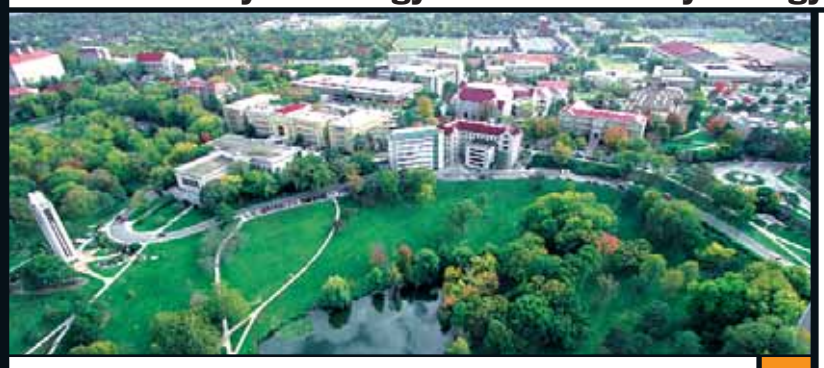
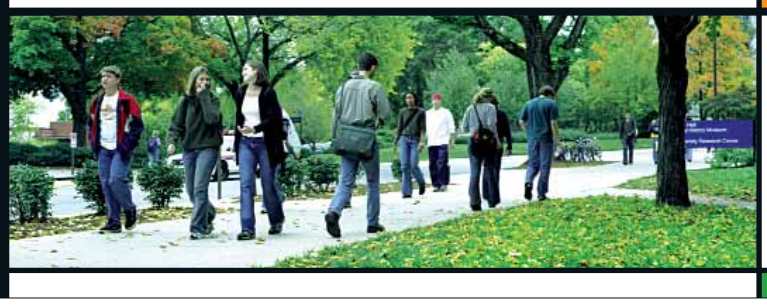
Graduate Study in Ecology and Evolutionary Biology

The University of KANSAS





The department offers comprehensive graduate study in ecology, entomology, evolutionary biology, plant biology, population biology, and systematics. It is one of two graduate departments in the Division of Biological Sciences (along with Molecular Biosciences). The division provides administrative support, supervises undergraduate teaching, operates the Biology Teaching Resource Center, and supervises shared service facilities.

The department currently has 40 faculty members, about half of whom have joint appointments with the Natural History Museum and Biodiversity Research Center, Kansas Biological Survey, or Environmental Studies Program. It also has 30 adjunct, courtesy, or emeritus faculty members. This creates a stimulating environment of outstanding intellectual diversity and numerous cooperative research opportunities with an interdisciplinary outlook. About 100 students are enrolled in the graduate program.

Graduate Programs

The department includes four recognized programs: Ecology and Population Biology; Entomology; Plant Biology; and Systematics, Biodiversity, and Macroevolution. The programs are flexible units for the establishment of graduate curricula, faculty recruitment, and intellectual development. The interests of many faculty members overlap program boundaries. Dissertation committees often are composed of faculty members from multiple programs and other departments. The primary affiliations of faculty members are

Ecology and Population Biology. H. Alexander, Billings, deNoyelles, Foster, Kelly, Martinko, Orive, Pierotti, Skalski, Slade, V. Smith, Thorp

Entomology. D. Alexander, Ashe, deBoer, Engel, Gleason, Greenfield, Jander, Loudon, D. Smith, O. Taylor

Plant Biology. Haufler, Hileman, C. Martin, Mort, E. Taylor, T. Taylor, Ward

Systematics, Biodiversity, and Macroevolution. Brown, Cartwright, Dimmick, Fautin, Jensen, Krishtalka, L. Martin, Peterson, Timm, Trueb, Wiley

Graduate Training

The broad aim of graduate training is to provide a firm foundation in the principles of ecology and evolutionary biology, while ensuring professional development in the specialized body of expertise each student will require in a chosen specialty. An advisory committee helps each student develop an individualized program of study and research activities designed to meet his or her career goals. This committee can include adjunct, courtesy, or emeritus faculty members, and those with appointments in other departments.

