Brown University
Division of Biology and Medicine
Department of Ecology, Evolution, and Organismal Biology

GRADUATE PROGRAM IN
Ecology, Evolution, and Organismal Biology

HANDBOOK FOR PHD STUDENTS

INTRODUCTION

This document is intended to provide a description of the Graduate Program in Ecology, Evolution, and Organismal Biology (EEOB). The aim is to spell out the guiding principles of the program so that graduate students understand what is expected of them and what they can expect from the program. The Brown Graduate School maintains their own handbook available here that provides a more general description of graduate study at Brown University.

1. GOALS OF THE GRADUATE PROGRAM

The general goals of the Graduate Program in Ecology, Evolution, and Organismal Biology are to train scientists in the broad area of organismal, evolutionary, and ecological biology who are capable of thinking critically about the biological world and to prepare these individuals to function as independent, professional scientists. To achieve these goals the Program must ensure that our graduates combine a broad understanding of ecology and evolutionary biology with a deep knowledge of a specific research area. Moreover, the Program must ensure that this knowledge can be applied effectively to the design, execution and publication of high-quality scientific research. Ultimately the quality of one's scholarship is an important measure of success, and this depends on one's ability to initiate and complete creative scientific research as an individual and as an effective collaborator. For that reason, the EEOB Graduate Program encourages students to initiate their thesis research at the earliest possible stages, and to play an active role in achieving scientific independence in collaboration with their primary advisor and thesis committee. By fostering an environment where students are afforded a remarkable degree of both freedom and access to faculty, we hope that our graduates will attain the skills to become leaders in their discipline.

The EEOB Graduate Program is administered by one or more faculty Directors of Graduate Study (DGSs) and the Graduate Program Coordinator.

2. MILESTONES DURING THE PHD PROCESS

A Ph.D. involves a succession of committee meetings, the goals of which are to ensure

that the student is on track and has access to the support needed for success. To this end, incoming students will meet twice with an advisory committee in the first year, and then at least annually with their thesis committee thereafter, culminating in a thesis defense on or around the end of the 5th year (this time frame is approximate). This schedule does not preclude additional meetings if needed. Students are also encouraged to contact individual committee members when they need to consult the committee member's particular expertise.

It is the student's responsibility to constitute and schedule all committee meetings. Students should talk to their advisor and other faculty about appropriate committee membership. A brief summary of these meetings (timing and required reports) is provided in Table 1, and the objectives and other details regarding each meeting are specified below.

Table 1: Summary of Committee meetings leading to the PhD

Committee Meeting [a]	Required Timing [b]	Required Report [c]
First Advisory Committee meeting	First week of the first fall semester	First Advisory Committee report
Second Advisory Committee meeting	In January or February of the second semester	Second Advisory Committee report
First Thesis Committee meeting	Early in the second fall semester	First Thesis Committee report
Second Thesis Committee meeting	Early in the second spring semester	None
Qualifying exam	No later than the end of the fourth semester	Qualifying exam report
Subsequent Thesis Committee meetings	At least annually	None
Thesis defense	Approximately five years after matriculation	Thesis and signature page provided to the Registrar [c]

[a] IMSD-supported students should invite someone from the IMSD Office to attend each of these meeting. Email imsd@brown.edu.
[b] The Graduate Program Coordinator will monitor students' adherence to this schedule, and send reminders to students, advisors and the DGSs as appropriate.
[c] Students should print and provide appropriate form to their advisor as a guide to the discussion. The advisor will then fill in the form and circulate to the student and other committee

members within one week of the meeting. Any discrepancies in recollection on the part of the student or other committee members should be promptly resolved by email (and with assistance of the DGS(s) if necessary). Finally, the student emails the final version of the report to the DGS(s), all committee members and the Graduate Program Coordinator. The student should also save a copy of all reports, as these are integral to the annual review process (see below).
[c] See Graduate School website for further details.

Year 1
Before or during the first week of the fall semester, first year students will identify and meet with the Advisory Committee consisting of their major professor and a minimum of two other EEOB faculty members. The incoming student and major advisor can discuss the makeup of this committee before the student arrives on campus. Aside from the major advisor, it is not necessary that members of this committee have expertise in the specific research area of the incoming student, as the main objective of this committee is to lay out clear expectations of course work, teaching and research activities during the first two years.

First Advisory Committee meeting report: The First Advisory Committee Report of the first meeting must be filed with the Director of Graduate Studies (DGS) and the EEOB Graduate Program Coordinator, including the composition of the committee, the stated course work (including suitable Environmental Health and Safety courses and the BioMed Responsible Conduct of Research course; see below), teaching and/or research to be done in the first year, and a general description of the research focus.

Coursework: In this first meeting, the student's background will be considered (courses, previous research and work experience), and any gaps will be identified. Students should prepare a CV and a list of relevant coursework, including course titles, and distribute these to the committee members by email at least 24 hours prior to the meeting. A list of potentially suitable courses is available at the back of this guide as a resource for students and Advisory Committee members. Courses come and go, so this list should not be viewed as definitive. The Courses @ Brown website is another resource.

We expect that incoming EEOB students will have completed the equivalent of an undergraduate course in the following topics:

- Ecology
- Evolution
- Organismal-Comparative Biology
- Cell and Molecular Biology
- Statistics

This minimum background is necessary to understand the diverse research topics in Ecology, Evolution, and Organismal Biology. Students will be required to take courses to fill any gaps, even if this means taking undergraduate courses that do not offer graduate

credit. A minimum of a B grade is required to satisfy Advisory Committee-assigned undergraduate courses. If the committee feels strongly that the student should not be required to fill gaps, they may petition the DGS(s) for an exemption.

Students and Advisory Committees are particularly encouraged to take advantage of the 1000-level courses in assembling the individualized curricula. These undergraduate/graduate level courses provide excellent opportunities for rigorous advanced study and offer an effective way to prepare for the qualifying exam.

