

School of Arts and Sciences

**ECOLOGY AND
EVOLUTION**www.pitt.edu/~biology

The environment and its delicate relationship to the human race are subjects of incredible interest today. If you are interested in fundamental questions of the evolutionary origins of organisms and how they survive (or, as is increasingly the case, don't survive) in the environments in which they are found, the ecology and evolution program within the Department of Biological Sciences would be an excellent choice for you.

In this program, you will have the opportunity to study the morphological and physiological adaptations of a wide variety of animals, plants, and microorganisms; the behavioral adaptations of organisms; the genetic mechanisms of evolution; and the ecological relationships of organisms—from the individual through populations and communities, to ecosystems, all the way to the global scale.

Employment opportunities in the environmental sciences have increased greatly in recent years. There is always a great demand for well-trained professionals at all levels (BS, MS, and PhD). Government environmental agencies, commercial consulting and testing firms, waste management industries, research laboratories, natural history and science museums, etc., are likely places to find a job. Graduate departments of ecology, evolution, environmental sciences, genetics, botany, public health, etc., are actively seeking well-qualified students for their programs. If you were to take the proper chemistry, physics, and mathematics courses, a major in ecology and evolution would also incorporate all of the requirements expected for admission to medical, dental, and other health-professional schools. An ecology and evolution major could also serve as a springboard to a career in law.

Requirements for the Major

All students within the School of Arts and Sciences (A&S) must complete the skills requirements and general education requirements. In addition to corequisite courses offered by other departments, the specific requirements for the ecology and evolution major also include the following courses from the Department of Biological Sciences:

BIOSC 0150 Foundations of Biology 1 (3 credits)
 BIOSC 0050 Foundations of Biology Lab 1 (1 credit)
 BIOSC 0160 Foundations of Biology 2 (3 credits)
 BIOSC 0060 Foundations of Biology Lab 2 (1 credit)
 BIOSC 0350 Genetics (3 credits)
 BIOSC 0370 Ecology (3 credits)
 BIOSC 0390 Ecology Lab (1 credit)
 BIOSC 1000 Biochemistry (3 credits)
 BIOSC 1130 Evolution (3 credits)
 BIOSC 1320 Population Biology (3 credits)
 BIOSC 1550 Ecology and Evolution Seminar (1 credit)
 Pymatuning Field Course (3 credits)
 Electives (4 credits)

Ecology and Evolution Electives

Examples of electives available in the department include:

BIOSC 0740 Yellowstone Field Course (4 credits)
 BIOSC 1200 Vertebrate Morphology (3 credits)
 BIOSC 1270 Ecology of Fish (3 credits)
 BIOSC 1480 Embryology (3 credits)
 BIOSC 1600 Stream Ecology (3 credits)



Corequisites

These courses are required courses located in departments outside of biological sciences:

Chemistry

CHEM 0110 General Chemistry 1 (4 credits)
CHEM 0120 General Chemistry 2 (4 credits)
CHEM 0310 Organic Chemistry 1 (3 credits)
CHEM 0330 Organic Chemistry Laboratory 1 (1 credit)
CHEM 0320 Organic Chemistry 2 (3 credits)
CHEM 0340 Organic Chemistry Laboratory 2 (1 credit)

Mathematics

All majors within the Department of Biological Sciences must complete two semesters of mathematics, including one semester of introductory calculus:

MATH 0220 Analytical Geometry and Calculus 1 (4 credits)

For the second semester of math, each major has a set of available courses that are appropriate for its curriculum. The options for ecology and evolution are:

MATH 0230 Analytical Geometry and Calculus 2 (4 credits)
STAT 1000 Introductory Statistics (4 credits)

Physics

There are two options for completing the physics requirement. One sequence is algebra-based, while the other is calculus-based. In either case, the laboratory course (shown in italics) is not required for completion of a major within the biological sciences, but it may be required for some graduate or professional schools:

Algebra-Based Sequence

PHYS 0110 Introduction to Physics 1 (3 credits)
PHSY 0111 Introduction to Physics 2 (3 credits)
PHYS 0212 Introduction to Laboratory Physics (2 credits)

Calculus-Based Sequence

PHYS 0104 Physics for Science and Engineering 1 (3 credits)
PHYS 0105 Physics for Science and Engineering 2 (3 credits)
PHYS 0106 Physics for Science and Engineering 3 (2 credits)
PHYS 0219 Basic Laboratory Physics for Science and Engineering (2 credits)

Departmental Honors

If you are interested in departmental honors, you must apply to the program by the end of your sophomore or junior year. Applications and further information can be obtained from the biological sciences advising center or by contacting the undergraduate advisers. The following criteria must be met to graduate with honors in the Department of Biological Sciences:

Course Work

1. You must complete all of the usual requirements of a major in ecology and evolution.
2. Your final quality point average (QPA) for biological sciences courses must be 3.25 or above.
3. Your final overall QPA for the 120 credits needed for graduation must also be 3.25 or above.
4. You must complete one term of a departmental seminar course.
5. You must complete six credits of BIOSC 1904 Honors Research under the direction of a faculty member.

Honors Thesis

Based on your research conducted in BIOSC 1904, you must write an honors paper. This paper must be turned in to the faculty member directing your research by the end of classes in your final term. It must be approved by him/her and by the departmental Honors Committee.

Oral Presentation

You must present the results of your research orally, together with other honors candidates, at a one-day departmental honors symposium.

