



EMORY
LANEY
GRADUATE
SCHOOL

Population Biology,
Ecology, and Evolution
Graduate Program

Graduate Division of Biological
and Biomedical Sciences

GRADUATE PROGRAM IN
POPULATION BIOLOGY, ECOLOGY, AND
EVOLUTION
EMORY UNIVERSITY

STUDENT AND FACULTY GUIDE
2024-2025

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I. Purpose and Goals of the Graduate Program

*“The most interesting parameter in the statistics of natural populations is the actual variation, its amount, and its nature. The amount of variation is different from character to character and from species to species. Darwin could not have arrived at a theory of natural selection if he had not adopted **populational thinking.**”*

Ernst Mayr
The Growth of Biological Thought

Ernst Mayr argued that Darwin’s key contribution to the foundation of biological thought lay in the recognition of individual variation within populations. Darwin’s adoption of “populational thinking” dramatically changed the biological sciences, opening new avenues of research focused on understanding the basis, causes, maintenance, dynamics, and effects of variation in natural populations. These fundamental questions drive the research of the students and faculty members who form the graduate program in Population Biology, Ecology and Evolution (PBEE).

Research topics pursued by PBEE faculty members, postdoctoral fellows, and graduate students are truly diverse. One central feature unites our program: the focus on the use of quantitative methods and models during the course of our research. This theme is reflected in the design of our core curriculum and the types of research projects pursued by our trainees. Our faculty are committed to pursuing innovative, interdisciplinary research and instruction that cuts across boundary lines dividing traditional disciplines and provides a rich educational experience for our students. Our focus on quantitative methods and models sets us apart from other graduate programs in the Graduate Division of Biological and Biomedical Sciences (GDBBS) and influences the types of graduate students and postdoctoral fellows we recruit into the program. Our program includes six main areas of inquiry, which broadly encompass major areas of research pursued by our graduate students, postdoctoral fellows, and faculty mentors. These include (in alphabetical order):

A. Bioinformatics and Biostatistics

The rapid increase in the size and complexity of population biology datasets require novel tools and improved methods of analysis, visualization and data handling. Developing and critically evaluating these tools and approaches is a core focus of PBEE members performing research in this area of inquiry. The types of population biology problems addressed are diverse. Some of these include inventing improved methods of genetic mapping for genome-wide association and family-based linkage studies and developing software frameworks for analyzing large genomics datasets.

Keywords: bioinformatics, family-based linkage, genome assembly and annotation, genome-wide association, microbiome, high throughput sequencing data analysis, quantitative genetics, spatial statistics, statistical genetics

B. Biology of Species Interactions

Interactions between species, whether beneficial or harmful, are ubiquitous in nature. These interactions may include two players (e.g. a host and its bacterial symbiont), multiple players (e.g. butterflies, their larval food plants and protozoan parasites) or an entire community (e.g. plant-pollinator networks at the landscape scale). PBEE members performing research in this area use experimental approaches, including experimental evolution, to understand the dynamics of these interactions and the importance of ecological context in shaping these interactions. We also use genetic and genomic approaches to uncover population structure, molecular mechanisms and genetic variation underlying the traits that shape species interactions. A major aim of our work is to understand how such interactions drive the population dynamics and evolution of the respective species, and we use this biological understanding to apply our work to



conservation and management questions in a variety of settings.

Keywords: community ecology, mutualism, parasitism, symbioses, microbiome

C. Disease Ecology

Related to Biology of Species Interactions, the major focus of disease ecology is to gain a greater understanding of how diseases spread, the interactions between the hosts, pathogens and environment, and ultimately the types of changes observed in natural populations. PBEE members performing research in this area use experimental and model-based approaches to address a diverse collection of problems with the goal of gaining a greater understanding of the spatio-temporal dynamics of disease. Problems addressed include the phylogenetic history and origin of pathogens, the population dynamics and control of infectious diseases, and the processes contributing to the evolution of drug resistance.

Keywords: eco--epidemiology, immunity, landscape genetics, microbiome, molecular epidemiology, vector--borne diseases, virulence evolution, within--host dynamics, zoonotic diseases, ecological immunology

D. Ecological and Evolutionary Modeling

Mathematical modeling of complex ecological and evolutionary processes can provide unique insights to biological systems, help elucidate unanticipated processes at work in populations, and provide testable predictions for empirical studies. Building and evaluating such models is central to research in this area of inquiry. PBEE members performing research in this area use mathematical models to address a diverse collection of problems. These include within-host dynamics of the immune response, the evolution of drug resistance, models describing the spatial-temporal dynamics of infectious diseases, and dynamics of microbial populations.

Keywords: community ecology, evolution of drug resistance, microbial population dynamics, phylodynamics, spatial dynamics, transmission dynamics, within--host dynamics

E. Genetics of Complex Traits

Understanding the genetic basis of complex traits is a central challenge in contemporary biology. Research in this area aims to combine the latest genomics technologies with sophisticated statistical models in order to better understand the how genomic variation leads to the phenotypic diversity observed in natural populations. PBEE members performing research in this area address a wide variety of problems. These include the nature of complex disease traits in contemporary human populations, the genetic basis of pathogen virulence and toxin resistance, and the structure, replication and segregation of chromosomes.

Keywords: adaptation, diversification, epigenetics, genetics, genetic mapping, genome-wide association, human disease, human genetics, immunity, infectious disease, population genomics, quantitative genetics, resequencing, next-generation sequencing technologies, speciation, targeted enrichment, transcriptome

F. Population and Comparative Genomics

Characterizing the patterns of genomic variation within and between species is a major goal of this research area. We explore how these data can be used to test evolutionary hypotheses and identify genomic regions with unusual or novel functions. PBEE members performing research in this area work in a variety of systems, use the latest next-generation sequencing and genotyping technologies, and analyze data using bioinformatic and computational biology tools.



Keywords: chromosome structure, copy number variation, demographic inference, evolution of gene regulation, genome structure and function, human genomics, insertion-deletion variation, microbial genomics, positive and negative selection, second-generation sequencing technologies, single nucleotide polymorphisms

These broad areas of inquiry are uniquely contained within the Emory University Graduate Program in Population Biology, Ecology, and Evolution (PBEE), which is part of the Graduate Division of Biological and Biomedical Sciences (GDBBS), within the Laney Graduate School (LGS). Program faculty are members of the following units:

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

A complete listing of PBEE faculty members can be found at http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/faculty.htm. A detailed description of all aspects of the PBEE program can be found on the program's website (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/).

II. Philosophy of Graduate Training

The graduate program in PBEE provides multidisciplinary, research-focused training with a number of overarching goals. First, we require that students become proficient at reading and critically evaluating the primary scientific literature. This includes both older, seminal papers and more current, cutting-edge manuscripts. Given the vast PBEE literature, both in terms of subject areas and historical depth, this can prove a real challenge. We want students to develop their critical thinking in order to devise multiple alternative hypotheses that can then be tested in their own dissertation research. The ultimate goal is to enable each student to “think like a scientist” and remain focused on the significant questions their research aims to explore. We strongly believe this type of training is essential for our graduate students to pursue successful research and teaching career.

Our formal training program contains three main areas of emphasis that mutually reinforce one another and are vital to the development of graduate students. The first area consists of an academically challenging set of graduate-level core courses that require students to learn the history of the field in addition to currently accepted scientific facts and theories. The formal course work is intended to provide basic knowledge as well as guidance for self-motivated learning by the student scholar. Such self-education is a full-time job and must be an active rather than a passive process.

The second area is designed to help students develop their oral and written communication skills and hone their ability to critically evaluate the scientific literature. This is accomplished in a variety of ways including mandatory attendance at a weekly PBEE seminar, student presentations of their own research work to the



PBEE faculty and students, and participation in small group Advanced Topics courses led by PBEE faculty members.

Our third area of emphasis focuses on teaching graduate students how to plan, conduct, and assess primary research, with an eye toward preparing to make original scientific contributions. First-year students perform laboratory rotations with up to three different faculty members in order to gauge different perspectives and approaches to the performance of scientific research. Ultimately, most of the individualized instruction required for this aim occurs as a result of interactions between students and their advisors, in an atmosphere of cooperative research and discovery. The overall goal of this three-pronged multidisciplinary training program is to develop superb research scientists with the skills to become self-sufficient in continuing education beyond graduate school. The program also prepares the student to teach PBEE and other related disciplines in professional and graduate schools, and helps the students to assess their strengths and interests as they consider future career goals.

III. Program Director and Executive Committee

The graduate program in PBEE is coordinated by a member of the program faculty who serves as Program Director (PD). In conjunction with the Director of Graduate Studies (DGS) and the Executive Committee, the PD is also responsible for coordinating faculty in monitoring the performance of students, scheduling and organizing the qualifying examination, overseeing selection of research advisors and dissertation committees, and is the representative of the program to the Graduate School Executive Committee which oversees policy and curricular matters. The PD and Executive Committee are responsible for providing information on the graduate program to prospective applicants, overseeing admissions, and working with each student to develop an appropriate program of study in the early stages of training before the selection of a research advisor.

The PD serves a three-year term with the possibility of renewal for an additional three years, typically beginning on June 1 and ending May 31. Nominations for the position of PD are solicited from faculty in the program and final selection is made by the Executive Committee, and approved by the Director of the GDBBS; final approval comes from the Dean of Laney Graduate School. The DGS also serves a three-year term with the possibility of renewal for an additional three years, typically beginning on June 1 and ending May 31. The PD and DGS may both change in a given year, although we prefer to have these positions roll over in different years.

Other faculty leadership positions include the Director of Recruiting, the Director of the Seminar Committee and the Director of the Curriculum Committee. These positions are typically three years with the opportunity of renewal. Solicitations are taken from PBEE faculty and final selections are made by the PBEE Executive Committee. Positions typically begin on June 1 and end May 31.

The Executive Committee has approximately 12 members total: 10 faculty and 2 graduate students. The PD, DGS, Principal Investigator of any training grant with significant PBEE participation, Curriculum Committee Director, Recruiting Director, and Seminar Director are automatically members of the Executive Committee. The other faculty members are selected by the PBEE faculty. The Executive Committee terms will be for three years typically beginning on June 1 and ending on May 31. Terms of Executive Committee members may be renewed. Typically, no more than two new members are elected each year. Two PBEE graduate students are elected by their peers to serve on the Executive Committee. Their terms will be two years in length and also typically begin on June 1 and end on May 31.



IV. Admission Overview

A. Admission Criteria

Admission information can be obtained from the Laney Graduate School website (<http://www.gs.emory.edu/admissions/index.html>) and from the Graduate Division of Biological and Biomedical Sciences (GDBBS) website (<http://www.biomed.emory.edu/admissions/index.html>). The usual admission deadline is December 1 for admission starting the following fall semester. Each applicant is judged on the merits of his/her overall record. A minor deficiency in any one area will not necessarily exclude the applicant from admission, especially if compensated for by exceptional strength in other areas. The specific criteria examined include:

1. Undergraduate Curriculum and Research Experience

Our most competitive applicants demonstrate superior performance in challenging and well-rounded undergraduate educational experiences that can be found at a wide variety of small and large educational institutions. We particularly wish to recruit students with strong backgrounds in quantitative fields. Preference will be given to applicants who have taken courses in biology, genetics, chemistry (physical, organic, biochemistry), mathematics (calculus, statistics, linear algebra), and physics. Research experience, either as an undergraduate or afterwards, is looked upon favorably and should be emphasized by the applicant if at all possible. Applicants should have an overall undergraduate grade point average (GPA) of B or better (i.e., at least 3.0 on a scale of A = 4.0), though this is not an absolute requirement. Applicants who have taken graduate-level courses should typically have at least a B average in these.

2. Letters of Recommendation

Three evaluations are required from individuals who are familiar with the applicant and his/her capabilities. Considerable weight is given to recommendations by faculty members or others who have first-hand knowledge of the academic and research potential of the applicant.

3. Statement of Goals

Applicants should provide a clear, concise statement of their reasons for wanting to enter the graduate program in PBEE. They should also indicate how such training fits into their long-term career goals.

