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The Thesis Proposal

P r e p a r i n g a n d P r e s e n t i n g

What is a thesis?

[ABOUT ME](#)[PICKING A TOPIC](#)[PROCESS](#)[WRITING](#)[PRESENTING](#)[CONTACT](#)

Defining a thesis

- “a position or proposition that a person advances and offers to maintain an argument” – a thesis needs to make a claim

How do I pick a thesis topic?

- “There is a mistaken view of thesis research that it starts with a thesis and then an investigation to prove or disprove the thesis. That only happens in fields that have matured to ‘filling in the blanks’, and even then it only happens with advisors who like to stick to tried and true questions.” – Chris Riesbeck

What is a thesis?

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How do I pick a thesis topic?

- “In young fields such as AI, you will never start with a claim. Very few start with a question. You start by exploring one or more problems in some task domain. You will start with some initial ideas, naïve or clever, and push them hard for a year or so. Then you need to stop and think about what you have done and what you have learned. Among your accomplishments and experience, there will be several good candidate theses. Pick one. Test it out on your advisor and other faculty members. Test it out on other students. ” – Chris Riesbeck

What is a thesis?

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How do I pick a thesis topic?

- “Watch out for the following flaws:
 - It takes half an hour or more for anyone to understand your claim. If it happens more than once, you don’t know what your claim is yet
 - Everyone thinks the claim is obvious. May be your claim is so general that it is vacuous. Can you formulate the opposite claim? Does anyone believe it could be true when you do?
 - No one think the claim matters. May be your claim is too specific. Who cares if you wrote a program and that program needs a particular data structure.” – Chris Riesbeck

What is a thesis?

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Types of theses

- A theory consisting of a body of theorems and proofs from first principles
- A new algorithm to solve a particular technical problem evaluated against current techniques
- A new system that makes something possible that was not before
- What else?

How to Pick the Right Topic for You?

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Work on what you are passionate about

- Take classes
- Do projects
- Read papers that is of interest to you
- Read other proposals and dissertations

Attend workshops in your area of interest

- Write – writing helps shape your ideas
- Join listservs and communities (facebook, linkedIn, etc.)
- Attend and present at workshops your work

Steps You Need to Do

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Find Out Your Department Requirements

- Department Milestones
- How your advisor and your department assess performance
- What does it mean for you to be a candidate

Find Committee Members

- Take classes with other faculty members
- Collaborate with other faculty members but make sure your advisor is in the loop

Form Relationships with your student colleagues

- Mentors
- Cohort

General Process

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Select Committee

- Advisor, Faculty and outside faculty
- Talk with your advise about selecting committee members
- Get committee approved

Proposal

- Write proposal to a good draft
- Set a date with your advisor for proposal defense
- Send committee invitation, graduate committee need to be informed
- Iterate the writing with your advisor then send around few weeks before the defense (see department rules)

Writing a Thesis Proposal

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Thesis Statement

- What is your thesis statement? Be concise and Specific
- Pass it by other students and faculty

Related work

- Discuss related work fully to show you did your homework
- Three items:
 - What is the work about? What is its contribution?
 - Why is it important or related to your work?
 - What are the issues with this work?

Writing a Thesis Proposal

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Methodology

- Show that you have done your homework on your research question
- What steps you will take to answer your research question
- Why would these steps work? (show any pilot work)

Schedule and Expected Contributions

- Plan of work
- Show that you know how long it will take (show example work you did)

Writing a Thesis Proposal

ABOUT ME

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Be ready to answer questions like:

- Why is this important?
- How will your work advance the field?
- So no one has done this before?
- Why do you think this approach will work?
- What field will this work advance?
- When do you know you are done?

