Ecology and Evolution (BEE)

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Degrees awarded: M.A. in Biological Sciences: Concentration in Applied Ecology; Ph.D. in Ecology and Evolution

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. GPEE at Stony Brook is generally ranked among the leading programs in its field. Its faculty includes two members of the National Academy of Sciences, several past presidents of national and international societies in ecology, evolution, and systematics, and authors of influential books in these disciplines. GPEE provides training that leads to the M.A. and Ph.D. 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, Hawaii, the continental U.S., Africa, the Caribbean, Central and South America, India, and Mexico. They study terrestrial, freshwater, and marine organisms in a wide range of taxa, including amphibians, bacteria, birds, fish, fungi, insects, mollusks, primates, reptiles, and vascular plants. Their research interests incorporate experimental, comparative, statistical, and theoretical approaches and utilize field and laboratory studies. Research in GPEE includes biological invasions, evolutionary developmental biology, evolutionary ecology, evolutionary genomics, experimental evolution, geographical variation and phylogeography, interspecific interactions, paleontology, phenotypic plasticity, phylogenetic biology, and population genetics. There is great interest in development of methods for morphometrics, multivariate statistics, and systematics. Many faculty members are interested in the application of their research to problems in conservation.

Graduates are qualified for positions in academic or research institutions, conservation organizations, environmental consulting companies, and government agencies. Former students have become faculty members in such departments as agricultural entomology, ecology, evolution, and marine biology 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 agricultural entomology, conservation, invasive species, marine toxicology, natural resource management, and risk assessment.

M.A. Program in Applied Ecology

A three-semester program leads to an M.A. in Biological Sciences with a concentration in Applied Ecology. This curriculum provides training in environmental sciences for positions in conservation and environmental protection organizations, environmental consulting firms, environmental departments of industrial companies, and government environmental offices. Applied environmental research involves data collection, data analysis, and interpretation of the findings. The need for trained personnel is greatest in the area of data analysis, which is a focus of the concentration in Applied Ecology. Students need to complete 30 credits and the master's paper to graduate.

Ph.D. Program in Ecology and Evolution

Graduate students in the GPEE are supervised by a temporary advisor and the Entering Student Advisory Committee (ESAC) during their first year. First-year students take courses in biometry, ecology, and evolution, and they take a general preliminary examination at the end of the first year. They are encouraged to take specialized courses at other institutions or to become involved in research during the first summer. Advanced courses and seminars are taken in subsequent years, and students appoint a permanent advisor and advisory committee during the second year. 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. An atmosphere of collegiality and intellectual interchange prevails throughout the GPEE and is fostered by discussion groups and an exciting program of invited speakers each week during the academic year. A detailed description of the program, including degree requirements, descriptions of the faculty research interests, and application materials are available on the Web at *http://life.bio.sunysb.edu/ee*. Applicants should contact individual faculty members whose interests they share.

Facilities

Ample environmental, greenhouse, and laboratory facilities and all of the normal laboratory equipment for molecular studies are available. All the equipment typically found in modern laboratories concerned with protein electrophoresis and DNA analysis is available, including automated sequencer, fraction collectors, high-speed and ultracentrifuges, liquid scintillation, sonicators, spectrofluorometers, and spectrophotometers. The Department houses laboratories of bacterial genetics, Drosophila genetics, and ecology. The Department has excellent computing facilities. In addition to microcomputers in most labs, UNIX-based servers are also available within the Department for mail and more intense computations than can be provided by desktop computers.

Field and marine study areas are at Flax Pond, a University-affiliated laboratory near campus. 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. There are other opportunities for field studies both in this country and abroad; faculty members have continuing projects at Cook Inlet in Alaska, Friday Harbor Marine Labs in Washington, Cajas National Park in Ecuador, and Ranomafana National Park in Madagascar. Collaboration is possible with scientists at Brookhaven National Laboratory, and several field stations are 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.