Graduate Seminar Requirement: EEOB doctoral students are required to take at least three graduate seminar classes (BIOL 2430/2440) during their graduate tenure. (Note that these courses need not be completed before students advance to candidacy.) One of them is a 1.5 semester long introduction to foundational papers in evolution, ecology, and organismal biology, which starts in October of even numbered years and is required of first and second year students. Two other graduate seminars are required. The main activities in a graduate seminar class are reading, discussing and writing about primary literature, but other research-focused courses (such as skills or methods courses) are also sometimes offered. It is anticipated that approximately one graduate seminar will be offered each year in each of the department's focal areas: Ecology, Evolution and Organismal Biology. A list of EEOB Graduate Seminar Classes (BIOL2430/2440) tabbed by semester is maintained. Graduate seminar classes other than 2430/2440, 2000-level classes that provide advanced training in some area of ecology and evolution, may also sometimes be used to fulfill this requirement. Interested students should consult with their advisor and the Director(s) of Graduate Studies if questions arise about whether a course will count toward the seminar requirement. All graduate seminars represent at least 180 hours of study during the semester.

Registering for Courses: Students in years 1-3 should register for Graduate Independent Study (BIOL 2980; select the section supervised by your major advisor) and any other courses of interest. Students should select the S/NC grading option for BIOL 2980, unless the student and advisor agree that it should be taken for a grade. In each semester, students should adjust the number of credits of Graduate Independent Study (BIOL 2980) to raise their total load to 4 credits.

Students in years 4 and beyond should register for at least one credit of Thesis preparation (BIOL 2990) every semester. BIOL 2980 and 2990 represent at least 180 hours of study each semester.

Teaching: All EEOB graduate students are required to serve as a teaching assistant (TA) for a minimum of 2 semesters, and additional opportunities are often available for interested students. These TA-ships are viewed as a critical part of a student's general training as they offer an opportunity to review and more deeply comprehend the material in a particular area of ecology, evolution or organismal biology. Serving as a TA in a

course that one did not take as an undergraduate might be recommended by the student's Advisory Committee as a means of acquiring adequate intellectual breadth. The TA-ships provide important teaching experience, which can serve as a guide when that student moves on to a faculty position. The TA-ships also fill an important instructional role for the University, and provide an opportunity for graduate students to interact with talented Brown undergraduates. The faculty in the EEOB program, and indeed the University in general, are committed to high quality teaching. We expect the same of our graduate students and encourage students to become fully engaged in the TA process as it broadens their training in many ways. The Sheridan Center for Teaching and Learning offers many programs, including several Teaching Certificates that are helpful in various aspects of professional development.

1st year research projects: It is expected that each student also identify an independent research project to conduct under the auspices of a specific faculty member. Many incoming students have a general idea for a thesis project, but in any case, specific time should be budgeted for reading, planning or doing research that might help further clarify a thesis project. While the specifics of this project will be very student-specific, analyses of pre-existing, unpublished datasets, and development and optimization of experimental or computational methodologies are often good starting points.

First-year projects are intended to develop into at least one component of the student's thesis research. Consequently, student and mentor should be mindful of the eventual "publish-ability" of the work. Thus first-year projects should not simply repeat published experiments or analyses, and must also have suitable intellectual motivation. See the description of the thesis proposal (below) for further details.

Second Advisory Committee Meeting:
The student will reconvene their Advisory Committee early in the second semester of the student's first year in order to review the student's progress and make recommendations for further study and summer research. It is essential that a meaningful research experience is a significant component of this first summer. A Second Advisory Committee Report must be filed with the DGS and the EEOB Graduate Program Coordinator.

Advancing to PhD candidacy
The advisory committee will dissolve at the end of year 1, to be replaced by the thesis committee that the student should form by the start of year 2. The thesis committee will supervise the student's qualifying exam, subsequent thesis research and thesis defense. Membership of the committee should be decided by the student and their major advisor, and gather the expertise needed to advise the student on their research trajectory. It is understood that committee membership may change in the later years, if for example the student's research direction changes or new faculty arrive on campus. Students interested in this possibility should begin by consulting with their major professor.

The thesis committee should have at least four members, and can include faculty from EEOB, other Brown departments, and other institutions. However, at least 2 of the members must be EEOB faculty, and at least 3 must be faculty at Brown. The Thesis Committee should consist of faculty that will best support the research and educational goals of the student and the advisor - students should build a team that can help them gain the skills and perspectives they need to complete a strong and effective thesis.

The addition of a reader from outside of Brown is allowed, but not required. The student and thesis committee should discuss this option, which often is motivated in the later stages of the thesis, particularly if the research topic moves away from the committee's areas of expertise. An additional advantage of having an outside reader is to bring the thesis work to the attention of a leader in the field. Students are welcome to share this handbook with potential outside committee members.

Expenses incurred when an outside committee member visits to campus can sometimes be covered with departmental funds if the individual simultaneously deliver a Tuesday departmental seminar. However, financial responsibility for additional visits generally fall to the mentor. Remote attendance via Zoom or similar is also sometimes appropriate.

First thesis committee meeting: This first thesis committee meeting should take place as early as possible in the fall of the student's second year. The main agenda item for the meeting should be the discussion of a thesis topic. If a satisfactory research area has not been defined, specific goals should be identified that will help in the development of a project.

In addition, the committee should discuss the needs for any further course or preparatory work and identify specific academic weaknesses that should be addressed during the coming year. For all students, a clear timeline for progress toward thesis goals should be defined in writing. A First Thesis Committee Meeting Report should be filed with the DGS and the EEOB Graduate Program Coordinator itemizing these goals and stating the agenda for the year.

Second thesis committee meeting: In anticipation of the qualifying exam, the student should convene a second meeting of the Thesis Committee, outline the plan for the Thesis Proposal, and seek input from the Committee on preparedness for the Exam. It is expected that the student and their primary advisor will be in close consultation about their readiness for the Qualifying Exam, so that preparation can proceed on a timely schedule. Typically, the second Thesis Committee meeting will take place early in the spring semester of the second year in anticipation of a qualifying exam, **which occurs no later than the end of the fourth semester**.

A critical part of the qualifying exam is the student's demonstration of mastery of published literature related to their research plans. After the second thesis committee meeting, the

student will assemble a proposed reading list, which can then be refined and approved by individual committee members. This process is most conveniently done with a cloud-based, shared document such as Google or Dropbox. In particular, this allows faculty to avoid overlapping and overloaded assignments. Any material can be included, in keeping with the goal of breadth and depth of training. Readings can include primary literature, books, chapters, analyses, etc. that focus on a particular sub-discipline that is important for training in the student's research area. Working from the student's recommendations, this reading list, or specified reading areas, should be agreed to by faculty on the committee within one month of this second thesis committee meeting, and enough in advance of the exam, so that the material can be read carefully. However, this list should not be regarded as a contract: during the course of developing the thesis proposal, additional readings may be identified (see below), although faculty should be mindful of not overloading students.