4. Evaluation of Candidates

Completed applications are evaluated by a committee composed of PBEE faculty. Interviews with the applicant during a special recruiting weekend, usually held in late January to early February, is a critical part of the application process. Typically, no more than ten students can be admitted to the program each year.

Emory is an equal opportunity employer, and qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, protected veteran status or other characteristics protected by state or federal law. Emory University does not discriminate in admissions, educational programs, or employment, including recruitment, hiring, promotions, transfers, discipline, terminations, wage and salary administration, benefits, and training. Students, faculty, and staff are assured of participation in university programs and in the use of facilities without such discrimination. Emory University complies with Section 503 of the Rehabilitation Act of 1973, the Vietnam Era Veteran's Readjustment Assistance Act, and applicable executive orders, federal and state regulations regarding nondiscrimination, equal opportunity, and affirmative action (for protected veterans and individuals with



disabilities). Inquiries regarding this policy should be directed to the Emory University Department of Equity and Civil Rights Compliance, 201 Dowman Drive, Administration Building, Atlanta, GA 30322. Telephone: 404-727-9867 (V) | 404-712-2049 (TDD).

B. After Admission to PBEE

Admitted students should expect to receive information from the LGS, the GDBBS, and the PBEE program after accepting an offer of admission to the PBEE program at Emory. The LGS and GDBBS will send information to incoming students during the spring and summer before the beginning of the fall semester to assist them with finding housing and registering for classes. The PBEE program will also be contacting incoming students to share important information. Incoming students should immediately begin to identify and contact faculty they may wish to rotate with. It is critical that incoming students ensure that they have a working email address where they may be contacted.

C. Upon Arrival

Students are typically registered for classes by the PBEE program and GDBBS prior to their arrival to Atlanta. Nevertheless, upon arriving in Atlanta, the new graduate student should contact the PBEE Program Administrator (PA), the DGS, and the PD in order to answer any questions and confirm the scheduling of courses and orientation. Students will also need to obtain an Emory ID card and follow instructions from LGS regarding paperwork related to receiving their stipend. New students must also make arrangements for and meet with faculty supervising their fall semester rotation projects. There will be a reception at the beginning of the term for the new students to get acquainted with the other students and faculty of the program, as well as an orientation session to cover various aspects of the program.

D. International Students and Language Requirements

The policy of the LGS is that all new international students must participate in English language assessments prior to registration and enrollment. If deemed necessary, students may be required to complete English as a Second Language courses. Further information about the can be obtained the LGS website (<http://gs.emory.edu/academics/elsp/index.html>).

E. LGS Student Honor Code and Conduct Code

Upon admission, all students should familiarize themselves with the Laney Graduate School Honor Code and the Laney Graduate School Conduct Code as outlined in the Graduate Student Handbook (<http://gs.emory.edu/handbook/>). This deals with the professional standards and conduct demanded of all graduate students, as well as the procedures for reporting and adjudicating any violations. Throughout the course of pursuing their Ph.D. in PBEE, students are required to adhere to this LGS Honor Code and Conduct Code. Continuance of stipend support is predicated upon satisfactory progress by the student toward a degree and adherence to the Honor and Conduct Codes.

V. Advising

The timeline and major milestones for a PBEE graduate student can be found in Appendix A1. Upon entering the PBEE program, the DGS will serve as a temporary advisor until each student has chosen a thesis advisor. A thesis advisor should be chosen and approved by the DGS following the completion of the student's first academic year (prior to the summer of their second year) as detailed below.



VI. Laboratory Research Rotations

During the first year in the program, each student will have a chance to perform research in faculty laboratories. These laboratory "rotations" provide students with an early opportunity for research experience and are designed to expose the student to different research approaches. These laboratory experiences will help familiarize the student with some of the many techniques used to examine research problems in population biology. As such, the rotations can help define a student's own research interests. This is an important first step in determining an area for a thesis project and the selection of a research advisor. The laboratory research rotations also give the faculty an opportunity to observe and evaluate the performance of first-year students in a research setting. Rotations can be performed with any faculty member in the Division, irrespective of the program affiliation of that faculty member, with the approval of the DGS.

Students are typically required to complete a total of three (3) laboratory rotations. In some instances, students entering the program with significant prior research experience may be allowed to perform fewer rotations at the discretion of the PD and DGS. Students interested in performing fewer than the usual three rotations should make an appointment to speak with the PD and/or DGS. During the semester in which the students satisfy a rotation requirement, they should register for IBS 597R (Laboratory Rotations) for a letter grade. MD/PhD students normally complete their rotations during the summer around their required health science classes in the School of Medicine. In rare instances, students may perform their first rotation in the summer prior to their first semester of classes. Students are encouraged to register any accommodations that may impact their rotation research using the portal provided by the Department of Accessibility Services (<https://accessibility.emory.edu/index.html>), indicating IBS 597R as the class for which they request accommodations. The registered accommodations will be communicated to the rotation research advisors by the DGS.

The three rotations will be completed during the fall and spring academic semesters during the student's first year in graduate school. The three rotations are completed according to the following schedule:

First Rotation: One month into classes (end of September) – Friday preceding Thanksgiving week

Second Rotation: Start of Classes (beginning of January) - Friday preceding Emory Spring break

Third Rotation: Monday following Emory Spring break – End of Classes (end of April)

Incoming first year students should choose and directly contact three or four PBEE faculty members whose research interests them during the summer before they begin their graduate studies. In arranging these rotations, every attempt will be made to accommodate students who are already interested in the research programs of particular faculty members. Students should also arrange to meet with these faculty members during the beginning of the fall semester. Based on these meetings, each student can make an informed decision as to the most appropriate lab for the first rotation.

After selecting a rotation advisor, each student must submit a completed PBEE Rotation Plan Form to the DGS for approval (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html). This proposal is a brief (one-page) description of the planned research and should be signed and dated by both the student and the rotation advisor. Students who wish to perform a rotation in the laboratory of someone who is not a member of the Graduate Program in PBEE must receive prior approval from the DGS or PD. Once the DGS has signed and dated the PBEE Rotation Plan Form, the student needs to submit the form to the PA.



At the end of each rotation, students are required to submit the PBEE Rotation Summary Form to the DGS (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html). The rotation summary should be signed and dated by both the student and the rotation advisor. The rotation advisor should assign the student a letter grade that should be emailed directly to the DGS. The rotation report and grade should be submitted to the PA at the completion of the rotation. Although, in many cases, little experimental progress will be made by the student in such a short period of time, the final summary can be useful for discussing analytical or methodological problems that were encountered during the rotation. The summary should be succinctly written and no more than one page in length.

Students who have not submitted a PBEE Rotation Summary Form by the due date will receive a grade of Incomplete (I) for the rotation. According to LGS guidelines, any student who receives an Incomplete for two or more courses will be automatically placed on probation within the graduate program. If the Rotation Summary Form is not received within two weeks of the end of the semester, the Incomplete will be changed to an F leading to a recommendation for dismissal.



VII. Courses and Related Program Requirements

A. Overview of Course Registration

During any given semester each PBEE student must register for at least 9 credit hours to maintain status as a full-time student. During the first two years in graduate school, this is accomplished by registering for a combination of formal courses, seminars, and research credits for time spent in the laboratory. From the third year onwards after a student advances to candidacy, this is usually accomplished largely by registering for research, seminar, and limited formal course credits.

B. Required Courses

The overall course requirements to obtain a Ph.D. are published in the LGS Handbook (including among other requirements the [Jones Program in Ethics](#) and [TATTO training](#) for teaching). The following core courses are required for all PBEE students:

1. IBS 594 Evolutionary Biology (fall semester, every even year)
2. IBS 593 Population & Quantitative Genetics (every spring semester, required in first or second year, recommended that it be taken after taking IBS 594)
3. IBS 595 Ecology (fall semester, every odd year)
4. IBS 592 Quantitative Methods in PBEE (spring semester, every even year)
5. IBS 796R Advanced Topics in PBEE, or an appropriate elective*
Students must enroll and successfully complete either one advanced topics course or a related elective before graduating from the program. If the elective is not taught by a PBEE member, the student must request approval from the DGS.
6. PBEE 577 PBEE Practice of Science (taken in the Fall semester of a student's 2nd year)

7. PBEE Statistics Requirement

The program in PBEE requires that most students complete a minimum of three courses in statistics and data science prior to defending their dissertation. Exceptions to the three-course minimum include MD/PhD students (2 required courses) and students with particularly strong backgrounds in statistics (course requirements will be determined on an individual basis). Students are required to complete at least one statistics course prior to their qualifying exam. This course must specifically be a statistics course. Before entering the program, students should consult with the DGS or PBEE's designated statistics advisor to determine an appropriate series of courses to fit the student's needs and interests. Students are encouraged to complete two courses during their first two years in the program. The third course is intended to be an advanced statistics or data science course in which students can analyze their own data or learn methods directly related to their dissertation research. Students should consult with their advisors and dissertation advisory committee members prior to registering for the third course. Additionally, students should pay careful attention to the course offerings each semester because some statistics and data science courses may be taught intermittently and pertinent courses may occasionally be added in various departments across campus. Most importantly, the first step for all students entering the program is to contact the DGS or PBEE statistics advisor to determine available and appropriate courses for each student.

8. PBEE Graduate Seminar

All PBEE graduate students must enroll in the PBEE Advanced Graduate Seminar (PBEE 790R) every semester. In addition to attending the PBEE seminars, students are required to provide the DGS a



single written question concerning the content of the seminar. These questions are returned to the speaker after the seminar.

PBEE graduate students in their third year and beyond are required to give a 15-minute presentation during the PBEE seminar, followed by question and answer session. Typically, third year students (who have passed their qualifying examination in the spring of their second year) are scheduled to give their seminar in the spring. The seminar for third year students should include both their plans and progress to date, recognizing that they may just be beginning their research and the data they have generated may be limited. Fourth year and beyond students are scheduled to present their seminar in either the fall or spring semesters. The seminar for fourth year and beyond students usually is more focused on the research progress achieved by the student. The PBEE Seminar Director and PBEE Seminar Committee, with the assistance of the PA, are responsible for scheduling seminars for each academic year.

9. Laboratory Rotations

During their first two semesters in graduate school when students are performing laboratory rotations, they should register for PBEE 597R (Laboratory Rotations) for 3 credit hours (or more, if needed, to reach 9 hours for full-time status). After the first year in graduate school, students should not register for PBEE 597R. Please refer to section VI. Laboratory Research Rotations for details on the requirements for rotations.

10. Credit Hours

Each student is required to sign up for at least 9 credits each semester. Students wishing to gain additional background in specific areas (for example mathematics, statistics, or probability) can take additional courses. If students wish to exceed 16 credit hours in a semester, they must obtain permission from the DGS.

C. Typical Student Schedules

A typical schedule showing the minimum required PBEE courses for the first two years of study is shown below. In addition to these PBEE courses, students must also satisfy Laney Graduate School requirements including JPE (Jones Program in Ethics) and TATTO (see section XVII of this handbook, and the [Laney Graduate School handbook](#), for more information).

1. First Year: Fall Semester

| Course Number | Course Title | Credits | Faculty |
|----------------------|--|---------|-----------------|
| IBS 519 | Statistical Rigor, Reproducibility, and Experimental Design | 3 | Various |
| IBS 594 or 595 | Evolutionary Biology (offered fall of even years) or Ecology (offered fall of odd years) | 4 | Program Faculty |
| IBS 796R | Advanced Topics in PBEE (as needed/offered) | 2 | Program Faculty |
| PBEE 597R | Laboratory Rotation | 3+ | Program Faculty |
| PBEE 790R | Advanced Graduate Seminar | 1 | DGS |

Note: Students need to submit the Rotation Plan Form (prior to beginning a rotation) and Rotation Summary Form (upon the completion of a summary).

2. First Year: Spring Semester

| Course Number | Course Title | Credits | Faculty |
|--------------------------|---|---------|-----------------|
| IBS 538 | Statistical Design and Analysis of Experiments | 3 | Various |
| IBS 592 or IBS 593 | Quantitative Methods (offered spring of even years) or Population & Quantitative Genetics (offered spring of odd years) | 4 | Program Faculty |
| IBS 796R | Advanced Topics in PBEE (as needed/offered) | 2 | Program Faculty |
| PBEE 597R | Laboratory Rotation | 3+ | Program Faculty |
| PBEE 790R | Advanced Graduate Seminar | 1 | DGS |

Note: Students need to submit the Rotation Plan Form (prior to beginning a rotation) and Rotation Summary Form (upon the completion of a summary).

