

**Department of Plant Sciences**  
**Proposal Guidelines for the Ph.D. Comprehensive Examination**  
**2008**

**Option 1 - How to Pick a Topic**

The topic of your proposal must be related to plants, plant microbes or plant-microbe interactions and must ultimately be approved by your Comprehensive Examination Committee. Your proposal should be unrelated to your dissertation project in terms of the experimental system, the conceptual question being addressed and the major techniques that are used.

It is important to find a topic that interests you since you will spend considerable time developing your proposal. Read some of the latest literature from major journals, determine what questions remain and decide what techniques could be used to answer them. Research the ideas with additional reading and try your idea, in general terms, with a faculty member in this or another department who might be familiar with the subject. Since the development of the proposal must be entirely your own, you should not ask for specific suggestions for how to approach the problem.

**Options 1 and 2**

**General considerations**

The quality of the proposed research is of primary importance and the research must be novel, creative and compelling in terms of its ultimate importance to society. The best proposals have a solid hypothesis and ask questions to prove or disprove it. The work proposed should be limited in scope so that a postdoctoral fellow (perhaps with the help of a technician) could accomplish the majority of the work in three years. Avoid asking questions that are too general. By being specific, the proposal will remain focused. Proposing too much is not fatal; however, it can suggest to reviewers that you don't have a clear grasp of what is feasible.

Once you have narrowed the topic to a manageable problem, write down a series of specific questions you want to answer. After you have identified a few critical and specific questions, outline what experiments you might do to answer them. Then work through the details to clarify your ideas.

You should consult with your Comprehensive Examination Committee at this stage for approval of the topic (Option 1) and hypothesis and questions (Options 1 and 2) prior to spending too much time developing an idea that the Committee might not approve. To do this, provide your Committee Chair with a 1-2 page summary of your proposal for distribution to all Committee members. While the Committee will not examine you on the subject prior to the Comprehensive Oral Examination, they may ask for additional details about the research plan.

Once the summary has been approved, the completed proposal should be provided to the Comprehensive Examination Committee Chair within 4 weeks for distribution to all Committee members for evaluation. The Committee members communicate their evaluation to the Chair within 3 weeks, at which time the Chair notifies the student, his/her Major Advisor and the Committee of the outcome of the written portion of the Comprehensive Examination.

## **The specifics of the proposal**

There are many ways to set up a proposal; some funding agencies have very specific guidelines. The elements discussed below would be useful for grants submitted to any agency. You can follow the format shown below or use any format provided by the agencies (e.g., NSF, DOE, USDA); this information can be found on their websites.

If you were writing a proposal for funding, the goal would be to convince very busy reviewers that your research should be part of the small percentage of work they recommend for funding. For your Comprehensive Exam, the goal is to convince your Examination Committee that you are ready to take the oral portion of the exam. In both cases, it is extremely important that you make it easy for the reviewer to understand the specific goals of the research, its significance and how it will be done. To do this, the proposal must be logically and clearly written.

### **Cover Page**

The cover page should include the title of the proposal and the name of the principal investigator. The title must be descriptive and no longer than 80 characters.

### **Table of Contents**

To make it easy for the reviewer to find information, each proposal must contain a table of contents.

### **Abstract/Project Summary** (typically half of a page to one page)

The abstract should include a brief statement of the overall goals of the project, its importance and the specific questions or objectives of the proposed research. Some of the most effective abstracts end with deliverables (new knowledge, answers to age-old questions, tools for improving the human condition) that might be expected if the research is funded.

### **Project Description**

The text of the project description must not exceed a total of 10 single-spaced pages with 1" margins all around and a 12 point font. You are encouraged to include illustrations (photographs, color prints, figures, etc.); they are not counted as part of text page limitations.

#### a. Objectives (usually half a page)

It is critical to provide the reviewer with the most important information (what you are proposing to do, why it is important and how you will do it) early. Reviewers will lose interest if they have to wait until half way through the grant to know what you are proposing to do!

The objectives section represents the beginning of the body of the proposal, so it will have many of the same elements as the Abstract (the big biological picture or the importance of the proposed research, a general sense of what is known that serves as the foundation for the proposed research and the specific goals of the work).

Number each objective using subject headings where appropriate. A format to follow might be: "The overall aim is to ..." or "The long-term goal is to ..." followed by one or two sentences. Specific objectives could be numerically listed with sub-headings, if necessary; e.g., 1. [1.a., 1.b.], 2. [2.a., 2.b.], 3, etc.

#### b. Significance of the Proposed Research (typically half of a page to one page)

This is the hit it hard "big picture" paragraph. Clearly show how the results from the study

will contribute to our understanding of the fundamental nature of plants, plant microbes or plant-microbe interactions and, if appropriate, the potential of the work for long-term improvement of U.S. agriculture. Any novel idea or contributions that the proposed project offers also should be discussed in this section. It should convince the reviewer that, even if the research is very basic, the implications for making an impact on society are significant.

c. Background (2-4 pages)

Like the introduction in a manuscript, this section should provide enough information for the non-expert reviewer (which may include some of your Committee members) to understand the proposed research and to convince the expert reviewer that you know the literature and won't duplicate efforts. It should include sections for each topic that needs to be reviewed relative to the proposed research with the appropriate references to the primary literature. An option to consider is to conclude each background section with a brief (1-2 sentences) summary of how the information just reviewed relates to the proposed work. This approach keeps the proposed research and its importance in the reviewer's mind.

d. Experimental Plan

This is the most important part of your proposal. In this section, each aim is carefully described. Start with a very brief statement of the significance of the aim and then describe the approaches/experiments you will take/do to address it. There should be enough detail that a knowledgeable scientist can evaluate the feasibility of the experiments. Be sure to incorporate appropriate controls in your experiments. You do not need to give details about commonly used procedures since these can be referenced. For example, molecular biological methods that are described in a manual or manuscript do not need to be detailed, but should be referenced. However, variations of the basic protocols that are integral to the proposed work should be detailed. Reviewers will look for indications that you have carefully thought out every step in the proposed procedure. If you are not sure that every step is feasible, indicate this and describe what alternatives exist if the experiment does not work. Try to design experiments that will yield results no matter the outcome.

You should also include information on the means by which the experimental data will be analyzed or interpreted. Grants are seldom funded just to make measurements and are frequently criticized because the results are "purely descriptive." What is the meaning of the data you hope to collect and how does it relate to the overall biological problem? Interpretation of possible outcomes is a key element in convincing reviewers that results from your work will become a significant contribution to the field. You should also discuss possible pitfalls and solutions (what you will do if the experiments don't work or don't support your hypothesis) and any limitations to the proposed procedures.

e. Timetable

This section includes some indication of the timeframe for completion of each aim. It can be in the form of written descriptions (year 1, year 2, year 3), tables or charts. You might expect some staggering relative to when specific aims begin and finish.