Thesis Proposal: The learning objective of the thesis proposal is for the committee to see the student's ability to identify an important scientific question, articulate a plan to address that question, and place that question in the context of other relevant results. It is not to complete the research, which instead is the goal of the thesis. Furthermore, a proposal is just that, it is not a contract. Therefore, students should not be surprised if their course of study eventually deviates from the thesis proposal. Nevertheless, the Thesis Committee must approve significant deviations from the plan outlined in the Proposal before a student submits a body of work for the dissertation.

More specifically, the proposal is a demonstration that the student has the ability to articulate and plan for a successful thesis project. To that end, the proposal should review the relevant literature, identify an intellectually significant gap in our understanding of a problem, and propose a series of at least three practical and logically connected projects that would fill those gaps. The proposal should include a detailed timeline for the execution of the research that extends through the student's remaining years. Each chapter should be conceptualized as eventually yielding its own publication. It is typical that during their first year, the student will have gathered at least preliminary data for at least one of the chapters to include in the proposal. This will justify the intellectual direction of the work as well as demonstrating its practicality. However, subsequent chapters are often much more preliminary. One useful approach can be to define an intellectually motivated dataset to be collected and then describe a proposed method of analysis.

A successful thesis proposal demonstrates the student's growing ownership of their research. It must articulate intellectual significance and feasibility of the proposed work, and students should recognize that unlike any previous academic experience, a PhD thesis defines both its questions and its answers. The thesis proposal should thus clearly craft and describe intellectually motivated questions, and demonstrate the student's capacity to answer those questions.

Students should plan to meet once or more with each committee member between the second thesis committee meeting and the qualifying exam to discuss their thesis proposal and assigned readings. Some students mistakenly feel that preparation for the qualifying exam should be done in isolation, but rather than being regarded as a shortcoming, such continued conversations with their committee members are an important part of the learning process. It is understood that the thesis proposal (and sometimes also the reading list) will evolve during this time, and the input of all committee members is a critical part of the process.

The thesis proposal is due to the qualifying exam committee no later than two weeks before the date of the qualifying exam. The thesis proposal format is designed to mirror that of a federal granting agency, such as NSF, NIH, NASA or DOD. Thus, **the written proposal should be 1) no longer than fifteen (15) pages in length; 2) single-spaced; 3) in 12-point font; and 3) have 1-inch margins.**

Students should discuss with their adviser any remaining specifics about proposal formatting. It is suggested that students use grant guidelines published by a federal funding agency (e.g., NSF) as a guide, but in doing so students should recognize that even these guidelines are often vague. The intention is not to create a challenge for students in writing their proposal, but rather to provide a platform that encourages intellectual creativity and difference in style of scientific expression. Students should embrace this ethos as they write their proposal.

Timeline: All students are required to complete the qualifying exam by the end of the fourth semester. Students who do not take the qualifying exam by this time will be placed on academic warning. Students who do not unconditionally pass the exam by the end of the fifth semester require: (1) unanimous committee support to remain in the graduate program and (2) a clearly achievable plan to complete all requirements of the graduate program. Completing the qualifying exam after the end of the fourth semester does not extend the duration of guaranteed graduate funding.

The qualifying exam is an oral exam that consists of a defense of the thesis proposal together with responses to questions related to the assigned reading material. Three hours should be scheduled for the exam. The student begins the exam with a brief oral presentation of the proposal (not more than 30 minutes long). The committee will not ask questions during the presentation. The examination then continues with two rounds of questions from all committee members. One round of questions will focus on specific questions related to the thesis proposal, and the other round of questions will include questions on broad background and the assigned reading. The questions are usually general in nature, involving several smaller questions that might need to be worked out at the white/black board over a period of time. After the two rounds of questions from each committee member, other questions can be asked.

The purpose of the qualifying exam is to observe the student's scientific thinking. Often this involves finding the outer limits of the student's knowledge to see how they think about questions to which they don't know the answer. Therefore, students should not be surprised to find that they are unable to answer some of these questions during this examination.

The Thesis Committee will assess the student on the basis of three criteria: the quality of the written thesis proposal, the quality of oral presentation, and the quality of answers to questions from the committee. This last point will take into consideration both the students mastery of their assigned readings as well as in their chosen research area.

Three outcomes of this examination are possible: Students may be given a "Pass" where no further remedial work is needed and the student advances to Candidacy for the PhD, a "Conditional Pass" where some areas of knowledge or experimental design are lacking, requiring a make up exam, or "Fail" where the student is deemed unprepared to advance to candidacy for the PhD. In the latter case a completely revised examination process can be devised. At the discretion of the Committee in consultation with the DGSs, the student may be asked to leave the program if the deficiencies are severe.

A Qualifying Exam Report should be filed with the DGS and the EEOB Graduate Program Coordinator summarizing the outcome of this process.

Transitional Master's degrees. Brown allows doctoral students to earn a Master's degree *en route* to the Ph.D. if they do not already hold a master's degree in Biology. Doctoral students are eligible to earn an AM degree after they have successfully passed the qualifying exam and the committee has approved the Thesis Proposal document *in lieu* of a master's thesis. Importantly, individuals can only receive one Master's degree from Brown, which means that receiving the AM would foreclose the possibility of an ScM, sometimes awarded as a terminal degree to students who leave the program before completing their PhD. The DGSs can provide additional information to interested students.

For students wishing to pursue this option, please contact the Registrar's office in order to let them know that you are interested in receiving the master's degree *en route to the PhD*; this should be specified in order to ensure that you will continue on as a PhD student after the master's is awarded.

PhD research and graduation

Subsequent thesis committee meetings: After passing their qualifying exam, students should convene Thesis committee meetings no less often than annually, although students are encouraged to meet with committee members and their full committees more often. Such meetings represent an almost unique opportunity for focused attention and feedback from top scholars in the student's field. No report is required from thesis

committee meetings for students who have advanced to candidacy.