Interested students are encouraged to contact faculty members with complementary research interests. Collectively, the faculty are diverse in their research interests, but the department has particular strengths in systematics, paleontology, biodiversity, population biology, taxon-focused studies (e.g., entomology and botany), animal behavior, plant and animal physiology, and community and ecosystem ecology (both terrestrial and aquatic). Graduate students may incorporate into their programs courses drawn from the rich diversity of subjects at KU (e.g., remote sensing in the Department of Geography, molecular biology in the Department of Molecular Biosciences).

Degrees

The department offers Ph.D. and M.A. degrees. The Ph.D. degree requires the equivalent of at least three academic years of full-time study. All doctoral students are expected to publish research papers, present papers at scientific meetings, and develop multiple aspects of their professional careers. A master's degree is not a prerequisite for the Ph.D. Two programs leading to the M.A. are offered – one research-oriented, requiring a thesis; the other emphasizing broader graduate training with less emphasis on lab or field research. Complete program descriptions are found in the *Graduate School Catalog*.

Charles Daghlian, Courtesy of KU Ecology and Evolutionary Biology

Research questions may require collecting living or fossil material in exotic locales.

The University

The University of Kansas is a major educational and research institution with 29,000 students and 2,100 faculty members. KU includes the main campus in Lawrence, the Medical Center in Kansas City, the KU Edwards Campus in Overland Park, a clinical campus of the School of Medicine in Wichita, and educational and research facilities throughout the state. The University of Kansas prohibits discrimination on the basis of race, color, religion, sex, national origin, age, ancestry, disability, veteran status, sexual orientation, marital status, and parental status.

Admission

Admission is based on background, preparation, test scores, and prior academic performance. We encourage applications from underrepresented groups. A graduate student should have a broad undergraduate background in natural science and math, including calculus, physics, chemistry, organismal biology, genetics, ecology, and evolutionary biology. Deficiencies can be made up during the first year of graduate study.

Applications for fall admission, including requests for financial aid, are due by January 10. Applications for spring or summer admission are due two months before the term starts.

A complete application includes (1) an application for admission (available online at *www.graduate.ku.edu*), (2) Graduate Record Examination scores for the general test, (3) two official copies of all college transcripts, (4) three letters of recommendation on forms available upon request (or on our Web site), (5) a statement of aims describing research interests and career goals, and (6) an application fee. Applicants from non-English-speaking countries must submit Test of English as a Foreign Language (or IELTS) scores.

Submit requests for application materials by e-mail to the Graduate Coordinator (see Web site for e-mail addresses) or by mail to

The University of Kansas
Graduate Committee
Department of Ecology
and Evolutionary Biology
Haworth Hall, 1200 Sunnyside
Ave., Rm. 2041
Lawrence, KS 66045-7534

A prospective student must have a faculty sponsor before being admitted. Students should correspond with one or more faculty members before and during the application process to identify prospective sponsors. Acknowledgment of sponsorship from a faculty member is critical to admission. We encourage interested students to visit our campus to meet faculty members and other graduate students. Graduate school is critically important in beginning a career, and the decision of where to enroll should be made carefully. We strive to match the goals and aspirations of each student with our faculty, programs, and facilities to the best degree possible.

For more information, visit our Web site: *www.ku.edu/~eeb*.

Aaron Paden/KU University Relations

Many research questions require experimental manipulations in the field or indoor facilities.

ECOLOGY AND EVOLUTIONARY BIOLOGY

The University of Kansas

Aaron Paden/KU University Relations

Specialized research facilities help yield answers to unique questions about organism function.

Aaron Paden/KU University Relations

Extensive collections of plants and animals accommodate diverse research interests.

