Writing the Dissertation Prospectus in Science and Engineering

Graduate School Workshop

Friday, April 7, 2017

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Dissertation Prospectus - What is this?

This is your **Research Proposal** or **Dissertation Proposal**.

" Before advancing to PhD candidacy, all PhD students must write and defend a dissertation prospectus that explains the justification for the dissertation research, reviews the relevant literature, identifies relevant theoretical, epistemological, and methodological issues, and provides a detailed research design that includes a timetable for the completion of the work. The prospectus defense is both an assessment of a student's readiness to proceed with the dissertation and an opportunity for the dissertation committee and the Director of Doctoral Studies to provide constructive advice on the project."

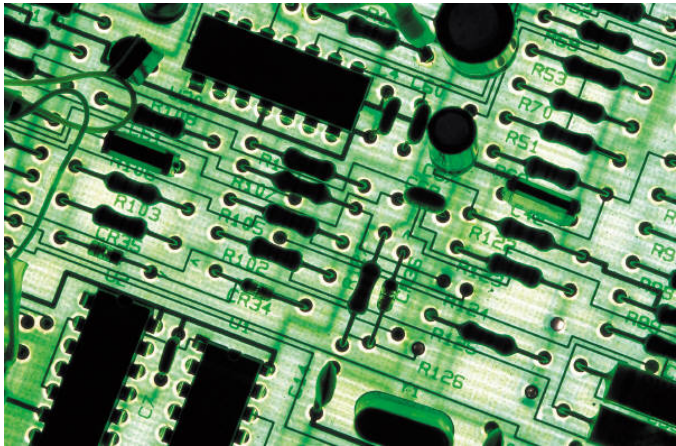
(American University, Washington, DC)

What is the dissertation prospectus based on?

→ Your research

Your dissertation research should be:

- original
- significant
- publishable



When is the dissertation proposal typically written?

This is program dependent. Please consult with your graduate advisor.

Biology: 2nd – 3rd year

Chemistry: 3rd year

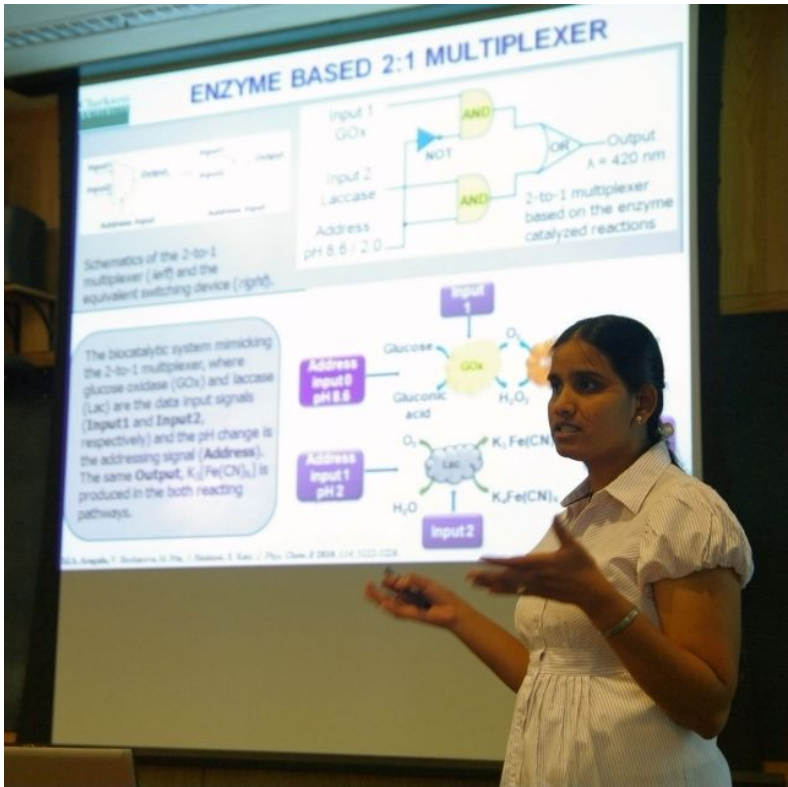
Who is the written dissertation proposal being submitted to?

To your dissertation committee.

In addition to the written proposal, students typically prepare a power point presentation that is presented to their dissertation committee.

In some departments this is a defense open to the public.

Check what is customary in your program.



