XXI.—Ideal scene in the Lower Cretaceous Period, with Iguanodon and Megalosaurus.

Graduate Student Handbook
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*The guidelines and policies in this handbook are expected to be normal practice – if reasonable exceptions arise, errors are found, or conflicting information is offered by students, faculty or staff, please contact the Director of Graduate Studies for clarification and resolution.*
OBA Degrees

The Department of Organismal Biology and Anatomy grants both Doctor of Philosophy (Ph.D.) and Master of Science (M.S.) degrees in Integrative Biology, but students are admitted with the understanding that they are working towards the Ph.D. degree.

OBA Programs

OBA emphasizes an integrative approach to biology and most of its faculty have research programs that can be categorized into one of four general areas. These are:

1. **Biomechanics**: the application of methods from engineering and physics to understanding the design of organisms.
2. **Developmental Biology**: understanding how information coded into the genome is translated into the patterns seen in organisms. Our developmental biology program has a special emphasis on the interface between evolution and development, an area sometimes called “EvoDevo”.
3. **Neurobiology**: understanding how the nervous system regulates and controls the behavior of animals. Our neurobiology program has a special emphasis on the relationship of the nervous system to behavior (or neuroethology) and the application of quantitative methods to understanding neural function (computational neuroscience).
4. **Paleontology**: documenting and understanding evolutionary patterns and processes through analyses of the fossil record.

As part of the Darwinian Sciences Cluster, students in the program on Integrative Biology typically frame their research in an evolutionary context. Most students will, like the faculty, emphasize one of the above areas in their work and interact strongly with faculty and students with similar interests in other Departments or Committees. However, a special feature of training in OBA is exploration of common themes and points of interaction between these areas, so IB students are encouraged to explore the full range of areas of inquiry that relate to their principal interests.

Life and Living in OBA

All entering students are assigned desk space together in a semi-communal office. It’s a good idea to get to know the other graduate students in the program and in the cluster as they are a good source of information about both science and the in's and out's of this Department. You will also find your fellow students an excellent source of advice about the University and living in Hyde Park, or Chicago more generally.

Students are expected to attend the Evolutionary Morphology seminar series (Thursday evenings, 7:30). This is just one means of learning about research within the department, but it has the added benefit of frequent contributions from external speakers, thereby giving a flavor of the wider interests of our research community. Many other valuable seminar series from other Departments and Committees will be available to you; these provide a superb opportunity to broaden your intellectual horizons. Many seminars include an opportunity for an informal get together (often with food) to ask questions, discuss the field and to get to know the speaker. Get into the seminar habit — you'll find that these are a painless way to pick up a speaking acquaintance with a variety of topics, and will amply reward the time invested. If at first you feel a bit lost in the talks, be assured that’s perfectly normal — these talks are generally aimed at professionals in the field. (Which you soon will be.) Persist and you’ll be amazed at how much you pick up over the course of a quarter. Most of all, don’t be afraid to ask questions. If you preface your question with “This is not my area but I was wondering ...” any question, no matter how basic, will be treated with respect. Seminar announcements are posted in the first floor hallway of Anatomy and are available by subscribing to a variety of mailing lists (see appendix).

The single most important thing you can do for yourself in graduate school is ... keep in touch. During your first year, let members of the Student Advisory Committee know how things are going; if you run into problems of any sort, let someone know. Two very important people to get to know are the Director of Graduate Studies in
the department (Mark Westneat) and the Graduate Program Administrator (Audrey Aronowsky), as well as members of the Student Advisory Committee: they are all trained to know how the program works and are good sources for advice and advocacy. During your first few years, go out of your way to maintain contact with the faculty members you think you may want to serve on your Committee. Let them know what your interests are, what courses you are taking and, of course, your latest brilliant ideas. Finally, get to know the administrative staff! They are here to help you as well, and if they don’t know the answer to your question, they will help you find the answer.

**Graduate Student Training**

IB students have the privilege of studying within a Department that encompasses a large range of biological fields, with faculty who take a broad "organismal" approach to biology. Students are expected to make the most of this opportunity by familiarizing themselves with the work of the Department and gaining a broad-based training. Although students are expected to gain a breadth of knowledge, your training should be aligned with your interests and will often have a direct bearing on your proposed dissertation. These aims can be achieved by a combination of course work, directed reading, laboratory experiences (formal rotations and other experiences), and by becoming an active member of the Department (attending seminars and interacting with other students, postdocs, and faculty).

**Student Advisory Committee**

As an incoming student, you will meet with the Director of Graduate Studies and the department’s Student Advisory Committee, who will assist you in making choices for a course of study in your first quarter (and all subsequent quarters until you have completed your Preliminary Exams; see below). The Student Advisory Committee will monitor your progress during your first two years in our program. You will meet with the Student Advisory Committee once per quarter to ensure that you are on track, and to provide you with formal feedback on your efforts in this initial stage of your graduate training.