For more information about the ecology and evolution program, contact:

Christine Berliner
A234 Langley Hall
Pittsburgh, PA 15260
412-624-4819
E-mail: christin@pitt.edu
www.pitt.edu/~biology

For more information about other majors, contact:

Office of Admissions and Financial Aid
Alumni Hall, 4227 Fifth Avenue
Pittsburgh, PA 15260-6601
412-624-PITT
E-mail: oafa@pitt.edu
www.oafa.pitt.edu

Special Programs and Opportunities

Undergraduate research is an important and valuable aspect of the department. It provides you with the opportunity to interact with faculty as an undergraduate. Your professors are also prominent research scientists, and the department encourages students to become aware of faculty research and to develop projects with the faculty. Involvement in research develops close working relationships, knowledge of lab techniques and equipment not normally available to undergraduates, and provides practical experience useful in future employment or in graduate or professional schools. In some cases, undergraduates coauthor research papers or give presentations at national meetings.

The **Hughes Program** provides an opportunity for students interested in pursuing scientific research careers to perform a substantial, in-depth research project in the areas of biochemistry, chemistry, and the biological and medical sciences in collaboration with one of the department's faculty members. This summer program is funded with a grant from the Howard Hughes Medical Institute to support outstanding undergraduate researchers. Upon completion of the program, participants will receive a certificate noting their accomplishment.

The **Organization for Tropical Studies (OTS)** is a nonprofit consortium of universities and research institutions in the United States and Latin America that provides leadership in education, research, and the wise use of natural resources in the tropics. You can join scientists from 25 different countries to study at one of three field sites in Costa Rica. OTS hosts a 15-week program that emphasizes ecological and environmental issues, language study, and tropical culture. Instruction comprises field-oriented, hands-on learning, and includes readings and group discussion. Courses currently offered include Fundamentals of Tropical Biology, Field Research in Tropical Biology, and Spanish and Latin American Culture.

The **University Honors College (UHC)** offers many resources for talented, active students—unique courses, special degrees, opportunities to perform independent research or teach, supplemental advising, and a social and academic community of similarly motivated students. UHC courses offer a more in-depth treatment of the material covered in a nonhonors course. Students work more problems, write more, read more, and discuss topics in greater depth. Although UHC does not have a formal membership and does not invite all students to participate in honors courses, there are certain qualifications that must be met to be eligible to take UHC courses.

An **internship** can be one of the most enlightening and productive aspects of your undergraduate education. It not only gives you a closer look at working in a particular field, but can help you gain a competitive edge, make contacts in the marketplace, and earn credits toward your degree. Pittsburgh is an exciting place for internship opportunities: internationally known as a renowned center for health care and ground-breaking medical research, home to many corporate headquarters, and a city with a wealth of cultural and entertainment activities, including three professional sports teams and the Carnegie system of museums. Internships are not limited to Pittsburgh, however. Every year, students complete internships in cities such as Philadelphia, Washington, D.C., New York City, and their own hometowns. Some students even complete an internship as part of their study abroad experience.

Beta Beta Beta is the biological science honor society, which was founded here at Pitt. The purpose of the organization is to develop sound scholarship, spread scientific truth, and promote research.

The **Organization for Women in Science (OWIS)** is dedicated to increasing the participation of women in the sciences in all arenas, including academic and industrial venues. OWIS meets regularly and organizes a number of educational and enlightening events each year.

Premedical Organization for Minority Students (POMS) is an organization that promotes the active participation of minority groups in medicine. POMS gives aspiring members of underrepresented minority groups who seek a future in medicine the opportunity to experience it firsthand through a series of guest speakers, activities, and workshops. In addition, members receive information on medical schools and MCAT preparation. POMS encourages diversity among medical professionals and is always seeking interested members.

Undergraduate awards exist in the department to recognize outstanding achievement in scholarship. They include the Ella P. Stewart Award (awarded to a deserving first-year student), the Alison Bentley Kephart Award (awarded to a first-year female undergraduate who has demonstrated outstanding potential for a successful career in one of the biological sciences), and the Outstanding Freshman Biology Award (awarded to several students each year, both male and female).

Study abroad is an exciting way to add an international perspective to your undergraduate education and strengthen your credentials as a graduate. Since only about 8 percent of American students have studied abroad, this experience distinguishes you when you enter the job market or pursue graduate study. The experience allows you to broaden your personal experience and gain an appreciation of other cultures while earning credits toward your degree. Scholarships are available, and financial aid is applicable.

Costa Rica is a prime location for studying ecology and evolution. Study in Costa Rica and discover all this Central American country has to offer, including beautiful warm white-sand beaches, 850 species of birds, and an amazing array of adventure sports. There are semester programs, academic year programs, and summer programs at the prestigious Veritas University to make your study abroad Costa Rica experience worthwhile. Regardless of language level, you may be able to earn college credit as you study Spanish and take courses in architecture, communications, dance, ethnic studies, fine arts, philosophy, phonetics, sciences, and other course subjects.

Students also have the opportunity to take conservative ecology courses in South Africa. Stellenbosch is South Africa's second oldest town, after Cape Town, in the world's most beautiful wine country: the Jonkershoek Valley on the southern tip of Africa. Superb beaches are a half hour away. Scenic mountains nearly 5,000 feet high form a spectacular backdrop. South Africa's million-plus square kilometers host a variety of landscapes, from breathtaking coasts and mountains in the south to the grassland bush in the north. The tip of the continent encompasses everything from the austere flats of the Karoo Desert to the subtropical beauty in Natal's exotic beaches, capped by the majestic Drakensberg mountain range. Students will have a three-day London stopover before the program, a six-day visit to the famous Garden Route, and different cultural activities to keep them busy throughout the semester.