Ecology and Evolution

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Degrees Awarded
M.A. in Biological Sciences: Concentration in Applied Ecology or Concentration in Applied Evolution
Ph.D. in Ecology and Evolution

Web site
www.stonybrook.edu/ecoelo

Application
https://graduateadmissions.stonybrook.edu/apply/

Ecology and Evolution Department

The Department of Ecology and Evolution and the Graduate Program in Ecology and Evolution (GPEE) at Stony Brook were the first such units in the United States and have served as models for corresponding units at many other institutions. The Faculty of the GPEE at Stony Brook has included several members of the National Academy of Sciences, and several past presidents of national and international societies in ecology, evolution, and systematics, and authors of influential books in these disciplines. Since its inception, the program has emphasized the integration of concepts from ecology and evolutionary biology.

The faculty and the graduate students in GPEE are engaged in research on Long Island and around the world, including Alaska, the continental US, the Caribbean, Mexico, Central and South America, Africa, and Antarctica. They study terrestrial, freshwater, and marine organisms comprising a wide range of taxa, including fish, amphibians, reptiles, mammals, birds, mollusks, insects, vascular plants, fungi, and bacteria. Their research incorporates experimental, comparative, theoretical, and statistical approaches and utilize field, laboratory, and literature survey studies. Research in GPEE includes interspecific interactions, population genetics, experimental evolution, evolutionary genomics, molecular evolution, evolutionary developmental biology, phylogenetics, population dynamics, biological invasions, phenotypic plasticity, ecosystem ecology and paleontology. Many faculty members are active in the application of their research to problems in conservation.

Our program has students studying toward both master's and doctoral degrees. Graduates are qualified for positions in academic or research institutions, government agencies, conservation organizations, and environmental consulting companies. Former students have become faculty members in biology, ecology and evolution, agricultural entomology, and marine biology departments at prominent private and public universities as well as selective liberal arts and smaller state colleges. Although GPEE emphasizes basic research, many of its graduates have entered careers that apply ecological and evolutionary principles to problems in such areas as marine toxicology, agricultural entomology, invasive species, natural resource management, conservation, and risk assessment.

An atmosphere of collegiality and intellectual exchange prevails throughout the GPEE and is fostered by discussion groups and an exciting weekly program of invited speakers during the academic year. A detailed description of the program, including degree requirements, and descriptions of the faculty research interests, and application materials are available on the web at www.stonybrook.edu/ecoelo. Applicants are strongly encouraged to contact individual faculty members whose interests they share.

Master of Arts in Biological Sciences (concentrations in Applied Ecology and Applied Evolution)

In our small program, each student is matched with an advisor from our program faculty. The plan of study is individually tailored within the course offerings and other internship or research opportunities to match the student's personal goals. Core courses provide training in statistics and ecology or evolution. Students participate in at least two topical discussion seminars in ecology or evolution. Students interact with each other in a shared office and through weekly group meetings and participation in seminars. Students must complete 30 graduate credits and a capstone project for the degree, which is typically completed in three semesters. Some of our students also receive an advanced graduate certificate in Geospatial Science, Data & Computational Science, Environmental Management, or Science Training & Research to Inform DEcisions (STRIDE). Graduates of our M.A. program go on to work at government agencies, NGOs, consulting firms, education, and industry, or use their degree as further preparation before applying for doctoral programs.

Ph.D. Program in Ecology and Evolution

First year students take courses in ecology, evolution, and biometry. A temporary advisor is assigned upon entering the program. Students appoint a permanent advisor and advisory committee during the second year. A general preliminary examination is given at the end of the first year. Students are encouraged to take specialized courses at Stony Brook and other institutions and to become involved in research during the first summer. Advanced courses and seminars are taken in subsequent years. After passing an oral examination that concentrates on the areas of their proposed research and submitting a research proposal to the faculty, students undertake original research that is typically independent of their advisor’s research.
Applications

To apply, fill out an online application on the Graduate School website.

Applicants will also need to provide:

1. Official transcripts of undergraduate and (if applicable) graduate course work
2. Three letters of recommendation
3. A non-refundable application fee of $100.00. (Please note that applications will not be processed without the $100.00 fee)
4. TOEFL or IELTS scores if the applicant’s native or primary language is not English
5. Personal statement addressing the applicant’s background and research interests.

All applicants should have a bachelor’s degree in biology, chemistry, mathematics or other courses of study that provide an appropriate background for advanced training in ecology and evolution. At least one semester of calculus is typically expected.

M.A. applicants are encouraged to correspond with the Program Director and GPEE Faculty member(s) to discuss their interests and goals.

