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Advice for the Ph.D. Appraisal: the written proposal, the seminar and the exam

Prepared and approved by the EEB faculty

The written Ph.D. proposal and the *in camera* oral defense of the proposal are important components for a successful Ph.D. appraisal exam in EEB. As explained in the “Guidelines for a PhD Appraisal Examination” document, the appraisal is designed to:

- 1) Determine whether the student can think critically, conduct research, and communicate at a level sufficient to produce an original, high-quality thesis.
- 2) Ensure that the proposed research is sound, and can be completed within the remaining years of the PhD program.
- 3) Ensure that the student has sufficiently broad knowledge in ecology and evolutionary biology to recognize and effectively pursue opportunity for research and collaboration in these fields.
- 4) Provide feedback to the student on the proposed research, including suggestions on approach, methodology, statistics, etc.

Points 1 and 2 above are addressed in the appraisal proposal that the student writes and they are evaluated during the portion of the oral Ph.D. appraisal exam that focuses on the proposal. *This document is intended primarily to provide students with advice and guidelines on (1) on the structure and content of the appraisal proposal document, and (2) the types of questions students should be prepared to answer during the oral defence. It also provides some advice on the appraisal seminar and the question bank.*

Please note that some supervisors may feel that some of the advice provided here is not relevant or appropriate for their own student(s). We ask that you confer with your supervisor(s) about whether they have other suggestions for any of the advice provided here.

You should begin preparing for your appraisal exam approx. 2-3 months prior to the exam.

The length of time required will depend on the background of the student in E&E courses.

Note: this does not mean 2-3 solid months of preparation; it means setting aside a few hours a week to do background reading in ecology and evolution, and to develop your thesis proposal.

Please see the following Current Graduate Student webpage for more documents and advice about the appraisal exam including the question bank, proposal, and talk:

<http://www.eeb.utoronto.ca/grad/current/grad-forms.htm>. First look at the “EEB Grad Handbook” and the “EEB Guidelines for PhD Appraisal Exam” documents for an overview of the proposal, seminar and exam. Then see the Appraisal Exam checklist for the procedures and deadlines. See the “Question Bank for Appraisal Exam” document for the list of questions that you might be asked during the breadth part of the exam. See the Appraisal Exam Report Form for the expectations the guidelines for the faculty for posting questions

and appraising the candidate. Please also see the ESGA's Official Unofficial Grad Handbook for valuable advice: <http://egsa.sa.utoronto.ca/Handbook.html>

Please note that there is an expectation that you will take your exam on time; if you take the exam late, the expectations will be higher.

See Appendix I below for the format of the exam.

Appraisal seminar: This document does not provide explicit advice on the appraisal seminar, but much of the advice for the proposal is relevant to the seminar. It may be useful to use the same general organization of the material for both the seminar and the proposal document. Do keep in mind the broad range of backgrounds of members of EEB; much of the talk should be accessible to everyone. The talk should be 25-30 minutes long.

Questions frequently asked by the Ph.D. examination committee (note: if these issues are described/justified well in the written proposal and the seminar, then there will be less focus on them during the exam):

Hypotheses and Questions

- What is the unifying theme of your research?
- What are the main hypotheses and/or questions you are testing?
- Why are these questions/hypotheses important in the study of ecology and evolutionary biology, and are they novel?
- What appeals to you about this research (why do you care)?

Background knowledge on theory, experiments and biology of organism

- What is already known with respect to the theoretical and empirical evidence that addresses your research hypotheses/questions? Make sure your statements are well supported with citations.
- Who are the early pioneers in your specific research area? How does your work build on what they and others in the field have already established?
- What gaps in knowledge exist in the literature for the scientific problem you seek to address?
- Justify your choice of experimental system, organism, community or ecosystem at a level that is appropriate for your research questions. In this justification, describe the relevant biology of the system, etc.

Methods

- Explain the experimental, theoretical, and/or statistical approach that will be taken to answer each of your research questions.
- What methods have other researchers used to answer similar questions?
- What are the strengths and weaknesses of your methods?

Results and Significance

- Provide a figure showing predicted results that answer your research question(s) given different possible outcomes.
- Which aspects of your proposed thesis do you expect to be novel?
- How might your results impact disciplines outside of your field?

