

WRITING EXCELLENT PROPOSALS



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What is a Thesis Proposal



- A thesis proposal is a document that describes the research you would like to accomplish as part of your advanced degree.
- Through a thesis proposal you demonstrate that you can make a contribution to science. Your thesis must show that you:
 - Know the state of the art (in your area of interest)
 - Understand the state of the art
 - Have identified a “hole” in the state of the art
 - Have a plausible idea for how to fill that hole
- About 25 pages

Steps to Writing an Excellent Proposal



- Ideally your advisor will advise you on the steps outlined in the following slides
- Proposal format will be something like the following:
 - Intro – Layman’s description
 - Discuss problem at high level
 - Summarize your potential scientific contributions
 - Previous related work
 - Research plan
 - Technical description (with preliminary results)
 - Problems to be solved (with potential solution approaches)
 - Experiments to be run (with details of set-up and how data will be gathered)
 - Schedule/plan of research activities
 - References

Read Literature



- Familiarize yourself with the relevant literature
 - From the Abstracts: get an idea of how to describe the important parts of a problem succinctly and at a high level
 - From the Introductions: get an idea of how to motivate and justify a problem
 - From the Previous Work sections:
 - Get an idea of how to clearly compare and contrast a problem to the relevant literature.
 - Read the citations as you read the paper to see who is associated with what previous work.
 - Notice whose work is cited in multiple papers. That work may be foundational for your problem too.

Read Literature (cont)



- Familiarize yourself with the relevant literature (cont)
 - Read the most relevant papers in their entirety
 - Understand subtle differences AND similarities among existing results
 - Understand the subtle differences AND similarities between your preliminary results and the existing results
 - To understand the differences and similarities, you may have to implement some of the other methods
- Read the literature critically
 - Were assumptions and models reasonable?
 - Were algorithms true to the assumptions?
 - Are there better approaches?

Before Outlining



- Answer these five questions with one sentence each:
 - What is the problem?
 - Why is it important to solve?
 - Which parts of the problem will you solve?
 - How might those problems be attacked?
 - How will you determine if you've solved the problem?
- Read other people's proposals and reviewers' comments

Write an Outline



Now that you know the literature and have identified the problem you want to solve...

- Write a high-level outline (one page)
 - More than:
 - Introduction (includes some motivation)
 - Previous work (includes some motivation)
 - Proposed research (includes proposed approach)
- Discuss it with your advisor
- Modify high-level outline as needed
- Write a detailed outline (three pages)
- Discuss it with your advisor

Write a Draft



- Write the formal technical part of your proposal first
 - This will help you see the similarities and differences between your proposed research and existing results
- Write the previous work section next
 - There's no point in citing a paper if it is not informative to the proposed research
 - Do NOT simply write a description of each relevant paper
 - Cluster previous work into groups based on qualitative features of their technical approaches
 - For each paper described, add a phrase or sentence saying how it is similar and different from the proposed work
 - This can be done for each previous paper discussed or for each group of papers discussed

Previous Work Section



- DON'T write like this: In [1], A was done. In [2], B was done. In [n], X was done.
 - This style of writing only proves you found the citations and maybe read the papers. It does not impress the reader.
 - Detailed sentences detailing the similarities and differences let the reader know you really know your sh*t
- DON'T SAY, “to the best of my knowledge...”
 - How can this phrase help you?
 - Reader might do a 10-minute search and find an example. Then you look really lame for not searching harder yourself.

Introduction

- Paragraph 1: Motivation. Broad description of problem area. Why is problem important. What is impact if solved.
- Paragraph 2: Narrow down problem area and describe your problem at high level. Why specifically is your problem important.
- Paragraph 3: Most important paragraph. Elevator pitch. “In this project, we plan to” Bulleted list of major contributions
- Paragraph 4: High-level comparison to state of the art
- Paragraph 5: Summarize contributions as very high level. How will your results change the world!

Finalize



- Write the introduction (and abstract) last
- Take a few days off
- Read through the whole proposal in one sitting
 - Eliminate redundancies and inconsistencies
 - Fix grammar and spelling errors
 - Double-check papers cited to make sure you have properly characterized them
- Take a few days off
- Have a friend read it playing Devil's Advocate
- Make adjustments