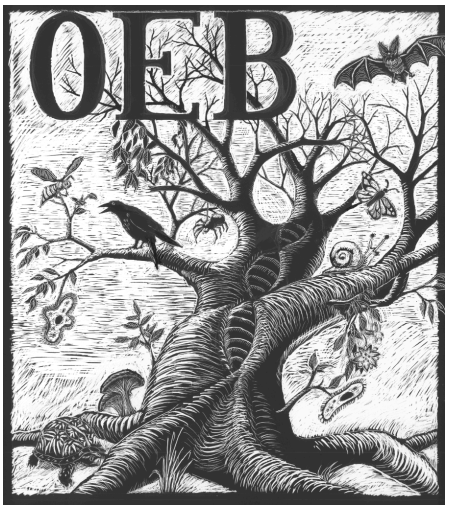

Graduate Program in Organismic and Evolutionary Biology

Academic Requirements, Policies And Procedures

2019-2020

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OVERVIEW OF THE GRADUATE PROGRAM IN ORGANISMIC AND EVOLUTIONARY BIOLOGY

The Graduate Program in Organismic and Evolutionary Biology provides interdepartmental training for MS and PhD students in ecology, organismal and evolutionary biology. Graduate students, post-docs, and faculty study biological processes ranging from the molecular to the ecosystem level, often bridging the gap between basic and applied research. Our faculty and students conduct research in four broad areas:

Animal Behavior: Behavioral ecology, communication, learning
Ecology: Community ecology, population ecology, landscape ecology, conservation biology
Evolutionary Biology: Evolution, phylogenetics, population genetics, molecular evolution
Organismal Biology: Physiology, morphology, paleontology

OEB includes more than 100 faculty from 13 departments within the College of Natural Sciences and other on- and off-campus institutes and organizations. Additional members are drawn from the other campuses in the Five College Community (Amherst, Hampshire, Mt. Holyoke, and Smith Colleges).

Three other interdepartmental programs train graduate students in the life sciences:
Molecular and Cellular Biology (MCB)
Neuroscience and Behavior (NSB)
Plant Biology (PB)

With more than 40 students, we are large enough to provide the opportunity for a wide range of interactions among students, but small enough so that students form a cohesive group. OEB is structured to offer broad flexible training. There are few formal course requirements. Instead, each student's committee tailors a program of coursework to the student's background and areas of research interest. Students are encouraged to seek extramural funding and publish their research before they complete their degrees. Students graduating from our program are well prepared to seek permanent research or teaching positions in higher education, government agencies, or museums.

OEB also promotes collaboration among faculty interested in ecology and organismal and evolutionary biology and advocates for these fields on this campus and in the wider community. Despite the diversity of disciplines, approaches and affiliations represented throughout OEB, we are united by our shared commitment to the study of organismal biology. With OEB as an umbrella, our graduate research and training missions form a focused program with a national reputation.

A cornerstone of the program is the nationally-renowned Darwin Postdoctoral Fellowship Program. This program brings recent PhDs to OEB, where they teach, conduct research and serve as mentors to OEB

GENERAL INFORMATION

This ***OEB Program Guide*** will inform you about requirements of the program and offer suggestions to help your work go smoothly. However, it is not the only source of information upon which you should rely. For Graduate School policies and regulations, you should obtain the ***Graduate Student Handbook:*** https://www.umass.edu/gradschool/policies-forms/graduate-student-handbook. You will refer to both documents many times throughout your graduate training. The ***OEB web site Students page*** (http://gpls.cns.umass.edu/oeb/students/resources) includes links to both of these documents as well as many other resources for students. There you will also find the ***OEB Survival Guide***, a document created by OEB students for OEB students.

ROLE OF MAJOR ADVISOR

Students are not admitted into the OEB graduate program without a provisional Major Advisor. These arrangements develop through communications with an appropriate faculty member before and during the admission process. It is the Major Advisor's responsibility to supervise your graduate work and to chair your thesis or dissertation committee. Your Major Advisor contributes to your funding and coordinates your laboratory space, office space, research supplies, keys, email, etc. It is your responsibility to schedule regular meetings with your Major Advisor to discuss your research, coursework, and other professional interests and concerns. It is best to ask your advisor or prospective advisor early about expectations regarding work hours, research procedures, etc. before a problem arises. A student can change his or her Major Advisor without jeopardy, providing that details of the transfer are agreeable to all parties concerned, and if the newly selected advisor can arrange for financial support for the student. If this occurs, you must notify the OEB Graduate Program Director via memo. (For more information on resolving workplace conflicts, see Appendix H.

OEB ADMINISTRATION AND PROGRAM STAFF

OEB is administered by a Director and an Associate Director, with guidance provided by the Steering Committee. The second floor of French Hall houses the Interdepartmental Graduate Program Office.

- **IDGP Director** oversees the four interdepartmental graduate programs (OEB, MCB, NSB, PB).
- The **OEB Program Leader** is responsible for the program budget and policy decisions, and is advised by the Associate Director and the Steering Committee. The program leader also serves as the **OEB Graduate Program Director** (GPD). The GPD is the program's link with the Graduate School and can help you understand its procedures. Much of the red tape associated with your program, such as thesis and preliminary exam committee appointments, and scheduling defenses, involves the GPD.
- The Associate Director serves as **Chair of Graduate Operations Committee (GOC)** that oversees graduate training in OEB and conducts annual grad student reviews. Both the GPD and the Chair of the GOC serve as the graduate student's advocates, and can be useful sounding boards if you have a problem you are reluctant to raise with your advisor.
- The **Admissions Committee Chair and members are appointed by the OEB Program Leader**. This committee reviews applications and make admission recommendations to the OEB Program Leader.
- The **OEB Steering Committee** consists of the OEB faculty members elected to represent the diverse interests of OEB, plus a student representative. The committee's responsibilities include formulating policy, advising the director on policy decisions, and reviewing all program activities.
- **The OEB Coordinator and other IDGP Staff** maintain your program file, track your progress, manage the program's finances, and can answer many basic questions relating to your graduate studies. The Graduate School keeps additional formal records. ***Students should maintain their own file of important documents and memos.***

It is critical that you keep the Office informed of your campus address, phone number, and email. ***If you plan to be away from the University for any length of time, you must inform the Office.***

ROLE OF GUIDANCE COMMITTEE

Your Guidance Committee will oversee the beginning of your graduate training and will advise you in planning your coursework. ***Because of its critical role in the early part of your graduate training, each student must form and meet with his or her Guidance Committee before the end of your first semester.*** This committee will consist of three members, including your Major Advisor, all of whom are members of OEB. Your Major Advisor will advise you in the selection of the other two faculty members. One of these faculty members must be in a department other than your Major Advisor's.

Your Guidance Committee is not necessarily the same as your Thesis, Preliminary Exam, or Dissertation Committees. However, it is likely that some or all of its members will continue to serve on these later committees. Students should bring to their first Guidance Committee meeting the following:

Course List--a list of all relevant undergraduate and graduate courses (including grades) organized under broad areas such as Chemistry, Math, Ecology, Evolution, etc.

List of Proposed Courses--explore available course options and provide full information such as semester offered, faculty in charge, etc.

Brief Statement of Research Plans--this is not a formal or final commitment to a specific project but an open discussion of potential projects.

Students will answer informal questions about their academic background. Your Guidance Committee will help you construct a specific program of courses designed to correct any deficiencies and tailored to your research interests.

FINANCIAL SUPPORT

The Admissions Committee makes initial financial aid recommendations. Except in unusual circumstances, students are not admitted into OEB without financial support. The OEB Program Leader works with the student's Major Advisor and their department, the IDGP Office, and the IDGP Director in making decisions about support. Three major categories of financial support are available: Teaching Assistantships, Research Assistantships, and Fellowships.

Teaching Assistantships OEB provides financial support in the form of a Teaching Assistantship (TA). Reappointment is based on departmental needs for teaching assistants, performance of assigned duties and adequate progress on graduate studies.

Research Assistantships Students are also supported on Research Assistantships (RAs). Such positions are funded by research grants awarded to the Major Advisor by granting agencies such as NSF and NIH. RAs carry specific duties related to the objectives of the grant and the Major Advisor. Thesis or dissertation subject matter for Research Assistants is often closely linked to the funded research area.

OEB Fellowships Some years OEB is able to offer a one-semester RA for a senior graduate student. The recipient is chosen by the GOC as part of the Graduate Review process. The goal is to provide a boost in progress towards either publication of a paper or completion of the thesis/dissertation.

Regardless of whether you have an RA or a TA, summer employment on grants may be available through your Major Advisor, your Major Advisor's Department, or the IDGP Program. Funding opportunities change frequently; keep posted on developments announced by the IDGP Office or by your Major Advisor's Department.

