript for publication to a peer-reviewed journal (prior to their defense), and attend and present their research findings at a scientific conference.

A dissertation based on original research must be developed and successfully defended in accordance with the rules and regulations (https://coursecatalog.syracuse.edu/academic-rules/) of the Syracuse University Graduate School. The maximum expected time in residence is five years.

Ph.D. in Biology - Neuroscience Concentration (Optional)

Students admitted into the Biology Ph.D. program may opt to complete coursework for the Interdisciplinary Graduate Neuroscience Concentration (I-GNC (https://artsandsciences.syracuse.edu/neuroscience/neuroscience-graduate-curriculum-overview/)). If all requirements are completed, the Ph.D. degree will be awarded from the Biology Department with the "Neuroscience Concentration" listed on the final transcript as an area of specialization, along with the Biology Ph.D. degree.

Affiliated Ph.D. Programs

The following Ph.D. programs also offer the I-GNC option:

- Communication Sciences and Disorders (https://artsandsciences.syracuse.edu/department-communication-sciences-disorders/graduate-program-overview/) (Research Ph.D. Audiology, Research Ph.D. Speech-Language Pathology)
- Psychology (https://artsandsciences.syracuse.edu/psychology/graduate-study-psychology/) (Ph.D. Cognitive Psychology, Ph.D. Social Psychology, Ph.D. Clinical Psychology, Ph.D. School Psychology)

Core Requirements

The Neuroscience Concentration constitutes a small set of core courses that each Ph.D. student will take. In addition to their academic aspects, these courses create an opportunity for students and faculty from the different neuroscience disciplines to interact.

Code	Title	Credits
BIO/NEU 607	Advanced Neuroscience	3
PSY/NEU 777	Advanced Cognitive Neuroscience	3
BIO 624/ BEN 613/ CSD 753/ NEU 613	Readings in Neuroscience	3
BIO 624/ BEN 614/ CSD 754/ NEU 614	Readings in Neuroscience	3

In addition, I-GNC students are expected to:

- Present at least one special seminar and participate in other research activities organized or sponsored by the I-GNC during their tenure as a student.
- Attend I-GNC-sponsored seminars given by outside speakers, other I-GNC graduate students, postdocs, and faculty.

Graduate Awards

Biology graduate students are guaranteed support for a specific number of years (i.e., 5 years for Ph.D., and 2 years for M.S.) as long as they maintain good standing in the program. Ph.D. students have the option of petitioning for an additional 5th year of support, if necessary.

During the academic year, most students are supported by a teaching assistantship for at least some semesters, and in many instances, for all semesters during their time in the program. Students may also be supported by their faculty research advisor's external grants or by Syracuse University fellowships. Applying to local and national programs for graduate fellowships is also strongly encouraged. Tuition costs are typically covered by tuition reduction credits, which are awarded as part of a teaching assistantship, research assistantship, or S.U. Fellowship.

Research Facilities

Shared research facilities currently include AAALAC-accredited animal facilities, a research greenhouse and growth chambers, a confocal microscope facility, extensive computing facilities, and local field experiment sites. Extensive facilities and instrumentation for carrying out modern biological research at the molecular, cellular, organismal, and population levels are available. Library holdings and computing facilities are readily accessible for student and faculty use. The Biology Department is housed in the Life Sciences Complex, a 210,000-square-foot building with dedicated and outstanding research and teaching space for the life sciences.