



University of Pittsburgh

Introduction

CS 2001: Research Topics in Computer Science
Fall 2014

Dietrich School of Arts 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

Fill out the Doodle with your Friday schedules so that we can pick a reserved make-up time

-
1. Courseweb
 2. (partial) <http://www.cs.pitt.edu/~litman/courses/cs2001>



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

Part II:

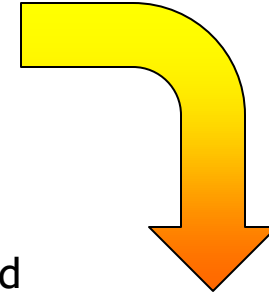


The goal of the first part of the course is to prepare you to do research



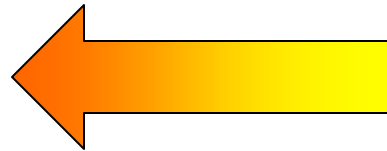
Research papers

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



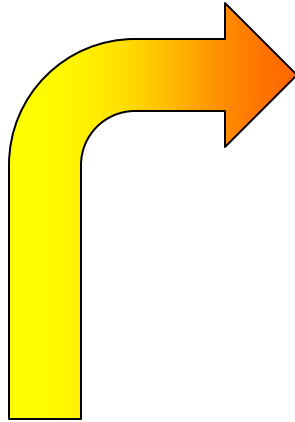
Tools of the trade...

- University computing environment
- Scripting and plotting
- Paper writing
- Peer reviewing



Communication

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



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?



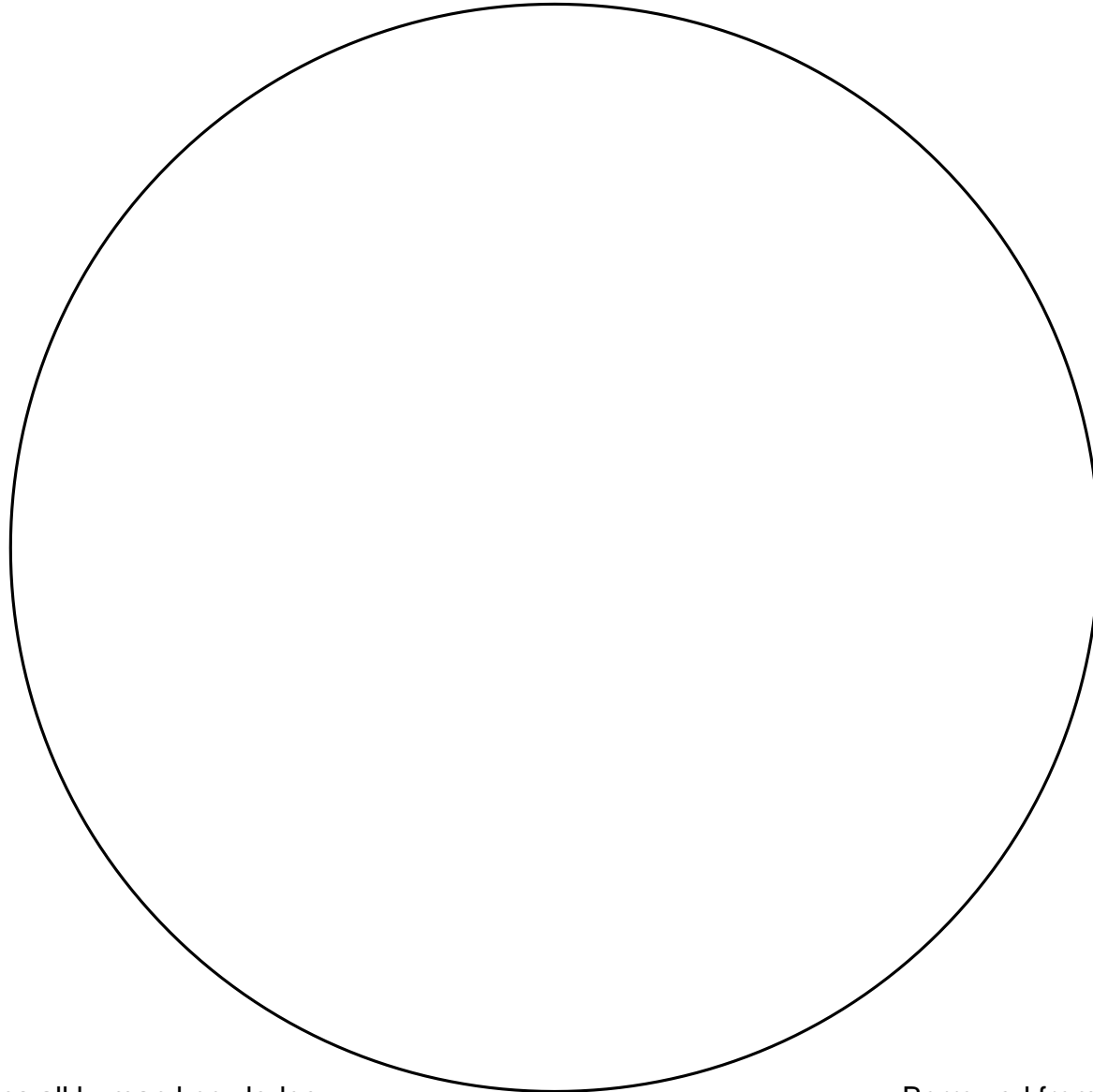
Let's get to know one another...

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

“I have no idea...” is a perfectly fine answer!