Undertaking employment outside the University in addition to a TA or RA is at the discretion of the student and his or her Major Advisor, although OEB discourages this. Students who elect to pursue outside employment remain responsible for meeting all requirements mandated by their assistantship, the OEB Program, and the Graduate School.

Fellowships allow a student to focus on his or her own research instead of TA or RA duties. The stipend level varies according to the source of the funds. Graduate School Fellowships and extramural fellowships are available.

Extramural fellowships include the **National Science Foundation (NSF) Graduate Research Fellowship**. These are highly competitive national awards that offer three years of support. Prospective students should plan to file an application for the NSF Fellowship when they apply to graduate school. First and second year students may also apply (or reapply) for the December deadline (with some restrictions). More information can be found by going to *http://www.nsf.gov/*, then navigating to Graduate Research Fellowship Program.

You may seek long-term support for graduate research in foreign countries from the **Fulbright Foundation**. Fulbright applications are available in early fall and are usually due in October. A campus-wide committee screens candidates and forwards folders of its nominees directly to the National Fulbright Committee. More information can be found at: https://www.cies.org/

A few special short-term fellowships, for instance for summer study at marine stations, may be available in some years. Consult the IDGP Office for further information. For information about the many other fellowships available, consult the Office of Professional Development in the Graduate School.

Travel Grants The IDGP office and graduate school offer small grants for travel or field work. Information on travel funding and procedures is available in the Student Resources section of the OEB website.

RESEARCH FUNDING

Your Major Advisor usually provides basic funding for your research from his or her research grants. Often, however, more extensive funding is needed. Among the best national opportunities for research support are small grants from Sigma Xi, or by applying to Professional Societies to which you belong, such as the Animal Behavior Society. Consult your Major Advisor or the Office of Professional Development (see below) for further information concerning research funding opportunities.

GRADUATE SCHOOL OFFICE OF PROFESSIONAL DEVELOPMENT

The Graduate School's Office of Professional Development (OPD) offers a large array of activities to help graduate students and postdoctoral researchers prepare for success in their careers at UMass and beyond. To accomplish this objective, they help students develop the professional knowledge and skills necessary to thrive in academia, industry, public policy and the non-profit sector. Their training programs encompass a broad spectrum of activities—including presentations, panel discussions, seminars, workshops, and site visits—that range in duration from one hour to a semester or longer. Each of these instructional sessions builds competency in at least one of four key areas: teaching, communication, leadership & management, and career preparation. Information about these workshops is typically circulated by email.

TIME LIMITATION FOR DEGREES

The Graduate School expects you to finish your program in a timely manner, and to encourage this has established statute of limitations (SOL) for graduate work. Students in master's degree programs are limited to three calendar years; doctoral students are limited to six calendar years, unless they enter with a related master's degree. The SOL is then four years.

EXTENSION OF STATUTE OF LIMITATIONS (SOL) POLICY

Sometimes it is necessary to request an extension to your SOL. To do this, you must write a memo to your Major Advisor, with a copy to the GPD that includes:

1. A summary of progress to date

2. What remains to be done
3. Justification for extension
4. Your timeline for completion

Upon approval of the Major Advisor and GPD, the Graduate School will grant a two-year extension. Further extensions become increasingly difficult to obtain, and require a justification and petitioning of the Graduate School.

Students are strongly discouraged from leaving the University before finishing all requirements for their degree, as experience has demonstrated that doing so greatly increases the chances that the degree will not be completed. Students who choose to take this action do so knowing that the Program is opposed to this decision and may choose not to submit further requests for additional statute of limitations extensions.

If you are unsure of your SOL date, you can check with the Graduate School or the OEB Program Coordinator. Failure to meet the Graduate School's deadlines or to petition successfully for an extension of the statute of limitations is sufficient grounds for dismissal by the Graduate School.

CHANGING PROGRAM TRACKS

M.S. students who decide that OEB is exactly the place they belong may apply to switch to the Ph.D. program. This should be done by the end of their first year in the graduate program by submitting a formal application to the Graduate School (no additional fee is required). Letters are required from both the student and the Major Advisor justifying the change. Changing from the Ph.D. to the M.S. program can be requested by a memo from the Graduate Program Director to the Graduate School.

TIME LIMITATION ON COURSES

The deadline for all course changes (add, drop, or exercising the pass/fail-option) is the mid-semester date. Incomplete grades remain as such for one calendar year. The Registrar then lists the grade as an IF (Incomplete-Fail). To change this grade, the professor in charge of the course must send a memo to the Graduate School.

FULL-TIME STATUS

The Graduate School considers nine credit hours per semester to be full-time status. Students may be considered full-time regardless of the number of credits for which they register provided their Graduate Program Director certifies via a memo to the Graduate School that they are working full-time on research. Students remain eligible for financial assistance whether on full-time status or by payment of the program fee.

GRADUATE STUDENT REVIEWS

OEB Graduate Student Reviews are held each spring to monitor student progress towards the OEB degree, and to provide advice and guidance along the way. Reviews are conducted by the Graduate Operations Committee. Unless you have officially scheduled your defense, you and your major advisor must participate in the review meeting, which lasts about 15 minutes. If you are unavailable during the annual review period, you may schedule a separate meeting.

The purpose of the review is to check on student progress through the program - are you meeting your milestones, such as taking the qualifying exam or submitting your prospectus? Are you having regular committee meetings? Have you met the program requirements (e.g. coursework, teaching requirement)? We do not conduct a formal performance evaluation of students. Instead, we try to get a general view of how each student is doing so that we can provide guidance and support.

In preparation for the annual review meeting, students complete an online review form, which includes a summary of requirements fulfilled to date, a summary of research objectives or progress (2 pages maximum), and a current CV (2 pages maximum).

If you haven't met with your committee in the past year, the best thing you can do to prepare for your

review is to schedule a meeting prior to your review. Review the M.S. and Ph.D. Timelines (Appendices B & D) to make sure you are meeting program expectations. Your review is also a time to discuss your financial support needs for the upcoming year.

The GOC provides a memo summarizing the review to the student and the advisor, and a copy is placed in the student's file. The summary outlines the specifics of the review, including areas of success, advice on next steps, as well as any outstanding milestones.

OEB COURSE REQUIREMENTS

Evolution and Ecology

OEB has few course requirements, allowing great flexibility in the training programs of individual students. However, as a broadly-based program, we t and a course in Evolution is required of all students. These courses, ORG&EVBI 617 and 618, are taught in alternate fall semesters (Ecology in odd years and Evolution in even years). Students in the 5th year MS track can petition to have a substitute for the core course they miss by completing their degree in one year. The student's faculty advisor must propose the substitute course to the GOC for their approval.

Additional Course Requirements

Additional Courses Your guidance committee can recommend additional courses that might be helpful for you.

Statistics We recommend at least one course in statistics or other relevant quantitative skills. For more information, see Appendix A.

OEB Graduate Seminar (BIO 891A – section 5), our weekly seminar series, is held on most Fridays at 4:00 p.m. Students are required to register for this course twice and should plan to complete this requirement in the first year in residence.

OEB Ecology and Evolutionary Biology Discussion (Org&EvBi 697B) 1-credit proseminar offered each fall for new students.

OEB Graduate Student Symposium (Org&EvBi 697 Y) 1-credit course offered each spring where students present their research in an informal setting. This may be taken at any time, but is best taken when you have data to present.

SEMINAR PROGRAM

OEB places great importance on bringing notable scientists to campus to interact with faculty and students. Our seminar series usually meets on Fridays at 4:00 p.m. in Room 222, Morrill Science Center, with refreshments at 3:45 p.m. preceding the seminar. An informal get-together takes place after the seminar. Student lunches with seminar speakers (free lunch! fun discussions!) offer an opportunity for further interaction. While students are required to complete two semesters of Biology 891A Grad Program Seminar-OEB section, ***all OEB students are expected to regularly attend seminars unless they have a scheduling conflict***. Seminars are listed on the OEB website*:*
http://gpls.cns.umass.edu/oeb/seminars
Additional seminars in the Life Sciences, can be found in the Graduate Programs in Life Sciences Calendar.

LUNCH DISCUSSION GROUP (LDG)

LDG meets once per week in spring semester over a lunch provided at no charge, and provides regular opportunities to interact with OEB faculty and students. Each week a noteworthy paper relevant to OEB is

selected for discussion. ***All OEB students are expected to regularly attend LDG.***

DARWIN POSTDOCTORAL FELLOWS PROGRAM

The Darwin Fellows Program, sponsored by OEB, brings talented young postdoctoral fellows to UMASS for two-year terms during which the fellow teaches one course each year in the Biology Department and conducts research in the lab of their faculty sponsor the remainder of their time. Darwin Fellows also act as mentors to OEB Graduate Students, both informally and through leading a student discussion group each fall and coordinating the OEB Grad Student Symposium in the spring. An OEB student is selected to serve on the Darwin Fellow Search Committee, offering valuable insight into the academic hiring process.