Thesis defense: Students approaching completion of their thesis must schedule a full committee meeting at least 3 months before they intend to defend their thesis. At that meeting the committee must agree that the student is on track to complete their work in the agreed upon time frame. At that time students should also identify a convenient day for the defense. The defense will take 3 hours, consisting of a one hour public presentation and a 2 hour closed door defense with the thesis committee. Students can work with the EEOB Graduate Program coordinator to schedule a suitable space for the public seminar. Students should also consult with the Graduate Program Coordinator (Derek Tavares) at least two weeks prior to your defense, to ensure dissertation defense information form is filled out is received by Barbara Bennet in the Grad School prior to the defense.

The complete dissertation must be submitted to all committee members at least two weeks before the scheduled defense date. This document should be compiled into a single PDF and include:

- Title Page
- Abstract for the whole dissertation
- Acknowledgements (if desired)
- Table of Contents
- Preface, describing the overall idea of the thesis, synthesis of chapters, and the connections between the chapters and the broader field.
- Research chapters, each with its own title, abstract and bibliography.

There is required formatting from the Brown Graduate School for the final version, and instructions for that formatting may be found on the Graduate School website. The document presented to the committee does not have to conform to Graduate School formatting, but students are expected to produce a professional product.

Publishable papers: As scientists, students are becoming professional writers. The coin of the realm is published papers, and it is expected that chapters from the dissertation will appear as published papers in peer-reviewed journals. At least one chapter must have been submitted for publication prior to graduation unless the committee expressly agrees to a deviation from this standard. In any case, all chapters should be written with publication in mind. For all submissions to journals before the dissertation defense, students are required to seek feedback from the committee before submission. Students are encouraged to be proactive and to work closely with their advisors and thesis committee in devising a strategy for publishing thesis research before or after graduation.

Graduation from Brown: Brown has one commencement ceremony per year, on the Sunday before Memorial Day in May. Nevertheless, degrees can be awarded in October and February as well as in May.

The Graduate School has explicit guidelines for completion and filing of the dissertation. Students should consult the Graduate School web page to ensure that they comply with the appropriate dates, formatting requirements, signatures and associated forms. The dissertation defense should be scheduled at least a month before the graduate school deadline for thesis submission to allow revision requests from the committee and evaluation of those revisions.

3. ADDITIONAL DETAILS AND REQUIREMENTS

Student and adviser dynamics

A primary goal of the graduate program in EEOB is to train students to ask and address new and exciting questions about the patterns and processes that drive the ecology and evolution of life on Earth. Part of this process comes from working with your adviser, who should help guide your intellectual development and see that your training moves forward in a productive way. As a graduate student, you must own your education–this means that you are responsible for your dissertation work and that you actively seek out the training and guidance you need from mentors across the university and throughout the broader academic community. Below, we outline expectations for each graduate student in our program, as well as the expectations of their adviser.

Honest and open communication between adviser and advisee is necessary to facilitate a good working dynamic. Students and their advisers should discuss the points outlined below. However, remember that this list is not exhaustive, and you should treat it as the minimum expectations required for success. Further conversations between adviser and advisees are likely necessary and highly encouraged.

Student expectations

- Take the primary responsibility for the successful completion of my degree.
    - Take ownership over the logistics and scheduling details of projects/experiments to ensure their timely completion.
    - Keep up with the relevant original literature in my field.
    - Recognize when I need to seek input from others, in and outside of the department, to facilitate progress on my research.
- Meet regularly with my advisor and provide them with updates on the progress and results of my activities and experiments.
    - It is my responsibility to communicate my preferred/ideal frequency and type of meetings. However, I must recognize that compromise may be necessary given the constraints of my advisor's schedule.
- Work with my research advisor to develop my thesis/dissertation projects.

- Seek input from my advisor about who might be a good fit for my dissertation committee, both internally and externally.
- Initiate requests for feedback and seek advice from my advisor, committee, and other mentors. Recognize that faculty have a lot of ongoing responsibilities and I may need to respectfully follow up later.
- Attend and participate in lab meetings, seminars, and journal clubs.
    - I understand that it is hugely beneficial to me as a trainee to attend and actively participate in departmental seminars and lab group meetings. Fully engaging with these opportunities only serves to enhance my graduate school experience and training.
- Be knowledgeable of the policies and requirements of my Department and University.
    - This includes initiating and managing all paperwork and processes related to academic and personal tasks, such as travel, benefits, payments, personal leaves of absence, etc. (see Rules and Regulations outlined by the Graduate School).
- Be a good lab citizen, including:
    - Maintain a safe and clean space.
    - Work collegially with everyone.
    - Maintain a detailed, organized, and accurate lab notebook.
- Proactively discuss policies with my advisor regarding:
    - Work hours
    - Sick leave and vacation
    - Authorship expectations
    - Attendance at conferences
- Be respectful of all members of our community — all who live, work, and study at the University — and do my part to ensure equal opportunities to thrive.

Advisor expectations

- Be committed to:
    - Each advisee's education and training as a future member of the scientific community.
    - Help plan and direct advisee's research projects, allowing advisees to take ownership of their research while setting reasonable goals and establishing a timeline for completion.
    - Encourage advisees to come to me with concerns and help find acceptable solutions to problems as they arise.

    - Facilitate advisee's training in complementary skills needed to be a successful scientist, such as communication, writing, management, and ethical behavior.
- Be available for regularly scheduled meetings. I recognize that recurring, scheduled mentorship time is an important contributor to my students' ultimate success in the program and as a scientist.
- Advise and assist advisee with thesis committee selection.
- Provide thoughtful feedback on student work including manuscripts, proposals, presentations, etc. in as timely a manner as possible. If feedback will be delayed due to other obligations, it is my responsibility to respectfully communicate that to the student and provide as clear a timeline for response as possible.
- Attend and participate in activities such as lab meetings, seminars, and journal clubs.
- Be knowledgeable of the program's requirements/deadlines, and guide advisees through these requirements.
- Manage lab-wide expectations and protocols for what it means to be a "good lab citizen" in my lab.
- Discuss authorship policies, acknowledge advisees' scientific contributions to the lab, and work with advisees to publish their work in a timely manner prior to graduation.
- Proactively discuss policies with my trainees regarding:
    - Work hours
    - Sick leave and vacation
    - Authorship expectations
    - Attendance at conferences
- Be respectful of all members of our community — all who live, work, and study at the University — and do my part to ensure equal opportunities to thrive.