**Course requirements**

In general, most students will have completed the following coursework before arriving:
- A) Biology — 6 courses or 16 semesters hours, including one course in biochemistry.
- B) Chemistry — two years of college chemistry (inorganic and organic) with laboratory.
- C) Physics — one year of college physics with laboratory.

All students are expected to be full-time students — four quarters per year. You are only required to register for coursework during the Autumn, Winter, and Spring quarters (though you will be registered for research or rotations during the summer). Courses may be at the graduate or undergraduate level, as appropriate. For example, if you are taking a course on a topic you did not touch upon as an undergraduate, it may be more helpful to take an undergraduate (200) level course, rather than a graduate (300) level course. You may also register for 300 level “research” courses that carve time out of your schedule dedicated to hands-on research. Summer quarters are unstructured, generally requiring no formal classes (but do register for "research"). In general, summers should be used to gain laboratory/field experience and to carry out research in the form of rotations, reading courses, or research related to your dissertation. Note that formal laboratory rotations can be counted as a course (and graded) if you and your lab sponsor fill out the appropriate form from the BSD’s Dean of Students office. For those quarters in which you do directed research with a faculty member, you should register for a research course or courses (300-level) with that faculty member. (After you have passed your written prelim exam, you will register for directed research courses full-time, i.e. 3 courses/quarter). It is **not** required that you take formal classes for all of your coursework during your first two years as a graduate student — indeed, if you don't spend a significant fraction of your time in the latter half of your first year and the first part of the second getting your feet wet in research, you'll be ignoring the most important part of your early graduate education.
The Department requires that you take ORGB 40000: “Introduction to Integrative Organismal Biology” in Autumn Quarter and ORGB 40001: “Topics in Organismal Biology” in the Winter Quarter during both your first and second years. The Division requires that you take the Ethics course (BSDG 55000: “Scientific Integrity/Ethical Conduct”) offered in the Spring quarter. We strongly recommend that you also take ORGB 40100: “Grants, Publications and Professional Issues” in the Autumn quarter if you are eligible; this course is invaluable for those of you who will be writing fellowship applications upon your arrival. If you are lacking any of the basic course requirements listed above, you will be expected to satisfy these requirements as soon as possible.

During your first two years, the Student Advisory Committee will help you to decide upon the course structure that is right for you, and will approve each quarter’s course registration. You will be able to choose from the wide range of classes available, so that the demands of your research interests are met. However, the OBA emphasis on integrative science is reflected in our requirement that students complete classes in four out of six research areas during their first two years of study: this is our ‘Distribution Requirement’. These areas include: (1) Biomechanics and Functional Biology, (2) Development, (3) Neurobiology and Behavior, (4) Genetics, (5) Paleontology and Morphology, and (6) Systematics/Evolutionary History. Remember to think about further options, such as molecular and cell biology. While not a distributional requirement, molecular and cell biology is an increasingly important component of most aspects of bioscience, and might well be considered (by future employers) as an essential item in your research training toolkit.

Finally, in addition to taking formal courses to establish your background in the biological sciences, it is important that you begin to define your research interests: attend seminars (you are expected to attend departmental seminars when they occur, as well as Evolutionary Morphology seminars), take reading courses, speak to faculty, probe the scientific literature, and start to assemble your Dissertation Committee.

The Department expects you to do well in all your course work; avoid overloading yourself with more than you can handle. The Student Advisory Committee exists to provide a check on likely problems. If you get less than a “B” in any course, expect to be asked to discuss your performance with the Director of Graduate Studies or the Student Advisory Committee. Be sure to allow yourself ample time for reading and primary literature review. This is often best accomplished as a formal reading course with one or more of the Departmental faculty.

Please be aware that, if you are receiving financial assistance from the Division of Biological Sciences, a training grant, or a graduate fellowship, you must also meet the requirements of your aid program or run the risk of losing that support. Ultimately, your graduate course work must be sufficient to prepare you for the preliminary qualifying examination.

The Department has no foreign language requirement. However, depending on your field and research interests, you may still be asked to achieve reading competency in a particular language.

**Preliminary Exams**

Our preliminary exam has two parts, a written exam (“Written prelims”) taken at the end of the 4th quarter and an oral defense of a proposal (“Oral prelims”), typically done in the 7th quarter.

**Written Prelim Exam**

The Written Prelim Exam will generally be taken in late September, just before the start of your second year. The exam consists of two broad, synthetic questions to be answered within one week. The precise questions will be tailored to you and your research interests; one of the two will be deliberately formulated to be far from your primary area of expertise. The questions will provide a challenging test of the extent of your knowledge, understanding, and ability to integrate the primary scientific literature. Each essay will be limited to 10 pages of text (not including figures or references), typically in the form of a critical review of the literature. The essays will be evaluated by an Ad-Hoc Written Prelim Exam Committee (chosen by the Director of Graduate Studies),
and you will then meet with the Committee to discuss your answers in further depth and get the verdict on whether your responses were deemed adequate.