Financial Support

All Ph.D. students are guaranteed five years of support, contingent on satisfactory progress toward the degree and professional accomplishments and on normal state funding. Master's students compete for financial support based on the teaching, research, and curatorial opportunities available. Most positions qualify for complete tuition waivers; all positions qualify for lower, in-state tuition rates.

Fellowships. University fellowships available for entering graduate students include Self Graduate Fellowships (*www.ku.edu/~selfpro*), Honors/First-year Fellowships, and several minority fellowships. Dissertation Fellowships are available for resident graduate students. The department nominates candidates for all KU fellowships. Students should be aware of government and private foundation fellowship opportunities.

Assistantships. The department offers Graduate Teaching Assistantships, which involve teaching in undergraduate laboratories or more advanced courses. The Natural History Museum and Biodiversity Research Center offers Curatorial Assistantships for work directly related to curation of specimens in research collections. Graduate Research Assistantships are offered by individual professors in connection with sponsored research programs.

Most assistantships and fellowships cover the academic year; some opportunities for funding via teaching, research, and curatorial assistantships are available for the summer. Applicants seeking financial aid from KU must complete the application process by January 10.

Facilities

Faculty and students are housed mainly in Haworth Hall, the Natural History Museum and Biodiversity Research Center, and at the Kansas Biological Survey. Special facilities in Haworth include controlled-environment rooms, greenhouses, and various instrument rooms, including an excellent electron microscopy lab.

The Natural History Museum has some of the finest natural history collections in the world. It includes the Divisions of Mammalogy, Ornithology, Ichthyology, Herpetology, Vertebrate Paleontology, Entomology, Invertebrate Zoology, Invertebrate Paleontology, Botany, and Paleobotany. These divisions support diverse research endeavors in systematics, evolutionary biology, and ecology, and they coordinate inventories of biological diversity throughout the world. Dyche Hall houses the vertebrate and invertebrate zoology collections. State-of-the-art facilities for molecular systematics and for the processing, analysis, and visualization of biodiversity data are in Dyche Hall. Invertebrate fossil collections are in Lindley Hall and on West Campus. The Snow Entomological Collection is in Snow Hall, and paleobotanical collections are in Haworth Hall. The R.L. McGregor Herbarium harbors collections of recent plants and is particularly comprehensive for the Great Plains flora.

The University of Kansas Field Station and Ecological Reserves (KSR) consists of 2,000 acres of woodland, prairie, old fields, and wetlands within 15 miles of campus and offers many opportunities for graduate student research. The Fitch Natural History Reservation and Baldwin Woods are used primarily to study unmanipulated ecological processes in undisturbed habitats. The John H. Nelson Environmental Study Area is used for experimental ecological studies and has experimental ponds, a dedicated lake and watershed, a common garden, small-mammal enclosures, and a succession facility. KSR is administered by the Kansas Biological Survey, a KU research and service unit and a nonregulatory state agency, whose mission is to gather information on the kinds, distribution, and abundance of plants and animals in Kansas, and to compile, analyze, interpret, and distribute this information.

KU is a member of the Organization for Tropical Studies (OTS), and a number of faculty members and students participate in advanced, field-oriented OTS courses. Graduate students can receive fellowships to participate in courses (e.g., on tropical ecology) taught in Costa Rica or for research projects in that country. Furthermore, OTS has recently expanded its offerings to South Africa.

KU has a modern computer center with ethernet and wireless access available throughout most of the campus. Libraries, especially Spencer Research Library and Anschutz Library, are excellent, as is the Linda Hall Science Library in Kansas City, which has a large collection of scientific journals.

Faculty

David Alexander, Asst. Prof. (Duke). Arthropod locomotion, energetics, and biomechanics.

Helen M. Alexander, Prof. (Duke). Plant population biology; plant-fungi interactions; conservation biology.