MASTER OF SCIENCE DEGREE

Students seeking the Masters of Science in OEB must follow the Graduate School's *Thesis Option.* There is no terminal non-thesis M.S. degree in OEB. See Appendix B for the expected timeline for MS students.

CREDIT REQUIREMENTS

The usual course load is two formal courses in addition to research credits for each of the first four semesters in residence. The non-negotiable requirements listed below are set by the Graduate School.

- § 30 graduate credits are required, with no more than 6 credits transferred from other institutions.
- § Transfer of credit requires the consent of the OEB Graduate Program Director and approval of the Graduate School. Transfer will be approved only for courses for which the student received a grade of B or better. Graduate level courses to be transferred must be taken no more than 3 years prior to the student's acceptance into the master's program.
- § 21 of the 30 credits must be in the courses listed by OEB, and 15 of the 30, not including transfer credits, must be on a letter-graded basis.
- § All courses listed by the OEB Program must be taken on a graded basis unless only offered as pass/fail.
- § At least 6 credits must be earned in 600-800 series courses (not including thesis credits).
- § No more than 10 of the credits may be earned by means of the thesis credits.
- § Special Problem (Independent Study) courses are limited to 6 credits.

M.S. COURSE REQUIREMENTS

OEB promotes flexibility in individual training objectives. Each student's Guidance Committee will work out a specific program of courses designed to correct any deficiencies and tailored to the student's research interests. However, all OEB students must demonstrate general knowledge and understanding of ecology and evolutionary biology. OEB M.S. students must fulfill the requirements listed below. Under exceptional circumstances, students can petition the OEB GPD for exemptions or substitutions.

- § Ecology Core Course, ORG&EVBI 617 (4 credits). This is offered in the fall of odd-numbered years.
- § Evolution Core Course, ORG&EVBI 618 (4 credits). This is offered in the fall of even-numbered years.
- § 2 semesters of Biology 891A Grad Program Seminar-OEB section (1 credit). This is offered every semester. Students should plan to complete this requirement in the 1st year in residence.
- § 1 semester of ORG&EVBI 697B Ecology and Evolutionary Biology (1 credit). Students must register for this Proseminar in the 1st semester of residence.
- § 1 semester of ORG&EVBI 697Y Graduate Student Seminar Symposium (1 credit). Students should plan to complete this requirement in spring of their 1st or 2nd year of residence.
- § Between 1 and 10 credits of ORG&EVBI 699 (MS thesis credits)
- § At least 1 course in statistics. See Appendix A for details on the statistics requirement.

SPECIAL PROBLEM COURSES (INDEPENDENT STUDY)

You may design Special Problem Courses, which are tutorials covering specific topics of interest to you and a particular faculty member. To avoid misunderstandings, develop a written plan outlining the course and describing any requirements for completion. Submit the plan, signed by both you and the faculty member, to the OEB Program Coordinator at the beginning of the course.

FOREIGN LANGUAGE REQUIREMENTS

There is no foreign language requirement for the M.S. degree, but the student's Guidance Committee may require a language or other skills such as computer science or statistics.

THESIS COMMITTEE

The Thesis Committee consists of 3 members who are both OEB and Graduate School Faculty. One member must be from a department other than that of the student's Major Advisor. Faculty not listed as Graduate Faculty may be included as "Consulting" members of your committee, but cannot replace the required Graduate Faculty members. Students are expected to meet with their committee once a year and are encouraged to meet more often.

THESIS PROSPECTUS

Your prospectus is a ***plan*** of the research that you intend to conduct. Note that it is not a binding commitment to a specific research course but rather a document designed to initiate conversations and interactions between you and your dissertation committee. It should be presented to and reviewed by your committee near the beginning of your research, not after the research is completed. ***Master's students should form their thesis committee and prepare their prospectus by the end of their third semester***. While this may be well ahead of the graduate school's deadline, which is four months prior to the thesis defense, it is our experience that a prospectus has much more value when prepared before rather than after most of the work is done. Plan to hold a committee meeting to discuss your prospectus once it is complete. Once your Thesis Committee is satisfied with the document, your committee and the OEB Graduate Program Director sign the cover page of the original copy to indicate approval of the topic and its plan of execution. The signed copy is placed in the student's file.

The thesis prospectus should contain the following:

1. What are the questions are you asking (the hypotheses you are testing)?
2. Why are you doing this research (justification of its importance)?
3. How will you conduct your research (approach and methods)?
4. When will it be done (provide a timeline for research, analysis and writing)?

Below is a suggested format for addressing these questions; other formats are acceptable as long as they answer these questions. Discuss the format you plan to use with your committee before preparing your prospectus. You will notice a broad range in the required page lengths. Different disciplines within OEB have different traditions. The state of the field may also influence the length: for example, if there is no recent literature review in your field, a long review may lead to a publication. Finally, advisors differ somewhat in their expectations for the prospectus. **Consult with your thesis committee about what they expect from you.**

- **Signature Sheet:** For format, see Appendix G
- **Introduction:** 2-5 pages, double-spaced
  Background of your discipline *(One of the goals of comparative physiology is to...)* 1-3 paragraphs
  Details of your system *(Hummingbirds are an especially useful group to examine…)* 1-3 paragraphs The specific questions you will be asking *(In my thesis I intend to determine...ask the following questions...address these hypotheses...)* 1-3 paragraphs
- **Literature Review** (optional): 5 pages maximum, double-spaced; What research has already been published in your area of research? (*What has already been done on hummingbird flight physiology?*)
- **Approach:** 2-8 pages, double-spaced; How will you be addressing the questions outlined above (*In order to determine how flight capacity differs among hummingbirds, I will examine 4 species... Using high speed cameras, I will measure...)* Include general approach, experimental design, location, species/specimens, sample sizes, statistics, etc. with no more detail than you would include in a paper. Break down by chapter or question if appropriate. Results can be included but are not necessary and should *not* be a major part of the prospectus.
- **Time Line:** 1-2 pages, double-spaced
  When will you complete your research, data analysis and writing? Break down by chapter/question. Thisis the part that students most often forget to include. The Graduate Program Director will not sign off without this component.

§ **Total Length:** 5 to 20 pages, double spaced

Be as clear and succinct as possible. The Graduate Program Director, who must sign your prospectus, may not be familiar with your area of research, so write for a broader audience than just your committee.

THESIS

The format of the thesis may contain pertinent sections including: Introduction, Literature Review, Materials and Methods, Results, Discussion, Conclusion, Literature Cited, etc. However, we strongly recommend instead that the candidate prepare the thesis in "publishable" manuscript format, meaning that each chapter has its own Introduction, Methods, Results, etc. OEB expects that your research will lead to publication in a refereed journal. Committee members must be given the opportunity to review chapters before they are submitted for publication; in doing so you will also gain the benefit of their expertise. If you select the manuscript format, then include appropriate appendices and follow the *Typing Guidelines for Master's Theses and Doctoral Dissertations* also available at the Office of Degree Requirements in the Graduate School. Committee members are expected to review thesis drafts and provide feedback within a two- to four-week period.

THESIS DEFENSE

When a candidate has completed his/her thesis, the student will take a general, oral "defense of thesis" examination. Because of the time required for a thorough review and necessary revision, ***the student must submit a complete printed (hard copy) draft or, if all committee members agree, a digital version of his or her thesis to each member of the Thesis Committee at least two weeks before the potential defense date and notify the OEB Program Coordinator when this has happened***. Keep in mind that your committee may require more time. Within one week of receipt of this draft, all Committee members must verify that thesis is ready to defend. The Program Coordinator will send an e-mail to the Committee shortly after the thesis is distributed asking for this verification and then notify the OEB GPD. Review of the thesis by Committee members may continue up to the date of defense, and the student can make minor changes to the final draft after the defense date.

The student, the OEB GPD, and the OEB Program Coordinator work together to plan the thesis defense. The appointment of a moderator by the GPD is allowed if the student or a committee member asks the GPD to appoint one, or if the GPD thinks there should be one. The role of the moderator is to preside over the defense but not to vote. In most cases however, the chair of the committee presides over the defense.