To give you an idea of the type of questions to expect, here are some examples from past years:

For the purpose of the examination, assume that OBA has founded a new journal named "Trends in Organismal Biology". This journal is much like the other "Trends" journals (e.g. Trends in Ecology and Evolution, Trends in Genetics, Trends in Biochemical Sciences), and it may be useful for you to examine them as models. An excerpt from the "Instructions to Contributors" reads: "Contributions to this journal should do more than just review research in an area. They should summarize the major themes and ideas in an area, examine them critically, and evaluate the area’s major assumptions, contributions to biological sciences as a whole, and directions in which future work would be productive. The data of others do have a place in such reviews, but should not be the exclusive focus: concepts and ideas are equally important."

1) The origin and diversification of whales involved changes to genes, anatomy, and biomechanical and physiological systems. New fossils and new molecular analyses of whale phylogeny have yielded controversy as to the origin and early evolution of the group. Review the origin of whales, paying particular attention to the evidence of their higher-level relationships within Mammalia and the morphological transformations involved in the evolution of their novelties. Your review should assess the spectrum of phylogenetic evidence that has been used to assess cetacean relationships. Include an analysis of implications of the different hypotheses of the morphological, functional and physiological changes involved with their origin.


3) The classical investigations of the physiology of the neuromuscular junction were carried out using the sartorius muscles of frogs, and work over the past half century has extended the taxonomic scope to include neuromuscular junctions in a wide variety of vertebrates and invertebrates. There has been particular progress over the past decade due to the introduction of a variety of innovative optical imaging techniques, as well as the application of tools from molecular biology. Nature: Neurosciences has asked you to write an overview of the neuromuscular junction that will be accessible to a broad range of neuroscientists from systems neuroscientists to ion channel groupies. After reviewing the classic concept of the function of the neuromuscular junction, Nature: Neurosciences has asked you to summarize the current understanding of how the structure and physiology of neuromuscular junctions is related to differences in the functional requirements of the muscles they innervate. In particular, they have asked you to clarify the relative roles of anatomical and molecular differences in determining neuromuscular performance, highlighting the contribution of modern techniques to clarifying this problem.

4) What do we know of deuterostome phylogeny? Considerable space has been devoted to this issue in multiple high-profile journals, but the evidence is so diverse and specialized that the individual pieces are only intelligible to a minority of interested parties. How is this diversity of data to be compared? Are there irresolvable conflicts? How is the sum total to be interpreted? Current Biology, always on the lookout for a review article with scope, has asked you to take on the task of digesting this indigestible lump, reviewing anatomical, developmental, molecular, phylogenetic, and fossil evidence, explaining along the way how each form of evidence contributes to the picture. Put another way, attempt to explain to Current Biology's readership their combined relationship to a xenoturbellarian.

Should you fail to reach the expected standard, there will be an opportunity to retake the Written Prelim Exam at a later date during the fall quarter up until December (of the second year). If you are still unable to satisfactorily complete the exam, you will be expected to make a choice between registering for a Masters degree or leaving the program. In order to obtain a Masters degree you must successfully complete a laboratory based, original research project, and present this work to the Department both in the form of a written manuscript and orally as a Research Seminar. The supervisory committee for the Masters degree can be formed in one of two ways. The...
most straightforward is for the student to identify at least three faculty members competent to supervise the work and secure their agreement to act as a thesis committee. (This is the preferred method.) Alternatively, the Student Advisory Committee will bring in a new Preliminary Committee member to assist the student in working towards his/her Masters. **To receive a M.S. degree, a student must formally request of the Department that this degree be granted.**

Please note that you cannot be formally admitted to candidacy for a Ph.D. degree until both portions of the Preliminary Examination have been passed. Having passed this exam you should file for Masters candidacy **even if you have every intention of going on to complete your Ph.D.** (It’s free — take it!) Assuming you successfully complete the Written Preliminary Exam and defend your dissertation proposal (the Oral Preliminary Exam — see below), the Masters degree is awarded on the basis of work completed to that point in your research training, subject to the approval of the Student Advisory Committee. An M.S. under these conditions costs you nothing, looks good on your resume, ... and will make your parents happy, giving them something to brag about.

**Dissertation Proposal and Oral Prelim Exam**

Having successfully passed the Written Preliminary Exam, you should concentrate on developing a dissertation proposal. To assist in this process, it is important that the final choice of a primary lab be made as early as possible in the second year, although you officially have until the end of your second year before you must declare which faculty member is to be your permanent dissertation advisor. "Permanent" is not as eternal and unchangeable as it sounds; you have the right to request a change of advisors at any time. This decision is not to be taken lightly, however, since your dissertation advisor should be the person to direct your research. A change in advisors usually also implies a change or major shift in research topic; because of the time necessary to complete most dissertation research, it is unwise (although not impossible) to change either one after the middle to end of your third year.