Additional topics recommended for discussion:

- Peer-reviewing manuscripts
- Grant writing process
- Non-academic career paths and training opportunities (i.e., internships)
- Teaching training opportunities
- Academic committee service
- Professional society memberships/participation
- Conferences – attendance, presentation types, different styles
- Advisor travel and extended absences
- Course work – suggested, elective, general opportunities

- Late-stage professional development – post grad transition, next steps for different career paths
- Field work and relevant safety plans and concerns
- Milestones and benchmarks for dissertation chapter/project completion

Departmental Citizenship

All graduate students are expected to be active departmental citizens during their tenure in the program. This includes attending seminars (see below) and other important departmental events, such as the annual retreat, PhD defenses, community "town halls" and forums, etc. This also means that PhD students are expected to live in the Providence, RI area to ensure that they can remain an active member of the community. Exceptions to this later policy will be made on a case-by-case basis in consultation with a student's faculty mentor, as well as the DGSs and EEOB Chair.

EEOB Departmental Seminars

There are two seminar series, both of which are an important part of the EEOB graduate training program: the EEOB Department Seminar on Tuesdays at noon, and the Brown Bag Seminar on Fridays at noon. The Tuesday seminar series features faculty from other universities who are invited by graduate students or a specific EEOB faculty member to speak to the general EEOB audience about their ongoing research. Time slots will be made available during the day for any member of the Department to meet with the speaker.

Moreover, the department sponsors a graduate student luncheon with each Tuesday seminar. These luncheon meetings are an ideal opportunity for students to get to know leaders in our field. In order to stimulate scientific conversation, seminar speakers are invited to provide one or two papers before their visit for students to read and gain a broader appreciation of the area. Another possible topic of conversation during these luncheons are questions of professional development. Faculty almost always count these opportunities to meet with young scientists among the high points of their visit.

Students who have not yet passed their qualifying exam are required to attend these luncheons unless they are traveling or have a course conflict, and those who have advanced to candidacy are welcome to attend as well. An RSVP email will be sent a few days before the date to ensure that an appropriate amount of food is on hand. Pre-quals students who are unable to attend should provide their excuse to the Program Coordinator by email.

The Friday Brown Bag seminar usually involves an internal speaker, such as a graduate student, postdoc or faculty member in EEOB. These are often less formal, and are an

ideal context for presentation of earlier Master's work, a project that is in progress, or incomplete ideas that need some feedback.

All students are required to attend all Tuesday and Brown Bag seminars. While it is easy to decide that one is too busy to listen to a talk outside one's field, doing so is a fundamental aspect of building breadth and depth of knowledge. The seminars also provide a common body of material for discussion among all members of the department, and thus are instrumental in maintaining our intellectual culture and community.

Annual Evaluations
Each year, the annual review process provides students with an opportunity to reflect on their research progress and goals, while openly discussing mentorship needs and practices with their advisor. Detailed descriptions of these practices, as well as the timelines for their completion are described below.

Reflections and Goal Setting. Meet with your advisor to reflect on what you've accomplished in the past year. At the same time, discuss your goals for the upcoming academic year and produce written answers to the following questions before your meeting:

1. *Did you complete the goals you set for yourself last year? If yes, how did you organize yourself to accomplish this? If not, why?*
2. *What are your goals for the next academic year?*
3. *What goals do you have by the time you complete your dissertation?*
4. *What is your ten-year goal?*
5. *How can your adviser help you achieve these goals?*

As you prepare answers to these questions and set your goals for the future, there are a few important things to keep in mind. First, recognize that your goals should be specific and actionable and measurable. If your 10-year goal is to graduate and work at a start-up, then describe the specific skills you will need, and begin to outline a plan for how you can reasonably acquire them and how you will measure progress. Vague and wishy-washy goals will not help you organize your career trajectory, and they easily become dismissed.

Second, recognize the importance of building in margin, planning and communication. Margin is contingency, and it therefore appreciates that things do not always work as we expect them to. People get sick, OSCAR goes down, animals die, experiments take longer than expected, instruments fail, and pandemics happen. Develop a plan that accommodates this uncertainty in a realistic manner. Clear communication lets your advisor know what you need and when you need it.

Third, be ambitious and set goals that push you. You're working on a 5-year timeline, which goes by very quickly. You will need to work at a fast clip to produce a competitive PhD that lets you call the shots on your next career move, whether that's in academia, industry, or elsewhere. Having said this, make sure that you are not overly ambitious by setting goals that you simply cannot achieve. We all have limits to our progress, and everyone needs to take a break from work. Strive to balance these two forces as you generate a list of goals and communicate with your adviser.

Finally, realize that the goals you develop in collaboration with your advisor will be shared with the faculty. The faculty will discuss steps necessary to help you achieve your goals and provide you with written feedback. This could include courses that you should take, meetings you should attend, and relationships you should build. Faculty recommendations will focus on your professional development broadly in addition to your academic training.

One way to guide the goal setting process is for students to develop Individual Mentorship Plans (IDPs) and share them for discussion with their advisor. Brown has resources that help students create IDPs, including templates to get the process started. Mentors are expected to fully engage with students in this process.

Mentorship Expectations. In consultation with your advisor, you should explicitly discuss (and write down as part of your annual review) expectations with respect to mentorship. This should include topics such as meeting frequency, progress reporting, in-person laboratory attendance, and policies related to personal travel. It is important that your advisor is aware of your mentoring needs, but also that your expectations are aligned with the mentoring style and professional obligations of your advisor. If your advisor is planning to be on sabbatical and meeting with you monthly by phone, but you are expecting to meet in-person weekly and by phone three times a week, expectations are not aligned. You would be unlikely to succeed and your relationship with your advisor will be stressed. Clear communication and written expectations maintain good professional relationships.

Evaluation process. Annual evaluations will proceed in the following way according to the timeline described above:

1. Students submit draft annual reports to their advisors on or before the first Friday in November. This document includes a list of future goals, as well as a reflection on past goals and whether they were achieved (and if not, and description of why). The document should also include a description of mentorship expectations.
2. Advisors and students have individual meetings to discuss progress and activities over the past year, whether annual goals were met, future goals, and mentorship expectations. Based on these conversations, students and mentors can adjust the annual report so that it is mutually agreed upon. **These meetings should be held by the second Friday in November**.