3. First Year: Summer Semester

| Course Number | Course Title | Credits | Faculty |
|---------------|------------------------|---------|---------|
| PBEE 699r | Adv. Graduate Research | 9 | DGS |

During each summer term students should register for PBEE 699r. The goal is to have students join a laboratory during their first summer in order to begin their research. In some cases, the students may perform an additional rotation at a remote field site over the summer. This should be coordinated with the relevant PBEE faculty member and the DGS.



4. Second Year: Fall Semester

| Course Number | Course Title | Credits | Faculty |
|--------------------------|--|---------|--------------------|
| IBS 594 or IBS 595 | Evolutionary Biology (offered fall of even years) or Ecology (offered fall of odd years) | 4 | Program Faculty |
| IBS 796R | Advanced Topics in PBEE (as needed/offered) | 2 | Program Faculty |
| PBEE 790R | Advanced Graduate Seminar | 1 | DGS |
| PBEE 699R | PBEE Advanced Graduate Research | 1-9 | DGS |
| PBEE 577 | PBEE Practice of Science | 1 | Program Faculty |
| Various | Course Electives (as interested) | Var | Various |

5. Second Year: Spring Semester

| Course Number | Course Title | Credits | Faculty |
|--------------------------|--|---------|--------------------|
| IBS 592 or IBS 593 | Quantitative Methods (offered Spring of even years) or Population & Quantitative Genetics (offered Spring of odd years) | 4 | Program Faculty |
| IBS 796R | Advanced Topics in PBEE (as needed/offered) | 2 | Program Faculty |
| PBEE 790R | Advanced Graduate Seminar | 1 | DGS |
| PBEE 699R | PBEE Advanced Graduate Research | 1-9 | DGS |
| Various | Course Electives (as interested) | Var | Various |

6. Third Year and Beyond: Fall and Spring Semesters

| Course Number | Course Title | Credits | Faculty |
|---------------|--|---------|--------------------|
| PBEE 790R | Advanced Graduate Seminar | 1 | DGS |
| PBEE 799R | Dissertation Research | 1-9 | DGS |
| IBS 796R | Advanced Topics in PBEE (as needed/offered) | 2 | Program Faculty |
| Various | Statistics or Data Science Course III (as offered) | 2+ | Various |
| Various | Course Electives (as interested) | Var | Various |

Note: After a student passes their qualifying examinations and advances to candidacy (which requires that all requirements be completed and is formally approved by the Dean of the LGS), they should register for PBEE 799R (replacing PBEE 699R). Refer to section “F. Research Credits” on the next page for more details.



D. Policies for MD/Ph.D. students

M.D./Ph.D. students have less time than a typical graduate student to complete course requirements and finish their doctoral dissertation. As a consequence, their required course selection may be modified or accelerated to ensure they can complete their dissertation. Typically M.D./Ph.D. students will spend their first 18 months in medical school and join the PBEE during the January of their second year in medical school. At this point, the student should meet with the PBEE Director and DGS to plan his/her course schedule for the next year. The goal is for the student to pass his/her written and oral qualifying examination at the end of the spring semester of their third year at Emory.

Specific policies include:

- M.D./Ph.D. students are required to take the Advanced Graduate Seminar (PBEE 790r) each semester until they complete their dissertation.
- M.D./Ph.D. students will be required to take the two core courses (IBS 593/IBS 594 or IBS 592/IBS 595) being taught during their third year at Emory. They will be required to demonstrate proficiency in the core courses not being taught that year. The DGS and course directors will work with them to provide them resources to learn the material that they will need to know for their written and oral qualifying examination.
- Laboratory rotations will be performed over the summer and/or during their first full year in the PBEE program. M.D./Ph.D. students are required to submit Rotation Plan Form (prior to starting a rotation) and a Rotation Summary Form (after the completion of the rotation). These rotations may be abbreviated if needed. M.D./Ph.D. students are required to successfully complete one additional advanced topics or elective course. If the elective is not taught by a PBEE member, the student must request approval of appropriateness from the DGS. This suggested curriculum for an M.D./Ph.D. student will be coordinated and approved by the DGS.

E. Elective Courses

Students may also enhance their education and meet the minimum course credit requirements of the LGS by taking a personalized selection of the many elective courses available.

F. Research Credits

After their first year in graduate school, but before they advance to candidacy (which usually occurs after the end of the second year), students should register for PBEE 699R to account for their research work. This is for variable credit and the number of credit hours registered for should be the number needed to bring the total (with formal courses) to at least 9 credit hours each semester. After a student has advanced to candidacy and selected a permanent research advisor, they should register for PBEE 799R (Dissertation Research). This is for variable credit and the number of credit hours registered for should be the number needed to bring the total (with formal courses) to at least 9 credit hours each semester.

G. Journal Club and Common Interest Groups

One of the most effective ways to learn methods and approaches to scientific inquiry is to read and critique the experimental work published by other investigators. Students are urged to participate in laboratory meetings as a means of interacting with faculty and developing critical scientific skills. Students can also spearhead Advanced Topics Courses (IBS 796R) by identifying topics of interest and faculty members to help lead these courses.



H. Exemptions From Course Requirements

Students may be exempted from taking one or more of the required courses under appropriate circumstances. Such circumstances usually consist of having taken a prior course with similar content and received a grade of B or better, or demonstration of competence in a particular area (usually by special examination). The DGS, in consultation with the PD, will make the final decision about any course exemption.

VIII. Grades

The scale of grades in the LGS is A (4.0), B (3.0), C (2.0) and F (0); there is no D grade. Some courses are taken on a Satisfactory/Unsatisfactory (S/U) basis. All students must maintain a minimum GPA of 3.0 in each semester of graduate work. If a student's semester GPA is below 3.0 in any semester, that student will be on academic probation with the expectation that he or she will maintain a semester GPA of 3.0 in all subsequent semesters. If a student is on academic probation for two consecutive semesters, or a total of 4 semesters, or if the student receives one F or U grade in any course, that student will be recommended for dismissal to the LGS.

If students are recommended for dismissal and believe that there were extenuating circumstances that adversely affected their performance, they may submit a written appeal for consideration of reinstatement to the DGS. The appeal should clearly outline the extenuating circumstances and must be submitted within one month of grades being recorded by the Office of the Registrar. All appeals will be reviewed by the PD, PBEE Executive Committee. If both the PBEE and GDBBS Executive Committees approve reinstatement, the student will be expected to maintain a GPA of 3.0 in every subsequent semester. If the student had received a C or F in a core PBEE course, the course must be repeated and a passing grade (3.0 or higher) obtained. At the discretion of the program, a failing grade in other required courses may also necessitate repeating the course. Please refer to the LGS handbook for further information about grades.



IX. Selection of Research Advisor

Students must select a research advisor from among the faculty of the Graduate Division of Biological and Biomedical Sciences (GDBBS) at the end of the spring semester during their first year. Additionally, students who join the PBEE program as a member of a laboratory of a faculty member joining Emory University may be excused from laboratory rotations by the DGS. The advisor will guide them to the completion of their qualifying examination and serve on the exam committee.

The student will submit the GDBBS Mentor Assignment Agreement and the accompanying financial worksheets to the DGS. This document formalizes all mentor assignments in the GDBBS and indicates that the advisor will be responsible for supporting the student financially. All choices of dissertation research advisors are subject to final approval by the PD, PBEE Executive Committee, the advisor's Department Chair and the GDBBS Division Director. Both forms can be found on the PBEE website under "GDBBS Mentor Agreement Form" at http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html

Students interested in choosing as their research advisor an adjunct PBEE faculty member (such as one whose main appointment is with the CDC or Georgia Tech) must also choose a PBEE Emory faculty member as a co-advisor. The Emory co-advisor should be a member of the student's dissertation committee. The student and the PBEE Emory co-advisor must provide the DGS a letter indicating that the PBEE Emory faculty member is willing to accept this responsibility. The Emory co-advisor's role is to ensure that the PBEE student's dissertation research meets standards identical to those for PBEE students with Emory research advisors. In addition, the Emory co-advisor should work with the student and DGS in case there are any unexpected problems that may impact the completion of the student's dissertation. The Emory co-advisor does not incur any financial obligation for the student by accepting this role; rather, the aim is to ensure the best possible academic experience for PBEE students working off-site.

Should a student wish to have a research advisor that is not a member of the PBEE Program and wish to remain in PBEE, they must receive explicit approval from the PD. If a student wants to select an advisor from another program and transfer to that program, such a transfer can occur if approved by both programs and the GDBBS.

Although every effort is made to accommodate the student's indicated preferences, in some instances it may not be possible for a student to work with their first choice of advisor. A faculty member who already is serving as research advisor to more than one student may not be able to take on another due to a lack of laboratory, space, or other resources. It is also possible that a faculty member may not have adequate financial resources to support the research of a new student entering the laboratory.

Students who, for valid reasons, are unable to make a choice by the start of the fall semester of the second year should submit a letter to the DGS requesting extension of the deadline for selecting an advisor and outlining reasons such an extension is needed. If the request is approved, the student will be given until the end of the fall semester (second year) to select an advisor. In such cases, the student must submit the GDBBS Mentor Agreement Form and accompanying financial worksheet before the beginning of the spring semester. Students who do not choose an appropriate research advisor, obtain a commitment of financial support from that advisor, and gain approval of the selection by the Executive Committee by the end of the spring semester (first year) will have their participation in the PBEE program terminated.



The matching of a student with a research advisor is not irrevocable. On rare occasions it may be in everyone's best interest for the student to switch to a different advisor. For example, research interests might change over time, so that those of the student are no longer compatible with those of the research advisor. The student and advisor should discuss any problems with the director and/or members of the Executive Committee. If reassignment of the student seems advisable, the Executive Committee will be asked to review the request and, taking into account the wishes and concerns of all parties, will make the reassignment. Almost invariably the student will lose substantial time when changing laboratories and research projects, therefore changing to a new advisor should be viewed as a permissible, but an extreme and rare step.

X. Qualifying Examination

The LGS requires a student to demonstrate adequate intellectual mastery of field of specialization and of appropriate supporting fields by passing a general doctoral qualifying examination before being admitted to candidacy for the Ph.D. degree. In PBEE, the qualifying examination consists of both written and oral exams that allow the program to assess whether the student demonstrates adequate mastery of PBEE to be advanced to candidacy. Completion of the qualifying examination process in PBEE requires three main steps. First, each student is required to form a qualifying exam committee composed of PBEE faculty members. Second, students are required to write a research proposal outlining the main questions and line of research they are likely to pursue for their dissertation research. Third, the students are required to pass an oral examination that will be based upon both their general knowledge of PBEE and their research proposal. The Emory University Honor Code will be observed throughout the examination process. Details about each of these requirements are provided below. Qualification exam dates are roughly:

| | |
|-------------------------|--|
| Late November: | Qualifying exam committee established, Proposal outline due to Ph.D. advisor(s) |
| Early- to mid-December: | Proposal draft due to Ph.D. advisor(s) |
| Mid-February: | Proposal due to committee |
| Early March: | Faculty submit research proposal feedback to DGS |
| Mid-March: | Feedback on research proposal returned |
| Late March: | Revised Proposal Due |
| Early to late April: | Oral qualifying exam |
| Early to mid-May: | Exam retake (if necessary) |

Appendix A1 provides exact qualifying exam dates for the current academic year.

A. Establish a Qualifying Examination Committee

Students are to provide a list of 6 PBEE faculty members who they would prefer to be members of their qualifying exam committee to the PD, DGS, and PA by the 1st Monday of November. The research mentor should advise the student in the submission of appropriate faculty who may be best qualified to serve on the committee. The provided list of faculty should span the core areas of PBEE, including population biology, ecology, and evolution, and not be limited to a student's area of expertise or interest. Non-GDBBS faculty are ineligible to serve on PBEE qualifying exam committees. Students may also provide the names, if any, of PBEE faculty members they wish to be excluded from consideration as members of their qualifying exam committee. This list (if provided) should remain as limited in length as possible, with the student having a compelling reason for each named faculty member that the student wishes to exclude.