The Thesis Committee conducts the examination. The final exam generally consists of a 30-50 minute research presentation to which the general public is invited, followed by a closed examination conducted by the Thesis Committee. A unanimous positive vote is a pass; two or more negative votes is a failure; and one negative vote is referred to the OEB Graduate Operations Committee for resolution. The Major Advisor will notify the OEB GPD and OEB Program Coordinator, via memo, of the outcome of the examination. The OEB GPD will then submit a memorandum to the Graduate School stating the results of the examination. If passed, the OEB GPD reviews and signs the form *Degree Eligibility Form (Masters)* after completion by the student. The *Eligibility* form is available on the Graduate School's website. It is the student's responsibility to ensure all of the required paperwork is submitted to the Graduate School. See Appendix C (OEB MS Checklist) for OEB's requirements and as well as the Graduate School's Master's Degree Checklist: *http://www.umass.edu/gradschool/Masters_graduation_forms.htm*

The master's thesis must be typed in a proscribed style (see the Guidelines for Master's Theses and Doctoral Dissertations) and submitted electronically through the University of Massachusetts Amherst ScholarWorks website. One original of the thesis signature page is to be submitted to the Office of Degree Requirements.

DOCTOR OF PHILOSOPHY DEGREE

GENERAL REQUIREMENTS

No specific number of credit hours is required for the Ph.D. beyond the minimum of 18 credits needed to satisfy the one-year residency requirement. See Appendix D for the expected timeline for doctoral students.

COURSE REQUIREMENTS

OEB promotes flexibility in individual training objectives. Each student's Guidance Committee will work out a specific program of courses designed to correct any deficiencies and tailored to the student's research interests. However, all OEB students must demonstrate general knowledge and understanding of ecology and evolutionary biology. To that end, OEB doctoral students must fulfill the following requirements:

- § Ecology Core Course, ORG&EVBI 617 (4 credits). This is offered in the fall of odd-numbered years.
- § Evolution Core Course, ORG&EVBI 618 (4 credits). This is offered in the fall of even-numbered years.
- § Pass an oral preliminary comprehensive examination in the student's second year of residence. This examination, required by the Graduate School and OEB, is rigorous. To prepare, most OEB doctoral students must strengthen and broaden their academic background by taking the two core courses and one or more statistics courses, identified in consultation with their Guidance Committee.
- § Complete a minimum of 18 dissertation credits (ORG&EVBI 899)
- § 2 semesters of Biology 891A Grad Program Seminar-OEB section (1 credit/semester). This is offered every semester. Students should plan to complete this requirement in the 1st year in residence.
- § 1 semester of ORG&EVBI 697B Ecology and Evolutionary Biology (1 credit). Students should plan to complete this Proseminar in the 1st semester of residence.
- § 1 semester of ORG&EVBI 697Y Graduate Student Seminar Symposium (1 credit). Students should plan to complete this requirement in the 2nd or 3rd year of residence.
- § Complete statistical coursework as specified in the Statistics Guidelines (see Appendix A)

TEACHING REQUIREMENT

All Ph.D. students are required to teach at minimum the equivalent of a 1-semester Teaching Assistantship (20 hours/week) for a course that includes substantial student contact. This requirement applies to all doctoral students, even if they are not supported by TA funding, and even if they have prior teaching experience at K- 12 or other non-university levels. The requirement could be met with two semesters of 10 hours/week TA positions, or by taking the lead role in teaching a course or seminar. Check with the GPD in advance with questions about whether a proposed teaching assignment will satisfy the teaching requirement. Students make arrangements for fulfilling this requirement through the OEB Program Coordinator. **NOTE:** Any student intending to go into an academic career is advised to gain substantially more teaching experience during their graduate studies than the one-semester minimum OEB requirement.

RESIDENCY REQUIREMENT

The Graduate School requires a minimum of one academic year as a full-time graduate student (at least 9 credits per semester) in residence at the University. The residency year must consist of either a fall-spring or spring-fall sequence. During this time, you must spend some part of each week physically on campus. You should fulfill this requirement in your first year.

LANGUAGE OR SPECIAL SKILL REQUIREMENT

Although there is no language requirement for the Ph.D., your Guidance Committee may require a language or the acquisition of appropriate additional skills instead (e.g., computer science, statistics, electron

microscopy)

DISSERTATION CREDITS

All candidates must have a minimum of 18 dissertation credits.

PRELIMINARY COMPREHENSIVE EXAMINATION
(See Appendix E for Prelim Checklist)

Content: The Preliminary Comprehensive Examination is an oral examination primarily designed to ensure that the student has a broad knowledge of organismic and evolutionary biology. The student will be examined in the following subjects: general biology, evolution, ecology, and statistics. In addition, students are expected to demonstrate familiarity with the principal questions, the working literature (e.g., journals) and the leading scientists central to their research, as well as show in-depth comprehension of the material covered in courses the student has already taken. Students whose main research interests lie outside of biology may petition the Graduate Program Director to substitute other general subjects for the exam. For example, students with a focus in Geosciences may request to substitute earth sciences for general biology. Successful completion of this exam qualifies a student to become a Ph.D. candidate. OEB students maintain an informal OEB Prelim Reference, available online, by submitting examiners' questions annually to the OEB Program Coordinator.

Students seeking a joint degree must confer with the Graduate Program Directors of both programs during the exam planning process to assure that the requirements of both programs are being met.

Timing: While students normally take their exam by the end of the fourth semester in residence, they are urged to begin planning and preparing for their oral comprehensive exam soon after entry into the program. By doing so they can take full advantage of reading suggestions and potential student questions provided by faculty and previous examinees. Upon written request to the OEB GPD, students without previous graduate training in ecology, organismic or evolutionary biology (e.g., no M.S.) will be given one extra year to schedule the Preliminary Comprehensive Examination.

Examination Committee: The student, in consultation with the Major Advisor, identifies examiners in each of the four subject areas and proposes the examining committee to the GPD. The GPD reviews the committee for balance and comprehensiveness and notifies the OEB Program Coordinator when the committee is approved. The committee will consist of four members who are OEB Faculty who may or may not be part of the student's Guidance Committee. The Major Advisor may or may not serve on the committee as preferred by the advisor and student. In order to reflect the breadth of training that OEB promotes, the committee will consist of at least one member outside the Major Advisor's department. The OEB Program Coordinator will seek a moderator from among OEB faculty on the moderator volunteer list. The role of the moderator is to ensure that the exam is fair for the program and for the student.

Scheduling the Exam: Once the Examination Committee is approved, the student, in consultation with the OEB Program Coordinator, schedules the Preliminary Comprehensive Examination. It is the student's responsibility to select a date for the examination at least four weeks in advance and to ensure that all members of the Examination Committee are available. Once this is done, the OEB Program Coordinator will assign a Moderator from the list of moderator volunteers. Do not plan to schedule prelims during final exam weeks or during intersession (including the period between the end of fall semester and the beginning of intersession), summer, or on a state holiday.

Exam and Results: The only people present during the exam will be the student, the moderator, and the examiners. If a member of the examining committee cannot be present on the day of the exam, then the student may elect either to accept a substitute or to reschedule the exam. The usual structure of the exam is that it consists of an oral exam only, in which two rounds of

questions are asked, with each committee member having 20 minutes for questions in each round. The committee may decide on an alternate structure, but it must contain a substantial oral component, and the student must be informed of the structure at least two weeks in advance.

Only the Examination Committee (not the moderator) will vote. Each member of the Examination Committee will vote on the student's performance only on questions dealing with his or her own area(s) of expertise. The student passes with a unanimous positive vote or fails with two or more negative votes. In the event of one negative vote, the Graduate School will be informed that the student has passed, but no defense can be scheduled until any recommendations made by the Examination Committee have been completed. The Examination Committee may require additional coursework or may make other recommendations to strengthen the background of the student. No defense can be scheduled until all recommendations have been completed. It is your responsibility to complete the recommendations and ask the appropriate person to supply documentation to the OEB Program Coordinator. If the student fails, the Examination Committee may either: 1) terminate the student from the Ph.D. program, or 2) provide the student an opportunity to retake the entire exam or portions of the exam within six months.

Following the Exam, the Moderator reports results to the OEB Office using a standard form. The OEB Program Coordinator prepares a memo for GPD signature notifying the Graduate School that the student has passed and has advanced to candidacy. It is the student's responsibility to verify that this memo is sent. The Dissertation Committee can be appointed once the student advances to candidacy.

M.S. "On-the-Way"

Students who pass the Preliminary Comprehensive Exam may obtain an M.S. degree "on the way" by submitting *a Degree Eligibility Form* to the Graduate School. They must have fulfilled the residency requirements for the doctorate and course requirements for the master's degree (30 graduate credits are required for a master's degree; 21 must be in the student's major, 1/2 credits must be graded, 6 credits in the 600-800 course level range). Dissertation credits may not be counted towards your M.S.

