Ph.D. Proposal Writing

Sandhya Dwarkadas
University of Rochester

Approximate Timeline

Getting started
- Choose a research area
- Choose a research advisor
- Work on a research team
- Secure financial support

Completing your research
- Develop long term career goals
- Complete your dissertation
- Prepare for your career

Defining your research

The Purpose of the Proposal

“The proposal should convince the reader (committee) that the problem is an important one and that you have a promising approach to solving it.”

- The idea
- The details
- The plan
- The organization

• What is the student’s research question?
• Is it a good question?
  – Is it useful
  – Has it been answered before
• Has the student performed due diligence to ensure that the question can be answered?
• Will this be an adequate and original contribution to knowledge?

“Writing a PhD proposal is a frustrating process at first – you will find there are a lot of things you don’t know. But the reward is enormous – you will find things that nobody knows.”
The Idea

- Begin with an area that excites you and can make a difference
- Follow with an in-depth look at prior art
- Formulate a nugget that will become the “thesis” of your dissertation

What is a thesis?

From Merriam Webster Online: “a position or proposition that a person (as a candidate for scholastic honors) advances and offers to maintain by argument”

Choosing a Research Area

Many areas could be “right” for you

Criteria
- Exciting and interesting area
- Important problems in area
- Activities suitable to you (theory vs systems)

Ways to identify a research area
- Take courses, attend seminars and colloquia
- Talk to professors, visitors, other students
- Read widely
- Learn about yourself and what you like to do
- Participate in a research project

Inspiration Versus Perspiration

“There are two main ways to find a topic: inspiration and scut work. Inspiration is great, but unpredictable. Scut work is a lot more dependable. In other words, join a project, build something, and see what’s hard about it. There’s a good chance that whatever caused you difficulty has a thesis topic in it.”

Identifying a Thesis Problem

Become an expert in the area
- Read papers, talk to experts, attend talks, …
- Question assumptions made by previous work

Consider some potential thesis problems
- Thoroughly understand the problem
- Break the problem into manageable pieces
- Have short-term and long-term goals
- Have a back-up plan

“Start with the questions, not the answers”

“Don’t lose the forest for the trees”

“Shoot for the moon but have something tangible and defensible if you fail short”
### The Details
- How will you support your thesis?
  - How will you demonstrate/evaluate your ideas?
  - What equipment/software will you need?
  - What will you build, simulate, analyze?
  - What is your metric of success?
  - What will you compare against?

### The Plan
- Partition work into publishable units
  - Make sure infrastructure you need is in place
- Set a goal/deadline, e.g., conference submission
- Chart a roadmap
  - Periodically regroup and reevaluate to make sure that your roadmap is realistic and your goals are being reached

### The Organization
- Motivation
- Thesis
- Related work
- The details behind the thesis/what's new
- Preliminary results
- Plan of action
  - Partition work into publishable units
  - Keep major conference deadlines in mind

### The “Thesis” or Problem Statement
- A concise statement of the question your thesis tackles and how you will answer it
- The details in this sections should provide
  - The question you want to answer
  - Why this question is worthwhile
  - Support (via reference to related work) that it has not been previously answered
  - Why you believe your solution will address the problem

### Writing Style
- Clear organization of individual ideas
  - Sections and paragraphs should have a logical flow
    - Define terms before you use them
    - Keep forward references to a minimum
  - Each section represents a high-level topic/organizational unit
  - Each paragraph contains a single idea with supporting details
  - Each sentence expresses a single point/detail
- Pay attention to detail – spelling and grammar

### Useful Resources
- “The Elements of Style”, W. Strunk, Jr. and E. B. White