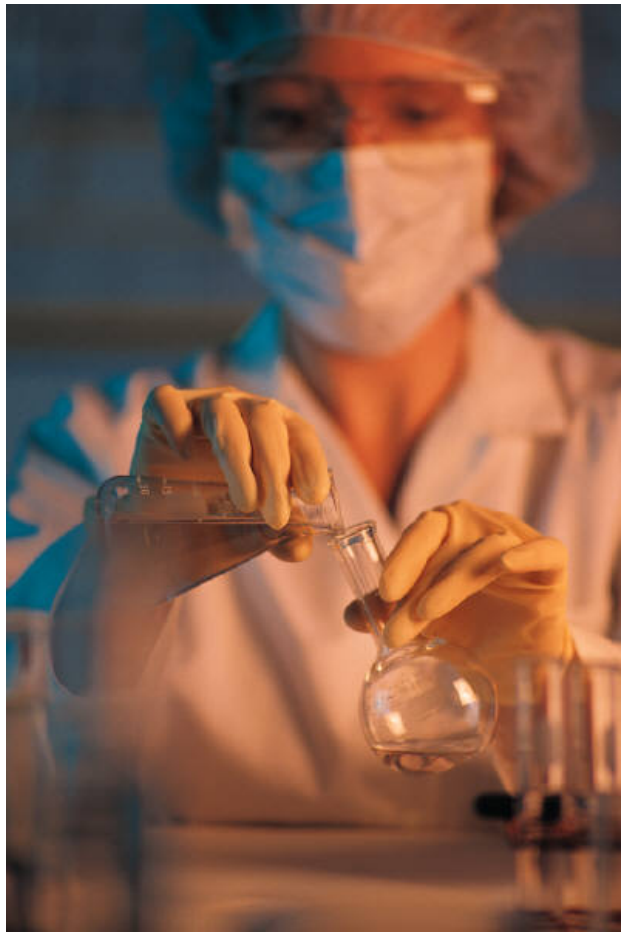
The dissertation proposal is similar to a dissertation.

What is the difference?

Your research project is not completed yet.

Even though you should already have tested/optimized some of your methodologies, and should have some results, there are still proposed experiments that need to be carried out in the future.

These data still need to be analyzed, evaluated, written up, and published.



Who can help you with your dissertation proposal?

→ **Your research advisor**, your dissertation committee, and anyone else who is knowledgable in your field, anyone who is a mentor to you.

<u>Different types of Research Advisors</u>

Some are very hands-off. In this case you have to have a lot of self-motivation and initiative. You need a good dissertation committee so that you can still get help and guidance when your research advisor is unavailable. Your dissertation committee should have at least one professor besides your research advisor, who is knowledgeable in your field.

Your Dissertation Committee

- Form a dissertation committee early. (in the 1st or 2nd semester of your doctoral studies)
- In Chemistry, there are typically four committee members in the dissertation committee of a student:

a) Your research advisor (committee chair)

b) Two other professors from your department

c) One professor from a different department

Record Keeping of your Research Data

- It is critical that you keep a proper laboratory notebook for recording your research data.
- Every day your notebook should have dated entries with experiment descriptions, observations, analysis, conclusions, ideas, and literature references.
- Your notebook is the property of the university and should not be removed from your work place. It remains in the university after you graduate.
- It can become a legal document, *e.g.*, in a scientific fraud investigation.
- Never remove pages, never use white-out, never erase any content. You can cross things out if you need to make corrections.
- Don't write in pencil, but use a permanent pen.
- You need your notebook for writing a dissertation proposal, since all experiments done and future ideas are described in there.

Upon successfully defending your dissertation Proposal (the dissertation prospectus), i.e. your committee is fully satisfied with your oral presentation, the questioning part, and the written proposal, you will Have reached an important milestone.

→ Ph.D. candidacy

This requires the signatures of your committee on the Dissertation Proposal Defense Form. (download from Graduate School homepage and submit to Graduate School)

http://www.utep.edu/graduate/graduation/how-to-graduate.html

Miles Loya Academic Services Building, Room 223
The University of Texas at El Paso
500 W. University Avenue El Paso, Texas 79968
(915) 747-5491 Fax (915) 747-5788
graduate.utep.edu

FOR DOCTORAL STUDENTS ONLY
Form 2 - Submit to the Graduate School
Please attach a Degree Plan

Name: _____ Student ID: _____

E-mail: _____ Degree: _____

Doctoral Program: _____ Major: _____

College: _____ Term of Admission: _____

DATE OF QUALIFYING EXAMS (IF REQUIRED)		
EXAM #1	EXAM #2	EXAM #3

Date of Dissertation Proposal Defense: _____ Does your research involve human subjects? ☐ Yes ☐ No

If yes, please provide your IRB number(s): _____ - _____ _____ - _____

First Term of Dissertation Enrollment: _____ Expected Term of Graduation: _____

Title of Dissertation Proposal: _____

_____

Dissertation Committee

Graduate School policy requires a minimum of three committee members: two from within the program/major and one from outside the

How should the dissertation proposal be constructed?