DISSERTATION COMMITTEE

After the student passes the preliminary comprehensive examination, in consultation with the student and Major Advisor, the OEB GPD nominates a Dissertation Committee to the Dean of the Graduate School. The committee consists of at least four members. All four must be Graduate Faculty, and at least three must be OEB Faculty. Additional faculty not listed as Graduate Faculty can be included as "Consulting" members of your committee, but cannot replace the required Graduate Faculty members or count as an official outside member. The candidate's Major Advisor shall chair the Dissertation Committee. One member of the Dissertation Committee must be an OEB faculty member from outside the student's department. This outside faculty member will act as representative of the Graduate Council and will attend all meetings of the Dissertation Committee, including the final examination, as a voting member. The responsibility of the Dissertation Committee is to supervise the dissertation project and conduct the final "defense of dissertation" examination. Committee members are expected to review dissertation drafts and provide feedback within a four to six-week period.

It is the responsibility of the student, with his or her Major Advisor, to arrange regular meetings (at least once each year) with all members of the Dissertation Committee to discuss the research problem before approving the dissertation prospectus.

DISSERTATION PROSPECTUS/DISSERTATION OUTLINE

Your prospectus is a ***plan*** of the research that you intend to conduct. It is not a binding commitment to a specific research course, but rather a document designed to initiate conversations and interactions between you and your dissertation committee. It should be presented to and reviewed by your committee near the beginning of your research, not after the research is completed. During the 3rd year in residence, Ph.D. candidates will formalize their dissertation committee and prepare their thesis

prospectus. ***An approved dissertation prospectus should be submitted to the Graduate Program Director by the end of the 3rd year.*** While this is well ahead of the graduate school's deadline, which is several months prior to the dissertation defense, it is our experience that a prospectus has much more value when prepared before rather than after most of the work is done. Plan to hold a committee meeting to discuss your prospectus.

When your committee is satisfied with the document, both your committee and the OEB GPD sign the cover page of the original copy to indicate approval of the topic and its plan of execution. Appendix G is a sample of the signature page. The GPD then sends the prospectus to the Graduate School and a copy is placed in the student's file. The prospectus should contain the following:

1. What are the questions you are asking (the hypotheses you are testing)?
2. Why are you doing this research (justification of its importance)?
3. How will you conduct your research (approach and methods)?
4. When will it be done (provide a timeline for research, analysis and writing)?

Below is a suggested format for addressing these questions; other formats are acceptable as long as they answer these questions. You will notice a broad range in the recommended number of pages. Different disciplines within OEB have different traditions. The state of the field may also influence the length: for example, if there is no recent literature review in your field, a long review may lead to a publication. Finally, advisors differ somewhat in their expectations for the prospectus. **Before you begin, consult with your dissertation committee about what they expect from you as to length and format.**

- **Signature Sheet:** See Appendix G for format.
- **Introduction:** 2-5 pages, double-spaced
  Background of your discipline, details of your system of interest, specific questions you will be asking.
- **Literature Review** (optional): 2-5 pages, double-spaced. What research has already been published on your thesis topic?
- **Approach:** 2-8 pages, double-spaced. How will you be addressing the questions outlined above? Include general approach, experimental design, location, species/specimens, sample sizes, statistics, etc. with no more detail than you would include in a paper. Break down by chapter or question if appropriate. Pilot results can be included but are not necessary.
- **Time Line:** When will you complete your research, data analysis and writing. Break down by chapter/question if appropriate.

Be as clear and succinct as possible. The Graduate Program Director, who must sign your prospectus, may not be familiar with your area of research, so write for a broader audience than just your committee.

DISSERTATION

The final requirement of the Ph.D. program is the completion and defense of a doctoral dissertation. The dissertation must demonstrate that the candidate possesses the ability and imagination necessary to do original independent thinking and research, and to present ideas clearly and in an organized form. The dissertation in its completed form is judged on the ability of the candidate to review and evaluate the literature; to formulate a problem, design appropriate experiments, and work systematically toward a solution; and to summarize and analyze data and draw logical conclusions. The goal of the dissertation is to make a significant contribution of publishable quality to scientific knowledge.

The format of the dissertation may contain pertinent sections including: Introduction, Literature Review, Materials and Methods, Results, Discussion, Conclusion, Literature Cited, etc. However, OEB expects that your research will lead to publication in a refereed journal, and thus we highly recommend instead that the candidate prepare the dissertation in "publishable" manuscript form, meaning that

each chapter has its own Introduction, Methods, Results, etc. If you select the manuscript format, then include appropriate appendices and follow the *Guidelines for Master's Theses and Doctoral Dissertations* (available at https://www.umass.edu/gradschool/sites/default/files/thesis_and_dissertation_guidelines.pdf). Committee members must be given the opportunity to review chapters before they are submitted for publication; in doing so you will also gain the benefit of their expertise. The preliminary pages of the dissertation must include an Abstract of not more than 350 words, not including words in the heading. It is especially important to write the Abstract carefully, as it serves as the most easily accessible public document resulting from a dissertation. After your thesis or dissertation has been completed, it will be available electronically via the UMass library system.

A "rule of thumb" that many OEB faculty use is that a dissertation should have a minimum of three substantive chapters. This is not hard and fast.

SCHEDULING THE DEFENSE

The Dissertation Committee and OEB GPD must unanimously approve as ready to defend the complete draft of the dissertation before the defense may be scheduled. Because of the time required for a thorough review and necessary revision, ***the student must submit a complete draft of his or her dissertation to each member of the Dissertation Committee a minimum of five weeks before the potential defense date.*** A digital copy is okay if committee members agree; but they might ask for a hard copy, which you should then provide. Your committee may also require more time to complete their reviews; ask in advance.

Shortly after the thesis is distributed, the Major Advisor will send an e-mail to the Committee requesting their approval to schedule the defense and then notify the OEB GPD and OEB Program Coordinator. Review of the thesis by committee members may continue up to the date of defense, and the student can make changes to the final draft after the defense date. Generally, revisions after the defense are relatively minor, but occasionally issues arise at the defense that require more extensive revision. Thus, it is best to allow plenty of time.

After approval is given to the dissertation draft, the defense may be scheduled. The candidate and all members of the Dissertation Committee must agree upon the date. The OEB GPD sends a notification of the defense to the Office of Degree Requirements in Graduate School ***at least four weeks before the examination*** for advertisement by the Graduate School. The defense must be held on the Amherst campus. All members of the committee must be present for the defense.

In most cases, there is no need for a moderator for a dissertation defense. The appointment of a moderator is allowed if the student or a committee member asks the GPD to appoint one, or if the GPD thinks there should be one, but in most cases the Major Advisor, who chairs the Defense Committee, will preside. If a moderator is present, he or she will not vote.

A hard copy of the dissertation draft must be submitted to the OEB Program Coordinator a week before the defense so that it is available to all interested faculty. The OEB Program Manager will notify OEB faculty that the dissertation is available for review.

DISSERTATION DEFENSE

The dissertation defense includes a 50-minute to 1-hour public seminar followed by a closed oral examination pertaining primarily to the dissertation topic. The Dissertation Committee conducts the examination. After the public portion of the defense, the Dissertation Committee will excuse the public and conduct a private discussion with the candidate. Only members of the Dissertation Committee may cast votes on the decision to pass or fail. Determination of pass or fail will be by secret ballot. For doctoral dissertation defenses, a unanimous positive vote is a pass; two or more negative votes is a failure, and one negative vote is referred to the Graduate Council for a decision (this is Graduate School policy). The

Program may allow students who fail to retake the exam.

Following the final examination, the Major Advisor sends a memo to the OEB Program Coordinator with the exam results. The OEB GPD then submits a memo to the Graduate School stating the results, and if passed, recommends the candidate for the Doctoral degree. The student is responsible to assure that this memo is sent. The student completes a *Doctoral Degree Eligibility Form* (this may be done earlier at the time the defense is scheduled) and submits it to the OEB Program Manager for additional information and signatures. The form and a Doctoral Degree Checklist are available at *https://www.umass.edu/gradschool/sites/default/files/checklist_for_doctoral_oral_exams.pdf*

The candidate provides 1 signature page on paper with original signatures to the Graduate Degree Requirement Office and submits the dissertation electronically. Check this site for additional information https://www.umass.edu/gradschool/current-students/doctoral-degree-requirements-and-dissertation-information. See also Appendix F (OEB Ph.D. Checklist).

ADDITIONAL USEFUL INFORMATION

YOUR UNIVERSITY AFFILIATION

During your years as a graduate student at UMass, you will be asked many times ***"What is your department?"*** When asked, you should list your affiliation as: ***Graduate Program in Organismic and Evolutionary Biology***. You do not have an academic connection to your advisor's department or with any department that funds you. This is important to remember whenever you fill out paperwork that requests your department *and* when you submit grants or papers for publication.

The University is very tied to the concept of the DEPARTMENT, which often adds to the confusion when you complete University paperwork. While OEB is not a department, it is viewed as one from an administrative point of view. Please keep in mind that listing the wrong department can mean that money meant for you might be deposited in the account of the wrong department or that paperwork pertaining to you is misdirected away from the OEB Office.