Reasons for exclusion do not have to be given. The members of this committee will evaluate the written exam materials and administer and judge their oral examination (see below for specific requirements).

The PD and DGS will use the student-provided list in conjunction with the listing of all the PBEE faculty members to form the qualifying exam committee. The qualifying exam committee will consist of three PBEE faculty members. The goal of this approach is to ensure that the members of a qualifying exam committee represent the full diversity of the program in PBEE. The DGS is excluded from serving on any qualifying exam committee. The student's research mentor will also not be a member of this committee.

The PBEE PD, DGS, and PA will then formally select the members of the qualifying exam committee and notify the student of the committee membership. Based on the availability of the student, the qualifying exam committee members, and the advisor(s), the PA will set a date and 2-hour time block on that date for the oral examination. The PA will then send out the official announcement of the qualifying exam time to the committee members, student, advisor(s), and DGS. This will be completed by December 15 of the student's second year. If December 15 falls on a weekend, the due date is the following Monday. In the case of an unsuccessful oral exam, the same process of scheduling an exam time will be followed to schedule a follow-up oral examination. The PA will schedule the follow-up exam at most two weeks from the original exam date.

B. Research Proposal

Students are required to write a well-developed and detailed research proposal that outlines at least a portion of the research they intend to pursue to complete their dissertation. The main goal of this **proposal is to assess the student's ability to present a compelling, cogent set of research aims and hypotheses** and to adequately address the methods needed to complete the research. It is not expected that this will represent the final path of the graduate student's research plan, but it is very helpful for the student if it is closely aligned with an already established research trajectory. A passing PBEE research proposal will demonstrate the graduate student's ability to:

- Identify an important problem in an area related to PBEE
- Provided a compelling, feasible set of aims or questions to address a portion of that problem
- Put their research within the broader context of the field
- Propose the most appropriate methods to address the questions

The proposal should be in the format of either a standard NIH F31 Ruth L. Kirschstein proposal (<https://researchtraining.nih.gov/programs/fellowships/F31>), a standard R01 NIH grant (see Section 5.5 at <http://www.niaid.nih.gov/researchfunding/grant/pages/appsamples.aspx#r01>), or a standard NSF Full grant proposal (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg). The total length of the proposal should be 6-15 single-spaced pages. References cited do not count against the 6-15 page limit. Use an Arial, Helvetica, Palatino Linotype, or Georgia typeface, a black font color, and a font size of 11 points or larger. The proposal should be detailed and consist of sections with the following titles:

If following the NIH F31 format:

Specific Aims (one page)

- State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will have on the research field(s) involved.



- List succinctly the specific objectives of the research proposed (e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology).

Specific Aims are limited to one page.

Significance

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
- Explain how the proposed project will improve scientific knowledge and/or technical capability in one or more broad fields.
- Describe how the concepts, methods, or technologies that drive this field will be changed if the proposed aims are achieved.

Approach

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how data will be collected, analyzed, and interpreted.
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- Describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.

References Cited

- Bibliography listing references cited in research proposal. All authors names should be listed on each publication (do not use “et al”). The length of this section is not included in the page limit.

The Specific Aims should be contained on one page. The Significance and Approach sections will be approximately 6 pages in length. Typically the Significance section is about 2 pages in length. The Approach section constitutes the remainder of the proposal (about 4 pages) and includes any applicable preliminary data. Most proposals will have two or three Specific Aims.

If following the NIH R01 format:

Specific Aims (one page)

- State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will have on the research field(s) involved.
- List succinctly the specific objectives of the research proposed (e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology).

Specific Aims are limited to one page.

Significance

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
- Explain how the proposed project will improve scientific knowledge and/or technical capability in one or more broad fields.
- Describe how the concepts, methods, or technologies that drive this field will be changed if the proposed aims are achieved.

Innovation

- Explain how the application challenges and seeks to shift current research paradigms.



- Describe any novel theoretical concepts, approaches or methodologies, instrumentation to be developed or used, and any advantage over existing methodologies or instrumentation.
- Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies or instrumentation.

Approach

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how data will be collected, analyzed, and interpreted.
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- Describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.

References Cited

- Bibliography listing references cited in research proposal. All authors names should be listed on each publication (do not use "et al"). The length of this section is not included in the 12-page limit.

The Specific Aims should be contained on one page. The Significance, Innovation, and Approach sections will be approximately 11 pages in length. Typically the Significance and Innovation sections together are about 1 to 2 pages in length. The Approach section constitutes the remainder of the proposal (about 9 - 10 pages) and includes any applicable preliminary data. Most proposals will have two or three Specific Aims.

If following the NSF format:

Project Summary (one page)

Each proposal must contain a summary of the proposed project not more than one page in length. The Project Summary consists of an overview and a statement on the intellectual merit of the proposed activity. A broader impacts section should NOT be included in the PBEE research program. The overview includes a description of the activity that would result if the proposal were funded and a statement of objectives and methods to be employed. The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge. The Project Summary should be written in the third person, informative to other persons working in the same or related fields, and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should not be an abstract of the proposal.

Project Description (approximately 11 Pages)

The Project Description should provide a clear statement of the work to be undertaken and must include: objectives for the period of the proposed work, expected significance, and relation to the present state of knowledge in the field. The Project Description should outline the general plan of work, including the broad design of activities to be undertaken, and, where appropriate, provide a clear description of experimental methods and procedures. Include how data will be collected, analyzed, and interpreted. Proposers should address what they want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified. These issues apply to both the technical aspects of the proposal and the way in which the project may make broader contributions.

A typical format for the project description would include:



Introduction to Proposed Work, Ending with Research Questions to be Addressed (1 to 1.5 pages total)
Along with the Project Summary, this is the most important section of the grant. It should explain to the reviewer the importance of the research within the bigger context of the field and make it clear why this research is worth doing. Most proposals will have multiple questions to be addressed.

Background Material on Field and Experimental System

This section should highlight only the background material critical for putting the research in a bigger context of what has already been discovered in the field, highlighting outstanding questions and where your research fits in. Your own preliminary data may be incorporated here or in the research plan.

Research Plan

The research plan should have a section for each question to be addressed. For each question, provide a brief overview, an outline of the research approach and expected outcomes. It may be appropriate to incorporate preliminary data in this section.

Concluding Section on Intellectual Merit and Relevance to Field

Questions about the format of the research proposal should be directed to the DGS and PD. Other formats may be acceptable, but need to be approved by the DGS and PD prior to the submission of the first draft of the research proposal. Failure to adhere to either NIH F31, the NIH R01, or NSF format without written approval by the DGS to use an alternative format will result in a grade of unsatisfactory on the research proposal.

In some cases, students will have generated varying amounts of preliminary data that should be incorporated into the research proposal (consisting primarily of data generated by the student during their time in their mentor's laboratory). The proposal should be developed by the student and their tentative mentor starting the summer of their first year of graduate school and during their second year in graduate school. While it is expected that there may be overlap between the student's research plan and ongoing research being conducted in the mentor's laboratory, the student's proposal should not simply be cut/pasted from an existing grant proposal that the mentor has previously written. Students should get feedback from other members of the PBEE community, and additional guidance will be provided through the PBEE practice of science course.

The research proposal should result from the PBEE student's work and ideas and will constitute the second half of the written exam portion of the qualifying examination. The research proposal should be submitted to the Director of Graduate Studies and Program Administrator.

The proposal will be graded by the members of the qualifying exam committee on the same scale as mentioned above for the review. Committee comments and grades will be submitted by late February/early March (specific date is year-specific). If a revision is required, it will be due late March (specific date is year-specific). Final Grades from the committee will be submitted within one week of this date. Each committee member will provide a grade of satisfactory or unsatisfactory for the revision. If the student does not receive a satisfactory grade from all committee members, the committee will meet to discuss the final grade. A grade of unsatisfactory is grounds for dismissal from the Ph.D. program.



Students will receive written feedback on their proposal from their Exam Committee. Students must address this feedback in a revision, which is then resubmitted to the committee prior to the oral examination. In doing so, students must prepare a written point-by-point Response to Reviews document to be submitted at the same time as the revision. Students are strongly encouraged to ask their advisors, senior graduate students, or others for examples of Response documents, which are a central component of the peer review process of publication.

C. Oral Examination

Following the submission of the research proposal, each student will be administered an oral exam by the three members of their Qualifying Exam Committee. The PD or DGS will appoint one of the faculty members to act as the chair of the exam committee. The student's mentor will also attend and observe the examination, act as a time-keeper, and may ask questions if they wish. The oral examination should be scheduled for a minimum of 2.5 hours, which includes time for private discussion by the committee and discussion with the student following the 90 minutes of scheduled examination.

The oral examination is intended to explore the student's general knowledge of PBEE, explore any areas of weakness in their comprehensive PBEE review, carefully examine their proposed research plan, including its relevance to the broader field and their choice of research methods, and assess their ability to express complex ideas and arguments in spoken form. A standard format will be used for all oral examinations. The oral exam structure will consist of at least two rounds of questions provided by the three examiners. Each examiner will be allotted 15 minutes per round. Notwithstanding the time limit for each question, the exam format is free-form and any of the examining faculty may interact with the student in the course of answers to questions (even those asked by other faculty members). The first round of questions will focus broadly on topics covered within the four core courses of PBEE training. The second round may focus more on the student's research proposal, but may also include other topics. All areas of PBEE are fair game for questions, including at a minimum the student's research proposal and material covered in the PBEE core courses. There is an optional 5-10 minute break for any reason between the rounds.

Upon completion of the exam, the student will leave the room. At the beginning of the committee's discussion, the research advisor will remain present to provide clarification on the courses that the student has taken and the students' previous experience. The research advisor will then typically be asked to step out so that the committee can discuss the student's performance and decide whether the student passed or did not pass the exam. At the discretion of the committee, the advisor may remain in the room for the entire discussion. If the advisor(s) has / have left the room, as is typical, the advisor(s) will be asked to come back in before the student so that they can learn of the decision before the student.

To pass this portion of the qualifying exam, the student must receive a "pass" from each of the three qualifying exam committee members. If the student did not pass the exam, they have one opportunity to retake the oral examination. This must be completed prior to May 30th of their second year unless the committee deems that more time may be needed. In the latter case: a) the retake must be completed by the end of the fourth week of the Fall semester of the student's third year; b) the DGS must approve of the extension, and c) the student's advisor(s) must approve of the extension. A student may retake the oral examination only once. Not passing the oral examination is grounds for dismissal from the Ph.D. program.

At the end of the examination, the committee chair must write a 1-paragraph summary of the examination including the outcome and submit this via email to the DGS and Program Administrator.



D. Preparation

Students are urged to prepare carefully for the qualifying examination. The written portions of the examination should be carefully researched and written with assistance provided by the research mentor and other members of the PBEE community. PBEE faculty, postdocs and students are usually willing to read drafts and provide comments. Preparation for the oral examination usually consists of review of the principles and concepts of population biology, ecology, evolution, and other basic biological and mathematical sciences necessary to undertake a successful research career in PBEE. Students are expected to have a firm understanding of all concepts and methods discussed in their comprehensive review and research proposal. A well-written comprehensive review and research proposal are central to the success in the oral examination.

In addition, students are strongly encouraged to practice the oral communication skills that will be necessary to pass the examination. Third- and fourth-year students who have already taken the examination are expected to provide advice and help to the students as they prepare for their qualifying exam. Since many students will not previously have experienced an oral examination, a mock oral defense of the student's general PBEE knowledge (based on content covered in the four PBEE core courses), comprehensive PBEE review, and their research proposal before the third- and fourth-year students will be extremely helpful. Students will generally find many people willing to help in their preparation for this important exam.

Students are encouraged to register any accommodations that may impact their research and qualifying exam timeline using the portal provided by the Department of Accessibility Services (<https://accessibility.emory.edu/index.html>), indicating their research class (PBEE 699R) as the class for which they request accommodations. The registered accommodations will be communicated to the student's research advisor and qualifying exam committee members by the DGS.