James Stephen Ashe, Prof. (Alberta). Systematics and phylogeny of beetles, especially Staphylinidae (rove beetles); relationship between phylogenetic pattern and evolutionary innovation of structures, behaviors, host relationships, and life history traits in staphylinids.

Sharon Billings, Asst. Prof. (Duke). Terrestrial ecosystem ecology and biogeochemistry, particularly as related to global change biology; ecosystem carbon and nitrogen cycling; stable isotope ecology; effects of global change (exotic species, elevated CO_2, ecosystem fragmentation, and land use change) on soil microbial function.

Rafe Brown, Asst. Prof. (Texas). Evolution and diversity of mate recognition systems of amphibians; phylogenetic systematics and character evolution; biodiversity, biogeography, and systematics of amphibians and reptiles of Southeast Asia, with a particular emphasis on the Philippines.

Paulyn Cartwright, Asst. Prof. (Yale). Role of development in the evolution of the cnidarian class Hydrozoa; relationships among gene expression, morphology, and phylogenetic patterns.

Gerrit deBoer, Assoc. Prof. (Maryland). Chemical, behavioral, and neurophysiological basis of host plant selection by lepidopteran insects.

Frank deNoyelles, Prof. (Cornell). Aquatic ecology; lake stratification and phytoplankton vertical migration; reservoir siltation and restoration; fish behavior; conservation issues.

Walter W. Dimmick, Assoc. Prof. (Southern Illinois). Systematics of fish, with special emphasis on molecular-based studies of phylogeny and population structure.

Michael S. Engel, Assoc. Prof. (Cornell). Paleontology, systematics, and phylogeny of Hymenoptera (particularly bees), Neuropterida, and Paleozoic insect orders; biology of bees.

Daphne G. Fautin, Prof. (Berkeley). Reproductive biology of marine animals; marine symbioses; coral reef community structure; systematics/taxonomy of sea anemones; coral phylogeny.

Bryan L. Foster, Assoc. Prof. (Michigan State). Plant community ecology; grassland biodiversity; ecosystem dynamics; disturbance ecology; restoration ecology.

Jennifer Gleason, Asst. Prof. (Yale). Evolutionary behavioral genetics; courtship behavior and speciation in *Drosophila*; quantitative genetics; molecular evolution.

Michael D. Greenfield, Prof. (Wisconsin). Behavioral ecology; sexual selection and animal communication, with special emphases on the evolution and function of acoustic signaling systems in insects.

Christopher H. Haufler, Prof. (Indiana). Systematic botany; coordinating diverse sources of data to test hypotheses of evolutionary history, focusing primarily on pteridophytes; species, speciation, and polyploidy.

Lena Hileman, Asst. Prof. (Harvard). Evolutionary developmental biology, integrating phylogenetic, molecular evolutionary and molecular developmental approaches to understand how the evolution of developmental programs leads to diversity floral form.

Rudolf Jander, Prof. (Munich). Animal behavior, with emphasis on orientation perception and learning.

Kirsten Jensen, Asst. Prof. (Connecticut). Parasitology; taxonomy and systematics of elasmobranch cestodes; morphology, diversity, and host specificity.

John Kelly, Assoc. Prof. (Chicago). Evolutionary genetics; quantitative genetics; plant population biology; molecular evolution.

Leonard Krishtalka, Prof. (Texas Tech). Mammalian paleobiology, systematics, and evolution; biodiversity surveys, collections, and informatics; museum management.

Catherine Loudon, Assoc. Prof. (Duke). Biomechanics; sensory physiology of insects; biological fluid flow; physiological ecology.

Craig E. Martin, Prof. and Chair (Duke). Ecological plant physiology; Crassulacean acid metabolism; environmental and biochemical limits on photosynthesis; morphological influences on ecophysiology; ecophysiology of epiphytes, succulents, C_4 plants, including prairie plants.

Larry D. Martin, Prof. (Kansas). Vertebrate paleontology; functional morphology; community evolution.

