

# Population Biology, Ecology and Evolution



EMORY  
LANEY  
GRADUATE  
SCHOOL



Population biology studies biological mechanisms across levels of organization from the molecular forces involved in genome evolution to the networks of species in complex ecological systems. Scientists in this challenging field continually cross traditional disciplinary and methodological boundaries to understand the evolution, organization and dynamics of natural populations.

Emory's program in Population Biology, Ecology and Evolution (PBEE) focuses on two areas: the population biology of infectious diseases, and molecular evolution and evolutionary genetics. It offers training in research methods ranging from field studies to laboratory work to mathematical modeling.

## Training for Research

The program is committed to training outstanding researchers capable of original work at the forefront of contemporary interdisciplinary biological science. Coursework provides students with the basic knowledge and skills needed to become self-educating researchers. Most graduate teaching consists of individualized instruction between students and their advisors in a context of cooperative research and discovery.

Students should think of the graduate program not as the next step in their education but as the first step in their professional careers. Almost from the start, students do many of the same things that professional researchers do: read scientific literature; plan, conduct and analyze experiments; write grant proposals; and present and publish the results of their research.

## CDC Field Training

In cooperation with the U.S. Centers for Disease Control and Prevention, PBEE offers all their students opportunities to pursue research projects with local scientists at field sites. To date, these include Montana, New Mexico, India, Kenya, and Venezuela; in the near future, we expect the list to include sites in Puerto Rico, Argentina, and Thailand.

We strongly encourage all students to spend some research rotation time at one of these sites. Our curriculum is structured to accommodate such time away, and we provide financial support for field experiences.

## Seminar Series

PBEE hosts weekly seminars designed to keep both students and faculty in contact with advanced research taking place in the U.S. and the world. Visitors are invited by a student-faculty committee and represent a broad spectrum of population biology and related fields.

DISCOVER

the unexpected

Recent visitors include

- Don Burke, Johns Hopkins
- Dieter Ebert, Zoological Institute, Switzerland
- Evan Eichler, University of Washington
- Sunetra Gupta, Oxford University
- Bob Holt, University of Florida
- Steve Hubbell, University of Georgia
- Mark Lipsitch, Harvard

## Faculty

Program faculty come from across Emory University—from Anthropology, Biology, Chemistry, Environmental Studies, the School of Medicine, the Rollins School of Public Health, the Yerkes National Primate Research Center, and the Emory National Vaccine Center. Some faculty come from nearby institutions like the U.S. Centers for Disease Control & Prevention and the Carter Center.

The program is part of the Graduate Division of Biological and Biomedical Sciences and enjoys close working relationships with students and faculty in the Division's other programs (see final page).

## Students

Our program has a relatively small and close-knit student community. Generally, 20 – 25 students are enrolled at any one time, with a portion being away conducting field research.

Our website has information about all our current students, including research projects.

Our graduates go on to a wide variety of careers. Some recent examples include:

- Post-doctoral researchers: placements include the Max Planck Institute, Utrecht University in The Netherlands, and the Department of Ecology, Evolution and Marine Biology at UCLA
- Assistant professors: placements include North Carolina State University and University of Alabama
- Research Associate, Bergstrom Lab, University of Washington
- MD studies or residence
- Epidemic Intelligence Service, CDC
- Senior Project Manager, Analytical Biological Services, Inc.
- Division of Strategic Stockpile, CDC

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## Student Profile

Beth Kochin is a third-year graduate student in PBEE working with Rustom Anita.

Beth is interested in theoretical immunology and disease dynamics, and she is currently studying the dynamics of acute malaria infections in mice using mathematical models in combination with experimental data.

In her first year in the program, she was supported by a George Woodruff Fellowship from Emory and by PBEE's NIH training grant in the population biology of infectious disease. In Spring 2008, she was awarded a Fannie and John Hertz Foundation Fellowship. This competitive fellowship is offered each year to 15-20 graduate students in applied sciences and engineering, and she was selected among an elite pool of almost 600 applicants. The fellowship provides five years of funding and is valued at \$250,000.

Beth has had a lot of opportunity to travel to conferences and workshops in her first year. She attended a DIMACS workshop on game theoretic approaches to epidemiology where she presented an analysis of chickenpox vaccination, a viral immunology conference, and the Ecology and Evolution of Infectious Diseases conference where she gave a poster on malaria. Next, she will be attending the Summer School in Computational Immunology at Yale.



## Curriculum

Students concentrate in one of the areas of focus, either population biology of infectious disease or molecular evolution and evolutionary genetics.

Students usually complete the program in 4 or 5 years.

A typical timeline looks like this:

Year 1: Required coursework, laboratory rotations

Year 2: Required coursework, elective coursework, select advisor, begin thesis research, qualifying exam

Year 3: Elective coursework, assemble dissertation committee, dissertation research

Year 4+: Dissertation research, written and oral defense

Our website has lists of specific required courses, electives in PBEE and other programs, and much more.

## Student Research Seminars

Students are strongly encouraged to present their research as part of the PBEE Seminar Series. Usually, these presentations are based on research conducted during laboratory or field training rotations. They tend to be scheduled during the fall of students' third year, after required coursework and the qualifying exams are completed. The presentations are an invaluable experience practicing the communications of scientific research and results.