Ph.D. applicants should also have:

1. Formal coursework in genetics, ecology, evolution and the biology of a particular group of organisms is strongly recommended. Prior biological research experience also strongly influences the likelihood of admission.
2. Prior correspondence with GPEE Faculty member(s) to discuss research interests and possibilities is strongly recommended. All incoming students will need to be accepted by both the Graduate School and the Department of Ecology & Evolution.

For more information on applying, contact the Ecology and Evolution Graduate Program Coordinator.

Financial Support and Application Deadline

To apply, fill out an online application on the Graduate School website.

Applicants will also need to provide:

1. Official transcripts of undergraduate and (if applicable) graduate course work
2. Three letters of recommendation
3. A non-refundable application fee of $100.00. (Please note that applications will not be processed without the $100.00 fee)
4. TOEFL or IELTS scores if the applicant’s native or primary language is not English
5. Personal statement addressing the applicant’s background and research interests.
6. CV

All applicants should have a bachelor’s degree in biology, chemistry, mathematics or other courses of study that provide an appropriate background for advanced training in ecology and evolution. At least one semester of calculus is typically expected.

M.A. applicants are encouraged to correspond with the Program Director and GPEE Faculty member(s) to discuss their interests and goals.

Ph.D. applicants should also have:

1. Formal coursework in genetics, ecology, evolution and the biology of a particular group of organisms is strongly recommended. Prior biological research experience also strongly influences the likelihood of admission.
2. Prior correspondence with GPEE Faculty member(s) to discuss research interests and possibilities is strongly recommended.

All incoming students will need to be accepted by both the Graduate School and the Department of Ecology & Evolution.

For more information on applying, contact the Ecology and Evolution Graduate Program Coordinator.

Facilities of the Ecology and Evolution Department

Ample laboratory, greenhouse, and environmental facilities and all of the standard laboratory equipment for molecular, microbiological, and genomic studies are available. The department houses laboratories working with model organisms including Drosophila and yeast. Field and marine study areas are at Flax Pond, a University-affiliated laboratory near campus. Some terrestrial studies are performed at the Ashley Schiff Nature Preserve, a 26-acre forested area on campus. The University is a member of the Organization for Tropical Studies, which maintains field stations in Costa Rica and South Africa. There are other opportunities for field studies both in this country and abroad; faculty members have continuing projects at Friday Harbor Marine Labs in Washington, Cook Inlet in Alaska, Ranomafana National Park in Madagascar, the Antarctic Peninsula and through various oceanographic cruises. Collaboration is possible with scientists at Brookhaven National Laboratory, Cold Spring Harbor Laboratory, and the New York Genome Center. Opportunities are also available for projects at field stations maintained by other university centers and colleges of the State University of New York. The School of Marine and Atmospheric Sciences is located on campus. Stony Brook is close enough to New York City and Washington, D.C. for arrangements to be made for consultation and work at museums and other institutions in those cities.
Requirements for the M.A. Degree in Biological Sciences

A. Concentration in Applied Ecology

Required Graduate Courses:

1. BEE 550: Principles of Ecology
2. Two graduate seminars, selected from BEE 692, BEE 693 and BEE 695
3. BEE 552: Biometry
4. WRT 621: Writing in the Academic Disciplines
5. BEE 556: Research Areas of Ecology & Evolution
6. BEE 599: Research (between 2 and 4 credits required)
7. BEE 671/672: Ecology & Evolution Colloquium

Electives include:

BEE 520: Advanced Human Genetics
BEE 521: Genomics Lab
BEE 555: Mathematical Methods in Population Biology
BEE 560: Advanced Ecology
BEE 562: Bayesian Data Analysis and Computation
BEE 571: Ecology Laboratory
BEE 572: Conservation Biology
BEE 574: Landscape Ecology Laboratory
BEE 577: Ecological Genetics
BEE 585: Research Design and Analysis in Ecology & Evolution
BEE 586: Introduction to Ecological Modeling
BEE 587: Applied Ecology and Conservation Biology Lab
ANT 536: Adv. Biostatistics and Phylogenetic Comparative Methods
GSS 513: GIS Fundamentals I
GSS 525: GIS Fundamentals II
GSS 526: Project Management
JRN 501: Communicating Science: Distilling Your Message
JRN 505: Connecting with Community
MAR 507: Marine Conservation
MAR 522: Environmental Toxicology and Public Health
MAR 536: Environmental Law and Regulation
MAR 569: Programming Statistics in R
MAR 581: Next Gen Sequencing Apps in Functional Genomics

and additional courses as determined by the GPD.