Edward A. Martinko, Prof. (Kansas). Remote sensing of vegetation; landscape analysis; successional change in insect communities.

Mark E. Mort, Asst. Prof. (Washington State). Angiosperm systematics, with an emphasis on Crassulaceae (stonecrops); morphological and physiological evolution of flowering plants; diversification of island plant taxa.

Maria E. Orive, Assoc. Prof. (Berkeley). Theoretical population genetics; life history evolution; relationship of population structure and life-history attributes to gene flow, hybridization, and genetic diversity.

A. Townsend Peterson, Prof. (Chicago). Biodiversity of Neotropical birds; conservation biology; diversification, evolution, and speciation; biogeography.

Raymond Pierotti, Assoc. Prof. (Dalhousie). Evolutionary ecology and population biology of birds and mammals, with special emphasis on the dynamics of parental care, mate choice, and hybridization; traditional knowledge of indigenous peoples.

Garrick Skalski, Asst. Prof. (North Carolina State). Quantitative behavior, ecology, and evolution; mathematical models; aquatic field biology, with focus on stream fishes.

Norman A. Slade, Prof. (Utah State). Mammalian population ecology and quantitative methods.

Deborah Smith, Assoc. Prof. (Cornell). Molecular genetic studies in systematics and population biology of insects and spiders, particularly honey bees and tropical social spiders.

Val H. Smith, Prof. (Minnesota). Ecosystem ecology, with special emphasis on the relationship between resource supplies and the structure and function of biological systems; phytoplankton ecology, particularly bloom-forming cyanobacteria; microbial ecology; relationships between host nutrition and the outcome of disease.

Edith L. Taylor, Prof. (Ohio State). Fossil tree rings and paleoclimate; distribution and diversity of Antarctic fossil floras; function and phylogenetic trends in fossil phloem.

Orley R. Taylor, Jr., Prof. (Connecticut). Reproductive isolating mechanisms in insects; ecology of Lepidoptera; pollination biology; plant population biology; ecology, genetics, behavior, and mating biology of honey bees.

Thomas N. Taylor, Roy A. Roberts Distinguished Prof. (Illinois). Evolution and diversity of Antarctic floras; Paleozoic and Mesozoic paleobotany and palynology; fossil fungal interactions; symbioses; origin of land plants; plant/animal interactions in the fossil record; origin of flowering plants.

James H. Thorp, Prof. (North Carolina State). Community-ecosystem ecology of aquatic systems, especially large rivers; regulation of benthic and planktonic food webs; carbon cycling in aquatic food webs; rehabilitation and management of rivers; ecology of freshwater invertebrates.

Robert M. Timm, Assoc. Prof. (Minnesota). Systematics and ecology of tropical mammals; host-parasite coevolution; mammal conservation in the tropics.

Linda Trueb, Prof. (Kansas). Amphibian systematics and morphology, with special emphasis on fossil and Recent anurans and osteology.

Joy K. Ward, Asst. Prof. (Duke). Evolutionary plant ecophysiology; global change ecology; paleoecology; global change effects on plant evolution; plant responses to low and elevated carbon dioxide; responses of vegetation to past climate change; ecophysiology of dioecious species (gender responses).

Edward O. Wiley III, Prof. (City University of New York). Fish systematics and evolution; systematic and biogeographic theory; evolutionary theory.

Adjunct, Courtesy, and Emeritus Faculty Members

These members, either affiliate or active emeritus, may serve on or, under special circumstances, chair student advisory committees.

Kenneth B. Armitage, Baumgartner Distinguished Prof. Emeritus (Wisconsin). Behavioral and physiological ecology; social biology and life history strategies of ground squirrels.

J. Gregory Burg, Courtesy Asst. Prof.; Asst. Dir., Undergrad. Biol. (Penn State). Population biology and behavior of ixodid ticks, with emphasis on vector species.