During your second year you should concentrate on laboratory work and, where appropriate, carry out a feasibility study on the proposed dissertation project. It is expected that some preliminary data will be included in your proposal. During this phase you will also continue to take courses and to be involved in directed reading projects, with your progress overseen by the Student Advisory Committee. As your dissertation interests develop, you should start to assemble a Dissertation Committee. This will need to include your dissertation advisor and two other faculty members from OBA; any additional members of your dissertation committee can be drawn from within the department, outside the department but within the University, or from outside the University. The committee should minimally have three members, but no more than six. Remember that your Committee is a resource to help you with your dissertation; you should choose Committee members with this in mind. In the unlikely event that problems arise between you and a member of your Committee, you may petition the departmental Chair at any time to change a Committee member. If you feel you need advice on forming a dissertation committee, the Director of Graduate Studies (Mark Westneat) is always available for confidential discussion.

The dissertation proposal should be formatted as a National Science Foundation (NSF) Doctoral Dissertation Improvement Grant (DDIG), or National Institutes of Health (NIH) pre-doctoral National Research Service Award (NRSA) application; each of these include sections on Background and Preliminary Results, Specific Aims, Methodology and Interpretation. You will not be penalized if a preliminary study has shown that a particular avenue is unlikely to be fruitful, but you will nevertheless be expected to present and explain any negative results, and the reasoning underlying any proposed changes of direction. Your proposal will provide the framework for an actual NSF DDIG / NIH NRSA Grant submission.

By the end of the Spring quarter (May or early June) of your second year, you should be ready to formally submit and defend a dissertation proposal. (Note that you will not be required to strictly adhere to this early proposal throughout the course of your Ph.D. work — we expect your research to evolve as you progressively learn more — but deviations from your proposal should be cleared with your dissertation committee). Having written the dissertation proposal and submitted it for examination, you will present it orally to your Dissertation
Committee. You may choose to present your proposal in closed session (the dissertation committee only) or in a forum open to the public (faculty and students). Nearly all students choose an open session. If you do choose a closed session, you will be required to make a public presentation of your proposal at a later date. Note that “closed” exams are closed to the general public but remain open to OBA faculty. Since the Department, not an individual faculty member, grants your degree, the entire faculty has a stake in the originality and rigor of your work.

You should email the Director of Graduate Studies and the Graduate Program Administrator at least 10 working days before your oral prelim exam, including information on the members of your committee, a pdf of your proposal, and the date, time, and place of your exam. Based upon this information, a notice will be emailed to all faculty giving the date, time, and location of your exam. After presentation of your proposal, faculty on your committee will perform the examination, providing you with valuable feedback on the direction of your research. Results of your exam may be Pass, Conditional Pass, or Fail.

Should the dissertation proposal examination fall short of the standards expected by the Department (determined by vote of the examining committee), you will be given an opportunity to retake this exam on one more occasions, at the end of September, before beginning the third year. If a student is still unable to satisfactorily complete the exam, he/she will be expected to make a choice between registering for a Masters degree or leaving the program as outlined above.

Having successfully completed your Oral Prelim Exam, you will file for "candidacy" for the Ph.D. These forms should be prepared by the Graduate Program Administrator and signed by the appropriate parties before submission to the Registrar. Admission to candidacy is an absolute requirement to enable you to apply for an NRSA or NSF Dissertation Improvement Grant so do not neglect to complete this step!

**Teaching Requirements**

The Division of Biological Sciences (BSD) currently requires that students serve as course assistants for a minimum of two approved undergraduate, graduate, or medical school courses. Students receive no additional pay for their teaching in meeting this requirement. If you wish, you may also take a TA Training Course (BSDG 50000: “Teaching Assistant Training” — offered in the Fall Quarter) that covers teaching concepts and approaches, a course meant to assist students in developing their teaching skills. If taken before or concurrently with your TA-ing an undergraduate or medical school course, this TA course can serve to meet one of your TA course requirements. The requirement to TA two courses is part of the BSD's guarantee of tuition and stipend support for five years (irrespective of your source of financial aid). For additional information on which TA-ships are available, see the Graduate Program Administrator. We view teaching as an important component of your professional training and believe that you will find it a rewarding experience.

If a student requires stipend support from the BSD (DU, Divisional Unendowed, support) beyond their first two years, the BSD currently requires the student to TA additional courses. To receive DU funding after year two, you must TA one course per year without additional remuneration. The Division of Biological Sciences will not provide stipend or tuition support beyond a student's sixth year; support beyond year six must come from a research grant, a non-university fellowship, or personal funds.