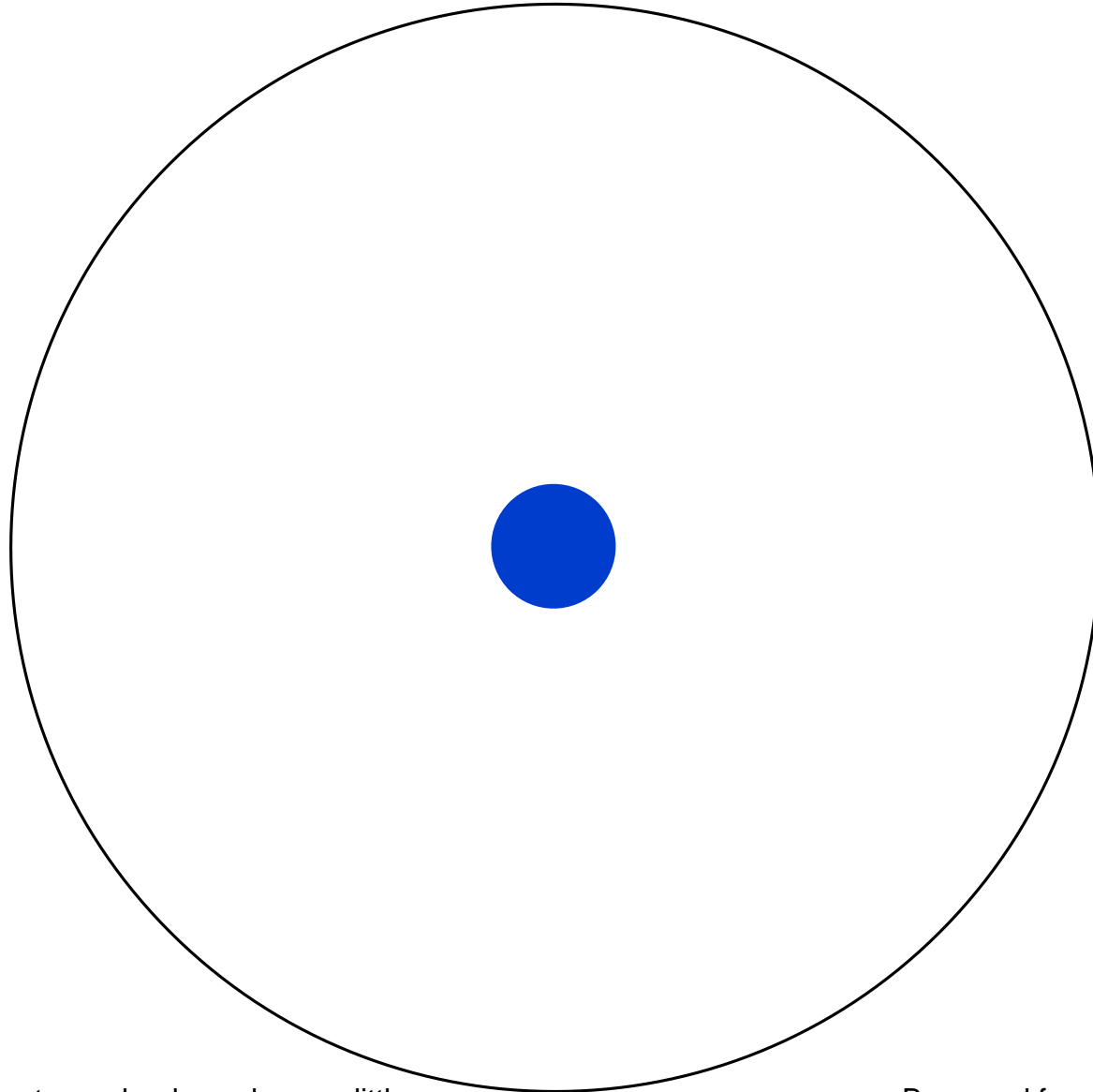
What is a PhD?