Department:	Graduate Program in Organismic & Evolutionary Biology
***Department Address*:**	2nd Floor, French Hall 230 Stockbridge Road (if you need to include a street address) University of Massachusetts Amherst Amherst, MA 01003
***Department Telephone*:**	413-545-2046
***College/School*:**	College of Natural Sciences (Dean Trisha Serio)
***IDGP Director** :*	Patricia Wadsworth. 545-4877 (use when asked for your *Department Head*)
***OEB Graduate Program Director*:**	Paige Warren (the GPD is your liaison with the Grad School) pswarren@eco.umass.edu 545-0061
IDGP Staff	2nd Floor, French Hall

OEB WEBSITE

OEB's website (http://gpls.cns.umass.edu/oeb) was designed with students in mind. In addition to general program information, you'll find a phone and e-mail directory, a listing of OEB seminars and a series of ***Students*** pages that list many student resources. You are strongly encouraged to create your own webpage using the template that is available. Contact the OEB Program Coordinator for details.

OEB STUDENT ORGANIZATION

OEB students have formed a student organization. During the semester, this group meets to share information on funding opportunities, discuss general information on the program, determine the position of the graduate student body about program issues, and plan outreach and social activities. A president is elected annually to oversee activities. The group also holds annual elections to choose graduate student representatives to serve on the following committees: 1) OEB Steering Committee, 2) OEB Seminar Committee, 3) Graduate Student Senate representative, and 4) Graduate Employee Organization. There are also a number of student volunteer committees.

OEB TA AWARD

A significant goal of OEB is to train graduate students to excel at teaching. To recognize excellence in teaching, the OEB Teaching Assistant Award was instituted in 1999 at the suggestion of students. OEB students, who teach in either the Fall or Spring semester, may apply for the award by submitting a dossier to the TA Award Committee that contains the following:

- § Statement of teaching philosophy
- § Three letters from students evaluating teaching effectiveness
- § Letter of support from course instructor or faculty advisor

The award is given out annually at the end of the spring semester and includes a small scholarship.

PUBLISHING

OEB expects that your research will lead to publications in refereed journals. You and your Major Advisor have a responsibility to make sure your work is published and made accessible to the broader scientific community. OEB encourages its students to write thesis/dissertation chapters as manuscripts ready for publication. Students planning to publish such chapters before the final defense **must provide their committee members the opportunity to review manuscripts** before they are submitted if the manuscripts are to be included in your thesis or dissertation. Students should generally be first author on published thesis or dissertation chapters. All oral and poster presentations as well as publications should acknowledge sources of funding and other support behind the research.

OEB POLICY ON USE OF OEB E-MAIL LISTS

Members of the OEB community are welcome to use OEB-email lists, but they must be used only for the following purposes:

The OEB seminar list (**oeb.seminar@bio.umass.edu**) should be used only for seminar announcements. This list includes OEB faculty, staff and students and also people outside of the five-college OEB community who have asked to be informed about seminars.

The OEB all list (**oeb.all@bio.umass.edu**) should be used only for OEB business and social events. This list includes all OEB faculty, staff and students, plus other interested individuals who have requested they be kept informed of OEB news and events.

The OEB graduate student list (**oeb.grad@bio.umass.edu**) should be used only for OEB business and for communication to and among graduate students.

The OEB faculty list (**oeb.fac@bio.umass.edu**) should only be used for OEB business and communication to and among OEB faculty.

It is not appropriate to use these lists for non-OEB business, including political messages.

RESOLVING WORKPLACE CONFLICTS

There are a number of resources in the OEB and UMass communities to support OEB graduate students who experience a workplace conflict. These resources are listed in Appendix H and on the OEB web site under Student Resources.

PROFESSIONAL SOCIETIES

We encourage students to join and participate in activities of professional societies that are relevant to their area of study. Membership in many of these societies includes a subscription to the society's journal, and frequently provides opportunities for small grants. Below is a list of some relevant societies. Your major advisor can supplement this list.

American Association for the Advancement of Science (AAAS)

Animal Behavior Society (ABS)

American Fisheries Society (AFS)
American Ornithologist's Union (AOU)
American Society of Ichthyologists and Herpetologists (ASIH)
American Society of Mammalogists (ASM)
Botanical Society of America (BSA)
Ecological Society of America (ESA)
Entomological Society of America (ESA)
Society for Conservation Biology (SCB)
Society for Integrative and Comparative Biology (SICB)
Society for the Study of Amphibians and Reptiles (SSAR)
Society for the Study of Evolution (SSE)
Society of Systematic Biology (SSB)
Society of the Sigma Xi
Society of Vertebrate Paleontology (SVP)

MUSEUM COLLECTIONS AND VOUCHER SPECIMENS

Students completing degrees in systematics or with research programs where the correct identification of species is crucial must deposit voucher specimens in the appropriate systematic collection. All curators of natural history collections on campus are members of OEB. There are several main collections: Fernald Hall houses an extensive collection of insects; the Biology Department in Morrill Science Center houses the University Herbarium and Zoological Collections (including mammals, birds, reptiles, amphibians, and fish); and the Department of Anthropology maintains physical anthropological materials in Machmer Hall. Your Major Advisor can assist with use of the collections. Before initiating your research program, consult with him or her.

ANIMAL USE PROTOCOL AND RESEARCH PERMITS

If you will be conducting research on live vertebrate animals (**including noninvasive field research**) there must be an approved Animal Use Protocol on file in the Animal Care Office on Campus (iacuc@resgr.umass.edu). Your Major Advisor may already have prepared a protocol and had it approved, but you will need to collaborate with your Major Advisor to prepare one and have it approved prior to any affiliated research. You also need to make sure that any necessary State or Federal permits are in hand prior to any affiliated research. IACUC approval takes time! Past OEB students have had their research delayed or stopped because they did not allow enough time for approval. If you proceed with your research without IACUC approval, UMass is subject to hefty fines, and your advisor's lab may be shut down. In addition, once you have an approved protocol, it is essential that you follow it. You are subject to federal inspection without prior notification. Again, violations can result in fines and lab closures. You can find more information at https://www.umass.edu/research/compliance/animal-subjects-iacuc/e-protocol-system-iacuc.

USE OF UNIVERSITY VEHICLES

You must have a valid driver's license and be a University employee for the vehicle's insurance to be in effect. Generally, you will make arrangements to use a University vehicle through your Major Advisor's department. Additional restrictions may apply -- check with the appropriate departmental office or your Major Advisor. Do not use University vehicles for personal business (i.e., no spouses, friends, children, dogs or personal furniture). ***Before returning a vehicle, clean the interior.*** Off-road travel should only occur with vehicles suitable for such usage, such as pickup trucks or four-wheel drive vehicles.

APPENDICES

APPENDIX A: OEB STATISTICS GUIDELINES

It is highly recommended that all OEB doctoral students have a solid understanding of how to 'choose and use' statistical procedures based on the objective at hand. This includes a familiarity with probability, the suite of available modern statistical tools (e.g., GLMs and GLMMs) and their underlying assumptions, and the statistical software and packages for conducting these analyses (e.g., R). Doctoral students are expected to take an intermediate statistics course, but may find an introductory statistics course useful as well. Masters students are expected to take an introductory level statistics course at a minimum. Because cutting-edge research in all fields of ecology and evolutionary biology often involves application of advanced statistical techniques, students should discuss with their Guidance Committee whether additional courses in statistics might match their career objectives. Below is a list of some UMass courses that would satisfy these requirements.

Introductory Statistics:

ECO 602/ECO 634 Analysis of Environmental Data + lab (Fall semesters)
STATISTC 501 Methods in Applied Stats (all semesters)

Intermediate Statistics:

ANTHRO597 Advanced Quantitative Methods in Anthropology (Spring semesters, even years)
ECO 636 Applied Ecological Statistics (Spring semesters)

Other useful quantitative courses:

ECO 632 Applied Multivariate Statistics (Spring semesters, odd years)
NRC 577 Ecosystem Modeling & Simulation (intermittently offered)
NRC 585 GIS for Natural Resource Management (every semester)

Other advanced courses in Mathematics and Statistics (accessible to those without a major math background) include:

Regression Analysis STATISTC
505 Design of Experiments
STATISTC 506
Multivariate Statistical Methods STATISTC 511
Statistical Computing STAT 535
R Programming for Data Analytics and Visualization STAT 597P