3. Annual reports are submitted to the Grad Program Coordinator on or before the last Friday in November.
4. Faculty meet in two, 3-hour blocks to discuss student progress.
5. In consultation with faculty advisors, the DGSs prepare annual review letters for each student. These are submitted to the student by the last Friday in January.
6. Students complete the Response Form (attached to their letter) within one week of receiving their annual review letter. The annual review letter and student response become part of the student's EEOB and graduate school files. The letter will typically not be modified based on the student's response; instead, they both go into the file.

Note that students in their first year are expected to get evaluated twice—first in December, and then a second time during the summer after their second semester in the program. It is highly recommended that new students initiate a meeting with their mentors at the onset of the first fall semester in the program to develop an IDP and outline mentorship expectations. The resulting materials can be referenced in the first review.

Otherwise, the contents of the student's Annual Report depend on how far the student has advanced in the program:

Students in year 1:
1. Current CV.
2. Report form from the First Advisory Committee meeting.
3. Completed IDP (or related document) and outline of mentorship expectations.

Students beyond year 2:
1. Current CV.
2. Report forms from Advisory or Thesis Committee meetings held in the past year.
3. Summary of research and professional development activities in the past year (1 page maximum).
4. Proposed research and professional development activities for the coming year, including a timeline (1 page maximum).
5. Completed IDP (or related document) and outline of mentorship expectations.

Doctoral students who have advanced to candidacy (passed qualifying exam)
1. Current CV.
2. Date(s) of thesis committee meetings completed in the past year.
3. Title and a short narrative for each thesis chapter including:
    1. Statement of research question
    2. Methods or approach
    3. Progress to date
    4. What still remains to be done
    5. Timeline for publication

4. Summary of other professional development activities in the past year, such as side projects, scientific meetings, teaching, outreach, etc., and plan for the coming year.
5. Timeline for completion of all thesis chapters and professional development goals and date of most recent thesis committee meeting (or scheduled date for the near future).
6. Completed IDP (or related document) and outline of mentorship expectations.

In the annual review faculty meeting, the faculty discuss the student's annual report, and listen to feedback from other relevant faculty. Student participation in the weekly seminar series will also be noted. Based on this discussion, the DGSs prepare and submit a letter of evaluation to each student in the program. There are three potential outcomes of this process: 1) a student can be judged to be in good standing, and recommendations for the upcoming year will be provided, 2) a student can be judged to be in satisfactory standing, and tangible steps (and deadlines) will be articulated for returning to good standing, or 3) a student can be placed on warning status, and tangible steps (and deadlines) will be articulated for returning to good or satisfactory standing.

A student not in good standing is required to make the recommended changes as quickly as possible, but no later than the set deadline(s). They will be reevaluated by their advisory or thesis committee as soon as practical after the deadline(s) specified in the annual review letter, to determine whether the student's status should be modified. Students on warning who fail to improve in status may be asked to leave the program, at the discretion of their committee, in consultation with the DGSs.

Brown University BioMed Division Individual Development Plan (IDP) policy.

While it is recommended that students annually complete an IDP, please note that first- and fourth-year graduate students are required to prepare and submit IDP by the end of the first semester in the first and fourth year, respectively. Following the guidelines and template provided here. First- and fourth-year students should submit draft versions of their IDP to their mentor(s) together with their draft annual reports according to the schedule above. Student and mentor(s) should then finalize the IDP at the same time as they finalize the annual report. Finally, the student is required to submit the final form of their IDP to the BioMed Division Office of Graduate and Postdoctoral Studies, as well as the EEOB Graduate Program Coordinator.

Mandatory Research Trainings

Federal, RI State and Brown University regulations require that all laboratory researchers receive training in laboratory safety, hazardous waste disposal. All first-year BioMed graduate students are required to take (and pass) the BioMed RCR Course. (RCR meets for seven weeks on Tuesdays at 4; please contact the Office of Graduate and Postdoctoral Studies for further details.) Students who fail the course will have to take it again in the second year. New students are advised to complete as many trainings as

possible before the start of classes, so arriving on campus in August is recommended. Other trainings that may be required, depending on your research include animal care and use, human research protections, biosafety, x-ray safety, and formaldehyde exposure control. Please ask your advisor or other members of the research group to determine which trainings are required for you.

Student Involvement in Department Governance and Student Self-Governance
Graduate students are highly valued members of the departmental community, and are encouraged to contribute to its governance in several ways.

Graduate student invited seminar speakers: Graduate students are responsible for selecting, inviting and hosting one department seminar speaker each semester. This process is organized by the GSA. Further details can be found here.

Brown Bag and Friday social organization: Graduate students are responsible for scheduling and managing the weekly Brown Bag seminar series. They are also responsible for organizing the weekly departmental social hour, which takes place on Fridays during the academic year at 4:00 in Walter Hall. Further details can be found here.

The EEOB Graduate Student Association: The EEOB GSA is responsible for graduate student self-governance. Officers (President, Vice President, Secretary, Graduate Student Council rep and BioMed rep) are elected annually. Volunteers (Brown Bag and Friday Social organizers) are selected annually. Further details can be found here and here.

EEOB Annual Retreat
The department organizes an annual retreat on the last Thursday before Labor Day. The format of the retreat varies from year to year, but the overall objectives are to improve the intellectual life and community of the department. Thus brief research talks, breakout sessions and a social hour are generally a part of the day. Attendance is expected by all graduate students not in the field or otherwise indisposed that day.

Financial Support
As detailed in the admission letters, PhD students are guaranteed five years of financial support. It is important to appreciate that in general, some portion of those five years' support comes from external grants awarded to one's supervisor, which can have implications for the research that student will perform. This rarely poses a problem, because students' own curiosities almost always align quite closely with some aspect of work that has been funded. But it is important that students clearly understand the source of their financial support in each year of their PhD, and that students work collaboratively with their supervisor to ensure that the goals of all parties (student, supervisor, granting agency) are met. If a student has any questions about this issue, they should first bring it

to their supervisor. If questions remain, the student can ask a DGS for further clarification.

As of this writing, the Graduate School also provides $1,750 transitional stipend for incoming doctoral students. The stipend aims to help offset moving and other costs associated with relocating to Providence and beginning Graduate School. Doctoral students receive their first monthly stipend payments at the end of September. Incoming students needing financial support in advance of September are eligible to apply for a short-term loan as of August 1 of $500.