B. Concentration in Applied Evolution

Required Graduate Courses:

1. BEE 551: Principles of Evolution
2. Two graduate seminars, selected from BEE 690, BEE 691 and BEE 692
3. BEE 552: Biometry
4. WRT 621: Writing in the Academic Disciplines
5. BEE 556: Research Areas of Ecology & Evolution
6. BEE 599: Research (between 2 and 4 credits required)
7. BEE 671/672: Ecology & Evolution Colloquium

Electives include:

BEE 520: Advanced Human Genetics
BEE 521: Genomics Lab
BEE 554: Population Genetics and Evolution
BEE 562: Bayesian Data Analysis and Computation
BEE 567: Molecular Diversity Laboratory
BEE 572: Conservation Biology
BEE 577: Ecological Genetics
BEE 585: Research Design and Analysis in Ecology & Evolution
BEE 587: Applied Ecology & Conservation Biology Lab
AMS 533: Numerical Methods and Algorithms in Computational Biology
AMS 536: Molecular Modeling of Biological Molecules
AMS 561: Introduction to Computational and Data Science
AMS 589: Quantitative Genetics
ANT 536: Advanced Biostatistics and Phylogenetic Comparative Methods
ANT 564: Primate Evolution
ANT 565: Human Evolution
CSE 549: Computational Biology
HBA 550: Vertebrate Evolution
HBA 551: Phylogenetic Systematics, Biogeography and Comparative Methods
HBM 503: Molecular Genetics
JRN 501: Communicating Science: Distilling Your Message
JRN 505: Connecting with Community
MAR 569: Programming Statistics in R
MAR 581: Next Generation Sequencing Apps in Functional Genomics and additional courses as determined by the GPD

C. Capstone paper

A capstone paper is required for completion of the M.A. degree. This paper will be completed when the student is enrolled in BEE 599: Research and WRT 621: Writing in the Academic Disciplines. The capstone project is an opportunity to dive into a specific line of intellectual inquiry. The project promotes organizational and writing skills and results in a product that is evidence of the graduate experience. Each student's project is overseen by their faculty advisor, including defining the project topic and scope. The paper may be composed of a literature review, systematic review, or original research, depending on the goals of the student and subject to the approval of the faculty advisor. Completion of the paper is subject to the approval of the advisor and a second reader.

D. Credit limits

Without approval from the Graduate Program Director, no more than 4 credits from BEE 670, 671 or 672 and no more than 4 credits of BEE 599: Research, may count towards the M.A. degree.

Requirements for the Ph.D. Degree in Ecology and Evolution

Stony Brook University Graduate Bulletin: www.stonybrook.edu/gradbulletin
A. Course Requirements

1. In the first year in residence, students are normally required to take BEE550 Principles of Ecology, BEE551 Principles of Evolution, BEE552 Biometry, and BEE556 Research Areas in Ecology and Evolution. A grade of B- or better is required for these classes.

2. In later semesters, students must take a minimum of three other graduate courses, other than seminars, within this or other programs of this or other universities. Upon the recommendation of a student’s dissertation committee and with the approval of the Graduate Program Director, one elective course may be waived.

3. BEE671 and BEE672, Colloquium in Ecology and Evolution must be taken each semester in residence.

4. Four graduate seminar courses are required under normal circumstances.

5. Most students will require advanced training in various ancillary disciplines appropriate to their chosen field of research. Requirements will be determined by the student’s advisory committee and may include a foreign language or advanced studies in mathematics, statistics, computer science, molecular biology, taxonomy, or other areas.

B. Entering Student Advising and Evaluation

Early in the first semester of study, each student meets with his or her advisor and other faculty member(s) as needed to discuss additional courses beyond required first-year courses. At the end of the second semester, a Preliminary Examination is given testing students’ knowledge in the fields of ecology and evolution. Failing the preliminary exam may be cause for dismissal from the graduate program.

C. Oral Examination

In the second year of study, each student takes an Oral Examination tailored to the student’s interests and administered by his or her advisory committee. The student and his or her committee decide in advance on the areas to be covered in this examination. This examination is concurrent with the submission of a Dissertation Research Proposal that is written by the student and must be approved by the advisory committee before advancement to Ph.D. candidacy. As part of his or her dissertation proposal, each student writes a substantial review of the topic of the dissertation.

D. Advancement to Candidacy

The faculty will recommend a student to the Graduate School for advancement to candidacy upon satisfactory completion of the Oral Examination and any language requirement established for the student, and upon acceptance of the written Dissertation Research Proposal by the graduate program faculty.

E. Research and Dissertation

A dissertation is required for the Ph.D. degree. It must contain the results of original and significant investigation. A student’s progress in research is monitored by regular evaluations by the faculty in meetings held twice a year. Continued lack of progress may result in probation or dismissal.

F. Dissertation Committee

Students select a temporary advisor during the first semester and a permanent advisor at the beginning of the third semester. The advisory committee, consisting of the permanent advisor and at least two other GPEE faculty members, is nominated by the student in consultation with his or her permanent advisor and must be approved by the Graduate Program Director. Additional members from outside GPEE and/or the University may be appointed to the dissertation committee.