Admission

Admission to the Ph.D. Program

In addition to Graduate School admission requirements, the Department requirements include:

A. 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

B. Formal coursework in ecology, evolution, genetics, and the biology of a particular group of organisms is strongly recommended

C. Report of Graduate Record Examination (GRE) General Test scores and, for international students, TOEFL scores

D. Acceptance by the Graduate Program in Ecology and Evolution and by the Graduate School

Admission to the M.A. Program in Applied Ecology

In addition to Graduate School admission requirements, the Department requirements include:

A. A bachelor's degree in a course of study that provides an appropriate background for advanced training in ecology

B. Report of Graduate Record Examination (GRE) General Test scores and, for international students, TOEFL scores

C. Acceptance by the Graduate Program in Ecology and Evolution and by the Graduate School

Faculty

Distinguished Professors

Fleagle, John G.,[1] Ph.D., 1976, Harvard University: Primate evolution; comparative anatomy; behavioral ecology.

Futuyma, Douglas, Ph.D., 1969, University of Michigan: Speciation; evolution of ecological interactions among species.

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

Rohlf, F. James, Ph.D., 1962, University of Kansas: Multivariate data analysis techniques applied to problems in taxonomy and ecology; computer modeling; applied ecology.

Sokal, Robert R., *Emeritus,* Ph.D., 1952, University of Chicago: Human population structure; spatial models in ecology and evolution; numerical taxonomy; theory of systematics.

Professors

Akçakaya, H. Resit, Ph.D., 1989, Stony Brook University: Conservation biology; applied ecology; metapopulation and landscape ecology.

Bell, Michael A., Ph.D., 1976, University of California, Los Angeles: Evolutionary biology; ichthyology; paleobiology; geographic variation.

Conover, David O.,[2] Ph.D., 1981, University of Massachusetts: Ecology of fishes; fisheries biology.

Dykhuizen, Daniel E., Ph.D., 1971, University of Chicago: Population genetics and molecular evolution, especially of bacteria.

Eanes, Walter F., Ph.D., 1976, Stony Brook University: Population and biochemical genetics of Drosophila; molecular evolution.

Ginzburg, Lev, *Director of the Master's Program in Applied Ecology,* Ph.D., 1970, Agrophysical Institute, St. Petersburg, Russia: Theoretical and applied ecology.

Gurevitch, Jessica, *Chair*, Ph.D., 1982, University of Arizona: Evolutionary ecology of plant populations and communities; plant physiological ecology.

Janson, Charles H., Ph.D., 1985, University of Washington: Social ecology of vertebrates; plant dispersal strategies.

Jernvall, J., Ph.D. 1995, University of Helsinki, Finland: Mammalian tood development and evolution; vertebrate paleontology; diversity in recent and extinct communities.

Lerdau, Manuel, T., Ph.D., 1994, Stanford University: Plant ecology and physiology; global change.

Lopez, Glenn R.,[2] Ph.D., 1976, Stony Brook University: Marine and freshwater benthic ecology; animal-microbe-sediment interactions; detritus.

Padilla, Dianna K., Ph.D., 1987, University of Alberta, Canada: Phenotypic plasticity, plant-herbivore functional ecology, ecology of invading species.

Pigliucci, Massimo, Ph.D., 1994, University of Connecticut: Plant Population biology, ecological and evolutionary genetics.

Slobodkin, Lawrence B., *Emeritus*, Ph.D., 1951, Yale University: Evolutionary strategy and constraints; Hydra; ecotoxicology.

Susman, Randall L.,[1] Ph.D., 1976, University of Chicago: Primate ecology.

Williams, George C., *Emeritus,* Ph.D., 1955, University of California, Los Angeles: Evolution of life-history strategies; ecology and population genetics of marine fishes.

Wright, Patricia,[3] Ph.D., 1985, City University of New York: Primates and tropical conservation.

Associate Professors

Armstrong, Robert,[2] 1975, University of Minnesota: Mathematical modeling in marine ecology and biogeochemistry.

