Preparing Your Thesis Proposal and Becoming a PhD Candidate

Dorian Arnold
Emory University

Cheryl Seals
Auburn University

CRA-WP IDEALS
Workshop
Minneapolis, Minnesota
April 11-13, 2024
In this session ...

• What’s a Thesis
• The Thesis Proposal
• Stories
• Pitfalls and Best Practices
Where are you in the THESIS PROPOSAL PROCESS? (Select all that apply)

Click Present with Slido or install our Chrome extension to activate this poll while presenting.
The Thesis (aka Dissertation)
**thesis** | \ˈthē-səs

1: a dissertation embodying results of original research and especially substantiating a specific view especially : one written by a candidate for an academic degree

2a: a proposition to be proved or one advanced without proof : HYPOTHESIS

2b: a position or proposition that a person (such as a candidate for scholastic honors) advances and offers to maintain by argument

-Merriam Webster
To Advance the Discipline

with new knowledge
• new fundamental concepts about computation
• better capabilities in computer design, programming, or usage
• new methods or algorithms to solve new problems in other fields
• render useful computer application, tool or data artifacts

with new professionals
• trained to be proficient and independent researchers
• with fundamental knowledge and skills appropriate for the discipline
• adept with deep expertise appropriate for specialty area
CS Research Methods

Exploratory research based on the formulation and study of a hypothesis

Conceptual Analysis
Mathematical Logic

Algorithm Analysis
Data Analysis

Prototype
Simulation

Case Study
Lab Experiment

Formal
Analytical

Modeling
Empirical
Example Thesis Design Patterns

Problems + Research Methods = Outcomes

• Theoretical: A study based on mathematical logic and principles to develop new theorems

• Analytical: Conceptual analyses to evaluate an algorithmic solution to an existing problem, compared to current techniques

• Experimental: Implementing and evaluating a software or hardware prototype that renders new capabilities

• Observational: Understanding new concepts of human behavior in relation to technology
Real Thesis Examples

Cheryl’s and Dorian’s Elevator Pitches

Other Considerations:

1. How far along was the project when you proposed?
2. Where did the problem/project come from?
3. How close was the final project to the original proposal?
4. Was your proposal and defense committee the same?
Thesis Proposal
The Thesis Proposal

Your proposal is a formal documentation of your thesis execution plan, providing opportunities to:

- master background of chosen sub-field
- demonstrate your research readiness
- receive (early) feedback and advice
- brainstorm and refine project ideas
- get your thesis plan formally endorsed
Proposal process

Idea Formation
- Open Questions
- Lit. Review
- Novel Approach

Execution
- Experiments
- Results/Analysis

Conclusion
- Findings

Are you ready to propose?
1. Demonstration of feasibility
2. Formal writeup
3. Committee formation
4. Presentation/Defense
When to Propose

Novel Approach → Experiments → Results/Analysis → Findings

initial conceptualization → full realization
Executing a Strong Proposal
A strong research proposal ...

Motivates ...
  • **background** for the target problem and challenges
  • **inspiration** for who should care and why
  • **limitations** of state of the art and field

Describes ...
  • objectives or **target problems**, questions and challenges
  • a **novel approach** for addressing the problems
  • a hypothesis of anticipated **outcomes**
  • a convincing **methodology** for evaluating the hypothesis
  • feasibility arguments for proposed methodology
  • an assessment, including risks, costs, resources and time
Arnold’s RIPE Project Assessment

Rate each criteria “High”, “Medium”, or “Low”

Risk: How feasible is the project? How high is risk of “failure”?

Impact: If successful, how impactful will the outcomes be?

Passion: How excited/motivated are you about the project?

Effort: How much time and resources are needed to complete the project?
PhD Candidacy
aka
“All But Dissertation”
Publishing your thesis work

Implicit or explicit program/advisor publication requirements?
• papers published? written? researched?

How do I turn my publications into my thesis document?
When are you PhDinished?

Easiest: Proposal is fully executed.

Hardest: Your advisor and committee say so.

Truest: You convince your advisor and committee!
Common Pitfalls
Common Pitfalls

• Proposal Process:
  • Ineffective proposal, including ambiguities and vagueness, incompleteness, poor writing, and unresolved research plans
  • Ineffective presentation, including cramming entire proposal document in a short timespan
  • Committee members not seeing your proposal document in advance

• Dissertation Process:
  • Research gets scooped
  • Results not as expected
  • Unexpected technical challenges
  • Far deviation from proposal plan
  • Interpersonal challenges with advisor or collaborators, including incompatibility and departure
  • Burnout
  • Life
Interactive Q&A
Choose up to three concerns about proposal and candidacy process

Click Present with Slido or install our Chrome extension to activate this poll while presenting.
Closing Thoughts
Cheryl’s Closing Thoughts

• Effective Time Management
  • Writing Prowess: Acknowledge the interactive nature of the writing process when incorporating feedback and the refinement may take longer than expected
  • Prioritize and Stay Focused

• Motivational Techniques
  • Strategic selection of a research topic that (1) You, (2) Your advisor and (3) committee are interested in
  • Personal Drive: Stay motivated, tenacious and be persistent
  • Coping with Writer’s Block: Have multiple strategies to maneuver period of creative stagnation

• Take Care of yourself and seek assistance when needed
  • Physical (e.g., get proper rest, nutrition)
  • Emotional & Mental Health (e.g., relax & recharge)
  • Well-being is multi-faceted (e.g., Social, Intellectual, Environmental, Spiritual, Financial, etc.)
Dorian’s Closing Thoughts

• Tackle and resolve difficult problems early!
• Find groups for technical, logistical and emotional support!
  • Engage periodically with your committee
• Establish good routines!
  • When and where do you work best?
  • What habits help you work best?
  • Understand and mitigate chronic distractions?
• Your dissertation is not the end, just the beginning!
Session Materials

https://tinyurl.com/IDEALS24-TP