G. Final Examination

The dissertation must be approved by the student’s advisory committee. A dissertation examining committee (which must include an external examiner) is then approved by the Dean of the Graduate School. A formal public oral dissertation defense is held, at which the student presents his or her findings and is questioned by members of the audience and then by the examining committee in a meeting immediately following the presentation.

H. Teaching Requirement

All graduate students completing a doctoral degree will function as teaching assistants during at least one semester of their graduate careers.

I. Residence Requirement

At least two consecutive semesters of full-time graduate study are required. The demands of the course of study usually necessitate a longer period of residence.

J. Time Limit

The time limit imposed by the Graduate School is observed by GPEE. Students must satisfy all requirements for the Ph.D. degree within seven years after completing 24 credit hours of graduate courses in GPEE.

Faculty of Graduate Program in Ecology and Evolution
Distinguished Professors


**Levinton, Jeffrey S. Emeritus** Ph.D., 1971, Yale University: Marine benthic ecology; population genetics of bivalve mollusks; paleoecology.

Professors

**Akcakaya, H. Resit** Ph.D., 1989, Stony Brook University: Applied ecology; conservation biology; population dynamics; landscape ecology.


**Balazsi, Gabor** Ph.D., 2001, University of Missouri at St. Louis: synthetic gene circuits as research tools in the fields of evolution, development, and cancer.


**Gobler, Christopher** Ph.D., 1999, Stony Brook University: Coastal ecosystem ecology, climate change, harmful algal blooms, phytoplankton, ocean acidification, effects of multiple stressors on coastal marine resources, aquatic biogeochemistry.

**Koenig, Andreas** Ph.D., 1992, Georg-August University: Primate behavioral ecology, social evolution.


**Wright, Patricia** Ph.D., 1985, City University of New York: Primates and tropical conservation

Associate Professors

**Baines, Stephen B.** Ph. D., 1993, Yale University-New Haven: Aquatic ecosystem ecology, biogeochemistry of carbon and trace elements, plankton ecology, stoichiometry.

**Collier, Jackie** Ph.D., 1994, Stanford University: Microbial ecology.

**Graham, Catherine** Ph.D., 2003, University of Missouri – St. Louis: Landscape and behavioral ecology.

**Markham, Catherine** Ph.D., 2012, Princeton University: Behavioral ecology; maternal care; spatial ecology; wild primates.


**Smaers, Jeroen B.** Ph.D., 2010, University of Cambridge, UK: Brain evolution, phylogenetic comparative methodology, macroevolutionary morphology.


**True, John** Ph.D., 1995, Duke University: Evolutionary and developmental genetics of color patterning in *Drosophila*.

**Twiss, Katheryn C.** 3 Ph.D., 2003, University of California at Berkeley: Archaeology, Human-Animal Interactions


**Volkenborn, Nils** Ph.D., 2005, University of Bremen, Germany: Benthic ecology, sediment biogeochemistry.

**Watson, Elizabeth** Ph.D., 2006, University of California, Berkeley: impact of climate and anthropogenic change to coastal watersheds and habitats

Assistant Professors

**D’Andrea, Rafael.** PhD. 2016, University of Michigan: Community ecology, theoretical ecology, species coexistence

**McClanahan, Giovanna** Ph.D., Louisiana State University: drivers of coastal change, to track transitions in structure and function of ecosystems and societies with disturbances such as storms, floods, and climate change
Munch, Stephan Ph.D., 2002, University at Stony Brook: Evolutionary ecology of growth and life history traits, Evolution in harvested populations, Applied population dynamics modeling, Mathematical modeling and statistics

Smiley, Tara M. Ph.D., 2016, University of Michigan: Paleobiology, biogeography, stable isotope ecology

Title, Pascal O. Ph.D., 2018, University of Michigan: Macroevolution, macroecology, species distribution modeling

Vitek, Natasha Ph.D., 2019, University of Florida: Vertebrate paleontology, evolution, scaling of variation.

Weissman, Jackie Lee Ph.D., 2019, University of Maryland College Park: Microbial ecology & evolution, (meta)genomics, bioinformatics, computational biology

Assistant Research Professors

Martins, Dino Ph.D., 2011, Harvard University: interactions between species, insects and plants, vectors and hosts and parasites

1) Department of Anatomical Sciences

2) School of Marine and Atmospheric Sciences

3) Department of Anthropology

4) Department of Biochemistry

5) Brookhaven National Laboratory

6) University of California, Santa Cruz

7) Swiss Federal Research Institute WSL

8) Turkana Basin Institute

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.