Battley, Edwin H., *Emeritus,* Ph.D., 1956, Stanford University: Thermodynamics of microbial growth; ecological energetics; microbial ecology; nitrification and denitrification in aquatic systems.

Bharathan, Geeta, *Director of the Ph.D. Program*, Ph.D., 1993, University of Arizona: Evolution of angiosperms; homeobox genes; genome size.

Bingham, Paul,[4] Ph.D., 1979, Harvard University: Regulation of transcription in developing multicellular organisms; the role of transposons in evolution and speciation.

Chase, Ivan,[5] Ph.D., 1972, Harvard University: Social behavior; dominance hierarchies; cooperation; resource distribution.

Forster, Catherine A.,[1] Ph.D., 1990, University of Pennsylvania: Vertebrate paleontology; systematics.

Hechtel, George J.,[6] Ph.D., 1962, Yale University: Systematics and zoogeography of marine demospongiae.

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

Wiens, John J., Ph.D., 1995, University of Texas at Austin: Systematics and biology of reptiles and amphibians.

Assistant Professors

Baines, Stephen, Ph.D., 1993, Yale University: Aquatic ecosystem ecology; biogeochemistry of carbon and trace elements.

Davalos-Álvarez, Liliana M., Ph.D., 2004, Columbia University: Evolutionary biology; phylogeography; conservation biology.

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

Munch, Stephan[2], Ph.D., 2002, Stony Brook University: Evolutionary ecology of growth and life history traits; evolution in harvested populations; applied population dynamics modeling; mathematical modeling and statistics.

Rest, Joshua S., Ph.D. 2004, University of Michigan: Regulatory evolution; protein network evolution; bioinformatics.

Vedder, Amy L.,[6] *Research Assistant Professor*, Ph.D., 1989, University of Wisconsin-Madison: Mammalian ecology; tropical forest ecology; conservation biology, planning, and practice.

Number of teaching, graduate, and research assistants, Fall 2005: 49

Students on fellowships: 12

1) Department of Anatomical Sciences

2) School of Marine and Atmospheric Sciences

3) Department of Anthropology

4) Department of Biochemistry

5) Department of Sociology

5) Recipient of the State University Chancellor's Award for Excellence in Teaching, 1974

6) Director, Africa Program, Wildlife Conservation Society

Degree Requirements

Requirements for the M.A. Degree

The Graduate Program in Ecology and Evolution (GPEE) usually does not accept a student whose goal is an M.A. degree, except those who wish to concentrate in applied ecology (see below). However, a student already in GPEE may be awarded an M.A. degree upon satisfaction of the following requirements in addition to the minimum Graduate School requirements:

A. Completion of an approved course of study including 30 graduate credit hours with a minimum 3.0 overall grade point average

B. Preparation of a research thesis

Requirements for the Ph.D. Degree

A. Course Requirements

1. In the first year in residence, students are normally required to take BEE 550 Principles of Ecology, BEE 551 Principles of Evolution, BEE 552 Biometry, and BEE 556 Research Areas in Ecology and Evolution.

2. Students must take a minimum of three other graduate courses, other than seminars, within this or other programs of this or other universities.

3. BEE 671-672 Colloquium in Ecology and Evolution must be taken each semester in residence.

4. A minimum of one graduate seminar per year is 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 might include one or more foreign languages or advanced studies in biochemistry, computer sciences, mathematics, statistics, taxonomy, or other areas.

B. Entering Student Advising and Evaluation

Early in the first semester of study, each student meets with an advisory committee that recommends additional courses beyond required first-year courses. At the end of the second semester, an exam will be given testing the student's knowledge of ecology and evolution.

C. Preliminary Examination

No later than the end of the fourth year of study, the student takes a preliminary examination tailored to the student's interests and administered by his or her advisory committee. The examination includes an oral portion and may include a written portion, at the option of the student. The student and his or her committee decide in advance on the areas to be covered in this examination.