Imagine a circle that contains all human knowledge

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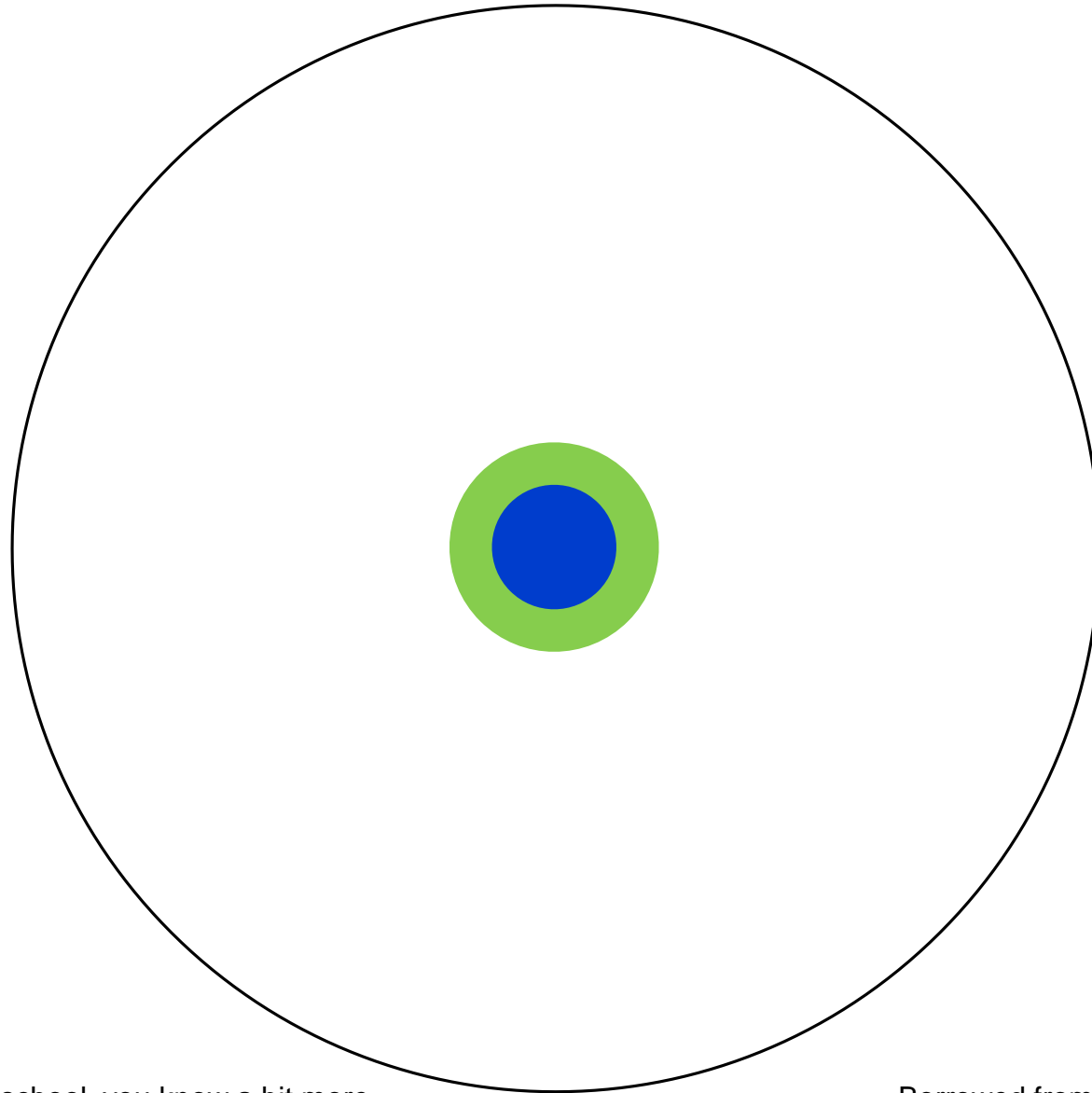
What is a PhD?



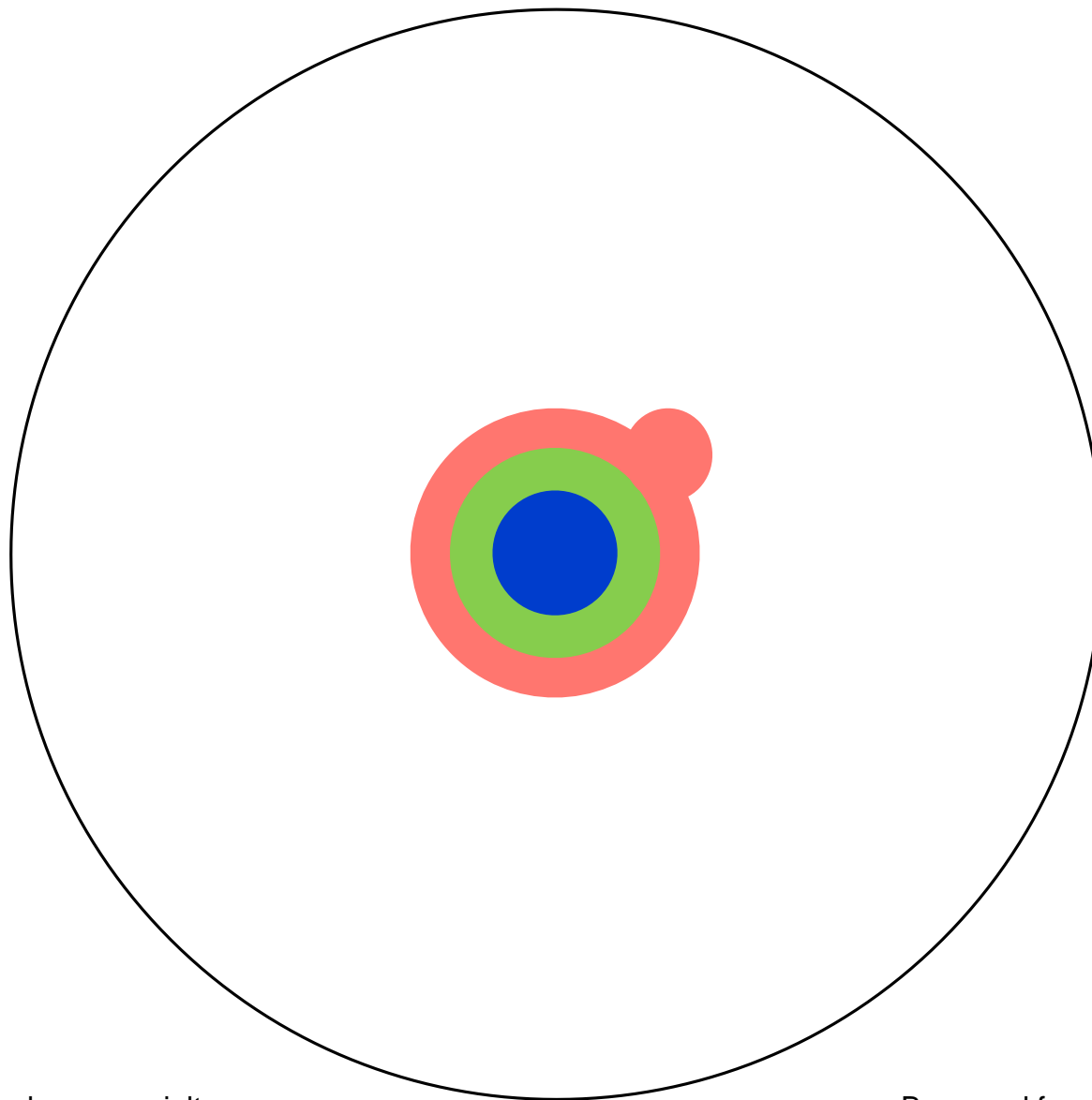
By the time you finish elementary school, you know a little