While stipend, tuition, and health insurance are guaranteed provided the student is making appropriate progress, grant writing is essential for doing science. Thus EEOB urges all students to apply for any and all graduate fellowships for which they may be eligible. The process of applying can help with the clarification of research ideas, hone writing skills, and provide training in balancing research, teaching, studying and grant writing – a critical set of survival skills.

In addition, all eligible students not already supported by the NSF Graduate Research Fellowship are expected to apply for this fellowship in their second year.

The Division of Biology and Medicine provides a modest incentive to all students who secure outside fellowships that provide 80% or more of their stipend. As of this writing, that amount is $150/month.

Students should also recognize that stipend levels among graduate students in EEOB will vary as a consequence of this diversity of funding sources.

Below and here are links to several Fellowships, most of which have deadlines in early November. Contact the Brown BioMed Office of Graduate and Postdoctoral studies for additional information.

NSF Graduate Research Fellowship
http://www.nsfgrfp.org/

Howard Hughes Medical Institute Fellowships
http://www.hhmi.org/grants/office/graduate/

NIH NRSA Individual Predoctoral Fellowships
http://grants.nih.gov/training/nrsa.htm

Department of Energy
http://orise.orau.gov/doescholars/

Department of Defense

https://www.asee.org/ndseg/instructions.cfm

National Academies Fellowship
http://www7.nationalacademies.org/FELLOWSHIPS/

Additional opportunities are listed on the BioMed Graduate and Postdoctoral Fellows page http://biomed.brown.edu/grad-postdoc/Funding/Funding.html

Proposals for some small grants, such as the Sigma Xi Grants-in-Aid, can be submitted directly by the student to the granting organization. Others must be submitted through the BioMed Research Administration (BMRA) and the Brown Office of Sponsored Projects (OSP). It is critical to find out as soon as possible whether a proposal must go through these channels because BMRA and OSP require a full six business days lead time on proposal submission. This policy is strictly enforced and can be somewhat confusing when university holidays might be involved. It is a good idea to contact the EEOB Grants Coordinator as soon as you know that you plan to submit a proposal, and at least a month in advance. See the EEOB "One Month" and "Day Minus One" Policies for internal EEOB deadlines. Some postdoctoral proposals have to be submitted through the equivalent offices at the host university, so advance planning and good communication with your potential postdoc advisor are particularly important for postdoc proposals.

Once a student has advanced to candidacy, they are eligible to apply for an EEOB dissertation improvement grant (DDIG, up to $10,000). These were established to mirror the National Science Foundation DDIG. While that NSF program is no longer available, subject to availability of funds EEOB still offers theirs. Proposals are typically due in October, and are reviewed by post docs in the department under the supervision of faculty. The goal of the DDIG is to provide funding for an additional project, not originally envisioned as part of the PhD, but which might add substantial value to the overall project. A specific call will be issued by the department when DDIGs are being solicited.

Career Development
Scientific meetings. Students should attend a scientific meeting in their chosen field in each year of their program. Financial assistance from the Division of Biology and Medicine and the Graduate School (international travel only) is available.

Research travel. Students can receive financial assistance for research and conference travel a variety of sources at Brown. These include

- Brown Graduate Student Council
- BioMed Travel Award (domestic travel)
- Graduate School International Travel Fund

Industry internships. PhD students sometimes find that an industry internship can be an important complement to their graduate training at Brown. Interested students should

begin by discussing this possibility with their supervisor, so that both can explore how this option might influence ongoing research, as well as the professional development. Typically, an internship lasts no more than three months, and in these cases, only written approval from the student's supervisor and a DGS is required in the form of an email. Students on an external fellowship (e.g., an NSF Graduate Research Fellowship) are responsible for also getting written approval for the internship from their sponsor.

Regardless of source of support, the student's Brown stipend will be suspended for the duration of the internship. Brown health insurance is renewed each year in mid-August, so students whose internships run through that month should explicitly confirm with a DGS that their insurance will not lapse.

Students interested in an internship that lasts longer than three months should consider requesting a Professional Development Leave of Absence from the Graduate School. The DGS can provide additional information on this process.

Postdoctoral and professional positions. The final goal of the EEOB Graduate Program is to place its graduates in competitive positions that enable them to reach their career goals. Students should begin considering potential postdoctoral positions during the 4th year of their program. The primary advisor and Thesis Committee are the best source of suggestions, as this is usually a matter of fit between past training and future interests. Potential postdoctoral advisors may not have funds to support fellows, so plan on writing a Postdoctoral Fellowship. These applications can take a significant block of time to prepare (1-2 months), and this should be done well in advance of completing the dissertation so that a lag in funding can be avoided.

Parental relief and family support policies
The EEOB graduate program follows the Brown Graduate School Parental Relief policy, as detailed here, except that applications requests should be sent directly to the DGSs and program coordinator, rather than to the Graduate School. Briefly, students in good or satisfactory academic standing are eligible for parental relief for the care of a newly born infant or adopted child under 16 years of age. Graduate students may request parental relief up to two times during their tenure as a student at Brown. The relief provides a stipend for one semester or a summer.

Details regarding the Child Care subsidy can be found here.

The EEOB graduate program extends the Brown lactation policy detailed here to all graduate students.

Student psychological support
It is very common for students to occasionally encounter interpersonal or psychological challenges during their tenure in graduate school, and a number of resources are

available to provide support in this event. Each of the following individuals will be happy to speak privately with students on any matter, subject only to Title IX restrictions, detailed below.

- BioMed Associate Dean for Graduate and Postdoctoral Studies
- The Graduate School Associate Dean for Student Support

Title IX Policy: Title IX is a Federal regulation that states in part "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Brown University has a well-developed policy and process for enforcement of this regulation. If you choose to tell any faculty or graduate TA of yours about an incident of gender-based violence, including sexual assault, dating violence, stalking, or harassment that you experienced as a student, they are required to direct any information you disclose to the Title IX Office. Please keep this in mind when deciding whether and how much information you share. If you would rather speak to a confidential resource about a Title IX issue, the following services are available to you on campus: CAPS (401-863-3476); SHARE Advocates (401-863-2794); Chaplains (401-863-2344).