XI. Admission to Ph.D. Candidacy

After successfully passing both the written and oral portions of the qualifying examination, a student may become a candidate for the Ph.D. degree upon the recommendation of the student's advisor and successfully completing all PBEE graduate course requirements.

Current students who entered the program prior to Fall 2017 must reach candidacy by August 1 before their fifth year. The form and eligibility requirements may be found on the LGS website (<http://www.gs.emory.edu/academics/policies/candidacy.html>).

Students entering Fall 2017 and later must be in candidacy no later than September 15 of their fourth year, but are typically eligible at the end of their 2nd year. To be eligible for candidacy, a student must meet the following requirements:

1. Complete all program requirements for candidacy: coursework and other training required by the degree program, including program required JPE training
2. Complete qualifying examinations required by the degree program
3. Select Dissertation Committee and submit LGS Dissertation Committee Form
4. Complete TATTO 600, TATTO 605, and JPE 600
5. Resolve any Incomplete (I) or In Progress (IP) grades
6. Be in good standing with a minimum cumulative 3.0 GPA
7. Have earned at least 54 credit hours at the 500 level or above



Application for admission to candidacy must include the designation of an advisor, appointment of a Dissertation Committee, and a proposed title for the dissertation. The student should complete both the Dissertation Committee Form and Candidacy Application, including obtaining all required signatures, and submitted to the PA at the GDBBS office. The forms can be found on the LGS website <http://www.graduateschool.emory.edu/academics/policies-progress/index.html>.

Students who do not meet this deadline will be placed on academic probation, will not be eligible for PDS funds, and may forfeit financial support. These sanctions will be lifted when the student enters candidacy.

XII. Selection of Dissertation Committee

In consultation with the advisor, each student must select an advisory committee (i.e., Dissertation Committee) that will assist the student and advisor in formulating and executing an appropriate independent research project to fulfill the requirements of the doctoral program. This should be completed by the end of the fourth week of classes in the fall semester of the third year. The LGS Dissertation Committee form must be uploaded online to LGS. A link to the LGS form can be found on the PBEE website (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html). Failure to submit this form in a timely manner will lead to the student receiving an Incomplete grade for Dissertation Research for the fall semester of their third year. If the problem is not resolved within one month of the beginning of the spring semester, that grade will be changed to a C, which will lead to probation according to LGS policies.

The committee must consist of at least four members of the faculty, including the research advisor. At least three members of the Dissertation Committee should be members of the PBEE faculty. Although a committee of four members is the minimum requirement, having five members is allowed. At the discretion of the student and research advisor, at most two faculty members on the Dissertation Committee can be selected from among faculty outside PBEE or Emory University.

The primary function of the advisory committee is to make a broad range of scientific expertise available to the student, to support the research efforts of the student, and help to guide the project to a successful conclusion. The advisory committee is also the primary body responsible for reading and evaluating the doctoral dissertation and for examining the student in the public oral defense of the doctoral dissertation.

The student and the DGS should together, and independently of the advisor, decide on a dissertation committee "**mediator**" from the committee whose official role is to be an advocate for the student. The discussion between the student and the DGS should take place in the weeks leading up to the finalization of the members of the Dissertation Committee. Following this discussion, the student should contact the proposed committee mediator to ask whether they would accept this role. If the proposed mediator does not accept this role for any reason, the student should contact the DGS again to discuss the appointment of a different mediator.

To ensure that the committee mediator can act independently in the student's best interest, the mediator should be an Emory faculty member and (if possible) a tenured faculty member or a professor of practice / pedagogy. A particular role for the mediator is to ensure that the expectations for completion of the dissertation are in line with the student's best interest. Examples of when these expectations may depart from the student's interest include but are not limited to: 1) the advisor expects more work (e.g. additional chapters or experiments) from the student relative to typical or reasonable expectations; and 2) when the advisor tries to speed a student's completion for financial reasons when the student could have substantial scientific or



professional gain from remaining in the program longer. The mediator is also generally responsible for serving as an independent sounding board to the student for any issues with the advisor. To facilitate this role, the student should check in with the dissertation committee mediator at least one week before each committee meeting for a one-on-one discussion about the student's experience with the advisor. If there are no perceived issues, an email to the committee mediator will suffice. While this is ultimately the student's responsibility, the committee mediator and the PA should also help remind students to check in with the mediator before committee meetings.

Since not all LGS (or GDBBS) programs have the policy of appointing a dissertation committee mediator, the LGS Dissertation Committee form does not currently provide a space for designating the mediator. At the time that the LGS Dissertation Committee form is submitted, the student also therefore needs to email the PA the name of the committee mediator. This email needs to cc the DGS, the chosen committee mediator who has agreed to this role, and the student's mentor. The PA will document the name of the mediator in the student's electronic progress files.

The requirement for a dissertation committee mediator was passed by the PBEE Executive Council in May 2019 and extends to all students, including students whose committees have already been formed. Students who are rising sixth-years and above as of summer 2019 can petition the Program Director and the DGS to waive this requirement if they feel that it is unnecessary in their particular case. Decisions on waiving the requirement are made by the PD and DGS jointly.

XIII. Student Research Proposal

During the fall semester of the third year each student must present to his or her thesis committee a written proposal for an original research project and an oral defense of that proposal. The proposal should be based on the project that will form the student's Ph.D. thesis and may be identical or very similar to that provided for the oral qualifying examination. The dissertation proposal should be written by the student with regular discussions with their faculty research advisor and other committee members. The faculty research advisor, who should be actively mentoring the student, can be expected to have substantial input as to the content of all sections of the proposal. However, the spirit of the proposal is that it should primarily be the student's work. Thus, the advisor should not rewrite the proposal or simply cut/paste text from an existing grant proposal. Rather, the faculty advisor should provide written and verbal feedback and advice to the student to aid them with the development and presentation of their research ideas.

The format of the proposal should be identical to the research proposal for the Qualifying Examination. As part of the first committee meeting in the fall semester, the thesis committee will meet to hear an oral defense of the written thesis proposal. The purpose of the defense and the written proposal is for the student, advisor, and thesis committee to reach an agreement on what would constitute a successful research project for completion of the Ph.D. in the PBEE program, and to establish a timeline for completion of the project.

XIV. Meetings with the Dissertation Committee

After successful completion of the qualifying examination and presentation of a research proposal, students should consult regularly with their Dissertation Committee to update them on the progress of their dissertation research. The format for this meeting need not to be as formal as that of the oral qualifying exam, but should



include a summary of the progress that the student has made, as well as an outline of the studies that the student and research advisor anticipate will be included in the final dissertation. The committee will give the student and advisor feedback and comments on what they consider necessary for successful completion of the dissertation research.

The first committee meeting should occur no later than the last day of fall semester of the third year. This is particularly important to help set the general scientific direction of the student's written proposal. Starting in the fourth year, students must meet with their Dissertation Committee at least once every fall and spring semester. Starting in the seventh year and beyond, students must meet with their Dissertation Committee at least twice every semester (fall, spring, and summer semesters) to insure adequate progress is being made toward the dissertation.

In scheduling Dissertation Committee meetings, students are allowed to have only one committee member absent from the meeting. In those cases, the student must meet with the absent committee member within two (2) weeks, in order to both consult on progress and get the Dissertation Committee meeting form signed.

Within two (2) weeks of the Dissertation Committee meeting taking place, the student must submit to the PA the appropriate form documenting that the Dissertation Committee has met and approved the student's progress. The form must include comments from the advisor making clear statements regarding expectations for student progress over the period leading to the next Dissertation Committee meeting. (In addition, the student should make sure that those comments are addressed at the next Dissertation Committee meeting.)

After every dissertation committee meeting, the student is required to submit a Dissertation Committee Report Form to the PA. The form can be found on the PBEE website (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html).

Failure to have a committee meeting and turn in the associated Dissertation Committee Report form by the end of the required semester will result in the student receiving a grade of C, at best, for Dissertation Research for that semester. **This will result in the student being placed on probation. Students are responsible for notifying their Program DGS prior to the end of the term of any extenuating circumstances that have prevented them from holding their committee meeting within the required time frame. In consultation with the Division Director, the DGS may then choose to grant an exception and not penalize the research grade. Therefore, the final research grade assigned will reflect both the student's work in the research advisor's lab as well as their compliance in holding their committee meetings within the required time frames. See GDBBS handbook page 32 for the full academic performance policy.**

Any changes to the membership of the Dissertation Committee require approval by the DGS and the Dean of the LGS. Students use the LGS Dissertation Committee form to submit and document changes to their committees. A link to the form can be found on the PBEE website (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html).

The student should keep the PD and DGS informed on their progress in forming a dissertation committee and the results of their meeting by providing copies of the required forms discussed above to the PA. The PA will make electronic copies of the form, store them in the student's file, and provide copies



to the PD and DGS. If the student has any difficulty, he or she needs to inform the PD, DGS, or PA immediately so that any issues can be resolved quickly.

If the committee feels that the student is not making sufficient progress or that there are major issues that need to be dealt with, this should be stated on the form. The DGS will review, and if necessary, then transmit this letter to the Executive Committee. They will decide if the Executive Committee or selected members of the Executive Committee should meet with members of the student's Dissertation Committee. If the student's research advisor and/or Dissertation Committee consider the student's research progress to be inadequate for continuation in the program, they can submit a letter to the Executive Committee requesting that the student's participation in the program be terminated. This request will be considered by the Executive Committee after meeting with the student and in consultation with members of the student's advisory committee and other appropriate faculty and administrative personnel in the LGS.



Student Dissertation Committee Meeting Timeline

| When | What |
|--|---|
| Third Year, Fall Semester | First committee meeting required before the last day of fall semester (must present current career goals and training plan to committee) |
| Fourth Year, Fall Semester | Committee meeting required, must update committee on career goals and training plan |
| Fourth Year, Spring Semester | Committee meeting required |
| Fifth Year, Fall Semester | Committee meeting required, must update committee on career goals and training plan |
| Fifth Year, Spring Semester | Committee Meeting Required, must occur within one month of start of semester if plan to graduate in that semester |
| Sixth Year, Fall Semester | Committee Meeting Required, must occur within one month of start of semester if plan to graduate in that semester, must update committee on career goals and training plan |
| Sixth Year, Spring Semester | Committee Meeting Required, must occur within one month of start of semester if plan to graduate in that semester |
| Seventh Year and Beyond, Every Fall/Spring/Summer Semester | Two Committee Meetings Required per semester unless graduating that semester. A meeting must occur within one month of start of semester if plan to graduate in that semester. Must update committee on career goals and training plan at Fall meetings |

*Exceptions will be granted to students who will be gone the ENTIRE semester for fieldwork. Planning should be done in advance to schedule a committee meeting before leaving or upon return.

XV. Dissertation Completion Time

Students are expected to complete their dissertations and apply for their degrees within six (6) years. If a student has not completed the degree at the end of the seventh (7) year, the program may grant a one-year extension. If a student has not completed the degree at the end of the eighth (8) year, the student may continue work for at most one additional year and only with approval from the Dean.

This policy is effective for students entering the program in 2017. Students who entered the program prior to 2017 will adhere to the policy that existed at the time they started.

For full details and most up-to-date information, including instructions and deadlines for obtaining approvals for completion time extensions, please read the LGS Handbook: <http://gs.emory.edu/handbook/>

XVI. Individual Development Plans (IDP)

Goals and Objectives. The National Institute of Health encourages institutions to assist graduate students to achieve their career goals within the biomedical research workforce through the use of Individual Development Plans (IDPs). A professional development plan is an ongoing process and should be implemented throughout the entire graduate career to ensure continuous professional growth. Each student must take a lead in assessing



and considering their own goals and related training objectives, and the student's advisor and committee members should initiate conversations on this topic with each student.

The PBEE IDP process consists of several steps.