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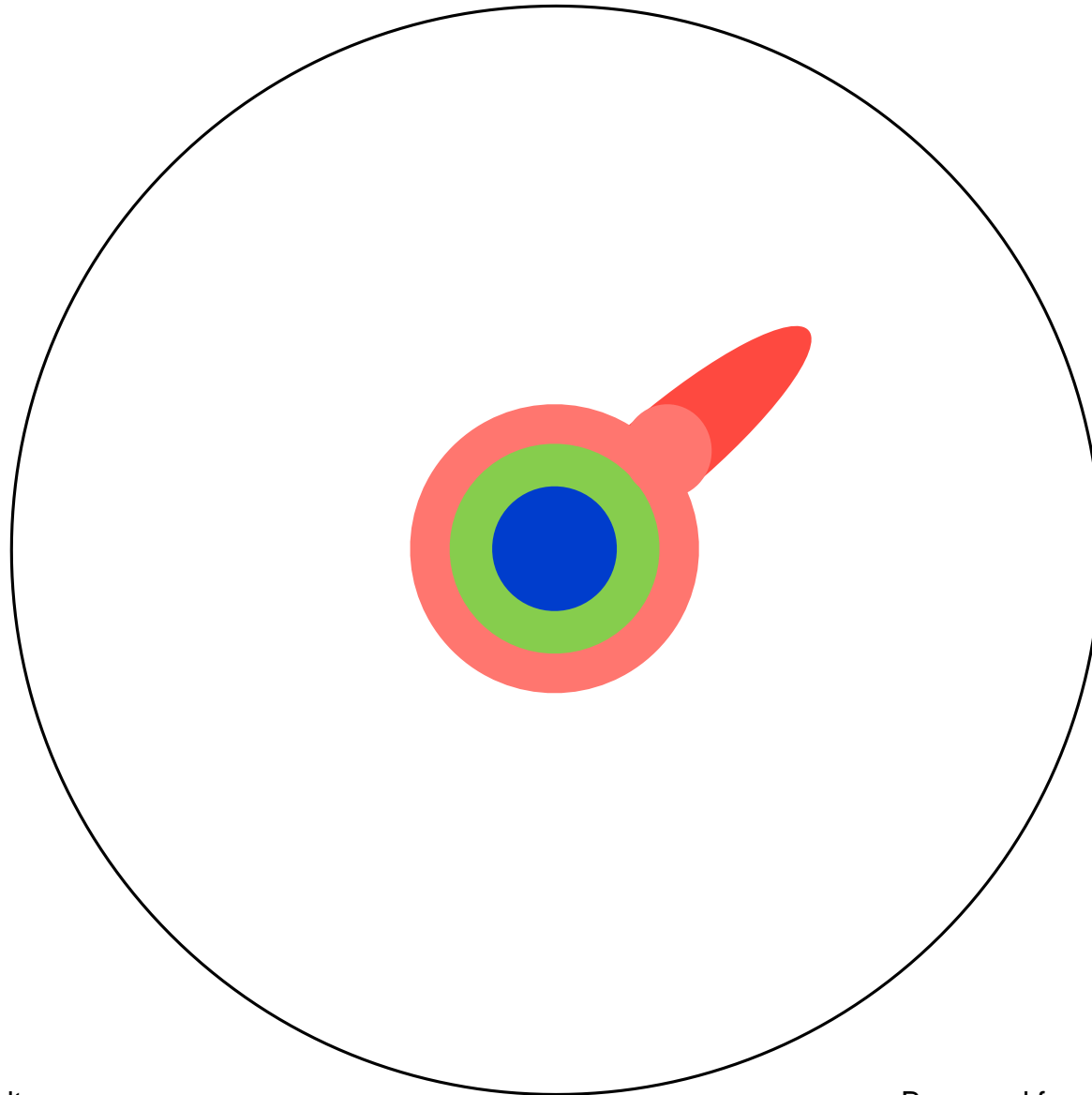
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