After you have fulfilled your Divisional Teaching Requirement, you may qualify to receive payment for performing additional teaching or as an assistant in certain courses with labs. When deciding what course to teach and at what stage, note that in general you will find that you need to concentrate increasingly on your dissertation research as you progress toward completing your doctoral degree. Consider carefully whether you can afford to give up research time for teaching, and be certain to obtain the support of your advisor and dissertation committee. It is not recommended that you teach during your final year in the program. In your final year, it is most critical that you complete your research and write and submit the dissertation in a timely fashion. The Graduate Program Administrator has information on the current stipend level for teaching assistants.
Research Support and Grants

We expect you will apply for research and tuition/stipend grants throughout your time in the program. Writing grants is an important part of pursuing an academic research career and it is appropriate that you think about obtaining funds to help support your research. Many small grants (Hinds Fund, Sigma Xi, and many others) as well as competitive federal funding are available; see the “Student Resources” section on the departmental website and contact the Graduate Program Administrator for specific funds that are available for your research interests. Don't neglect smaller grants; these can be an important source of funding, and you will find that all the real work goes into writing the first application. (Text can largely be recycled for subsequent applications.) There is a subsidiary benefit to securing outside funding, one which you should not minimize; having a number of grants on your curriculum vitae will make you more attractive to potential employers. Finally, applying for small grants will help you to develop good grant-writing skills that will always be important to your career success. Any time you are preparing a fellowship or grant application, you must check in with the grants and contract administrator in OBA, to see whether you need to route your application through the University. Failure to do so before submission could result in many headaches after an award has been made.

We expect that, if eligible, you will write and submit National Science Foundation GRFP (3-year fellowship) applications at the beginning of your first (Autumn) quarter on campus. The course “Grants, Publications, and Professional Issues” will help you with this application. These are highly desirable awards to receive, both for you and for the University. This is also an excellent starting point for developing a strong CV that demonstrates your ability to compete for funding, as well as your promise and achievement in carrying out independent scientific research. Obviously, your ability to bring in extramural support for three years of your graduate education helps the Division of the Biological Sciences (and, thus, our Department) support a larger number of talented graduate students. Success in gaining funding from NSF depends on:

1. A strong paper record (i.e. strong GPA, GREs, an undergraduate honors research thesis paper),
2. A strong research statement; you need to be able to define the general direction of your research interests and why the program that you are in will help you to achieve these goals.
3. Strong, detailed letters of recommendation from both former and current professors familiar with you, your research interests, and the specific proposal you will be submitting.

A detailed research project is not required; however, the more focused you can be in describing your research goals, the stronger your proposal will be. You should plan to consult with the Director of Graduate Studies and take the Grants, Publications, and Professional Issues (ORGB 40100) course to write this proposal. These are competitive grants, so do not be disappointed if you fail to receive an award. Even if you do not receive a pre-doctoral fellowship, the experience is certainly worth the effort of having written your first research application. Between 2007-2011, 17 out of 36 domestic students in the Darwinian Sciences (OBA, CEB, E&E) have received NSF fellowships, an impressive 47% rate of funding.

As outlined above, once you have passed your preliminary qualifying exam and are advanced to candidacy for your Ph.D., you may apply to the National Science Foundation (NSF) Doctoral Dissertation Improvement Grant (DDIG) in many fields. These proposals are due in early autumn each year; check with the Graduate Student Administrator for this year's deadlines. NSF DDIGs pay for research supplies and travel; they do not cover stipend or tuition support. Students in our graduate program often receive such awards to support their doctoral research. As you prepare your own proposal, you should consult with these students and review successful proposals, in addition to discussing the proposal with your doctoral dissertation advisor. Normally such awards will support your research for a 1-2 year period (Year 4/5). Finally, it is often the case that your research can be supported, in whole or in part, by funds available from your doctoral dissertation advisor's research grant(s). Such support carries with it an obligation that your research bear some meaningful relevance to the stated goals of your advisor's own grant, as it is incumbent upon him/her to meet those research goals for which they received funding.

If you are working in an area relevant to the research programs of the National Institutes of Health (NIH) we will also expect you to apply for an NRSA. NRSA Fellowships pay a stipend that the BSD supplements to the
Divisional level, together with support for insurance and travel. Tuition costs are supplemented by BSD for students holding these fellowships. These pre-doctoral awards are for up to 5 years. (Note that there are also 3-year NRSA Post-doctoral fellowships; you will not be precluded from holding one of these should you obtain a pre-doctoral NRSA). Pre-doctoral awards provide no support for research expenses.

**Dissertation Committee Meetings**

The Department and BSD requires that all students admitted to candidacy (i.e., who have passed the written preliminary exam and the oral qualifying exam) meet with their Dissertation Committee no less than two times each year during the remainder of their time as a graduate student. **It is your responsibility to schedule these meetings.** They are extremely important, so don't avoid arranging them. Committee meetings ensure a mechanism for maintaining communication between you and your Committee members, as well as your advisor, with whom you will most likely maintain closest contact. Clearly the degree of contact that you have with your advisor will depend on the nature and field of research that you have chosen to embark on. For committee meetings and resultant progress reports, the dissertation committee has a formal committee Chair, separate from your advisor. The dissertation committee Chair runs the committee meetings, takes notes on the conversations, and prepares the report of each dissertation committee meeting that is circulated to you, your advisor, and to your official files.