1. myIDP: The myIDP website contains information and a survey <http://myidp.sciencecareers.org/> to help each student think about their future professional development. Students are required to take this survey prior to advancing to candidacy, and it is suggested to complete it during the second year. The student must then fill out a short form (Career Development Initial Assessment) to discuss their career goals, perceived strengths and weaknesses, and training objectives. They will discuss their observations with their selected advisor or another faculty member. The Career Development Initial Assessment form must be submitted to PBEE prior to their first dissertation committee meeting (fall semester of the 3rd year).
(http://biomed.emory.edu/PROGRAM_SITES/PBEE/documents/pdfs/pbee-career-development-assessment-060116.pdf).
2. Dissertation Committee meetings: Dissertation committee meetings are required at least yearly for PBEE students after passing their qualifying exam. Career development must be discussed at one committee meeting a year. Students will be required to include their goals and strategies in a slide presentation at the beginning of each Fall semester committee meeting (see template on the PBEE website http://biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html), or they can print out a short document with the same information to be handed to each committee member.

The schedule is as follows:

| When | What |
|---|--|
| Fall or Spring Semester, Second Year or Fall Semester, Third Year | Complete myIDP online, discuss strengths and weaknesses with advisor or a faculty member of student's choosing, submit career development initial assessment form to program administrator prior to advancing to candidacy |
| Fall Semester, Third Year | Present career goals and training plan to committee |
| Fall Semester, Fourth Year and Beyond | Update committee on career goals and training plan |

Graduate students will be encouraged to take part in sessions of the GDBBS IDP and Professionalization workshops, focusing on topics such as development of a five-year career plan, choosing rotations, choosing a mentor, selecting advanced courses as well as additional topics that arise during their graduate career on topics such as study skills, time management, professional expectations, work/life balance, dealing with stress, and how to handle difficult conversations. Students and faculty must complete these requirements to maintain good standing in the program.



XVII. Teaching Assistant Training and Teaching Opportunity Program (TATTO) and Jones Program for Ethics (JPE) Training

The Teaching Assistant Training and Teaching Opportunity Program (TATTO) is administered by the LGS to provide teacher training and experience for doctoral students in the GDBBS. Completion of the TATTO program is required for the doctoral degree. Typically, PBEE students take the TATTO course in their first or second year.

The GDBBS requires each student to serve as Teaching Assistant (TA) for at least one semester during their graduate career and many PBEE students TA more than once to gain additional experience. Prior to beginning the teaching experience, students participate in the TATTO 600 Workshop, which is a two-day teaching orientation that occurs every August. While many students choose to TA after their second year, we recommend that you take TATTO before your first semester here, if possible, as it leaves the opportunity for you to TA that first year.

Refer to the LGS website for more information (<http://www.gs.emory.edu/professional-development/teaching/index.html>). Students commonly TA classes offered in a STEM department within Emory College. Students should reach out to PBEE faculty to find out about TA opportunities, and should discuss options with more advanced PBEE students. Faculty typically try to identify TAs several months before the semester starts. We generally discourage TAing during the spring of the second year, during which students are preparing for and taking their qualifying examination.

The Jones Program for Ethics (JPE) training consists of three requirements: 1) JPE 600, which students typically take during orientation upon arriving at Emory; 2) JPE 610, completion of which requires attendance at four workshops; and, 3) attendance of PBEE ethics seminars, which occur once per semester during the normal PBEE seminar time. For the PBEE ethics seminars, a student must attend every seminar unless they are out of town for a work-related activity or have an unexpected emergency. If the former, the student must notify the PA and DGS beforehand to discuss possible make-up activity. If the latter, the student must notify the PA and DGS as soon as possible to discuss possible make-up activity. Failure to do so may lead to an unsatisfactory grade in the seminar course for the semester. Additional information can be found at: <http://www.gs.emory.edu/professional-development/jpe/index.html>.

XVIII. Dissertation Research

The most important aspect of a student's training program is his or her thesis research. Other aspects of the program are designed to lead up to and provide preparation for this research work. Normally this research will begin no later than the second summer in residence. The work must be an original contribution to scientific knowledge and should be of a quality that will lead to several publications in peer-reviewed scientific journals. Successful completion of the dissertation requires at least one published manuscript. Generally, thesis work will be performed on site at Emory. Completion of thesis work at other institutions will require the explicit approval of the Executive Committee and the PD.

Following candidacy, students register for IBS799R as their research class. Students are encouraged to register any accommodations that may impact their research and qualifying exam timeline using the portal provided by the Department of Accessibility Services (<https://accessibility.emory.edu/index.html>), indicating this research class (IBS 799R) as the class for which they request accommodations. The registered



accommodations will be communicated to the student's research advisor and thesis committee members by the DGS.

XIX. Submission of Ph.D. Dissertation

A. Guidelines for Writing and Submission

The general format of the dissertation includes an abstract, introduction, at least three individual research or review chapters (each with abstract, introduction, methods, results, discussion, and references) and a conclusion. Some chapters may be represented by scientific papers on which the student is an author and which have been published or are in press in refereed journals. If one or more of the student's research or review chapters have already been published, these published papers can be included directly in the thesis as long as the journal in which the work was published permits this type of reproduction of content. Journal permission can be either through explicitly stated journal policy or through written permission from journal staff. Direct inclusion of published work can be in the form of a published pdf. If the published work includes coauthors (including the thesis advisor), then the student needs to include in the relevant thesis chapter a specific description of their contributions to the published work. While the student does not need to be the first author on the published work, the contribution of the student needs to be sufficiently substantial to warrant the published work as a chapter in the student's thesis.

For thesis chapters that have not been published, alternative formats to research chapters (that is, ones that deviate from the traditional structure of: abstract, introduction, methods, results, discussion, and references) may be considered at the discretion of the Dissertation Committee and PD, though this is rare. The dissertation must be submitted electronically. Figures and other illustrations must be of publication quality. More detailed directions as to the form of the dissertation are available from the LGS Office (<http://www.gs.emory.edu/academics/policies/completion.html>).

B. Submission of the Dissertation

Prior to scheduling the defense, all members of the committee must give provisional approval that a defense date can be set. This is accomplished by the student having a committee meeting to review progress and then submitting the PBEE Provisional Dissertation Approval Form to the PD/DGS/PA. The form can be found on the PBEE website (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/documents/pbee-provisional-dissertation-approval-form-aug-2016.pdf). Once provisional approval has been given, the oral defense can be scheduled. The defense announcement (GDBBS Defense Flyer & GDBBS Defense Program) should be sent to the PA at least three weeks before the defense for distribution.

After the dissertation has been read and approved by the thesis advisor, the student must give a copy to all members of the thesis committee. The dissertation must be complete at this time, including figures and references. A final copy of the dissertation is due to the committee at least three weeks before the defense. This should give committee members enough time to read the dissertation thoroughly before giving approval to defend (within one week of receiving dissertation from student) and before the final defense. Two weeks before the scheduled defense date, the PA will check with the committee members, via email, to confirm that they agree that the dissertation is complete and that the student is prepared to defend. An official announcement of the student's defense time and location will only be made with approval of the committee.

| Steps Prior To Dissertation Defense | |
|---|---|
| Step | When |
| Committee Meeting to Get Approval to Schedule Defense | Should be in semester before anticipate defending or within first month of semester that anticipate defending |
| Submission of PBEE Provisional Dissertation Defense Approval Form to PA | By the end of the first month of the semester in which you intend to graduate (at the latest) |
| Schedule Defense Time/Location with PA | After Committee Meeting |
| Submission of Complete Thesis to Advisor | at least One Month before Defense |
| Submission of Complete Thesis, approved by advisor, to Committee | at least Three Weeks before Defense |
| Submission of Defense announcement to PA | at least Three Weeks before Defense |
| Submission of PBEE Final Dissertation Defense Approval Form to PA | at least Three Weeks before Defense |
| Defense announced to PBEE community | at least Two Weeks before Defense |
| Dissertation made available to PBEE faculty not on the student's committee (upon request) | One Week before Defense |

XX. Defense of Ph.D. Dissertation

As a final requirement for obtaining the Ph.D. degree, the candidate must orally defend the dissertation before the Dissertation Committee and other interested faculty and students. All PBEE students are expected to attend the dissertation defense for a fellow PBEE graduating student. Students are strongly encouraged to schedule their dissertation defense as a seminar in the PBEE Seminar Series. In order to achieve this, the defense must usually be scheduled well in advance (often weeks or months) of the anticipated date. It is the candidate's responsibility to find a date and time that is appropriate and to notify the committee and faculty in writing. Although most dissertation defenses require less than two hours, a three-hour period (including the one-hour public presentation, see below) should be scheduled in case additional time is necessary. The defense should occur at least two weeks before the LGS degree completion deadline. Refer to the LGS website for graduation deadlines (<http://www.gs.emory.edu/academics/policies/completion.html>).

The dissertation defense will consist of a public seminar with public questioning at the end, followed by private deliberations between the student and the thesis committee.

A. Public Dissertation Defense

The public dissertation defense is a formal scientific seminar. The atmosphere should be one that encourages critical questioning so that the student can demonstrate their expertise in an open forum. The advisor will introduce the student and their research in a manner similar to other seminars. The defense consists of a ~45-50 minute oral presentation by the candidate of a summary of the project. The student may elect to present their Acknowledgements either immediately after this presentation as a single slide or opt to immediately invite questions from the audience. If the student opts to immediately invite questions from the audience, they may follow this period with Acknowledgements in any form and duration. At the appropriate time, the chair will invite questions from the audience (typically 10-15 minutes but occasionally longer). The committee, other members of the PBEE faculty, and any audience member present can question the candidate on matters related to the dissertation research to assess the thoroughness of the



candidate's knowledge and the quality of the work. The candidate is expected to be an authority in his or her research area, and successful defense of the dissertation requires the oral demonstration of that expertise.

B. Private Dissertation Defense

Following the public defense, the dissertation committee mediator will chair the private defense in an administrative capacity. At this time any issues brought up at the public defense and any other questions that the thesis committee deems appropriate should be addressed. At no time should the advisor answer questions posed to the student. The student will be asked to leave the room, at which time the student's performance will be discussed and evaluated by the committee. All committee members must confirm in writing that the student has successfully defended the dissertation. This is accomplished by submitting the "Committee Approval of the Oral Defense Examination" form to the GDBBS. This form can be found on the GDBBS website.

C. Revisions

In general, all revisions to the dissertation should be made prior to the defense. A final copy of the revised dissertation should be made available to interested faculty who are not on the Dissertation Committee one week prior to the final defense. However, if revisions have not been made in a satisfactory manner, as judged by the committee, final approval of the dissertation will be delayed until the appropriate revisions have been made and reviewed.

XXI. Awarding of Degree

In order for a student to earn a degree in the PBEE Program, he or she must complete all the requirements of the PBEE program, the GDBBS, and the LGS. The GDBBS and LGS requirements are contained within their respective handbooks that are available on their websites and also the PBEE website (http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html). The requirements for PBEE are in this handbook, and it is the responsibility of the student to obtain and fulfill all GDBBS and LGS requirements.

A. Deadlines

The LGS has several deadlines that must be met by the candidate during the semester in which the degree is to be awarded. These deadlines include: 1) last day to file application for degree; 2) last day for receipt of Degree Clearance Reports for Master's and Doctoral candidates (note: theses and dissertations must have final approval, and dissertations must be defended prior to this date); 3) degree candidates' theses and dissertations due in the LGS Office. These deadlines are published in the Academic Calendar (<http://registrar.emory.edu/Students/Calendars/>). The degree completion requirements and forms are listed on the LGS website (All of the requirements for obtaining a Ph.D. are published in the LGS Handbook. Please take the time to read the section entitled "Degree Completion.")

B. Degrees

The Program in Population Biology, Ecology, and Evolution offers two degrees: the Doctor of Philosophy (Ph.D.) and the Master of Science (M.S.). The program of study is intended for the Ph.D. degree. Students seeking only the M.S. degree will not be accepted into the Program. However, under certain circumstances, a student may be permitted to work for a terminal M.S. degree that requires submission of an appropriate thesis.

Applying for and Completing a Terminal Master's Degree



A student may petition the Executive Committee for permission to complete a terminal Master's degree instead of continuing her or his doctoral studies. If the petition is approved, such a student must form a Master's Dissertation Committee consisting of a faculty advisor and two additional members of the program faculty. The student must complete a research project approved by the committee and write a Master's thesis. The student need not have taken the qualifying exam. The Master's degree in the GDBBS is a research-based degree and a "publishable" body of scholarly experimental work is written up in the same format as a Dissertation, except that the length and depth of the work is typically less, with a minimum of one substantive chapter in addition to the introduction and conclusion. Guidelines for writing and submission of a Master's thesis are the same as those for the Doctoral dissertation.