D. Advancement to Candidacy

The faculty will recommend a student to the Graduate School for advancement to candidacy upon satisfactory completion of the preliminary examination and any language requirement established for the student, and upon acceptance of a dissertation proposal by the 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 dissertation proposal must be approved by the faculty during an early stage of the student's research. 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 the examining committee and other members of the audience.

H. Teaching Requirement

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

J. 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.

K. 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.

Requirements for the M.A. Degree in Applied Ecology

Students must complete 30 credits and achieve a 3.0 overall grade point average to graduate; this can be achieved in three semesters. Six courses form the core of the program: three courses focus on ecology; three provide training in mathematical methods, statistics, and computer programming. The six courses are:

BEE 550 Principles of Ecology

BEE 552 Biometry

BEE 555 Mathematical Methods in Population Biology

BEE 571 Ecology Laboratory

BEE 585 Introduction to Ecological Research

BEE 587 Applied Ecology and Conservation Biology Laboratory

A large number of elective courses are available to fulfill the degree requirements.

Courses

BEE 500 Directed Readings in Population Biology

Directed readings in topics of current interest, under supervision of a faculty sponsor, culminating in one or more critical review papers.

Prerequisite: Sponsor and approval of master's program executive committee

Fall and spring, 1-3 credits, S/U grading

May be repeated for credit

BEE 501 Directed Readings in the Biology of Organisms
Directed readings in topics of current interest, under supervision of a faculty sponsor, culminating in one or more critical review papers.
Prerequisite: Sponsor and approval of master's program executive committee
Fall and spring, 1-3 credits, S/U grading
May be repeated for credit

BEE 550 Principles of Ecology
Population dynamics, interactions of organisms, theoretical concepts of community structure and their biological and evolutionary implications.
Prerequisite: Permission of instructor
Fall, 4 credits, ABCF grading

BEE 551 Principles of Evolution
Biological evolution, including the genetics of populations, speciation, evolution of higher taxa, and the fossil record.
Fall, 4 credits, ABCF grading

BEE 552 Biometry
An intensive course in statistical theory and methodology. The analysis of real biological data is emphasized. Topics include analysis of variance, simple multiple and curvilinear regression analysis, correlation analysis, and goodness of fit tests.
Spring, 4 credits, ABCF grading

BEE 553 Multivariate Analysis in Biology
An introduction to multivariate statistical analysis for biologists. Topics include general least squares analysis, MANOVA, cluster analysis, and factor analysis.
Prerequisite: BEE 552 or equivalent
Fall, 3 credits, ABCF grading

BEE 554 Population Genetics and Evolution
A general introduction to mathematical population genetics and evolutionary theory. The effects of mutation, recombination, selection, and migration are studied. Modern concepts in both theoretical and experimental population genetics are covered.
Prerequisite: BEE 552 or equivalent and a course in evolution
Spring, odd years, 0-3 credits, ABCF grading

BEE 555 Mathematical Methods in Population Biology
This course covers a variety of mathematical methods used in modern theoretical biology. Topics include linear algebra and applications, ordinary and partial differential equations, and stochastic processes. Examples from population biology, i.e., mathematical ecology and population genetics, are used throughout.
Fall, even years, 3 credits, ABCF grading

BEE 556 Research Areas of Ecology and Evolution
A description of the current research areas of ecology and evolution, broadly conceived. All first-year ecology and evolution students are expected to participate.
Fall and spring, 1-2 credits, S/U grading
May be repeated for credit

BEE 558 Tutorial Readings
Individual tutorial study with an instructor in the graduate program in Ecology and Evolution for the purpose of background reading in an area of ecology and evolution.
Fall and spring, 1-4 credits, S/U grading
May be repeated for credit

BEE 559 Individual Studies in Organisms
A detailed study of the biology of a selected systematic group chosen by the graduate student and a faculty member. This is conducted as a tutorial course.
Fall and spring, 1-4 credits, ABCF grading
May be repeated for credit