Get a thesis buddy:

- Someone who will read your drafts and can give you feedback

Working on a Presentation

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Keep in mind

- People probably didn't read your thesis completely or never did
- Most of the people in the audience are not working in your area
- You know more about your work than any other person in the room

Presenting

- Take voice and theatre classes
- Project your voice
- Dress nicely – makes you feel good
- Avoid a lot of text on slides
- Speak slowly – do not rush through slides

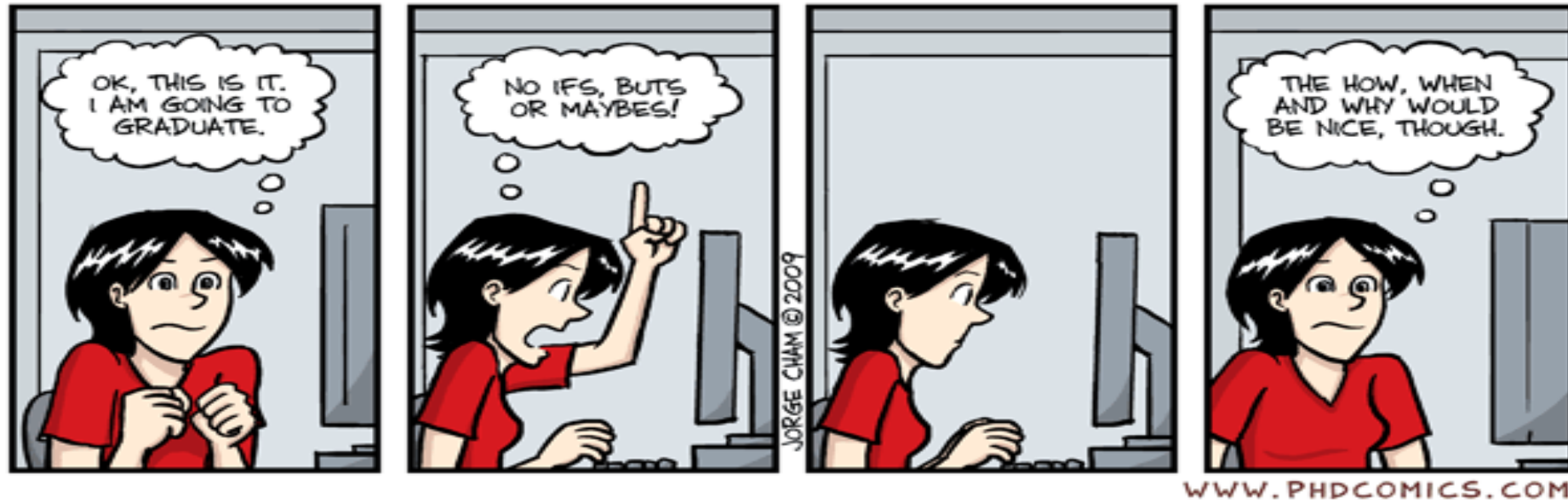
General Outline

- What is the problem or area you are studying?
- Why is it important?
- What is the current state of the art?
- How are you planning to approach it? How is that different from what has been done before?
- What results have you achieved ?
- Plans and schedule

PREPARING YOUR PHD PROPOSAL

Ming C. Lin

University of North Carolina at Chapel Hill



CRA-W

Computing Research Association
Women

INTRODUCTION

Outline



- **Picking a thesis topic**
- **Deciding to propose**
- **Writing the proposal**
- **Presenting the proposal**