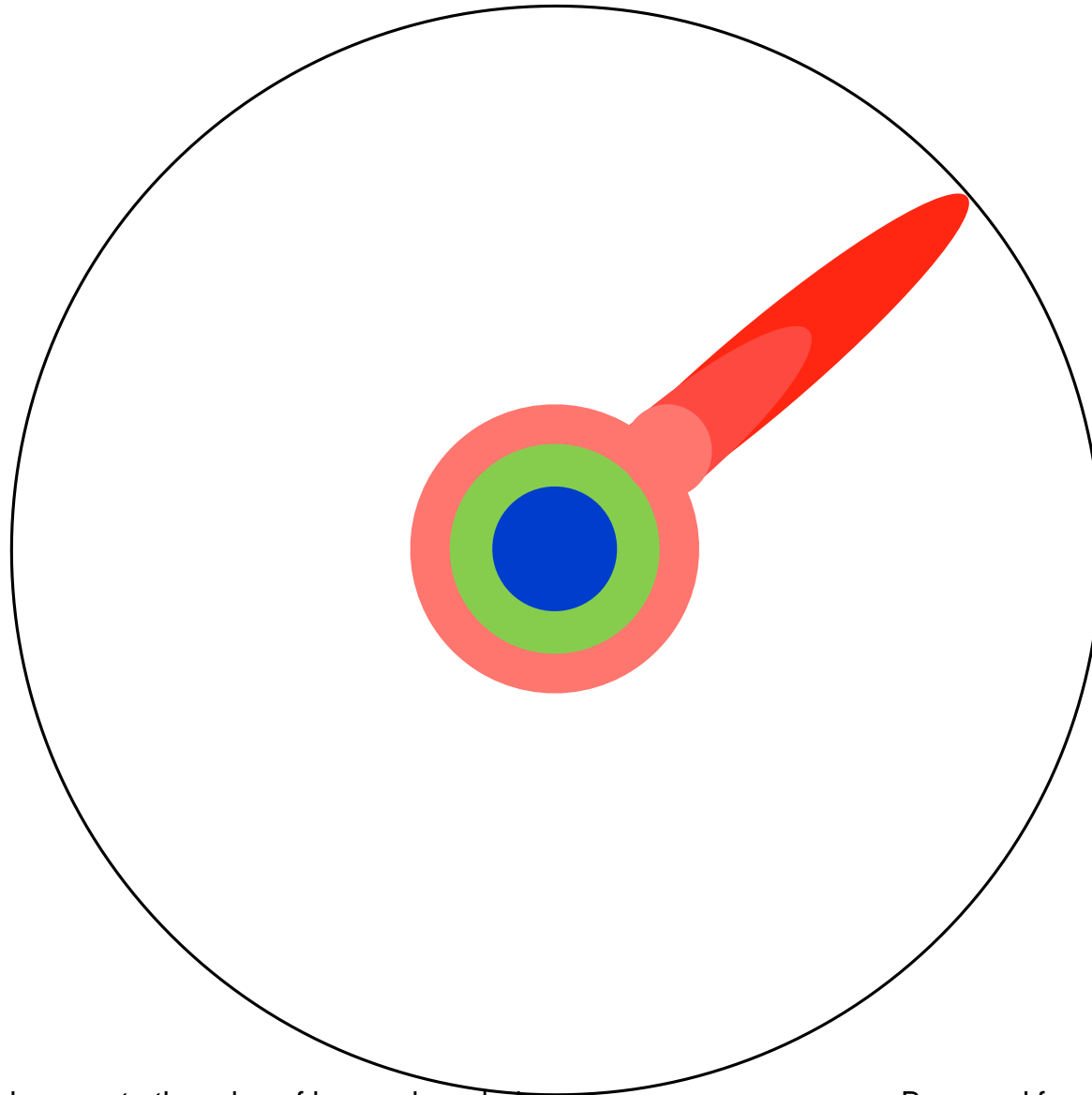
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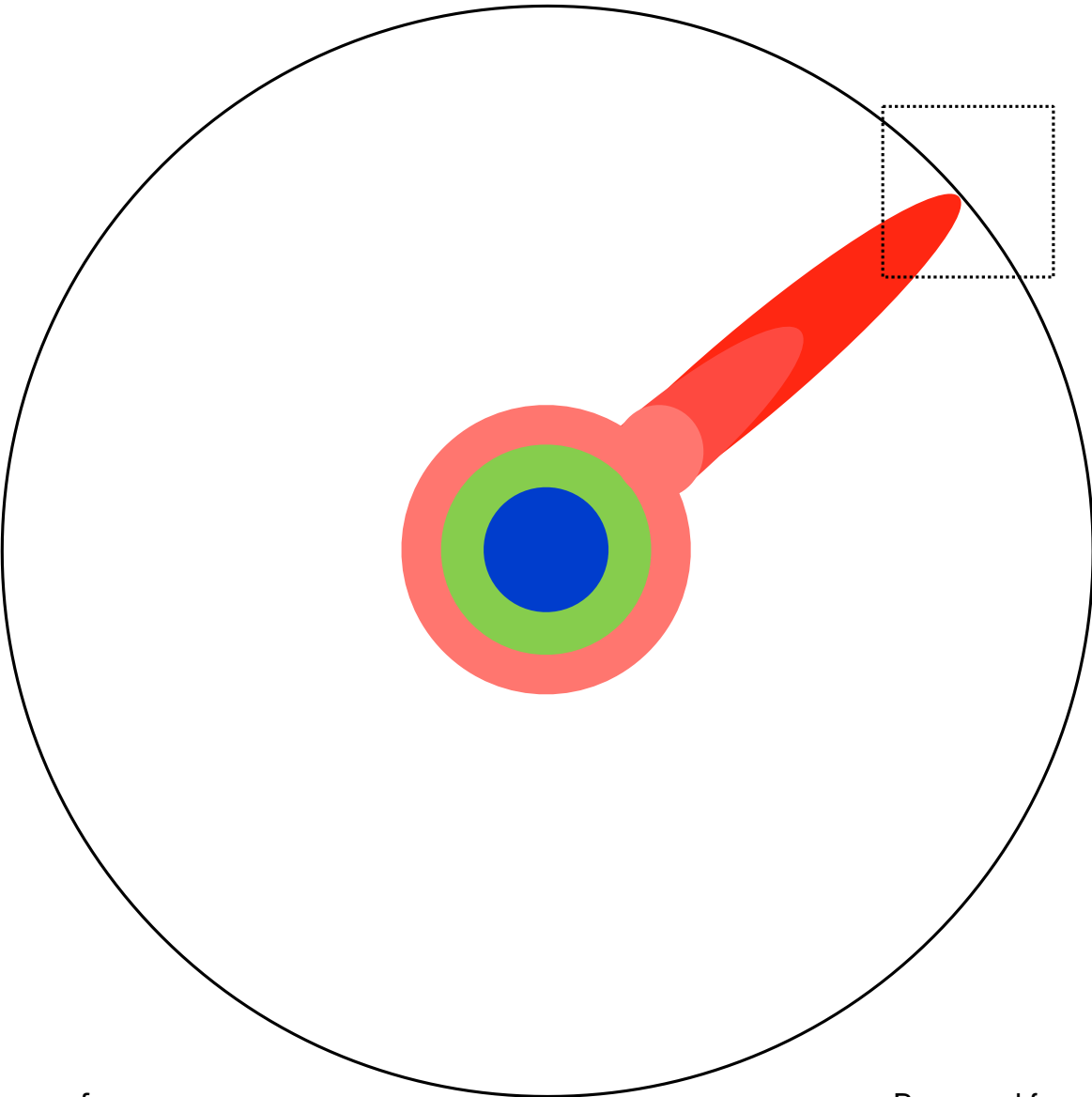
What is a PhD?