BEE 561 Macroevolution
This course emphasizes the processes generating large-scale evolutionary trends and patterns. Topics include rates of evolutionary change; patterns of speciation and extinction, including radiations and mass extinctions; the role of constraint and innovation in molding evolutionary patterns; adaptive landscapes and complex character evolution; development and evolution; the origin and importance of major body plans; and the role of biogeography and climate in evolution.
Spring, odd years, 3 credits, ABCF grading

BEE 562 Concepts and Methods in Evolutionary Biology
The course aims at achieving two related objectives: first, to provide graduate students in Ecology and Evolution, and other Biology departments, as well as Philosophy, with a basic understanding of the varied methods (both experimental and statistical) that make up the body of evolutionary quantitative biology. The focus will be in particular on quantitative genetics and its interface with more modern approaches, including QTL mapping, bioinformatics, and the various omics (genomics, proteomics, etc.). Second, students will become familiar with the fundamental concepts of philosophy of science, in particular as they relate to the conceptual analysis of the ideas that shape modern evolutionary and ecological theory. In this respect, the focus will be both on philosophical concepts such as falsificationism, induction, deduction, hypothesis testing, and the nature of evidence, as well as on the meaning of key ideas in evolutionary ecology, such as natural selection, genetic drift, and constraints.
3 credits, ABCF grading

BEE 564 Geometric Morphometrics
An introduction to theory and methods used in geometric morphometrics. Image analysis, outline methods, landmark methods, and shape statistics are covered.
Prerequisite: BEE 552 or equivalent; BEE 553 recommended
Fall, even years, 3 credits, ABCF grading

BEE 565 Molecular Evolution
An introduction to the use of molecular information in population genetics, evolution, and taxonomy. This course combines discussions of methodology, data, and theory to illustrate how molecular information is changing our view of the evolutionary process.
Prerequisite: BEE 551 or permission of instructor
Spring, odd years, 3 credits, ABCF grading

BEE 567 Molecular Diversity Laboratory
This course will provide hands-on experience in established and recently developed methods of detecting and analyzing molecular variation (DNA, RNA, Proteins) in nature. Natural populations of Drosophila melanogaster will be the model material for this laboratory. The main theme of this course is that molecular variation is abundant in nature and is an important tool for understanding adaptive evolution and species relationships.
Prerequisite: Permission of instructor
Fall, 3 credits, ABCF grading

BEE 571 Ecology Laboratory
This course stresses the collection, analysis, and interpretation of ecological data, mostly in terrestrial settings. Laboratory and field exercises demonstrate the operation of general ecological principles in specific populations and communities.
Fall, 3 credits, ABCF grading

BEE 575 Evolutionary Ecology
The approach is to understand the theoretical basis and review empirical tests of diverse topics. The format includes both lectures and student-led discussions of primary literature.
Prerequisite: BEE 550, BEE 551, or permission of instructor
Fall, alternate years, 3 credits, ABCF grading

BEE 585 Research Design and Analysis in Ecology
This course covers topics relevant to carrying out ecological research, including sampling and quantitative description of ecological communities, spatial pattern and spatial heterogeneity, design and analysis of field experiments, application of demographic models, analysis of meta-population dynamics, and population estimations.
Spring, even years, 0-3 credits, ABCF grading

BEE 586 Introduction to Ecological Modeling
This course will provide students with a familiarity of the major concepts, approaches, and underlying rationale for modeling in the ecological sciences. Topics will include reviews of theoretical and empirical models, the use of models in adaptive management, and how to confront models with data to evaluate alternative hypotheses. Roughly one third of the course will be devoted to the use of models in management, focusing on the problems of fitting models to data and management pitfalls that follow. Course work will consist of readings, in-class exercises, and group assignments that involve the construction, analysis, and interpretation of ecological models.
Prerequisite: BEE 550, BEE 552; MAT 131 or equivalent; any statistics course
Spring, 3 credits, ABCF grading