General guidelines for the structure of a Ph.D. written appraisal document:

As described in EEB's Appraisal "Guidelines" document, the written proposal should present the conceptual framework of the thesis, hypotheses/objectives/questions, methods, a timeframe for completion of the research, and analyses of preliminary data, if available. Try to avoid specialist jargon. This document should be 15-20 double-spaced pages (4000-5000 words), in 12-point font, with 1" margins; note that this length limit does not include figures, tables or citations. Appendices may also be used for additional figures/text/ manuscripts that might be relevant. You should view appendices as 'optional' material for your committee to read for additional information; anything the committee needs to read for the appraisal should be in the main text. Although there is no one 'correct' format or style, here are some suggestions for the content and lengths of the various sections of the Ph.D. appraisal document. Most faculty prefer to have the tables and figures imbedded in the main document; please check with your supervisor (and exam committee) about that. At the top of the document, please specify the number of words in the main proposal, not counting the references, tables, figures or appendices. Also include the times and locations of your seminar and the in camera part of your exam.

Expect to work through several (or more) drafts of our proposal, with comments from your supervisor, lab mates, and other students in the department. Make sure you allow ample time for feedback and revisions.

When you send the document to the members of your exam committee, please send it both as a Word file and as a pdf. Send these files 14 days before the appraisal exam.

1) Introduction to the scientific problem and research area:

- Length: 6-10 concise paragraphs (approx. 1.5-3 pages (450-900 words))
- Provide an overview of the biological problem and why it is important.
- Concisely review what is known about your topic and identify gaps in the literature that require further attention.

2) Objectives, hypotheses and questions:

- Length: approx. half a page (150 words)
- Clearly articulate the objectives of your thesis.
- Explicitly state the hypotheses and/or research questions that your thesis will address. These may be formulated in terms of long-term objectives along with more direct hypotheses and outcomes of the proposed research.

3) Study system (if appropriate)

- Length: 0.5-1 pages (150-300 words)
- Describe the organism, population, community and/or ecosystem that is the focus of your research
- Why is this system particularly appropriate for your research questions?

4) Description of Projects:

The number and focus of individual projects that comprise the thesis should be determined by the student and the advisor(s), but it is expected that most proposals will describe 3-5 projects that together address the central theme of the thesis or a facet of the theme. For each project, a brief introduction and methods should be provided. It is common for the first one or two projects to be explained in greater detail (2-3 pages each), with specific methods and, ideally, some preliminary results. For subsequent projects (0.5-1 pages/each), usually the ideas and basic methodology are briefly described, but results are often not provided as these typically represent future work yet to be done. The committee recognizes that, as projects develop and results come in following the appraisal exam, there may be a shift in the emphasis of certain components of the thesis and that entirely new projects may be developed. Note that this is a 'research plan' not just a 'progress report', so it is important to lay out at least some of your plans for your thesis. Preliminary results are important, but make sure your future directions/broader plan is also described. Please also note that the appraisal exam should be done well before all the data (whether simulated or real) for the thesis has been collected.

If possible (and this may not be possible till later, as the data collection phase is wrapping up), provide a breakdown of the 3-5 core projects into putative thesis chapters, since a final thesis typically consists of 3-5 'stand alone' journal articles and/or manuscripts.

5) Significance of Research:

We recommend that you include a concise (1-2 paragraph) discussion of the potential significance of the thesis to its discipline and to the scientific community at large. This information can provide useful context to the committee about the potential impact of the thesis results.

6) Timeline:

- This is critical. It is one way in which the appraisal committee evaluates whether the proposed research is feasible in the time remaining during the Ph.D. At minimum, give the rough, expected completion dates for each project. Many committee members prefer more detail

including time in the lab/field to collect data for specific projects, so please speak with your supervisor about their expectations.

- Provide an explicit timeline that shows, for the more developed projects, when you intend to complete the experiments/simulations/etc., analyses, writing and submission of papers. Give rough estimates for the projects that are not as well developed (note: the committee realizes that it is not always possible to anticipate factors that may delay one or more of these components, and that your timeline can change as your thesis develops).
- You don't need to include this in your proposal, but think about how you will prioritize your projects so that it will be possible to drop the one with lowest priority if it becomes necessary to do so in order to finish in a timely fashion. In general, it is good to anticipate and discuss which aspects of your project(s) are riskier and what fallback plans you might have.