What is a PhD?



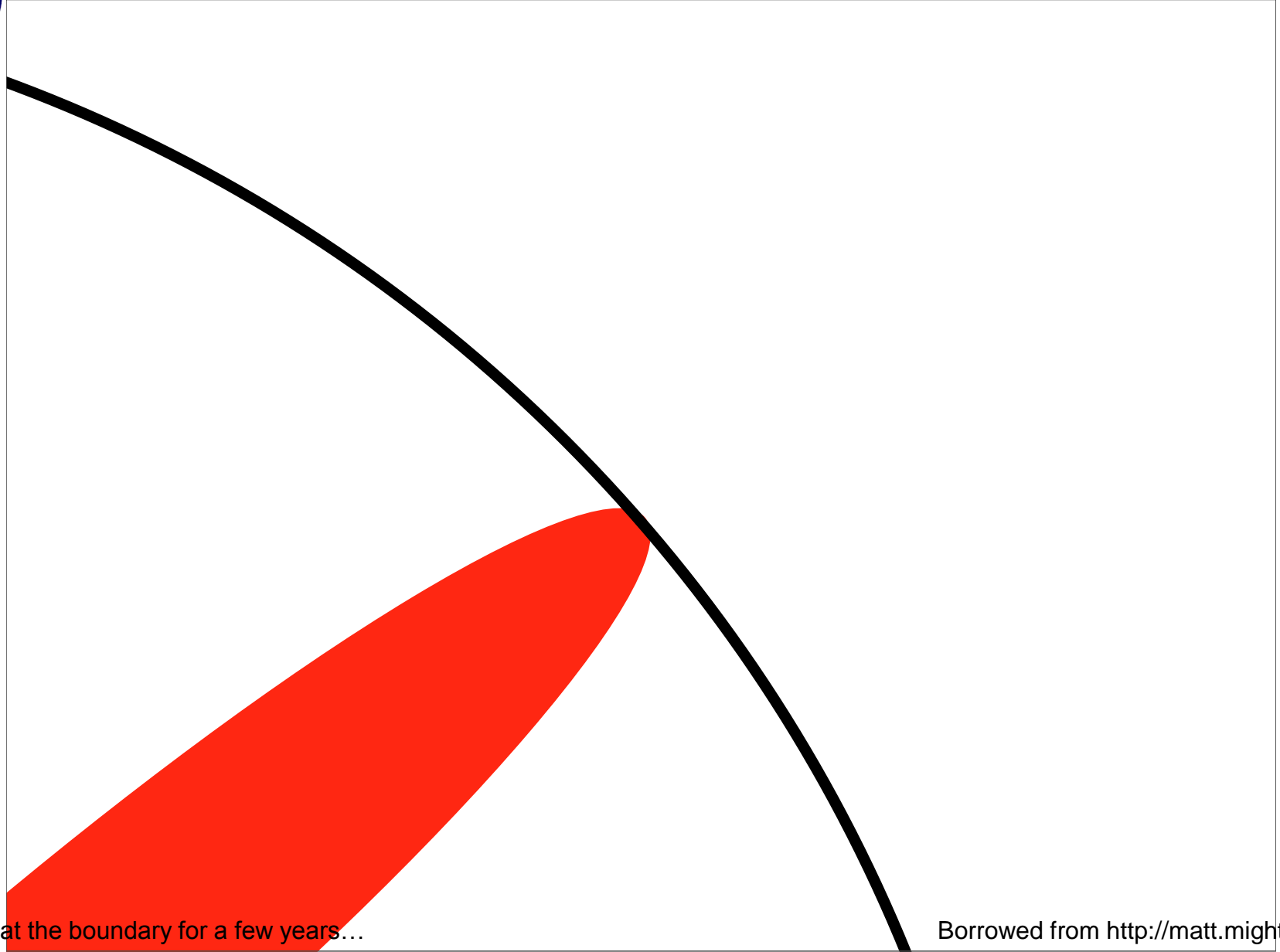
What is a PhD?



