Introduction

CS 2001: Research Topics in Computer Science
Fall 2014

Dietrich School of Arts of and Sciences
Department of Computer Science
Administrivia

Research Topics in Computer Science

- CS 2001
- TU/TH 1:00 - 2:15PM, F ? - ? (rarely)
- 6516 Sennott Square

Instructor

- Professor Diane J. Litman
- litman@cs.pitt.edu
- 5105 Sennott Square; also 741 LRDC
- Office Hours: If my door is open

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1. Courseweb

Fill out the Doodle with your Friday schedules so that we can pick a reserved make-up time
So how is this course scheduled anyway?

Two distinct sections...

Part I:
- What is research?
- How do I understand research?
- How do I evaluate the research of others?
- How do I do my own research?
- How can I communicate my exciting new results to others?

The goal here is to prepare you for success in our program
The goal of the first part of the course is to prepare you to do research

Research papers
- How to read and understand
- How to critique
- How to write

Communication
- What makes a good talk?
- What makes a bad talk?
- Advertisements vs. book reports

Tools of the trade...
- University computing environment
- Scripting and plotting
- Paper writing
- Peer reviewing
Goals for today...

1. Quick introductions to one another
2. What is a PhD?
3. Why do a PhD?
4. Getting a PhD at Pitt
Who are you guys?

Let’s get to know one another...

- Your name
- Why Pitt?
- Research interests
- Anything else?

“I have no idea…” is a perfectly fine answer!
Imagine a circle that contains all human knowledge.
What is a PhD?

By the time you finish elementary school, you know a little

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What is a PhD?

By the time you finish high school, you know a bit more...
What is a PhD?

With a BS, you begin to develop a specialty

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What is a PhD?

An MS deepens that specialty

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What is a PhD?

Reading research papers takes you to the edge of human knowledge.
Once you’re at the boundary, you focus
What is a PhD?

You push at the boundary for a few years…

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What is a PhD?

Until one day, the boundary gives way.
What is a PhD?

And that dent you've made is called a PhD.
What is a PhD?

Of course, the world looks different to you now...
What is a PhD?

Keep Pushing.

So don’t forget the bigger picture

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So... What is a PhD?

A PhD is a process!

Smart is not enough, so a demoralizing process at times...

- So much has been done already, how do I keep up?
- What new problem should I be solving?
- Solving this problem is way harder than I thought it would be...
- Why doesn’t my code (or code that I’ve borrowed) work?!
- Why do my papers keep getting rejected?

But a process that will educate you greatly

- Problem identification and solving
- Persistence and hard work
- Clear (written and spoken) communication skills
- Team work, management, and mentoring
So why would anyone do a PhD?
Journey of a PhD student

“When can I finish?” (if ever)

“prelim”

“proposal”

“comp”

“defense”
The (Abridged) PhD Timeline at Pitt

1. **CS 2001**
   - Pass Prelims
   - Coursework only
   - 4 Classes, A- or better
   - CS 2100 - 2899 only
   - Can count towards core reqs

2. **CS 2002**
   - Find an advisor!
   - Pass core requirements
   - One course from each of
     - AI / Database
     - OS / Networks
     - Architecture / Compilers
     - Theory / Algorithms
   - At least a B in each

3. **Comprehensive Exam**
   - Demonstrate depth of knowledge
   - Very basic gist of PhD topic area
   - Committee: 3 CS faculty
   - Ideally done by end of year 3

4. **Dissertation Proposal**
   - “Contract” for PhD
   - Committee: 3 CS + 1 external

5. **Defense**
   - The big show...
   - At least 8 months after proposal

http://www.cs.pitt.edu/grad/regulations_pages.php
Tips for Success

• Work hard to finish course requirements
• Identify research areas/professors of interest
• Begin reading papers & discussing area & even attending group meetings
Tips for making the most of meetings...

When reading/experimenting:
- Take notes on the papers
- Write down questions and interesting problems
- Write up preliminary results

During the meeting:
- Take notes!
- Ask questions: It’s OK to be confused
- Agree on next steps, desirable outcomes

After a meeting:
- Reflect on meeting “minutes”
- Develop a plan for meeting expectations
- Pop-in or exchange email to address small problems between meetings
Tips for Success

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- Begin reading papers & discussing area

- Attend group meetings
- Read several papers per week
- Research! Develop your niche.
- Work on time management skills
- Success is not hours, it’s results
How do I choose an advisor?!

Key points: research interest and fit

You are unlikely to finish a PhD that you aren’t interested in...
- Use CS2001 to get to know faculty whose work seems interesting
- Take courses and seminars in these areas
- Read papers, make sure you’re interested in recent developments
- Think about whether you like theory vs. applications

You will be working very closely with your advisor
- Do you prefer “hands on” or “hands off” advising?
- Can you take direction/criticism from this person?
- Use CS2002 and course projects to test fit!

Choosing an advisor is a big decision...
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- More than smarts: Persistence!
- Time management should become an art...
- Identify larger open problem, not just many small “neat” problems
- writing, Writing, WRITING

- Good thesis or great thesis?
- To defend, you must be an expert. Are you?
- Resist the temptation to take a job before you defend. This is a recipe for disaster.
Welcome to the program!