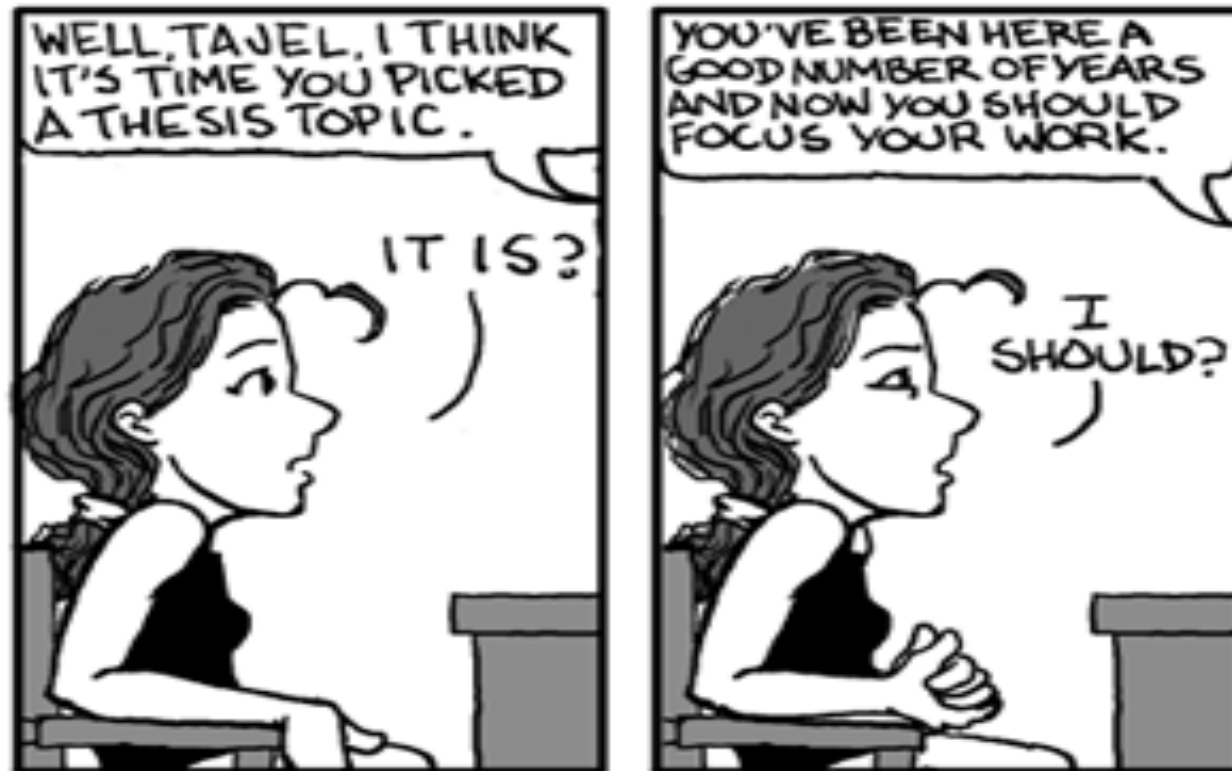
PhD Proposal

- Identify important, unsolved problems
- Show that
 - The problem is solvable
 - I will solve $P \neq NP$
 - “You” can solve it :
 - ability to develop a complex research topic
 - expository skills to explain what you are doing
 - thoroughness to collect and analyse the data.

How to pick a topic ?

How much is enough for a proposal?

Part I : Picking a topic



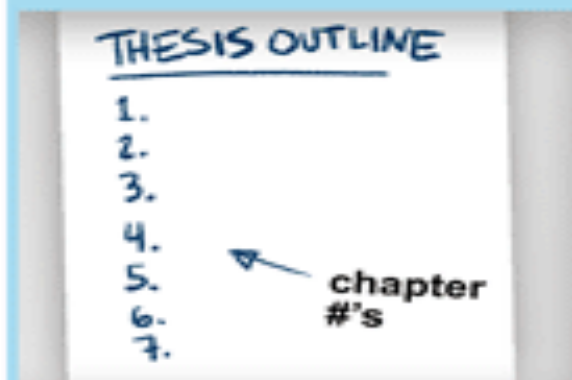
Inspiration Versus Perspiration

- There are two main ways to find a topic: inspiration and perspiration.
- Inspiration is great, but unpredictable.
- Perspiration is a lot more dependable.
 - Join a project, build something, and see what's hard about it. Whatever caused you difficulty has a potential of thesis topic in it.

WRITING YOUR THESIS OUTLINE

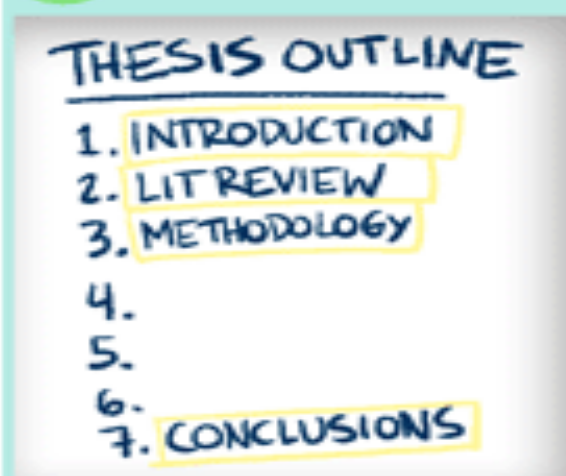
NOTHING SAYS "I'M ALMOST DONE" TO YOUR ADVISOR/
SPOUSE/PARENTS LIKE PRETENDING YOU HAVE A PLAN