BEE 587 Applied Ecology and Conservation Biology Laboratory
A computer laboratory course introducing students to ecological risk analysis and conservation biology. Laboratories are based on

interactive software. Computer simulation techniques for addressing problems in applied ecology are emphasized.
Prerequisites: A year of calculus; one-year undergraduate Biology course for majors
Spring, even years, 3 credits, ABCF grading

BEE 588 Current Topics in Ecology and Evolution
Subject matter varies from semester to semester, depending upon the interests of students and staff.
Fall and spring, 2 credits, S/U grading
May be repeated once for credit

BEE 599 Research
Original investigation undertaken with the supervision of a member of the staff.
Fall and spring, 1-12 credits, S/U grading
May be repeated for credit

BEE 670 Informal Seminar
Presentation of preliminary research results and current research problems by students and faculty.
Fall and spring, 0-2 credits, S/U grading
May be repeated for credit

BEE 671 Ecology and Evolution Colloquium
A weekly series of research seminars presented by visiting scientists as well as by the faculty. Required every semester of all ecology and evolution graduate students.
Fall, 0-2 credits, S/U grading
May be repeated for credit

BEE 672 Ecology and Evolution Colloquium
A weekly series of research seminars presented by visiting scientists as well as by the faculty. Required every semester of all ecology and evolution graduate students.
Spring, 0-2 credits, S/U grading
May be repeated for credit

BEE 689 Seminar on Adaptations of Marine Organisms
Seminars on selected topics concerning ecological, genetical, and evolutionary problems in the marine environment.
Fall or spring, alternate years, 0-2 credits, S/U grading
May be repeated for credit

BEE 690 Seminar on Evolutionary Processes
Seminars on selected topics concerning evolutionary processes.
Fall or spring, alternate years, 0-2 credits, S/U grading
May be repeated for credit

BEE 691 Seminar on Systematics and Phylogeny
Seminars on selected topics in systematics. Topics will include the theory of classification and numerical taxonomy, both phenetic and cladistic.
Fall or spring, alternate years, 0-2 credits, S/U grading
May be repeated for credit

BEE 692 Seminar on the Environment and Human Affairs
Student seminars on selected topics concerned with the effect of man on the environment. Application of ecological and evolutionary theory to the solution of human problems.
Fall or spring, 0-2 credits, S/U grading
May be repeated for credit

BEE 693 Seminar on Population and Community Ecology
Student seminars on selected topics in population and community ecology.
Fall or spring, 0-2 credits, S/U grading
May be repeated for credit

BEE 699 Dissertation Research On Campus
Prerequisite: Must be advanced to candidacy (G5); major portion of research must take place on SB campus, at Cold Spring Harbor, or at Brookhaven National Lab
Fall, spring, and summer, 1-12 credits, S/U grading
May be repeated for credit

BEE 700 Dissertation Research Off Campus–Domestic
Prerequisite: Must be advanced to candidacy (G5); major portion of research will take place off campus, but in the U.S. and/or U.S. provinces (Brookhaven National Lab and the Cold Spring Harbor Lab are considered on-campus); all international students must enroll in one of the graduate student insurance plans and should be advised by an International Advisor
Fall, spring, and summer, 1-9 credits, S/U grading
May be repeated for credit

BEE 701 Dissertation Research Off Campus–International
Prerequisite: Must be advanced to candidacy (G5); major portion of research will take place outside the U.S. and/or U.S. provinces; domestic students have the option of the health plan and may also enroll in MEDEX; international students who are in their home country are not covered by a mandatory health plan and must contact the Insurance Office for the insurance charge to be removed; international students who are not in their home country are charged for the mandatory health insurance (if they are to be covered by another insurance plan they must file a waiver by the second week of classes; the charge will be removed only if the other plan is deemed comparable); all international students must receive clearance from an International Advisor
Fall, spring, and summer, 1-9 credits, S/U grading
May be repeated for credit

BEE 800 Full-Time Summer Research
0 credit, S/U grading
May be repeated for credit