The goal of these meetings is for you to present a progress report on your work, identifying any difficulties that may have come up since the last Dissertation Committee meeting and any resulting changes in the scope or direction of your dissertation. (It is wise strategy to get your committee to approve such modifications of your planned dissertation as they become apparent — these are not issues you want to arise in your dissertation defense.) In addition, it is a good idea to plan to present representative data that you have collected and a summary of the data, which your Committee members can evaluate and comment on. Feedback from your Committee members, who have varying perspectives and expertise that bear on your doctoral project, is a critical component of these meetings. Following each meeting, you and your dissertation advisor are responsible for writing a summary of the meeting, documenting your Committee's evaluation of your progress and the goals that were agreed on at the meeting for your subsequent work. This report will be circulated to you and to all members of your Committee, as well as being kept in your student file. In this way, there is a paper record giving you and the Department feedback on the nature of your progress. Remember that this report and the meetings themselves are meant to serve a positive role in providing you with critical feedback on the progress of your work. In our experience, inadequate communication between you and your Dissertation Committee is the main source of difficulty likely to arise when you write and defend your dissertation. By keeping your Committee informed regarding your progress and any change in the content and scope of your thesis, you will assure that no unforeseen surprises await you at your defense.

If, during the course of your work, you have a problem, it is your responsibility to seek advice from the appropriate member of your Committee, much as you will ask advice of your colleagues after you receive your degree. It is possible that you may have a problem but not recognize it. This represents an additional reason for regularly reporting to your Dissertation Committee — they can help you by offering advice and pointing out both problems and possible solutions.

**Research Conferences**

It is important for your training, and also for raising your profile within your field, that you attend research conferences. The Department provides $500 travel support (see Student Expense Account, below) for students to attend a conference each year. Ideally, this will be to present a portion of your research results. Presenting your research is critical at the early stages in your career for establishing an identity with others in your field; it will give people something to talk to you about and to remember you by. Departmental support for travel is intended to help cover the meeting registration fee, your travel costs (airfare, car, bus/cab) and housing (hotel room). No meal expenses or alcohol are reimbursable. To receive reimbursement for these costs, it is essential that you retain receipts. Submit these receipts and a travel report form to the Operations Assistant (Cindy King), who can supply you with the form. Travel Support (Student Expense Account) is budgeted from July 1 to June...
30 of each academic year. If you are supported by or are working on a faculty grant, these funds will take precedence over the Department's support of your travel. Your Student Expense Account can also help to pay your expenses to off-campus training or field courses.

**Travel Support (Student Expense Account) — Frequently Asked Questions**

- **Amount of money you get per year:** $500
- **How many years of funding:** 5 years
- **Purpose for this money:** The $500/year is to be used for travel support for students to attend one national conference/meeting per year. (Ideally, this will be to present a poster or oral report on your research).
- **Can this money be used for non-conference use:** If you would like to use this money towards something non-conference related, you will need to contact both the OBA Chair (Robert Ho) and Director of Graduate Studies (Mark Westneat) to get their approval.
- **Can any unused money from your account rollover:** Yes, but only for two years (to a maximum of $1000) under normal circumstances.
- **Exception to Rollover Rule:** If there is some special circumstance that will demand a larger sum than available in a single year (e.g., a major conference/meeting that is held outside of the U.S.; a course important to your training given at a field station or other remote location) it is possible to accumulate your travel award over more than one year. Again, you will need to contact both the OBA Chair and Director of Graduate Studies to get their approval IN ADVANCE.
- **Documentation:** Note that all expenditures must be supported by itemized receipts, so save credit card receipts, hotel bills, etc. Expenses not supported by receipts cannot be reimbursed. Consistent with the 2012 change to student reimbursement policy at the University, you will also be required to submit a signed waiver acknowledging that the expense is legitimately non-taxable.

If you have any questions about the purpose/policy for these funds, please contact the OBA Chair and Director of Graduate Studies.

**The Doctoral Dissertation**

As you work on your dissertation research, set yourself goals and deadlines. If your project turns out to be unworkable, how many years are you willing to devote to finding this out? With the assistance of your advisor and Dissertation Committee, set yourself a deadline for definitive, positive results, using your best judgment as to how long it will take to get solid results, yet leaving yourself enough time to change the direction of your research if your original proposal turns to be unworkable. Budget ample time for writing your dissertation (only you can judge how long this may take you), keeping in mind that your dissertation will probably go through at least two drafts before the final version.

As you approach the quarter you will be graduating in, please meet with the Graduate Program Administrator at least four weeks prior to the start of that quarter to review what needs be done in order to graduate (applying for graduation, registration, the dissertation submittal process, etc.).

The format of your dissertation is between you and your Dissertation Committee, as long as the basic formatting requirements of the University are met. Make sure to meet with the University of Chicago Dissertation Office (http://www.lib.uchicago.edu/e/phd/) early in the dissertation writing process to check on the latest regulations. Although the Department has no specific requirements concerning the dissertation itself, we recommend you
structure your dissertation as separate chapters that correspond to publishable papers. Each chapter will have an introduction, materials and methods, results, and discussion sections (as opposed to a "traditional" dissertation, which comprises a single introduction, materials and methods, results and discussion sections). Although this will add some redundancy to your dissertation due to overlap among your principal chapters, writing your dissertation so that each chapter represents the format of a scientific paper facilitates any final changes that may be required before you actually submit your paper(s) for publication to a journal. This latter approach will generally require that you write a short introductory chapter as a background leading into your primary research chapters and a short summary chapter providing an overview of your entire dissertation research. Publication of your work in refereed journals should be your real goal, not simply completing your dissertation. If you submit dissertation chapters for publication before you defend your dissertation (a practice we strongly encourage), be sure to give the members of your Dissertation Committee a chance to review and comment on the manuscript before you submit it. Nothing irritates a Dissertation Committee more than to be presented with a fait accompli in the form of a published dissertation chapter that they didn’t get an opportunity to review.