Once you're at the boundary, you focus

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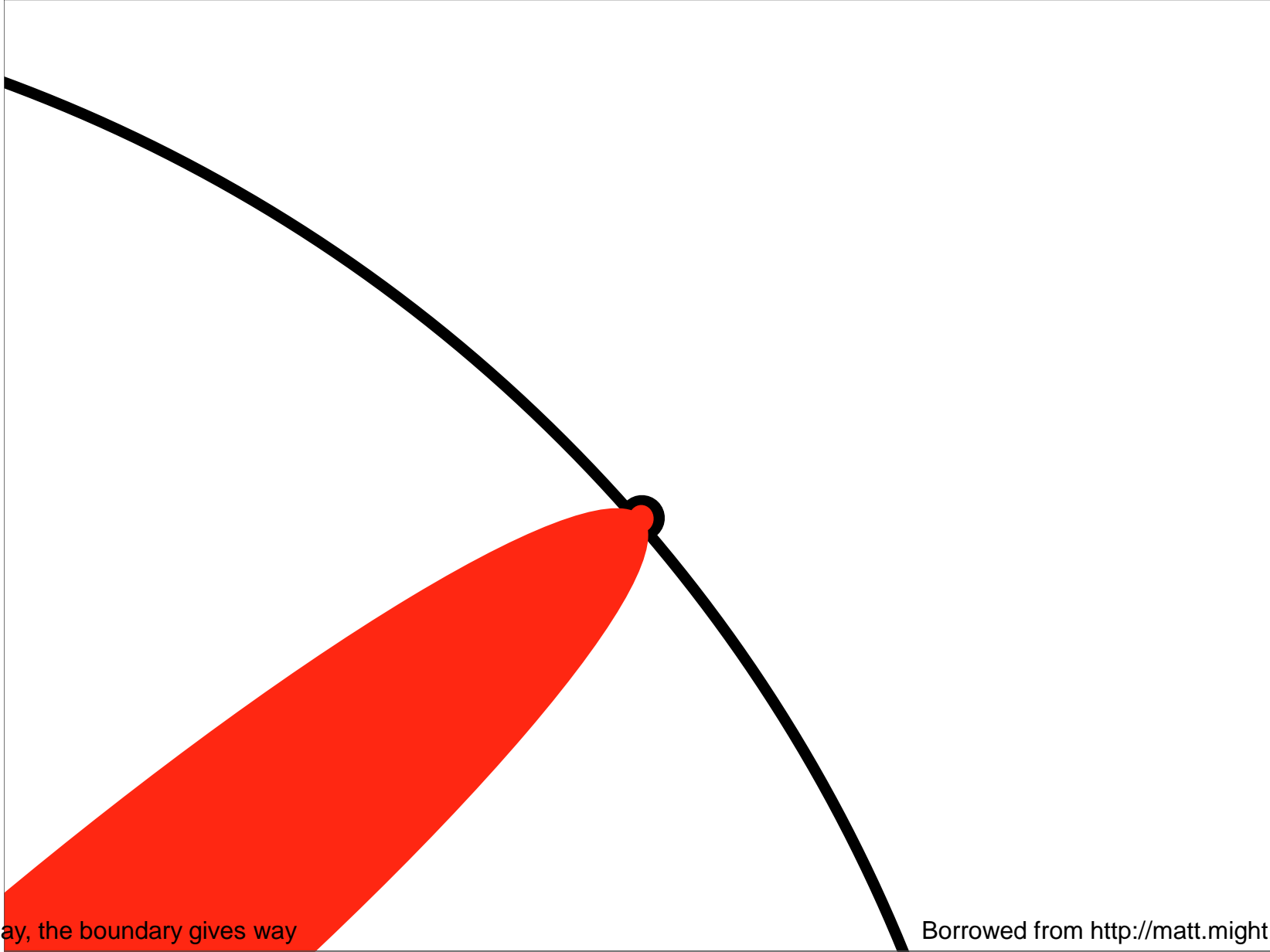
What is a PhD?



You push at the boundary for a few years...

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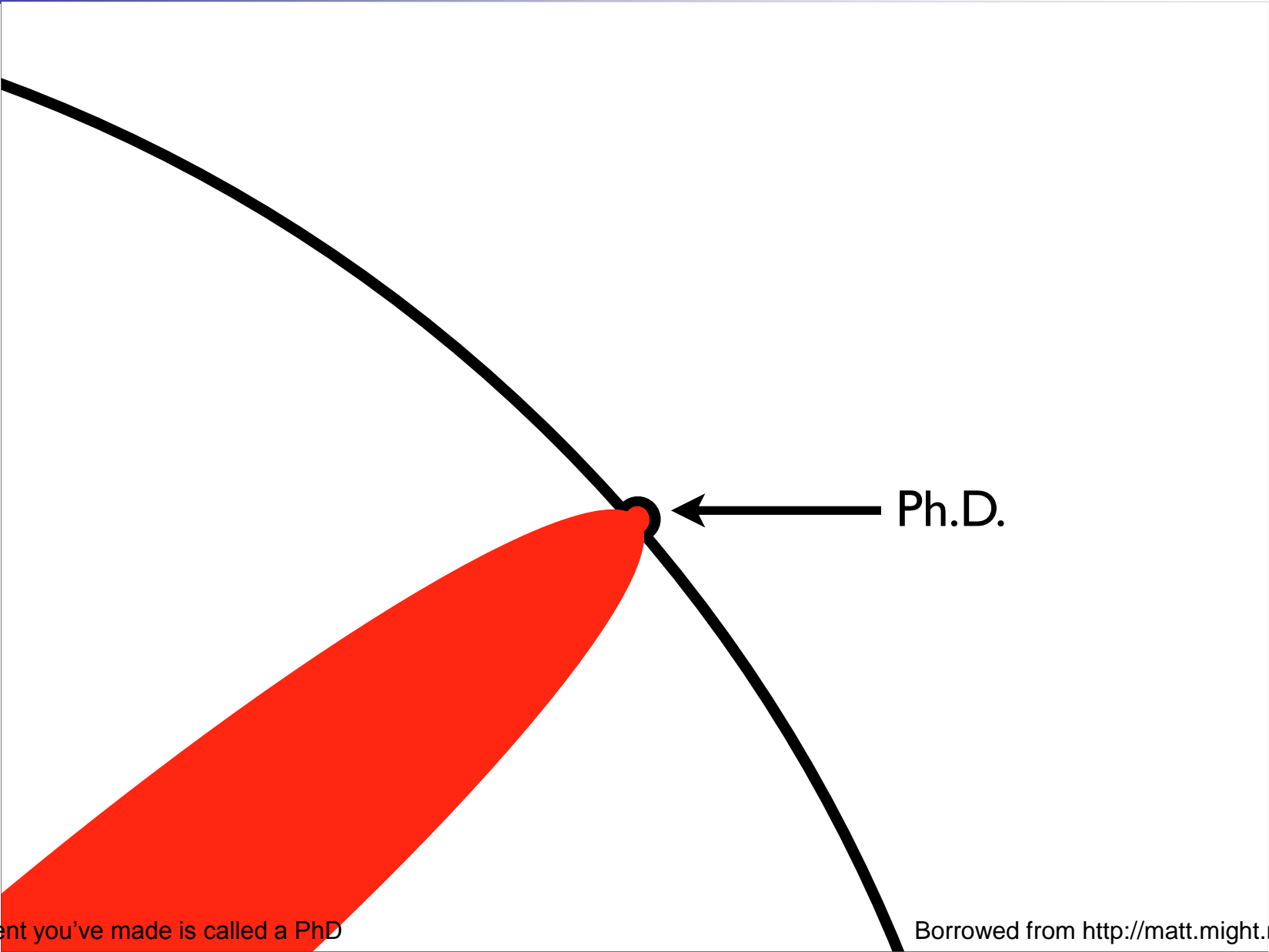
What is a PhD?