## Training in Teaching

Scientists are often also teachers, whether in formal education or in the process of presenting to lay persons. At Emory, all doctoral students receive training in pedagogy and other elements of teaching, through the Teaching Assistant Training and Teaching Opportunity Program (TATTO) administered by the Graduate School.

After a brief summer workshop (usually before the second year), students are assigned by the Graduate Division of Biological and Biomedical Sciences to assist a faculty member as a lecturer, laboratory instructor or discussion leader for one semester. The Graduate Division offers additional TATTO courses, as well as additional teaching opportunities.

## PBEE Faculty

- Rustom Antia, Ph.D.  
*Associate Professor of Biology*
- George Armelagos, Ph.D.  
*Goodrich C. White Professor, Chair of Anthropology*
- Chris Beck, Ph.D.  
*Senior Lecturer of Biology*
- Greg Dasch, Ph.D.  
*Rickettsial Section Chief, Director, CDC/WHO Collaborating Reference Center for Rickettsia and Bartonella-Associated Diseases, CDC*
- Michael Epstein, Ph.D.  
*Assistant Professor of Human Genetics*
- Nicole Gerardo, Ph.D.  
*Assistant Professor of Biology*
- John Gimnig, Ph.D.  
*Research Biologist, CDC*
- John Glasser, Ph.D.  
*Mathematical Epidemiologist, CDC*
- Keith Klugman, Ph.D.  
*Professor, William H. Foege Chair in Global Health, Rollins School of Public Health*
- Uriel Kitron, Ph.D.  
*Professor/ Chair of Environmental Studies*
- Bruce Levin, Ph.D.  
*Samuel Candler Dobbs Professor of Biology*
- John Lucchesi, Ph.D.  
*Asa Griggs Candler Professor of Biology*
- David Lynn, Ph.D.  
*Candler Professor of Chemistry and Biology*
- John E. McGowan, Ph.D.  
*Professor of Epidemiology, Rollins School of Public Health*
- James Mills, Ph.D.  
*Chief, Medical Ecology Unit, Special Pathogens Branch, CDC*
- Leslie Real, Ph.D.  
*Asa Griggs Candler Professor of Biology*
- Jaap de Roode, Ph.D.  
*Assistant Professor of Biology*
- Katie Rudd, Ph.D.  
*Assistant Professor of Human Genetics*
- Charles Rupprecht, Ph.D.  
*Chief, Rabies Section, CDC*
- Todd Schlenke, Ph.D.  
*Assistant Professor of Biology*
- Stephanie Sherman, Ph.D.  
*Professor, Director of the Genetics and Molecular Biology graduate program*
- David Stephens, MD  
*Stephen W. Schwarzmans Distinguished Professor of Medicine, Executive Associate Dean for Research, School of Medicine*
- Yun Tao, Ph.D.  
*Assistant Professor of Biology*
- Robert Tauxe, Ph.D.  
*Chief, Foodborne and Diarrheal Diseases Branch, Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, CDC*
- James Taylor, Ph.D.  
*Assistant Professor of Biology*
- James Thomas, Ph.D.  
*Assistant Professor of Human Genetics*
- V. Udhayakumar, Ph.D.  
*Chief, Genetics and Immunology Laboratory, Malaria Branch, Division of Parasitic Diseases, CDC*
- Irwin Waldman, Ph.D.  
*Professor of Psychology*
- Lance Waller, Ph.D.,  
*Professor, Rollins School of Public Health*
- Carol Worthman, Ph.D.  
*Samuel Candler Dobbs Professor of Anthropology, Director, Laboratory for Comparative Human Biology*
- Michael Zwick, Ph.D.  
*Assistant Professor of Human Genetics, School of Medicine*

## About the GDBBS

Emory University is one of the major biological research and medical referral centers in the Southeast and is among the fastest growing Medical Centers in the United States. Emory is consistently ranked in the top 20 institutions nationally for NIH research support. Emory was recently named one of the 25 “New Ivies” by *Newsweek*, a testament to its quality and dedication to education.

The Graduate Division of Biological and Biomedical Sciences (GDBBS) has over 460 graduate students in eight interdisciplinary Ph.D. programs:

- Biochemistry, Cell and Developmental Biology
- Genetics and Molecular Biology
- Immunology and Molecular Pathogenesis
- Microbiology and Molecular Genetics
- Molecular and Systems Pharmacology
- Neuroscience
- Nutrition and Health Sciences
- Population Biology, Ecology and Evolution

Over 330 world-renowned researchers mentor students admitted to these programs, giving them a unique opportunity to train with faculty at:

- the American Cancer Society
- the U.S. Centers for Disease Control and Prevention
- Emory College
- the Robert W. Woodruff Health Sciences Center
- the Rollins School of Public Health
- The Carter Center
- the Winship Cancer Institute
- the Yerkes National Primate Research Center

Financial support includes a tuition scholarship, health insurance and stipend (\$24,500 for the 2008-2009 academic year). Funding is guaranteed as long as the student is making satisfactory progress toward their degree. The average time to degree is about 5.5 years. Training is interdisciplinary and students have the flexibility to work with GDBBS faculty outside their program. Students typically perform three rotations before affiliating with a faculty member for their dissertation research.

**The application deadline is January 3rd for the following fall semester.**



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Requests for Additional Information:

RECRUITMENT AND ADMISSIONS

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