- STEP 1** Aim for a respectable number of chapters:



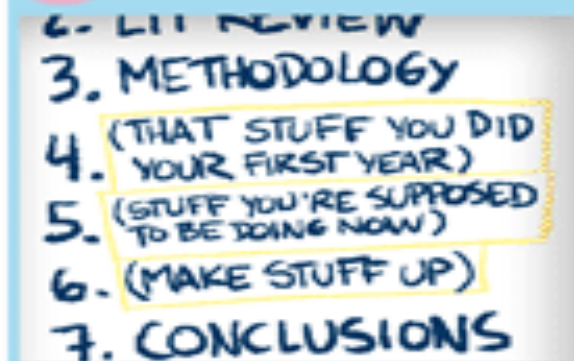
- 5 = "That's IT??"
6-7 = "Not bad"
8+ = "Are you crazy??"

- STEP 2** Fill in the "freebies":



You're half way done!

- STEP 3** Make up titles for the "meat" chapters:



(It'll be years before you actually have to work on that later chapter, and by then your thesis topic will have changed anyway)

- STEP 4** Voilà! You just bought yourself another two years



JORGE CHAM © 2006

www.phdcomics.com

Multiple research problems

- Its OK to explore multiple problems till you figure out what you like.
- Very narrow domain problems do not typically make a good thesis.



Making a coherent whole

- Research can be messier than you imagine.
- If you are lucky, thesis = n steps to solving a problem
- Thesis = n papers + a story/theme

Think the big picture!

The big picture



- Your responsibility
- Spend a few minutes every day thinking about your thesis.
- Just thinking about the title helps

The thesis title

Too technical

Optimizing Scoring Functions & Indexes for Proximity Search in Type
Annotated Corpora.

v/s

Too broad

Next Generation Search

v/s

Next Generation Search via Answer Types

Just right

ATTEND OTHER PROPOSALS (DEFENSE)*

**Read other people's proposals*



CRA-W

Computing Research Association
Women

Find committee members early



- Get to know faculty members through classes and other interaction
- Collaborate with other faculty in your research area and other related topics
 - They will often give you feedback about your progress.

So far ..

- Work on multiple problems (if needed)
- Think about the big picture (the title)
- The outline
- Do some research

Now what ? Am I ready to propose ?

Part II : How much (research) is enough?

- Requirements & expectations differ by university
- When to propose : 3rd to 5th year
- Length of proposal : 15 to 150 pages
- Amount of research : 0 to many papers

Get yourself familiar with your department expectations!

When do you propose then ?

- You will “*know*” when you are ready !
 - I have done enough research.
 - I really really want to graduate!
- If not, your advisor should tell you.



Again ...

Attend other proposals (defense)* !

*and thesis defense.