COURSES OF POTENTIAL INTEREST TO EEOB GRADUATE STUDENTS

This list is intended as a resource for students and Advisory Committees in planning individualized curricula. Courses come and go, so this list should not be viewed as definitive.

Introductory Courses - appropriate for students changing fields, have holes in background, or good TA opportunities:
BIOL 0210 - The Diversity of Life
BIOL 0310 - Introduction to Developmental Biology
BIOL 0380 - The Ecology and Evolution of Infectious Disease
BIOL 0390 - Vertebrate Evolution and Diversity
BIOL 0400 - Biological Design: Structural Architecture of Organisms
BIOL 0410 - Invertebrate Zoology
BIOL 0420 - Principles of Ecology
BIOL 0430 - The Evolution of Plant Diversity
BIOL 0440 - The Plant Organism
BIOL 0450 – Evolutionary Behavioral Ecology
BIOL 0460 - Insect Biology
BIOL 0470 - Genetics
BIOL 0480 - Evolutionary Biology
BIOL 0800 - Principles of Physiology

Advanced Undergraduate/Graduate Courses:
BIOL 1100 - Cell Physiology and Biophysics
BIOL 1130 - Cell Structure and Movement

BIOL 1155 – Hormones and Behavior
BIOL 1160 - Principles of Exercise Physiology
BIOL 1180 - Comparative Animal Physiology
BIOL 1270 - Advanced Biochemistry
BIOL 1410 - Evolutionary Genetics
BIOL 1420 - Experimental Design in Ecology
BIOL 1430 - Population Genetics
BIOL 1440 - Marine Biology
BIOL 1460 - Microbial Diversity and the Environment
BIOL 1470 - Conservation Biology
BIOL 1475 - Biogeography (pending approval by CCC)
BIOL 1480 - Terrestrial Biogeochemistry and the Functioning of Ecosystems
BIOL 1490 - Human Impacts on Ecosystem Functioning
BIOL 1500 - Plant Physiological Ecology
BIOL 1515/2015 - Conservation in the Genomics Age
BIOL 1800 - Animal Locomotion
BIOL 1880 - Comparative Biology of the Vertebrates
BIOL 1940X - Topics in Conservation Science
BIOL 1940Y - Origins of Multicellularity and the Evolution of Germ Line

Graduate Courses:
BIOL 2010 - Quantitative Approaches to Biology (an MCB core course)
BIOL 1515/2015 - Conservation in the Genomics Age
BIOL 2060 - Ultrastructure/Bioimaging
BIOL 2090 - Topics in Respiratory Physiology
BIOL 2310 - Analysis of Development
BIOL 2320 - Current Topics in Developmental Biology
BIOL 2320A - Systems Biology in the Study of Development and Evolution
BIOL 2320D - The Biology of Aging
BIOL 2430 - Topics in Ecology and Evolutionary Biology (EEOB Gradsem Fall; 1-2 specialized seminars offered every Fall semester)
BIOL 2440 - Topics in Ecology and Evolutionary Biology (EEOB Gradsem Spring; 1-2 specialized seminars offered every Spring semester)
BIOL 2470 - Seminar in Genetics and Genomics (MCB occasional seminar)
BIOL 2980 - EEOB Graduate Independent Study (for graduate years 1-3)
BIOL 2990 - EEOB Thesis Preparation (for graduate years 4 and beyond)
BIOL 3644 - Integrated Medical Sciences I - Human Anatomy

Statistics:
PHP 2500 - Introduction to Biostatistics
PHP 2510 - Principles of Biostatistics and Data Analysis
PHP 2530 - Bayesian Statistical Methods
PHP 2511 - Applied Regression Analysis

PHP 2620-S01: Statistical Methods in Bioinformatics

Geosciences:
GEOL 1100 - Global Descriptive Oceanography
GEOL 1110 - Estuarine Oceanography
GEOL 1120 - Paleooceanography
GEOL 1130 - Ocean Biogeochemical Cycles
GEOL 1150 - Limnology
GEOL 1330 - Global Environmental Remote Sensing
GEOL 1350 - Weather and Climate
GEOL 1370 - Environmental Geochemistry
GEOL 1380 - Environmental Stable Isotopes
GEOL 1950 - Geomicrobiology
GEOL 2330 - Advanced Remote Sensing
GEOL 2910 and GEOL 2920 - Special Topics various, including 2920E Intro to Organic Geochemistry and 2910U Climate Variation

Engineering:
ENGN 0310 - Mechanics of Solids and Structures
ENGN 0040 Dynamics and vibrations
ENGN 0810 Fluid mechanics
ENGN 1000 Projects in Engineering Design
ENGN 1210 - Biomechanics
ENGN 1230 Instrumentation Design
ENGN 2320 Experimental Mechanics

Environmental Studies (Mix of Grad and Undergrad):
ENVS 1330 - Global Environmental Remote Sensing (GEOL 1330)
ENVS 1350 - Environmental Economics and Policy
ENVS 1455 - Marine Conservation Science and Policy
ENVS 1460 - Microbial Diversity and the Environment (may be listed in Bio next year)
ENVS 1500 - Human Impacts on Ecosystem Function
ENVS 1492/1493 - Semester in Environmental Science at Marine Biological Laboratory (MBL), Woods Hole (Semester-long program in ecosystem science, contact H Leslie, J Rich or K Foreman for details)
ENVS 1900 - Introduction to Geographic Information Systems for Environmental Applications (GEOL 1320)
ENVS 2010 - Special Topics in Environmental Studies (Graduate Seminar)
ENVS 2680 - Ecosystem Modeling for Non-Programmers (Taught at MBL in January)

Applied Math:
APMA 0330 and APMA 0340 - Methods of Applied Mathematics
APMA 1070 - Quantitative Models of Biological Systems

APMA 1080 - Statistical Inference in Genomics and Molecular Biology
APMA 1940N - Introduction to Mathematical Models in Computational Biology
APMA 2810Y - Discrete high-D Inferences in Genomics

Computer Science:
CSCI 1810 - Computational Molecular Biology
CSCI 1950L(S01) - Algorithmic Foundations of Computational Biology
CSCI 2950C - Topics in Computational Biology

Chemistry:
Chem 1220: Computational Tools in Biochemistry and Chemical Biology