To receive a terminal master's degree from a GDBBS program, a student must meet all LGS requirements for a terminal master's, which among other requirements include 30 hours of course work, at least 15 of which are not dissertation research, and the successful defense of a master's thesis. Details can be found in the LGS student handbook. PBEE imposes an additional requirement: the student must pass all four core PBEE courses.

PBEE only offers a thesis-based Master's degree (as opposed to a course-based Master's degrees, which some other LGS programs offer). The steps to completing a Master's include:

1. Together with the selected advisor, the student must request permission from the PBEE Executive Committee to switch tracks and exit with Master's in writing. This request includes a thesis proposal from the student and letter from the student's advisor. Details are provided below
2. If the Executive Committee approves, the student completes [LGS Terminal Master's request](#).
3. Student submits Master's mentorship agreement form to GDBBS, if needed.
4. Student establishes a three-person committee. This committee should include the student's advisor and two other full members of the LGS.
5. The student needs to hold at least one committee meeting in the student's first term (including summer term if applicable) as a Master's candidate to discuss the research plan and provisional timeline to completion.
6. With guidance from the student's advisor and committee, the student completes research and writes a thesis.
7. With permission of the student's committee, the student sets a thesis defense date. Typically, a Master's thesis is defended by the end of the term following the student's request to change to the Master's track.
8. The student [applies for a Master's degree with LGS](#).
9. Student defends thesis.
10. Student submits [LGS Master's Degree completion paperwork/processes](#).

Requesting consideration for a Master's Degree will require a one-page Master's thesis proposal from the student and a letter from the student's advisor to the PBEE executive committee. The executive committee will vote to approve or deny the student's request. A simple majority of votes is needed to approve the request.

The advisor's letter will:

- lay out a very brief prospectus for the Master's thesis plan (one short paragraph) including work completed at the time the letter was written



- include a deadline for completion of the Master's degree with a schedule of benchmarks to be met by the student with specific dates. In most cases, this deadline will align with the LGS deadlines for completion for a particular term (fall, spring, or summer).
- provide an explicit statement that the advisor expects the student to have the necessary background knowledge, skills, and work ethic to complete their plan for the Master's degree by the deadline
- In some instances, the advisor must also state a source of stipend support for the student:
 - For students who decide to pursue a Master's (rather than doctoral) degree in their first or second year, stipend support by the University does not extend beyond 21 months. In these cases, the Master's degree work will typically not extend beyond 21 months. In the instance that it is mutually beneficial for the student and the advisor for the Master's degree work to extend beyond the 21 months of support, the advisor must explicitly state the source of support for the student by naming the grant or account the support will come from. If the advisor does not have funds for supporting the student, extension beyond 21 months will not be an option for completing the Master's degree with that advisor.
 - For students who decide to pursue a Master's degree after their 21 months of University support have ended (or which will continue after the 21 months of support), the advisor must explicitly state the source of support for the student by naming the grant or account the support will come from. In such cases, the deadline for completion of the Master's degree will typically be no later than the term following the request (for example, a request made in the spring semester will typically have a deadline of completion no later than the summer term). If the advisor does not have funds for supporting the student, extension beyond 21 months will not be an option for completing the Master's degree with that advisor.

Completion of the Master's degree: the student must complete all of the applicable requirements specified by the LGS, the GDBBS, and PBEE by the deadline for completion in the term they are scheduled to finish. If the deadline for completion of the Master's degree (including all requirements, forms, etc.) is not achieved by the student, the student will under most circumstances be dismissed from the program.

Extensions past the original deadline: In the case that the advisor and student agree that it would be mutually beneficial for the student to have an extension for completion of the Master's degree, beyond the timeline set out in the original request, they may petition the PBEE executive committee for an extension. This request must come from both the advisor and the student, i.e. the advisor must be supportive of an extension. This petition request is in the form of a letter from the advisor to the PBEE executive committee, which will vote to approve or deny the extension request. A simple majority of votes is needed to approve the request. The petition request letter should include:

- an brief explanation of why the student did not complete the Master's degree by the expected timeline;
- a new proposed deadline for completion;
- a brief explanation of why the advisor expects the student to complete the Master's degree by the new deadline
- source of stipend support (following the guidelines in the original consideration request for the Master's degree, above). If the advisor does not have funding to support the student during the extension period (and the extension period extends beyond the 21 months of support), the request will be denied.

Typically the PBEE executive committee will not approve more than one extension, unless there are very clear extenuating circumstances. To petition for a subsequent extension, the advisor must submit a letter following the form of the original extension request. A simple majority of votes from the executive committee is needed to approve the request.



XXII. Tenure of Graduate Studies

Ph.D. students and their advisors should aim for completion of their graduate studies within a period of five years. M.D./Ph.D. students should aim for completion of the program within four years after beginning the graduate school portion of their studies. Most graduate students should be able to complete their dissertation research and defense within this period of time. If it becomes evident to a student and his or her advisor that successful defense of the dissertation cannot occur before August 31 at the start of the seventh year, the student must submit a formal petition to the Executive Committee for an extension of this time limit. This petition should be in writing and should include a statement as to the reason for the student's inability to complete the program within six years and a clear justification for the extension. The deadline for submission of this request is January 1 of the student's sixth year in the program. Also, the petition should include a projected date for the defense. When considering the petition, the Executive Committee will consult with members of the student's Dissertation Committee to determine whether they consider the projected date of the defense to be realistic and attainable.

XXIII. Expectations of Performance

A. Student Performance

Students are expected to perform satisfactorily in required and elective course work. In most cases, this includes active participation in classroom and seminar discussions as a way of contributing to the scientific environment of the University and to the development of the student. Students are also expected to actively participate in the various events and seminars sponsored by the program. Students should be motivated to continually develop their scientific independence and creativity. This is demonstrated by active interest in and knowledge of the current scientific literature and by planning and performing original research. The student's research results should be published as independent contributions to the scientific literature. It is obvious that to accomplish these goals, students need to acquire and develop written and oral communication skills.

Students are also expected to make continuing progress throughout the program. This includes selection of an advisor and Dissertation Committee in a timely fashion and submission and defense of the dissertation soon after completion of laboratory research. We anticipate most students will complete the graduate program in approximately 5-6 years. Students are encouraged to show a dedication and enthusiasm for their research projects and to continually strive for the excellence and discipline that will make them competitive in the modern scientific world. In addition, students should be familiar with the regulations governing University-student relationships and with the LGS Honor and Conduct Codes as published in the LGS Handbook (<http://gs.emory.edu/handbook/>).

B. Faculty Performance

Students may expect the faculty to enthusiastically give their time and expertise. This is done both in terms of presenting well-prepared, current formal courses and by providing individual instruction and consultation in the laboratory such that students can maintain progress in their research. The faculty provide laboratory space, equipment, and financial support so students in training can conduct their research. In many cases, student stipends are also provided directly by individual faculty members' research grants. Importantly, faculty should serve as professional role models and encourage and advise students to fully develop their scientific talents. Finally, faculty should counsel students in determining the direction their postdoctoral careers might take and help students with a development plan appropriate for the student's goals. [Mentoring guidelines](#) are provided through the graduate school. Faculty are also expected to provide



reasonable and clear guidelines for the graduate program and to administer LGS requirements at the program level.

A student who is experiencing disagreements or problems related to her or his progress in PBEE is encouraged to directly communicate with the DGS and/or PD, as early as possible after the student recognizes that there is a potential issue. Early communication can greatly reduce the possibility of more serious problems.

Appeals

If a student in a GDBBS graduate program believes that either a grade or a grade leading to recommendation to dismiss the student was impacted by extenuating circumstances that adversely affected his/her performance, he/she may appeal the grade or the dismissal to the Division Director, and request a reconsideration of the grade or the dismissal. The appeal should clearly outline the extenuating circumstances and must be submitted within one month of grades being recorded by the Office of the Registrar, or the letter recommending dismissal being received by the student. The graduate program will be asked to respond to the appeal, and will follow the grade appeals process outlined in the handbook of student's graduate program. The student will be notified of the decision by the Program Director of the graduate program and the GDBBS Director.

If the Program vote was unanimous, and the student believes the appeal is not resolved, the appeal will be relayed directly to the Laney Graduate School, bypassing review by the GDBBS Executive Committee.

If the graduate program vote on the appeal was not unanimous, and the student believes the appeal is not resolved, the student can appeal to the GDBBS Executive Committee. The same document that was presented to the graduate program for their review of the appeal should be sent to the GDBBS Director. Appeals will be reviewed by the GDBBS Executive Committee which consists of the Program Directors of the eight graduate programs and the GDBBS Director, minus the Program Director of the graduate program(s) directly involved in the appeal. The GDBBS Director will provide the appeal materials to help ensure consistency across the Division, but will not vote except in the need of a tie-breaker. The Program Directors and GDBBS Director will review the material and meet face-to-face to discuss. A majority of the Program Directors must be present at the meeting, and only those who are present can vote. Votes will be taken via SurveyMonkey to ensure confidentiality. If the appeal is denied the GDBBS Director will immediately notify the LGS. If the appeal is accepted the GDBBS Director will notify the student and the Program Director and DGS of the graduate program.

Grievance Policy

Students who have a grievance related to some aspect of their PBEE PhD program should submit a detailed letter describing the grievance and the relevant details to the appropriate person, as detailed below. The process starts at the graduate program level, unless the grievance involves the Program Director or DGS of that program:

| <u>Level</u> | <u>Focus of Grievance</u> | <u>Process Starts With</u> |
|--------------|------------------------------|---------------------------------|
| 1 | Within the student's Program | Director or DGS, as appropriate |
| 2 | Program Director or DGS | Director of the GDBBS |
| 3 | GDBBS or GDBBS Director | LGS Senior Associate Dean |

Grievances submitted to the Program (level 1 above) will be handled according to that Program's grievance policy. If the grievance cannot be resolved at the Program level, the student may file a grievance addressed to



the Senior Associate Dean of the Laney Graduate School, who will follow LGS Grievance Procedure (<http://gs.emory.edu/handbook/honor-conduct-grievance/grievance.html>).

If the grievance is submitted to the Director of the GDBBS because it involves the Program Director or DGS of a program (level 2 above), he/she will review the grievance documentation and will try to resolve the grievance in conversation with the student and relevant parties. If this is not successful, the GDBBS Director will ask a committee consisting of the eight Program Directors and the GDBBS Director, minus the Program that is directly involved in the grievance, to review the grievance and propose an appropriate response. The GDBBS Director will provide the grievance materials to help ensure consistency across the Division, but will not vote except in the need of a tie-breaker. All grievance discussions will take place in a formal face-to-face meeting scheduled typically within one week of the grievance being filed. A majority of the Program Directors must be present at the meeting, and only those who are present can vote. Votes will be taken via SurveyMonkey to ensure confidentiality.

If the grievance cannot be resolved at the Division level, the GDBBS Director will refer the matter to the Senior Associate Dean of the Laney Graduate School, who will refer the matter to the LGS Committee on Grievances, which is composed of three graduate faculty members. The Director of the GDBBS and the Director of the Program where the student resides will meet with the Senior Associate Dean of the LGS to discuss the outcome and recommendations related to the grievance.

XXIV. Student - Faculty Communication

Students usually have questions and suggestions that can assist the faculty in achieving and maintaining a high-quality training program. Student feedback about all aspects of the program, and particularly about courses, is very important in helping the faculty recognize the strengths and weaknesses in the current program. Student-faculty communication is therefore strongly encouraged, and students are urged to make their views known to the faculty. Faculty will request feedback, but when they do not hear from students they often assume that there are no problems in the current program.

The student's advisor or members of his or her dissertation committee are in the best position to discuss research or personal problems. The PD, the DGS, the Program Administrator and members of the Executive Committee are obvious first choices to approach about procedure and policy questions. However, all faculty attempt to be readily available to meet with students, within the restrictions of their schedules. If a faculty member cannot see a student immediately, he or she will make an appointment to meet with the student at the earliest available time. Please use the faculty as a resource.