Read other people's proposals*

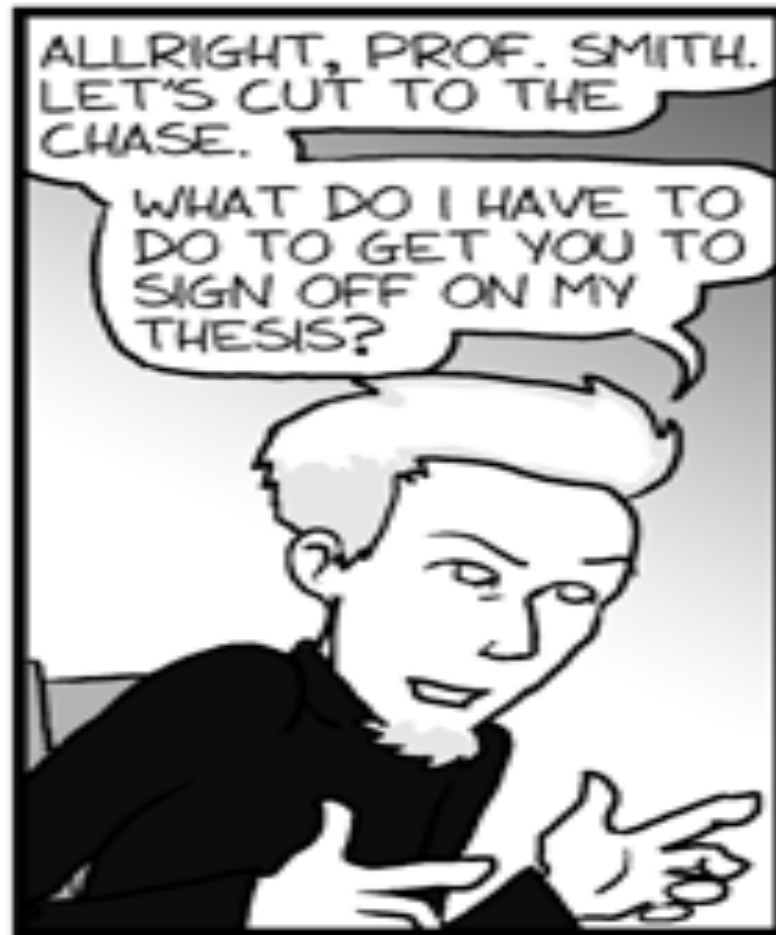
Under-confidence issues

- The imposter syndrome
 - My 2 papers were just luck ! They are not that good !
 - They are good – but they don't form a thesis
 - I haven't done enough math ! I have no experiments !
- Get a mentor.
- Talk to your friends and colleagues.

To summarize

- **Do good research**
- **Think about the big picture**
- **Talk to other people**
- **Attend other people's proposals**

Ready to propose ?





Part III:

WRITING A Ph.D. PROPOSAL

What is a PhD Proposal really?

- a succinct write-up of your proposed research goals, strategies, justification, contributions

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- a brainstorming and planning process
- a good time to get feedback and direction from experts

What is a PhD Proposal really?

- a succinct write-up of your proposed research goals, strategies, justification, contributions
- a brainstorming and planning process
- a good time to get feedback and direction from experts
- *Sometimes a stressful period of graduate school*

Why write a PhD Proposal?

- Focus your research direction
 - Writing can clarify your thoughts
- Establish contact with committee
- Obtain feedback from committee
- An important step towards graduation!
- Side effect: Proposal writing experience

How long should a Ph.D. proposal be?

- Examples from your department
- Could be:
 - NSF proposals – 15 pages single spaced
 - Longer, more in-depth
 - Shorter, more concise

Challenges, Frustrations, Misconceptions

- “The proposal is just a hurdle. I can just propose ideas off the top of my head now and then figure out what I really want to do later.”
- “How can I propose something when I don’t know the details yet?” – the unknown path
- “I don’t know how to organize the different parts of the research on the page.”
- “I am not ready yet. I might as well solve the problems and then present them”

What does a good Proposal Accomplish?

The proposal should clearly answer:

- What is the **problem** you are studying?
- Why is it **important**?
- What **results** have you achieved so far and why to they matter?
- How is this **substantially different** from prior work?
- How will you systematically **evaluate** your work?
- What do you need to do to **complete** your work?

When is the best time to write/present a Proposal?

- When you have a clear idea of the problem you want to solve
- When you have some **preliminary work done** to demonstrate promise of your approach
- When you have some notion of the major subproblems to be solved
- When your advisor recommends

What would help before I start writing?

- Think about what YOU want to accomplish
- Write a succinct thesis statement/hypothesis
- Discuss your ideas to others
- Presented parts of the research at seminars, conferences etc.,
- Think about 3-4 major contributions/papers
- Formulate these contributions in writing

How do I get started writing?

- Look at **examples** in your department, with same advisor, in same overall topic (from a distance)...
 - Breadth of project proposed
 - Separation into subprojects
 - Writing style: problem statement, hypothesis
 - Organization
 - Overall outline and flow
 - Within each proposed project section
 - How they motivated their topic and expected contributions

Think about the Audience

- Your Committee
 - Not necessarily all in your general topic area
 - Not familiar with your specific problem
 - Not aware of your prior work
 - Not aware of your skills, infrastructure
- Implications
 - Background: terminology, problem,...
 - State of the art related to your problem
 - Convincing motivation for importance
 - Demonstration of feasibility/promise of success

Organization

- Introduction
 - Problem statement and importance
- Background and State of the Art
- Proposed Research
 - Subsections on each research contribution
- Evaluation Plans
- Research Plan
- Summary of Expected Contributions

The Introduction

- Motivation and general, high level problem for non-experts to appreciate
- Quick overview of what state of the art does not address and the current needs
- *Thesis statement* – specific open problem and proposed strategy
- Brief overview of key insights and why is promising approach
- List of expected contributions of dissertation

The Background

- What level is it presented?
- How much is included?
- How is it organized?