Once you have completed each chapter of your dissertation, circulate it among your Committee members for their comments. The draft of your dissertation must be judged acceptable in format and style by your Committee before you can schedule your dissertation defense. A final copy of your dissertation must be submitted to your Committee and made available for examination by the Department faculty two weeks before your defense. You should also have an abstract of your dissertation (about two typed pages) to give to the Graduate Student Administrator for circulation to all members of the faculty two weeks before your defense. Consult your dissertation advisor and the members of your Committee in setting a date for the dissertation defense. Send an e-mail to the Graduate Student Administrator at least 10 working days before the defense which includes: a list of your committee members, the title of your dissertation, and the date, time and place of your Dissertation Hearing. The two-page abstract of your dissertation should be included with this email. A notice will be electronically sent to all students and faculty announcing your Dissertation Hearing and Seminar.

N.B. In order to graduate in a given quarter you must have successfully defended your dissertation by the end of the fourth week of that quarter. You must file an online application for the Ph.D. Degree by the beginning the quarter in which you plan to graduate. Please meet with the Graduate Student Administrator four weeks before the start of the quarter in which you plan to graduate to review the graduation process.

**Timeline for Graduate Work**

Here is a summary of the principal steps in obtaining your Ph.D.

**First Year**

- Orientation week – meet with Director of Graduate Studies and Student Advisory Committee in preparation for Autumn quarter.
- Begin fulfilling breadth requirements
- Apply for predoctoral fellowships
- December – second meeting with SAC, in preparation for Winter quarter.
- March – third meeting with SAC in preparation for Spring quarter
- BSD ethics course
- June – fourth meeting with SAC in preparation for Summer quarter
- Lab rotations if necessary

**Second Year**

- End of summer quarter – Written Preliminary Exam.
- Orientation week – fifth meeting with Student Advisory Committee
- Choose primary lab and dissertation advisor
• Start to assemble Dissertation Committee (minimum of three OBA faculty); plan an informal meeting of likely members.
• December – sixth meeting with Student Advisory Committee
• March – seventh meeting with Student Advisory Committee
• June – Oral Preliminary Exam. File for candidacy for the Masters degree. File for candidacy for the Ph.D.

Third Year and Beyond

• Begin a schedule for regular meetings with Dissertation Committee: at least twice each year for (Autumn and Spring) for students in their 3rd year and beyond.
• Apply for DDIG and other research grants
• Present your research at appropriate conferences and symposia
• Teaching requirement should be completed by this point.
• Plan to have one paper submitted for publication by the end of this year.
• Begin thinking about next steps after graduation (see p. 13)

Final Year

• Continue meeting with Dissertation Committee
• Meet with the Graduate Program Administrator at least four weeks prior to the start of the quarter that you will be graduating to review what needs be done in order to graduate (applying for graduation, registration, the dissertation submittal process, etc.).
• Two weeks before Defense: distribute a two page summary of dissertation to Department, final copies of Dissertation to Committee and available to the Department.
• Oral defense of dissertation by end of fourth week of quarter.
• File approved dissertation with Dissertation Office by the end of week 7 of the quarter (or 6th in the summer quarter). If you miss this deadline you cannot graduate in that quarter.
• Please monitor the Navigating Graduation section of the OGPA website for the most accurate instructions and timelines for your final year.

Next Steps After Graduation

There are many career paths that you may choose to pursue after your Ph.D. The office of Graduate Student Affairs houses career advising for grad students (http://grad.uchicago.edu/training_support/). The dedicated representative for the sciences is available to help with both academic and non-academic job preparation and professional development. Many doctoral graduates will decide to pursue an academic career, either via further postdoctoral research training, or by directly entering an academic research or teaching position. Others will take up research positions in industry, and still others will make use of the unique intellectual training afforded by a Ph.D. to pursue science-related or non-scientific careers. The myChoice program (http://www.mychoice.uchicago.edu/) is designed to expose BSD students to a broad range of potential careers.

Postdoctoral Fellowships

Postdoctoral fellowships not only can allow you the opportunity of learning new techniques and points of view, but they give you the chance to improve your academic credentials by publishing a greater body of work. In most fields within the biological sciences, post-doctoral training is required to be competitive for a job at a research university. Certainly you are likely to get a better academic position after having completed a postdoc.

