Population Biology, Ecology and Evolution

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) aims to provide graduate students the multidisciplinary training required for a successful research and teaching career. PBEE faculty and students pursue a broad range of research questions in a wide variety of experimental systems, ranging from bacteria to humans. A focus on the use of quantitative methods and models during research is a central feature that unites our program. This theme is reflected in the design of our core curriculum and the research projects pursued by our students. Our graduate program has six main areas of inquiry that include: Bioinformatics and Biostatistics, Biology of Species Interactions, Disease Ecology, Ecological and Evolutionary Modeling, Genetics of Complex Traits, and Population and Comparative Genomics.

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.

Professional Development
Laney offers a range of programs that encourages students to develop their professional skills, engage with broader professional communities, and prepare for their careers. Visit gs.emory.edu to learn more.
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.

Recent visitors include:

- David Hughes, Penn State University
- Molly Cummings, University of Texas at Austin
- Sonia Altizer, University of Georgia
- Peter Hudson, Penn State University
- Mary Power, University of California at Berkeley

Faculty

Program faculty are members of the Emory College of Arts and Sciences (Departments of Biology, Chemistry, Environmental Studies, Environmental Sciences, Psychology, and Physics) the Emory University School of Medicine (Departments of Human Genetics, Medicine, Microbiology & Immunology, Neurology, Pediatrics, Psychiatry and Behavioral Sciences), the Emory Rollins School of Public Health (Departments of Bioinformatics and Biostatistics, Environmental Health, and Global Health), the Yerkes National Primate Research Center, the Emory National Vaccine Center, and the U.S. Centers for Disease Control & Prevention (CDC).

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, 25 – 30 students are enrolled at any one time. 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, Stanford University, University of Washington, the University of California at Los Angeles, Princeton University, Washington University, and Oxford University.
- Assistant professors: placements include North Carolina State University and University of Alabama
- MD studies or residence
- Epidemic Intelligence Service Officer, CDC
- Senior Project Manager, Analytical Biological Services, Inc.
- Division of Strategic Stockpile, CDC

Curriculum

Students usually complete the program in 5 years. A typical timeline looks like this:

Year 1: Required coursework, laboratory rotations, select advisor

Year 2: Required coursework, elective coursework, 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 Profile

Erica Harris is a second-year graduate student in PBEE working with Nicole Gerardo and Jaap de Roode. Erica is interested in the ecological and evolutionary interplay between host diet, gut microbiota and parasite infection. She is currently studying the interaction between host plants, monarch butterflies, and their protozoan parasites.

In her first year in the program, Erica was supported by the Laney Graduate School. In Spring 2014, she was awarded a graduate student fellowship from the National Science Foundation. The fellowship supports outstanding graduate students in NSF-supported disciplines, and provides funding for three years.

Erica has embraced the opportunity to learn different techniques during her rotations in the PBEE program: beyond mastering entomological, parasitological and microbiological techniques, she has worked with Tim Read to learn the bioinformatics tools she needs for her research. In addition to her research, Erica runs an active outreach and community service program. She was an invited panelist and oral research presentation moderator at the Mellon Mays Undergraduate Fellowship SE Regional Conference in 2013 and has served as mentor and residential teaching assistant for Minority Introduction to Engineering and Science at MIT. She is a member of the PBEE seminar and executive committees and mentors undergraduate students.
Student Research Seminars

Students are required to present their research as part of the PBEE Seminar Series. These presentations are based upon completed, ongoing or planned dissertation research. Each student seminar is 20 minutes in length (15 minutes for the presentation, 5 minutes for questions), similar to that typical of presentations at national meetings. A student typically presents their first seminar during the spring of their third year, and then annually thereafter. The presentations provide students an invaluable experience practicing the communications of scientific research and results, while providing an opportunity to receive feedback from program faculty, postdoctoral fellows, and students.