The Background

- What level is it presented?
- How much is included?
- How is it organized?
 - General to specific
 - Conclude by contrasting yours against existing work

A good rule of thumb:

Include terminology and background on an as-needed basis – let the rest of the proposal drive the background section.

State of the Art



- Which works need to be included?
- At what level of detail are they described?
- What order are they best presented?
- How do I nicely discuss limitations?

State of the Art

- Which works need to be included?
- At what level of detail are they described?
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- How do I nicely discuss limitations?

A good rule of thumb:

Enough to give complete picture of context and novelty

Most closely related to least related.

Problem, strategy, limitations – show how still an open problem

Proposed Research

- Overview of project – diagram or flow chart?
- Major steps in the project(s)
- For each –
 - Assumptions
 - Problem Statement (including input and output)
 - Strategy & Overall Approach
 - Details known now
 - Plans for remaining challenges
 - Evaluation plan

Evaluation Plans

Experiment Design:

- Questions you will target to judge success of your approach
- Independent variables – what is being varied/compared
 - Eg, your technique versus other techniques
- Dependent variables and Measures – what is being measured
 - Effectiveness – precision and recall, speedup
 - Cost – overhead
- Subjects
- Methodology
 - Design choices
 - Justification

Research Plan

- What steps do you plan to take next?
- After that? E.g. Future work

Expected Contributions

- Summary of contributions to the state of the art – intellectual/scientific merit
- Broader impact on the topic area, the field of computing, and the society

General tips on Writing: Diagrams

- Tell the story in a visual way
- Explain the key ideas
- Together they should present the main concepts and results
- The picture should be self-explanatory
- Each caption should clearly explain the associated diagram by itself

General tips on Writing: References

- Thorough survey
- Key references must be included
- Avoid having mostly self-citations
- Be generous & gracious
- Give appropriate credits



Part IV:

PROPOSAL PRESENTATION

What is the role of the Committee?

- Throughout the process ...
 - Guidance and Understanding of what to expect
 - Feedback
 - Eventually, reference letters
- At the proposal
 - Make sure you know your stuff, have thought about the issues
 - Make sure you have the right topic/focus/questions/plan
- At the defense
 - Make sure you know your stuff and that you're ready to fly on your own

Selecting the PhD Committee

- PhD advisor
- Faculty in the topic area to provide useful direction
- Faculty outside topic to provide high level feedback
- External member – someone in research area who could write a ref letter or provide suggestions

Proposal Presentation Tips

- *Attend* others' presentations before yours
- *Thank committee*, introduce yourself and background
- *Practice* presentation *many* times
 - Have someone take notes of questions
- Be polite during interruptions with questions
- Be open to suggestions
- Prepare for questions
- Don't be afraid to have no answer for a question. Ask for direction/help on those questions.
- Be confident. Don't look to advisor for answers.

Example Questions at Proposal Defense

- Topic: too large, too small; doable in the timeframe; focus; What are the can of worms that are beneath the surface (difficult to implement or evaluate)?
- Evaluation (plan, statistics, validity)
- Related work
- Practicality/scalability
- Limitations and possible ways to address them
- Vision of where this can go...
- Certain people have go-to questions.
- Watch your committee members on other committees

Summary: Ph.D. Proposal Process

1. Select your committee with your advisor
2. Create abstract of your proposal
3. Invite your committee members, sending them the abstract and predicted timeline
4. Get committee approved by department (if required)
5. Write proposal and iterate with advisor
6. Give proposal to committee
7. Prepare presentation of proposal
8. Prepare for hard questions – re-read proposal *as committee member*
9. Set proposal defense date
10. Present and defend proposal
11. Celebrate this big milestone!
12. Thank committee, meet with advisor to discuss questions and directions
13. Move forward on research