APPENDIX B: OEB M.S. TIMELINE

TIMELINE FOR OEB MS PROGRAM			
		REQUIREMENT	**NOTES**
YEAR 1	1st Semester	Form and meet with 3-member Guidance Committee	Pg 3 of OEB Student Guide
		Fulfill course requirements (OEB seminar, Org&EvBi 697B, 1st Core Course + others)	Pg 7 & 8 of OEB Student Guide
	2nd Semester	Continue to fulfill course requirements (OEB seminar + Org&EvBi 697Y)	
		Annual Graduate Review	Pg 6 of OEB Student Guide
YEAR 2	1st Semester	Form and meet with 3-member Thesis Committee	Pg 8 of OEB Student Guide
		Fulfill course requirements (2nd Core Course + others)	Pg 7 & 8 of OEB Student Guide
		Prepare Thesis Prospectus	Pg 9 of OEB Student Guide
		Schedule Thesis Committee meeting to review prospectus	
		Submit Prospectus to Grad School by end of semester or petition GPD for an extension	
		Conduct research	
		Fulfill remaining course requirements	
	2nd Semester	Schedule annual thesis committee meeting before Graduate Review	
		Annual Graduate Review	
		Conduct research	
		Write thesis	
		Prepare manuscripts	
		Defend--typically MS students complete their degree in 4-5 semesters	Pg 10 of OEB Student Guide

APPENDIX C: OEB M.S. CHECKLIST

Also see the Graduate School's Master's Degree Checklist at
http://www.umass.edu/gradschool/Masters_graduation_forms.htm

Deadlines for completing all degree requirements and submitting required forms to the Office of Degree Requirements are as follows (check the Graduate School Calendar for the exact dates, which may vary slightly from one year to the next; the deadlines are absolute and will not be extended):

May Degree	April 15 deadline
September Degree	August 31 deadline
February Degree	December 15 deadline

COMPLETE COURSEWORK

OEB REQUIREMENTS

2 semesters OEB Seminar 1 semester OEB 697B
1 semester OEB 697Y Ecology Core Course Evolution Core Course
1 semester of introductory statistics Other courses specified by Guidance Committee

GRADUATE SCHOOL REQUIREMENTS

Minimum of 30 credits
Minimum of 21 credits in major field Minimum of 6 credits at 600-800 level Minimum of 1/2 credits letter-graded Maximum of 6 transfer credits Maximum of 10 thesis credits Maximum of 6 credits of Ind. Study

THESIS COMMITTEE

Thesis Committee: 3 members of OEB & Graduate School Faculty, with 1 of these members from a department other than that of the student's advisor. Student should inform OEB Program Coordinator of committee members, and OEB Coordinator will prepare memo for GPD signature and forward it to the Graduate Dean.

THESIS OUTLINE

Thesis Committee and GPD must sign thesis outline cover, signifying their approval. This is typically prepared before the end of the third semester. A copy must be provided to the OEB Program Coordinator for placement in the student file.

DEFENSE

Final draft of thesis distributed to committee members and GPD for approval, allowing 2-3 weeks for review. Defense may be scheduled only after the Thesis Committee notifies the GPD of their approval.

At least one week before defense, notify OEB Program Coordinator of thesis title, defense location, and date and time of defense.

Defense consists of research seminar that is open to the public followed by an oral examination conducted by the Thesis Committee. Major Advisor submits memo indicating results of exam to OEB GPD/OEB Program Coordinator, who notifies the Graduate School by memo over GPD signature.

AFTER DEFENSE

Complete first page of ***Master's Degree Eligibility Form*** (electronic copy available at https://www.umass.edu/gradschool/sites/default/files/masters_degree_eligibility_form_for_thesis_students.pdf) and sign. Provide form to OEB Program Coordinator, who will gather electronic signatures from GPD and IDGP Program Director and submit form to Degree Requirements

Office.

Submit 1 Signature Page with original signatures to Degree Requirements Office.

Submit thesis electronically, following all instructions. Information is available at https://www.umass.edu/gradschool/current-students/masters-degree-requirements-and-thesis-information/electronic-thesis-submission-pro

Pay any required fees.

NOTE: You must be an "active" student in order to graduate by either taking at least one credit or by registering for continuous enrollment every semester until your graduation date.

APPENDIX D: OEB Ph.D. TIMELINE

TIMELINE FOR OEB Ph.D. PROGRAM			
		REQUIREMENT	**NOTES**
YEAR 1	1st Semester	Form and meet with 3-member Guidance Committee. Develop plan for coursework.	Pg 3 of OEB Student Guide
		Fulfill course requirements (OEB seminar, Org&EvBi 697B, 1st Core Course + others)	Pg 7 & 11 of OEB Student Guide
		Fulfill 1st semester of Residency Requirement	Pg 11 of OEB Student Guide
		Meet TA requirement (any semester)	
	2nd Semester	Continue to fulfill course requirements (OEB seminar + others)	
		Fulfill 2nd semester of Residency Requirement	
		Annual Graduate Review	Pg 6 of OEB Student Guide
YEAR 2	1st Semester	Form and meet with Preliminary Exam Committee. Schedule and prepare for exam.	Pg 12 of OEB Student Guide
		Continue to fulfill course requirements (OEB seminar, 2nd Core Course + others)	
		Conduct research, write, publish	
	2nd Semester	Take Prelims Exam by end of semester or petition GPD for an extension	Pg 12 of OEB Student Guide
		Continue to fulfill course requirements (Org&EvBi 697Y)	
		Form 4-member Dissertation Committee after advancing to candidacy	Pg 13 of OEB Student Guide
		Schedule annual committee meeting before Graduate Review	
		Annual Graduate Review	
YEAR 3	1st Semester	Conduct research, write, publish	
		Prepare Dissertation Prospectus	Pg 14 of OEB Student Guide
		Submit research grant applications	
	2nd Semester	Schedule Dissertation Committee meeting to review prospectus	Pg 14 of OEB Student Guide
		Submit Prospectus to Grad School by end of semester or petition GPD for an extension	Pg 14 of OEB Student Guide
		Schedule annual committee meeting before Graduate Review	
		Annual Graduate Review	
YEAR 4		Conduct research, write, publish	

	Submit research grant applications	
	Schedule annual committee meeting before Graduate Review	
	Annual Graduate Review	
YEARS 5 & 6	Conduct research, write, publish	
	Schedule annual committee meeting before Graduate Review	
	Annual Graduate Review	
	Defend—typically PhD students complete their degree in their 5th or 6th year	Pg 16 of OEB Student Guide

APPENDIX E: OEB PRELIMINARY COMPREHENSIVE EXAMINATION

The Preliminary Comprehensive Examination covers the student's knowledge of basic biology, evolution, ecology and statistics, as well as in-depth comprehension of the specific program of courses selected by the student's Guidance Committee. The OEB Program Coordinator maintains a notebook with information on the Preliminary Comprehensive Examination, including questions from previous exams. Successful completion of this examination qualifies the student to become a Ph.D. candidate.

TIMING

Students should begin preparing for their exam soon after entry into the program.

Students are expected to take their prelims by the 4th semester in residence. Students who do not have a M.S. in a related area may petition the GPD for one extra year to schedule their exam. On other rare occasions (e.g., a student whose first language is not English), the exam may be postponed if the advisor and GPD concur.

PRELIM COMMITTEE COMPOSITION

The student and his/her Major Advisor recommend an appropriate preliminary comprehensive exam committee, including topic assignment for each member, to the GPD. It is best to confirm the willingness of the examiners in advance. This committee should be set up in the first semester of the 2nd year.

4 members of OEB Faculty.
1 member must be in a department other than Advisor's department
OEB Program Coordinator seeks moderator from pool of OEB moderator volunteers

GPD reviews committee for balance and comprehensiveness and approves the committee by way of a memo to the student and the committee.

SCHEDULING OF EXAM

Student consults with examiners to select a date for the examination at least four weeks in advance. Student notifies OEB Program Coordinator so that a moderator can be assigned to the exam. Do not plan to schedule exams during final examination weeks, intersession, summer or on a state holiday.

The OEB Program Coordinator sends a memo listing time and location of exam to committee members and moderator.

AFTER EXAM

The moderator completes a form that indicates the result of the exam and provides it to the OEB Program Coordinator.

The OEB Program Coordinator sends memo over GPD signature indicating the result of the exam to the Graduate School's Office of Degree Requirements.

Once the student passes the preliminary exam, it is his or her responsibility to verify with the OEB Program Coordinator that the necessary memos indicating exam results have been sent.
Students who have passed their prelims may obtain an M.S. degree "on the way" by application to the Graduate School. The residence requirement for the Ph.D. and course requirements for the M.S. degree must have been fulfilled. Students must obtain and complete a M.S. Degree Eligibility Form, then submit it to the OEB Program Coordinator for review and signatures.

Student advances to candidacy and now may proceed with nomination of Dissertation Committee and preparation of Dissertation Prospectus.