William H. Busby, Courtesy Asst. Prof.; Kansas Biol. Survey (Florida). Conservation biology of the Great Plains fauna, especially birds; plant/pollinator interactions.

George W. Byers, Prof. Emeritus (Michigan). Biology and systematics of Tipulidae (Diptera) and Mecoptera.

Daniel J. Crawford, Adjunct Prof. (Iowa). Molecular systematic studies of Asteraceae and Lemnaceae; evaluation and phylogeny of plants on oceanic islands.

Bruce Cutler, Courtesy Assoc. Prof.; Dir., Microscopy & Electronic Imaging Lab. (Minnesota). Ultrastructure of arthropod cuticle and cuticular structures; taxonomy and biology of jumping spiders; spider-ant interactions.

William E. Duellman, Prof. Emeritus (Michigan). Evolutionary biology of amphibians, with special emphasis on reproductive adaptations in anurans; systematics and biogeography of amphibians and reptiles, especially in the Neotropics; tropical biodiversity.

Douglas Eifler, Adjunct Asst. Prof.; Haskell Indian Nations University (Harvard). Herpetology; ecology and behavior of lizards.

Henry S. Fitch, Prof. Emeritus (Berkeley). Vertebrate ecology; ecology and behavior of reptiles, especially snakes; long-term studies of successional change.

Johanna Foster, Adjunct Asst. Prof.; Johnson County Community College (Kansas). Community ecology; insect ecology, particularly in grasslands.

Craig C. Freeman, Courtesy Assoc. Prof.; McGregor Herbarium (Kansas State). Floristics of the Great Plains; systematics of *Senecio* (Asteraceae).

Robert Hagen, Courtesy Asst. Prof. (Cornell). Insect ecology and population genetics.

Donald Huggins, Courtesy Asst. Prof.; Kansas Biol. Survey (Kansas). Aquatic ecology; anthropogenic impacts to lotic ecosystems.

Philip S. Humphrey, Prof. Emeritus (Michigan). Systematics and distribution of birds of Fuego-Patagonia; modern museum management theory; history of KU museums.

Richard F. Johnston, Prof. Emeritus (Berkeley). Evolutionary biology of house sparrows; population biology of feral pigeons; structure of bird communities.

Kelly Kindscher, Courtesy Assoc. Prof.; Kansas Biol. Survey (Kansas). Prairie and wetland plant community ecology; ethnobotany; restoration ecology.

Robert W. Lichtwardt, Prof. Emeritus (Illinois). Taxonomy and evolution of trichomycetes and their hosts, with special emphasis on the dipteran family Chironomidae (midges).

Bruce S. Lieberman, Courtesy Assoc. Prof.; Geology (Columbia). Macroevolutionary theory; levels of selection; biogeography; phylogenetic analysis of trilobites.

Stanford L. Loeb, Courtesy Asst. Prof.; Environ. Studies Program (California-Davis). Limnology; aquatic ecology; aquatic primary productivity; relationship between land-use activities and water quality.

Charles D. Michener, Watkins Distinguished Prof. Emeritus (Berkeley). Origin and evolution of social behavior in bees; kin recognition and behavior; systematics, phylogeny, and biogeography of bees.

Richard Prum, Adjunct Prof.; Yale University (Michigan). Phylogenetic systematics, evolution, morphology, and behavior of birds.

Valery J. Terwilliger, Courtesy Assoc. Prof.; Geography (California). Plant and soil water relations; use of stable isotopes in understanding carbon and water use properties of co-occurring tropical trees; plant ecophysiology.

Andrew M. Torres, Prof. Emeritus (Indiana). Late Paleozoic and Early Mesozoic calcareous algae.

Michael Tourtellot, Adjunct Asst. Prof. (Kansas). Computer simulation and data analysis.

Cover photos: Doug Koch, Elissa Monroe, and Aaron Paden. Design: Mo Issa. Produced by the KU Office of University Relations, 2005.