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.
  Professor of Biology
- Chris Beck, Ph.D.
  Professor of Pedagogy in Biology
- Berry Brosi, Ph.D.
  Assistant Professor of Environmental Sciences
- Karen Connelly, Ph.D.
  Assistant Professor of Human Genetics, School of Medicine
- Greg Dasch, Ph.D.
  Laboratory Chief and Supervisory Microbiologist, Rickettsial Section, CDC
- Michael Epstein, Ph.D.
  Associate Professor of Human Genetics, School of Medicine
- Nicole Gerardo, Ph.D.
  Associate Professor of Biology
- Tom Gillespie, Ph.D.
  Associate Professor of Environmental Sciences
- John Gimnig, Ph.D.
  Research Entomologist, Division of Parasitic Diseases, CDC
- John Glasser, Ph.D.
  Medical Epidemiologist, CDC
- Joanna Goldberg, Ph.D.
  Professor of Pediatrics, School of Medicine
- Meleah Hickman, Ph.D.
  Assistant Professor of Biology
- Minsu Kim, Ph.D.
  Assistant Professor of Physics
- Uriel Kitron, Ph.D.
  Goodrich C. White Professor & Chair of Environmental Sciences
- Keith Klugman, Ph.D.
  Professor of Epidemiology
- Subra Kugathasan, M.D.
  Marcus Professor of Pediatric Gastroenterology & Professor of Human Genetics, School of Medicine
- Bruce Levin, Ph.D.
  Samuel Candler Dobbs Professor of Biology
- Karen Levy, Ph.D.
  Assistant Professor of Environmental Health, Rollins School of Public Health
- David Lynn, Ph.D.
  Asa Griggs Candler Professor of Chemistry and Biology & Chair of Chemistry
- Donna Maney, Ph.D.
  Associate Professor of Psychology
- Levi Moran, Ph.D.
  Assistant Professor of Biology
- Ilya Nememman, Ph.D.
  Associate Professor of Physics and Biology
- Timothy Real, Ph.D.
  Associate Professor of Medicine and Human Genetics
- Leslie Real, Ph.D.
  Asa Griggs Candler Professor of Biology
- Justin Remais, Ph.D.
  Associate Professor of Environmental Health, Rollins School of Public Health
- Jacobus de Roode, Ph.D.
  Associate Professor of Biology
- William Shaffer, Ph.D.
  Professor of Microbiology and Immunology, School of Medicine
- Stephanie Sherman, Ph.D.
  Professor of Human Genetics, School of Medicine
- Robert Tauxe, Ph.D.
  Deputy Director, Division of Foodborne, Waterborne and Environmental Diseases, CDC
- Venkatachalam Udhayakumar, Ph.D.
  Chief, Genetics and Immunology Laboratory, Division of Parasitic Diseases, CDC
- Gonzalo Vasquez-Prokopec, Ph.D.
  Assistant Professor of Environmental Sciences
- Jorge Vidal, Ph.D.
  Assistant Professor of Global Health, Rollins School of Public Health
- Irwin Waldman, Ph.D.
  Professor of Psychology
- Lance Waller, Ph.D.
  Professor & Chair of Biostatistics and Bioinformatics, Rollins School of Public Health
- Howie Weiss, Ph.D.
  Professor of Mathematics, Georgia Institute of Technology
- Thomas Wingo, M.D.
  Assistant Professor or Neurology, School of Medicine
- Hao Wu, Ph.D.
  Assistant Professor of Biostatistics and Bioinformatics, Rollins School of Public Health
- Shozo Yokoyama, Ph.D.
  Asa Griggs Candler Professor of Biology
- Larry Young, Ph.D.
  William P. Timmie Professor of Psychiatry and Behavioral Sciences, School of Medicine
  Division Chief of Behavioral Neuroscience and Psychiatric Disorders, Yerkes National Primate Center
- Michael Zwick, Ph.D.
  Associate Professor of Human Genetics, School of Medicine

PBEE Areas of Inquiry: [http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/research/inquiry.html](http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/research/inquiry.html)
Detailed Faculty Profiles: [http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/faculty.htm](http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/faculty.htm)
About Emory

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. Emory is recognized as a leader in higher education in sustainability and has won numerous awards. The Best Colleges has placed Emory in the top 10 in the nation in the categories of greenest universities and the most beautiful college campuses.

The Graduate Division of Biological and Biomedical Sciences (GDBBS) has around 500 graduate students in eight interdisciplinary Ph.D. programs:

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

Over 360 world-renowned researchers mentor students admitted to these programs, giving them a unique opportunity to train with faculty at:

- 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 a competitive stipend ($29,000 for the 2015 – 2016 academic year). Funding is guaranteed as long as the student is making satisfactory progress toward their degree. The average time to degree is about 6 years. Training is interdisciplinary and students have the flexibility to perform their thesis work with GDBBS faculty outside their chosen program. Students typically perform three rotations before affiliating with a faculty member for their dissertation research.

The application deadline is December 1st for the following fall semester.