XXV. Financial Support

Stipends and tuition fellowships, awarded to students on the basis of academic merit, are intended to cover basic living expenses and tuition. With the exception of special awards, such as the Woodruff Fellowship, Centennial Scholars Fellowship, and Laney Fellowship, stipend levels are set by the Division based upon the availability of funds from LGS and university sources. The faculty also encourage and assist students in obtaining individual stipend support from extramural sources, such as federal agencies and private foundations.

It is the policy of the Division to continue support for all students in good standing working for a PhD up through year six, with seventh year support available in special circumstances. Financial support beginning in the third



year is the responsibility of the student's thesis advisor. However, no student in good standing has ever been refused support by the Division. For PBEE, typical sources of support after the second year are from research grant funds of the student's advisor or individual fellowships awarded to the student, or through graduate research assistantships from outside funding agencies, e.g., the CDC, NSF, Dean's Teaching Fellowship, and other departmental or programmatic fellowships.

Financial support may be withdrawn from students whose performance in the graduate program is unsatisfactory as stipulated in the sections above. Financial support is normally provided only to full-time students working toward the doctoral degree.

XXVI. Policy Regarding Employment

Stipend and tuition fellowships are awarded to allow students to devote full time to the graduate program and to complete the requirements for the Ph.D. degree in as short a time as is consistent with adequate training and research progress. The student should not engage in employment while receiving a stipend through the graduate program, regardless of the source of that stipend. Such employment generally causes a serious distraction from the educational process. Graduate education and research are by necessity self-motivated processes and the distractions of employment can interfere with the ability of students to prepare satisfactorily for their future professional careers.

If a student feels strongly that employment is necessary while in the graduate program, the student must discuss the need with his or her advisor and submit a formal request to the Executive Committee at least 30 days in advance of beginning employment. The petition must be fully supported and signed by the student's advisor; however, the student should be aware that such a request will only be granted if it is deemed appropriate and if it will further the student's ultimate career goals. Also, such requests will normally be considered only for students in Advanced Standing. If employment is necessary and allowed by the Executive Committee, the student must not allow it to interfere with high standards of performance. If the student's advisor, any committee member, or the DGS / PD feels that employment is interfering with the student's performance, they may petition the Executive Committee to rescind the request for outside employment.

XXVII. Parental Accommodations

The Laney Graduate School has set up accommodations for graduate students who are new parents. Students can learn more by visiting the appropriate LGS site here:

<http://www.graduateschool.emory.edu/academics/policies-progress/index.html>

XXVIII. Student Support Services

Graduate school can be a stressful time on your body and mind. Be sure you are taking care of yourself. Go to Laney Graduate School student support page and the LGS/GDBBS support page for links to all student support services available to you:

<http://www.gs.emory.edu/guides/students/support.html>

<https://secure.web.emory.edu/biomed/intranet/students/Resources%20for%20Students.html>



XXIV. Special Section on the Office of Accessibility Services (OAS)

“Emory provides all persons an equal opportunity to participate in and benefit from programs and services afforded to others. The Office of Accessibility Services (OAS), part of the Office of Equity and Inclusion, assists qualified students, faculty and staff with obtaining a variety of services and ensures that all matters of equal access, reasonable accommodation, and compliance are properly addressed.” OAS “is committed to providing access to campus resources and opportunities to allow students with disabilities to obtain a quality educational experience.”

Qualified students need to register with OAS and make a request for services. Confidentiality is honored and maintained. (Emory OAS website):

<http://accessibility.emory.edu/students/index.html>

XXX. Leaving the Program

A. Beyond the PhD

The question of what direction a student's career will take following completion of the doctoral training program should arise early and become increasingly important as training progresses. It is never too early to begin to consider career options and to plan a curriculum accordingly. It is common for students receiving the Ph.D. to take a postdoctoral research training position in order to pursue a specific research interest, as well as to acquire additional techniques and expertise to prepare themselves further for a career of independent research. Such postdoctoral training is especially valuable and is usually essential for a career in academic research. Some postdoctoral positions are tailored to students interested in developing teaching skills. Some students take permanent positions in industrial or government research laboratories immediately after receiving the Ph.D. degree. Others decide to enter further advanced degree programs, such as medical school. Career objectives can best be realized through the careful planning of a student's graduate training program. The PD, DGS, Executive Committee, and all members of the faculty stand ready to advise students on career options. Students are strongly encouraged to seek this advice at any time during their training and are required to discuss their individual development at committee meetings.

B. Poor Performance

The DGS will review the progress of students once each semester, or more frequently if warranted. All students must meet the LGS's definitions of good standing and due progress to continue in the program. Degree candidates must also be conducting satisfactory research as judged by the advisor and dissertation committee. Students who are experiencing difficulty in the program are strongly encouraged to seek assistance at their earliest opportunity from the Director, DGS, and members of the Executive Committee, their advisor, or other faculty. Every effort will be made to assist students in meeting the performance standards that are required for continuation in the program. However, a student who does not maintain an adequate standard of work or make due progress will be placed on probation due to an unsatisfactory research grade, and financial support may be withdrawn. The student will be informed by Laney Graduate School in writing of the conditions of the probation, and a timetable for elimination of the probationary status. A student who fails to meet the conditions of the probation will be placed on a second probation, and recommended for dismissal from the program if probation conditions are not satisfied, following LGS policies.



A student who fails either the written or oral part of the doctoral qualifying examination is considered to not be making due progress. Such a student may petition the faculty to retake any portion of the examination only once, and all reexaminations must be completed within the first month of the fall semester of the student's third year. A student who fails the reexamination can petition to complete a terminal Master's degree or will be recommended for dismissal from the program, following LGS policies.

Appeals of the Executive Committee's decisions in these matters will follow the appeal process outlined above.

XXXI. University Requirements and Other Policies

Every effort has been made to make this document as accurate and complete as possible. Policies are subject to change without notice. Refer to the latest version of the LGS Handbook

(<http://www.gs.emory.edu/academics/policies/index.html>) and GDBBS Handbook

(<https://secure.web.emory.edu/biomed/intranet/handbooks/index.html>) for other policies such as:

- University Policies
- Honor Code
- Minimum Degree Requirements
- Professional Development Funds
- Withdrawals and Leaves of Absences
- Parental Accommodations and Leaves
- Degree Completion & Graduation

Appendix A1. PBEE Graduate Student Timeline and Milestones

PBEE Student Degree Progress Guide 2024 - 2025

Towards the beginning of each semester, one of the PBEE seminar slots will be dedicated to a ‘Student Life Cycle’ seminar. This seminar will review the upcoming requirements and milestones for each class and allow older PBEE students to impart their wisdom on younger and incoming PBEE students. Please also use this guide to review your degree progress and discuss any questions or concerns you have. If you would like to review your progress individually with the Program Director, DGS, and/or PA, please contact us to schedule a meeting.

PBEE Program Director: David Civitello Ph.D.
Rollins Research Center, Room 1011
404-727-3336 (office)

PBEE DGS: Daniel Weissman Ph.D.
Math Science Center, Room N244
404-727-4296 (office)

Submit all forms to: Rosalyn Lightfoot, MPA, MPM
Program Administrator
Dental Building (1462 Clifton Rd.), Suite 300A
TBA (temporarily: (404) 727-3707)

FORMS

| | |
|-------|---|
| PBEE | http://www.biomed.emory.edu/PROGRAM_SITES/PBEE/student-resources/index.html |
| GDBBS | https://secure.web.emory.edu/biomed/intranet/students/index.html |
| LGS | http://www.graduateschool.emory.edu/academics/policies-progress/index.html |

HANDBOOKS

| | |
|-------|---|
| GDBBS | http://staging.web.emory.edu/gdbbs-internal/handbooks/index.html |
| LGS | http://gs.emory.edu/handbook/ |



YEAR 1

| Milestone | Form | Deadline |
|---|------------------------------|--|
| TATT 600: Workshop | N/A | August 22-23, 2024 |
| JPE 600: Core Course | N/A | August 16, 2024 |
| Lab Rotation 1 (Sept. 25 – Nov. 17, 2023) | PBEE Rotation Plan | First Monday of October; submitted to DGS |
| | PBEE Rotation Summary | First Monday of December; submitted to DGS |
| Lab Rotation 2 (January 8 – March 1, 2024) | PBEE Rotation Plan | Third Monday of January; submitted to DGS |
| | PBEE Rotation Summary | Second Monday of March; submitted to DGS |
| Lab Rotation 3 (March 4 – April 26, 2024) | PBEE Rotation Plan | Third Monday of March; submitted to DGS |
| | PBEE Rotation Summary | First Monday of May; submitted to DGS |
| Select Faculty Advisor | GDBBS Mentor Assignment Form | Second Monday of May; submitted to DGS |
| PBEE Ethics Training | N/A | Fall & Spring |



YEAR 2

| Milestone | Form/Details | Deadline |
|--|--|------------------------------------|
| TATT 600: Workshop | If not completed last year | August 22-23, 2023 |
| Submit Names for Qualifying Exam Committee | Email a list of 6 PBEE faculty (in order of preference) to PD/DGS/PA | 1 st Monday of November |
| Proposal draft to advisor | Send advisor a tentative outline of the proposal | 1 st Monday of November |
| Establish Qualifying Exam Committee | PD/DGS/PA will email you completed PBEE Qualifying Exam Committee Information and Oral Exam Date | 3 rd Monday of November |
| Draft to Advisor | Send advisor draft of Research Proposal | 2 nd Monday of December |
| Submission of research proposal | Email document to Committee, DGS and PA | 2 nd Monday of February |
| Submission of revised research proposal | Email document to Committee, DGS and PA | 4 th Monday of March |
| Oral Exam | N/A | April 1-21 |
| PBEE Ethics Training | N/A | Fall & Spring |



YEAR 3

| Milestone | Form | Deadline |
|--|------------------------------------|---------------------------------------|
| Reach Candidacy | LGS Admission to Candidacy Form | September 15 of Year 4 |
| Select Dissertation Committee | LGS Dissertation Committee Form | By end of first week of fall semester |
| Required: Dissertation Committee Meeting | PBEE Dissertation Committee Report | By end of fall |
| Optional: Dissertation Committee Meeting | PBEE Dissertation Committee Report | By end of spring |
| PBEE Ethics Training | N/A | Fall & spring |

YEAR 4

| Milestone | Form | Deadline |
|--|------------------------------------|------------------|
| Required: Dissertation Committee Meeting | PBEE Dissertation Committee Report | By end of fall |
| Required: Dissertation Committee Meeting | PBEE Dissertation Committee Report | By end of spring |
| PBEE Ethics Training | N/A | Fall & spring |

YEAR 5+

| Milestone | Form | Deadline |
|--|--|--|
| Required: Dissertation Committee Meeting | PBEE Dissertation Committee Report | By end of fall |
| Required: Dissertation Committee Meeting | PBEE Dissertation Committee Report | By end of spring |
| Schedule Dissertation Defense | PBEE Provisional Dissertation Approval | By the end of the first month of the semester the student intends to graduate in |
| | GDBBS Defense Flyer & Program Templates (email to PA) | At least 2 weeks before defense |
| Written Dissertation Approvals | Doctoral Completion Form (submit original copy to PA) | Defense should occur at least 2 weeks before LGS deadline |
| Oral Defense Approvals | Committee Approval of the Oral Defense Examination Form (submit original copy to PA) | Immediately after defense; defense should occur at least 2 weeks before the LGS deadline |
| Plan for Graduation | LGS Application for Degree (online in OPUS) | Varies Fall: September Spring: February Summer: July |
| PBEE Ethics Training | N/A | Fall & spring |

*Students in their seventh year or beyond must have at least 3 dissertation committee meetings per year (fall, spring, and summer).

Planning for Graduation:

- Review LGS Degree Completion requirements and policies:
<http://www.gs.emory.edu/academics/policies/completion.html>
- Refer to LGS Calendar for graduation deadlines and due dates:
<http://registrar.emory.edu/Students/Calendars/academiccalendar/index.html>

Questions about Degree Completion:

Renee Webb (LGS)

renee.webb@emory.edu

Administration Building, Suite 209

404-727-4870