(Try to avoid writing in the first person)

1. Title informative, clear, catchy, accurate, interesting, not too long (if possible no more than one or two lines)

2. Abstract Typically 200 – 400 words. Check with your advisor if an abstract should be included.

3. Goals/Aims/Objectives (~ 1 page)

Typically, one goal with several sub-aims, or two or three smaller goals. Don't be overly ambitious, goals must be realistic.

Most science research is hypothesis driven, but discovery driven research (without a hypothesis) also exists.

4. Hypothesis

2-3 sentences long.
(= a very short pragraph)

A proposed explanation for a phenomenon. For a hypothesis to be a **scientific hypothesis**, the scientific method requires that one can test it. Scientists generally base scientific hypotheses on previous observations that cannot satisfactorily be explained with the available scientific theories.

5. Background and Significance (~ 3-5 pages)

- Why is this research important?
- What is the current status and understanding of the field?
- Why is an improvement/advancement needed?
- What implications does this research have?
- Support all statements, particularly the work already done by others or your group with the proper references in consecutive order. (Use a referencing program, don't mix different styles in your bibliography.
- Use illustrations/tables/graphs when appropriate. Use numbers and captions, and refer to them in the narrative.
- Do not plagiarize.

6. Approach/Methods & Experiments (~ 5 pages)

- The experiments must be designed in such a way that they can clearly test the hypothesis. Is the hypothesis correct or incorrect?
- What experiments are proposed?
- What methods will be applied/developed?
- What analyses will be performed?
- Provide numbered illustrations/tables/graphs. Use captions, and refer to the images in the narrative.
- What is the innovation of this approach?
- What could be potential pitfalls, and what alternative experiments/methods will be used?
- In other words, if *Plan A* fails, what will be *Plan B* and *Plan C*?
- If you are working on this project jointly with a colleague, make clear what each person's contributions/responsibilities are.

7. **Preliminary Data** (2-5 pages)

- These are data already obtained pertaining to the project (published or unpublished). This section is less detailed than the experimental section. Focus on the result, not on how exactly the experiments were carried out.
- Which data did you obtain, and which were obtained by a colleague (if any)?

8. **Conclusions** (0.5 page)

- Can some conclusions already be drawn? Do you already have indications whether your hypothesis is acceptable?

9. **Future experiments** (2-3 pages)

- Summarize what experiments/analysis/method development still need to be carried out to complete the project.

10. Experimental Data

- This section has detailed experimental data of experiments already carried out.
  (For example, when a polymer was synthesized, in what container, how many grams and moles of starting material was used, what solvent, catalyst, and what temperature? How was the reaction worked up, what analysis was performed? Was the product pure, or was a purification necessary? How was the polymer characterized, etc.)
- Add spectra, images, and other analytical data
- Ask your research advisor how detailed the experimental part of the dissertation proposal should be.

11. Bibliography (References) (1-2 pages)

- Make sure the references are accurate and current.
- Do not mix different styles.
- Your research advisor may want the references in a specific style, e.g., references can be listed with or without article titles; the page numbers may be inclusive, or only the first page may be provided, etc.

Hatch, K.A.; Ornelas, A., Williams, K.N., Boland, T.; Michael, K.; Li, C.-Q.
"Photolysis of a peptide with *N*-peptidyl-7-nitroindoline units using two-photon absorption"
Biomed. Optics Express **2016**, 7, 4654-4659

Workshop Tasks

1. Write a **mini** dissertation prospectus of your own doctoral research (instructions on next slide).

2. Form groups of four and present your outlines to each other. Help each other improve your outlines.

3. Select one mini dissertation prospectus of your group to be presented to the class.

The class tries to understand and may make suggestions.

Outline for dissertation proposal (miniature version)

1. **Title** (one or two lines)
2. Abstract (skip)
3. **Goals** (State one or two goals)
4. **Hypothesis if applicable** (one sentence)
5. **Background and Significance**
   a) State the problem. (one sentence)
   b) What is the current status of this research area? (one sentence)
   c) If the research were successful, what impact would it have? (one sentence)
6. **Approach**
   a) What experiments are proposed to test the hypothesis? (one sentence)
   b) What is innovative about your approach (one sentence)
7. Preliminary data (skip)
8. Conclusions (skip)
9. Future Experiments (skip)
10. Experimental (skip)
11. References (skip)