You will have a broader choice of labs in which to do your postdoc if you are able to obtain your own fellowship funding, rather than relying on your potential supervisor to provide funds. Also, having such a
fellowship will show future employers that you have the capacity to obtain independent funds. Of course you will need to identify a supervisor and discuss potential projects before you can make most applications. There are several different types of postdoctoral fellowships available, depending on your field; consult with the Graduate Program Administrator about such funding opportunities. The OGPA maintains a list of fellowships here (http://gradprograms.bsd.uchicago.edu/current_students/postdoctoral_fellowship_opportunities.pdf).

Because of the significant time delay between making fellowship applications and the start of the funding, not to mention the possibility that you may be unsuccessful at your first attempt, it is a good idea to be thinking about labs for your postdoc up to 18 months before you hope to start.

The BSD Postdoctoral Association is also a great resource (http://www.bsdpostdoc.uchicago.edu/) – they offer helpful seminars during the academic year, and of course lots of people who have just recently experienced what you are going through!

**Jobs in Academe**

In the present tight job market (and demographics seem to indicate that the market will not get better soon), you have to convince prospective employers at the outset that you are a professional, competent scientist, even if you are applying for jobs before you actually receive your degree. Since most advertised academic positions attract from 100 to 300 applications, you need to find some way to make your application stand out. There are basically two ways to increase your visibility, and you should decide early in your graduate career that you are going to use both:

1. **Publications.** Publishing your research is the best way to get yourself known in science and will show prospective employers that you do publish your research. The latter point may seem silly, but it isn't; approximately three-fourths of all dissertations completed in the U.S. are never published in professional journals. Since active research and publishing are requirements for most jobs, having a few publications on your CV will greatly improve your chances of landing the postdoc or job you want. Decide early that you are going to have at least one paper published or in press before you leave grad school. (Keep in mind that it will take at least 3-6 months for a submitted manuscript to go through the reviewing process; if a paper is accepted it will take at least another four months to one year before it actually appears in print.)

2. **Making contacts and establishing an identity in your field.** This process uses word-of-mouth recommendations, news of your work, and personal acquaintances and can often be the deciding factor in getting the postdoc or job you want. So how do you get plugged into this process if you are a mere graduate student? There really is only one way — advertise yourself. When there is a Departmental seminar in your field, hang around after the seminar is over and take the opportunity to talk with the speaker; contribute what you can to the conversation. Go to one national meeting a year if you can, introduce yourself to people, and talk informally about your research and interests. Once you have data to present, discuss with your thesis advisor the possibility of giving a paper at one of these meetings. If you do this, by the time you are writing your dissertation, you'll find that you know many of the people in your field and they know you.
CONTACT INFORMATION

Department Staff

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<thead>
<tr>
<th>Role</th>
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Office of Graduate Affairs--Biological Sciences Division (BSD)

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Fax Machine for student use is located in:

Anatomy 107  (Office hours only)  773-702-0037

RELEVANT SEMINARS

By being on the student email list (obastu@lists.uchicago), you are automatically subscribed to announcements for the Natural History and E&E weekly seminar series. Others of interest are listed below.

- Evolutionary Morphology - evmorph@lists.uchicago.edu
- Integrative Neuroscience, CNS and Neurobiology Seminar announcements - synapse@lists.uchicago.edu
- MGCB Seminar announcements - mgcb_seminars@lists.uchicago.edu
- Animal Behavior Brown Bag Seminar - behavior_seminar@lists.uchicago.edu
- Computational Neuroscience Journal Club - cns-jc@lists.uchicago.edu
- Fish Group

Useful links for coursework and thesis preparation
Biological Sciences Division policy requirements for admission to candidacy to the Ph.D. and for the Ph.D. degree

1. Admission to candidacy for the degree of Ph.D. requires:
   a. Completion of Divisional Course requirements (nine courses, up to two of which may be substituted by graded laboratory rotations). A “B” average (GPA = 3.0) must be maintained.
   b. Submission of a written thesis proposal and its defense to the satisfaction of the candidate’s thesis committee (note in some programs this defense also has a public component).

2. Admission to candidacy must occur, or be scheduled to occur, before the end of the student’s ninth quarter in residency (typically the Fall quarter of the 3rd year).

3. If admission to candidacy has not occurred by the end of the student’s ninth quarter then he/she will be unable to register at the beginning of the tenth quarter unless OGPA has approved a detailed plan from the program, student, and thesis advisor in which:
   a. The program adequately explains why candidacy has not yet been achieved.
   b. The student lays out a detailed plan for completion of the thesis proposal, with a timeline that does not extend beyond the end of their eleventh quarter in residency.
   c. The thesis advisor provides a detailed plan, which includes frequency and nature of mentoring meetings, to assist the student in satisfactorily completing and defending the thesis proposal.

4. Completion of the Ph.D. degree additionally requires:
   a. Completion of Divisional TA-ship requirements.
   b. Completion of Divisional Ethics training requirements.
   c. Completion of all graduate program-specific requirements.
   d. Submission and oral defense, to the satisfaction of the student’s thesis committee and graduate program, of an original dissertation.