7) References:

The proposal should be thoroughly referenced with a consistent style of the references and citations (usually 20-30 references).

8) Appendices:

Appendices can include: manuscripts that are about to be submitted, have been submitted or are published; supplementary figures and tables

Include here your personal data form including publications, submitted manuscripts, conference presentations, TAing, contributions to the department, societies, etc. Please include the year(s) for all activities.

The Question Bank questions:

Students should aim for a deeper understanding of the questions than just a 1-2 sentence answer and they should be prepared to address follow-up questions related to questions in the Question Bank. See the EEB handbook for the regulations on the Question Bank questions and the Question Bank document for a list of the questions.

- The EEB faculty debated long and hard about how to encourage (and ensure that) our students have a good, broad understanding of the fields of ecology and evolution. Some wanted students to write full-on comprehensive exams, as occurs at many universities. Some felt that was overkill, so instead, we took what we thought would be the least torturous and most helpful approach—the question bank questions.
- The questions represent important ideas/themes in different areas of ecology and evolution. Be prepared to answer not only the question, but also explain the question's context and answer a follow-up question or two.

- Faculty are looking for evidence of understanding and comprehension of the general issues raised by question bank questions, and the context for how these questions relate to ecological and evolutionary research. Many faculty will view regurgitated samples of keywords and memorized phrases sampled at random from a word cloud but lacking context, comprehension, or ability to relate the question to real research issues as incomplete or even erroneous answers.
- You will likely be pushed a bit on some of the questions—this is to see how deep and broad your knowledge is. You aren't expected to know everything about all topics (who does?), but if doing a PhD, you should be a scholar and at least strive to have some breadth.
- You are expected to have a greater knowledge about the questions that are related to your field than for the less related questions. The Question Bank is the only aspect of the appraisal exam where everyone knows the questions in advance. While everyone will forget an answer or two, or get a few points confused, there is no excuse for doing poorly. The questions are known in advance, agreed upon, and widely circulated. Doing poorly reflects a lack of serious preparation.
- You can prepare for questions on topics you're unfamiliar with by reading relevant sections of textbook chapters. Some students (who have done well) formed study groups to discuss and work through the answers to the questions. If you are unfamiliar with some subject areas, request permission to sit in on undergraduate lectures covering those topics.
- Go to seminars (you are supposed to anyway). It is a great way to efficiently learn about areas outside your own expertise. Go to a discussion group(s) (e.g., the one that the grad students run).

Why you need breadth (and not just because you are a scholar):

- You won't fail your appraisal exam if you do poorly on only the question bank questions, but EEB faculty take the question bank questions seriously. If you don't pass this part, they can require you to take an extra course, write a review paper, etc.
- Whatever your career path, you will always need to know about things outside your area of expertise. Whether you are lecturing in a course, acting as a consultant, working for the government, etc., breadth will be important. Showing knowledge and interest in what people are doing can also be key during job interviews.
- Some of the most exciting scientific discoveries come from putting together ideas from very different fields.

Appendix I: Procedures during the appraisal exam (note: please allow at least 2.5 hours for all components of the exam)

Here, we briefly describe how the exam will proceed. After the seminar (and a break if requested), the student and examination committee will move to the exam room (or the members of the audience will leave the seminar room). The student will be asked to leave the room so the committee can fill in the paperwork. The student will return and each member on the exam committee will have approx. 10-15 minutes to ask several questions on your proposal and talk. The order of questioners will be as follows: faculty who aren't on your committee, then your committee members, and then your supervisor(s). After the first round, then the examiners will do another round of questioning, and then there maybe one or two final questions from some or all of the examiners.

Students are allowed to ask for a short break before the breadth part of the exam. In the breadth section, examiners will each ask 2-4 questions from the question bank. This part of the exam will take 20-30 min.

The candidate will then be asked to leave the room and the examiners will discuss your proposal and presentation, and how you did on the different components of the exam. They will also talk about your progress-to-date and, what is left to do to complete the thesis. These discussions usually take at least 10-15 minutes (you might want to text a buddy to wait with you). Following the committee's deliberations, you will be called back into the exam room and, you will be told the outcome of the exam, how you did on the various components of it, and what requirements and recommendations the committee has for you. The conversation usually concludes with an interesting and useful discussion about the cool aspects of your project. Now, go for drinks.

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