APPENDIX F: OEB Ph.D. CHECKLIST

Also see the Graduate School's Doctoral Degree Checklist at
http://www.umass.edu/gradschool/sites/default/files/checklist_for_doctoral_degrees.pdf

Deadlines for completing all degree requirements and submitting required forms to the Office of Degree Requirements are as follows (check the Graduate School Calendar for the exact dates, which may vary slightly from one year to the next; the deadlines are absolute and will not be extended):

May Degree	April 15 deadline
September Degree	August 31 deadline
February Degree	December 15 deadline

COMPLETE COURSEWORK

OEB REQUIREMENTS

- 2 semesters OEB seminar 1
- semester OEB 697B
- 1 semester OEB 697Y
- Ecology Core Course
- Evolution Core Course
- Statistics through multivariate
- Additional courses specified by Guidance Committee
- Complete Teaching Requirement

GRADUATE SCHOOL REQUIREMENTS

- Residency requirement satisfied
- Minimum of 18 dissertation credits
- Passed Preliminary Comprehensive Exam

PRELIMINARY COMPREHENSIVE EXAM

Typically completed by the 4th semester in residence. Refer to Preliminary Comprehensive Examination Checklist (Appendix E)

DISSERTATION COMMITTEE

Once the Preliminary Exam is completed, the Dissertation Committee should be formed. Dissertation Committee Guidelines: 4 members, 3 of which are members of OEB & Graduate School Faculty, with at least one of these members from a department other than that of the student's advisor. Student and Major Advisor recommend committee to GPD who then recommends committee to Graduate Dean.

DISSERTATION PROSPECTUS

The prospectus (dissertation outline) should be prepared during the 3rd year in residence, following the preliminary exam. The Dissertation Committee and GPD must sign prospectus cover sheet, signifying their approval. ***The Graduate School must receive dissertation outline, with original signatures, ideally by the end of the third year.***. A copy must also be provided to OEB Program Coordinator.

DEFENSE

- § Final draft of dissertation distributed to committee members for approval, allowing minimum of 5 weeks prior to defense date for review. Defense may be scheduled only after the Dissertation Committee gives their approval to GPD. Consult with GPD if a moderator is requested for the defense.
- § At least 4 weeks before defense, notify the OEB Program Coordinator of committee members,

thesis title, defense location, and date and time of defense so that memo scheduling defense can be submitted to Graduate School in time to be announced in the UMass newsletter. NOTE: this deadline is very important. Degree cannot be granted unless the defense has been announced in the newsletter.

§ Defense consists of 45-minute to 1-hour research seminar that is open to the public followed by an oral examination conducted by the Dissertation Committee. Major Advisor submits memo indicating results of exam to OEB Program Coordinator, who then notifies the Grad School by memo over GPD signature.

AFTER DEFENSE

§ Submit 1 copy of signature page with original signatures to Degree Requirements Office.

§ Complete ***Doctoral Degree Eligibility Form***

(Form may also be completed earlier, when you are scheduling your defense). The electronic version is at https://www.umass.edu/gradschool/sites/default/files/doctoral_degree_eligibility_form_phd_edd.pdf) Complete and sign top of form and submit to OEB Program Coordinator, who will obtain needed signatures and submit to the Degree Requirements Office on your behalf.

§ Upload your dissertation to Scholarworks

§ Submit survey of earned doctorates

§ Pay any needed fees

NOTE: You must maintain an "active" student status until your official graduation date by either taking a dissertation credit or paying the continuous enrollment fee.

APPENDIX G: TEMPLATE FOR PROSPECTUS SIGNATURE SHEET

TITLE

A Thesis ***OR*** Dissertation Outline Presented

by

YOUR FULL NAME

Approved as to style and content by:

_____, Chair
Advisor's name typed

_____
Member's name typed

_____
Member's name typed

_____
Member's name typed

_____
GPD's name, Graduate Program Director
Organismic and Evolutionary Biology

APPENDIX H: GUIDELINES FOR RESOLVING WORKPLACE CONFLICTS

1. If Conflicts Arise Between You And Your Advisor/Ra Supervisor

Although OEB is a friendly and collegial group, occasionally there are conflicts between a student and their advisor or RA supervisor. You may find that you do not share the same research interests as your Major Advisor. Your personalities may clash. You may have different expectations about your research, work habits, or timeline. You may find that you have different expectations about authorship.

Try to resolve conflicts early by meeting with your Major Advisor. It may be uncomfortable to broach a difficult subject, but advisors are generally as eager to resolve differences as you are. In some cases, conflicts arise because of a simple misunderstanding and a frank conversation is all that is needed. In other cases, conflicts can be resolved over a period of time. Even if you cannot resolve the conflict immediately, it will be helpful for each of you to learn exactly what the other person's position is. It becomes more difficult for everyone if problems are left to fester.

If you are dissatisfied with the outcome of your meeting(s) with your Major Advisor, you are encouraged to meet with the Graduate Program Director, or with a member of the GOC. The GPD and GOC members are familiar with the norms of the program and can serve as facilitators on issues such as whether your Major Advisor has reasonable expectations of you. If beneficial, the GPD or GOC member will meet with your Major Advisor, with or without you present (as you desire). Your conversations with the GPD are confidential. Note: In the case that a law has been broken (e.g. title IXexual harassment) conversations with the GPD are not guaranteed confidentiality.

If your advisor or RA supervisor is serving as the current Graduate Program Director of your program, or if you feel your GPD is unable to resolve the problem or conflict to your satisfaction, you can seek the advice of one of the other GOC members or the Director of the Interdisciplinary Graduate Programs (IDGP director). Each of these leaders is vested in the success of all students in our program. You can also seek the advice of the Department Head for your advisor's home department. For some issues, you may find value in having a meeting with several department leaders in order to have multiple viewpoints on the issue. Although they will not be familiar with the culture of our program, you can also enlist the services of the University's Ombud's office to help resolve conflicts (see below).

Changing Advisors - Perhaps you and your Major Advisor have a conflict that cannot be resolved and that will make it difficult for you to continue your degree. You may find a better match with a different Major Advisor in OEB. Advisors vary greatly in their styles of interactions with their students and level of involvement with their students' research projects. Students also vary tremendously; some prefer to work very closely with their advisors, and some prefer a more independent path. If you think that you may want to change your Major Advisor, discuss it with your current Major Advisor, if it is comfortable to do so. It is generally recommended that you let you current Major Advisor know in advance that you plan to explore other labs. Discuss your ideas with the GPD, who can suggest a different match. Major Advisors are generally at least partially responsible for your funding, so this will need to be taken into consideration in finding a different match.

If you decide a problem or conflict is not resolvable to your satisfaction, you may change your advisor without jeopardy, providing that details of the transfer are agreeable to all parties concerned. If this occurs, you must notify the Graduate Program Director via email/memo that will be added to your file. The note should provide an effective date of your advisor switch, list your new thesis committee and outline how this change will impact your funding.

If you are a Ph.D. student and no other OEB lab would be a suitable home for you, consider stopping with a master's degree (either by passing your Preliminary Comprehensive Examination or by writing a master's thesis) and then seeking your Ph. D. elsewhere.

Remember that a decision to change advisors or leave the program, although it can be painful, can lead to a good outcome. Ask most faculty and they will tell you stories (perhaps their own!) of students who had a change of path during graduate school that ultimately led to success.

A final important note. If you feel that you have been subject to harassment in the workplace, know your rights. Resources include your union (the Graduate Employee Organization, or GEO), the title IX coordinators and the GPD. See below (Appendix H, section 4) for contact information of resources outside of the department.

2. If Conflicts Arise Between You And Your TA Supervisor

A variety of factors can contribute to conflicts between TAs and their supervisors. Most conflicts can be resolved with a meeting with your supervisor. Refer to earlier discussions and documents about expectations, and both parties can work to clarify and follow through. If you are dissatisfied with the outcome of your meetings with your supervisor, you are encouraged to meet with the Graduate Program Director. The GPD is usually familiar with the various TA roles and can work with you to resolve the conflict. You and the GPD may also enlist the advice of the department head or associate department head for the program in which you are teaching. You can at any time solicit the advice and assistance of the Graduate Employee Organization. They have experience assisting in mediating conflicts between students and supervisors.

3. If Conflicts Arise Between You And Your GPD

Unless the GPD is an examination/thesis committee member, he/she is not directly involved in your progress toward your degree and does not impact outcomes of these milestones. Nevertheless, occasional conflicts arise between a student and the GPD. For example, you may be dissatisfied with your office setting or teaching assistantship assignment. The most effective way to resolve conflicts is by scheduling a meeting with the GPD to discuss your concerns. The discussion may quickly lead to resolution as you each present your positions on the issue. Keep in mind that some issues of office or teaching assistantship assignment cannot have immediate resolution due to the multiple other constraints. If the issue is not on a path towards resolution after discussions with the GPD, you may find value in meeting with Director of the Interdepartmental Graduate Programs.

4. OEB Graduate Student Resources for Resolving Workplace Conflicts:

For additional resources for managing workplace conflict, please go to the Student Resources page on the OEB website.