Until one day, the boundary gives way

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What is a PhD?

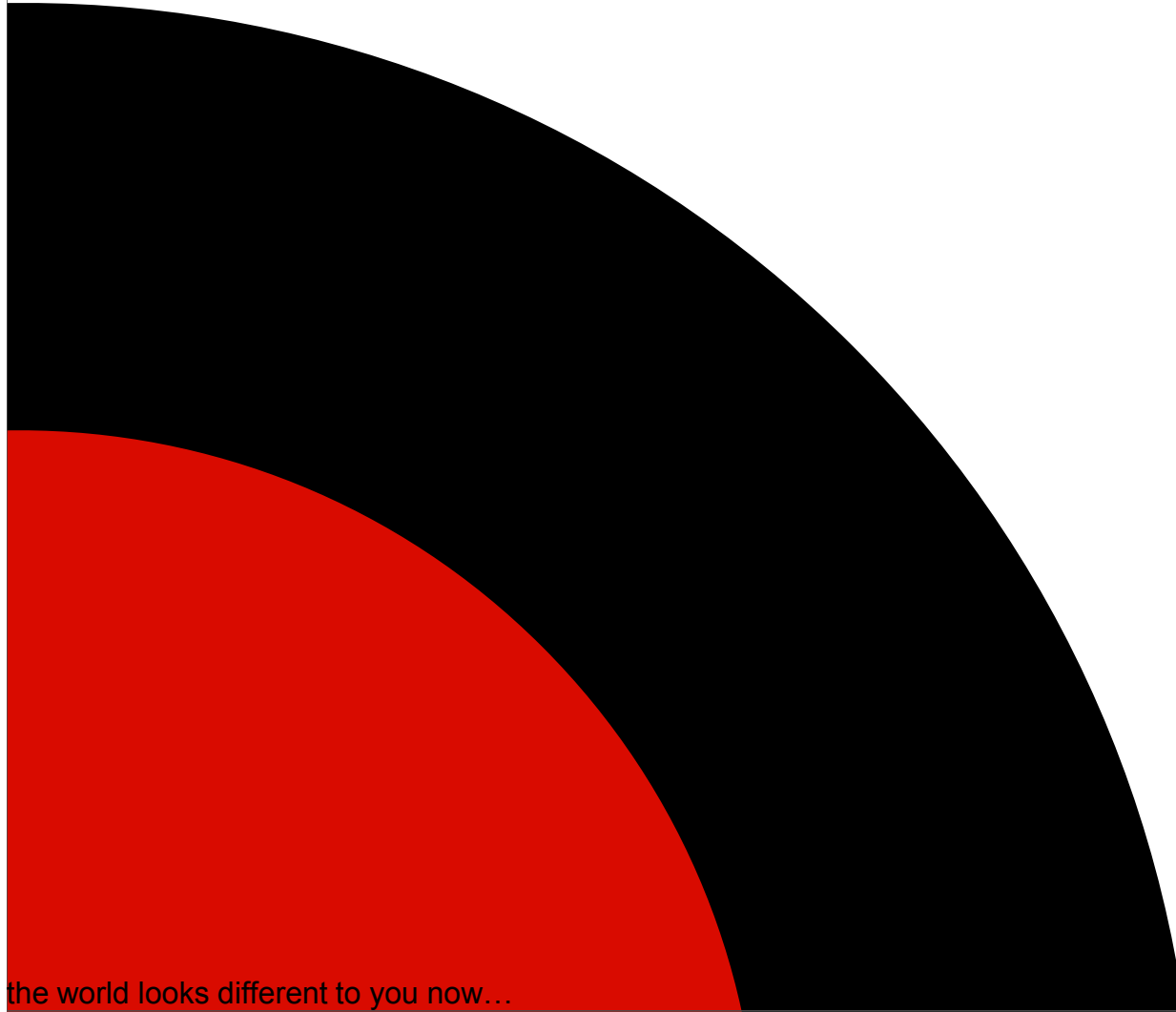


Ph.D.

And that dent you've made is called a PhD

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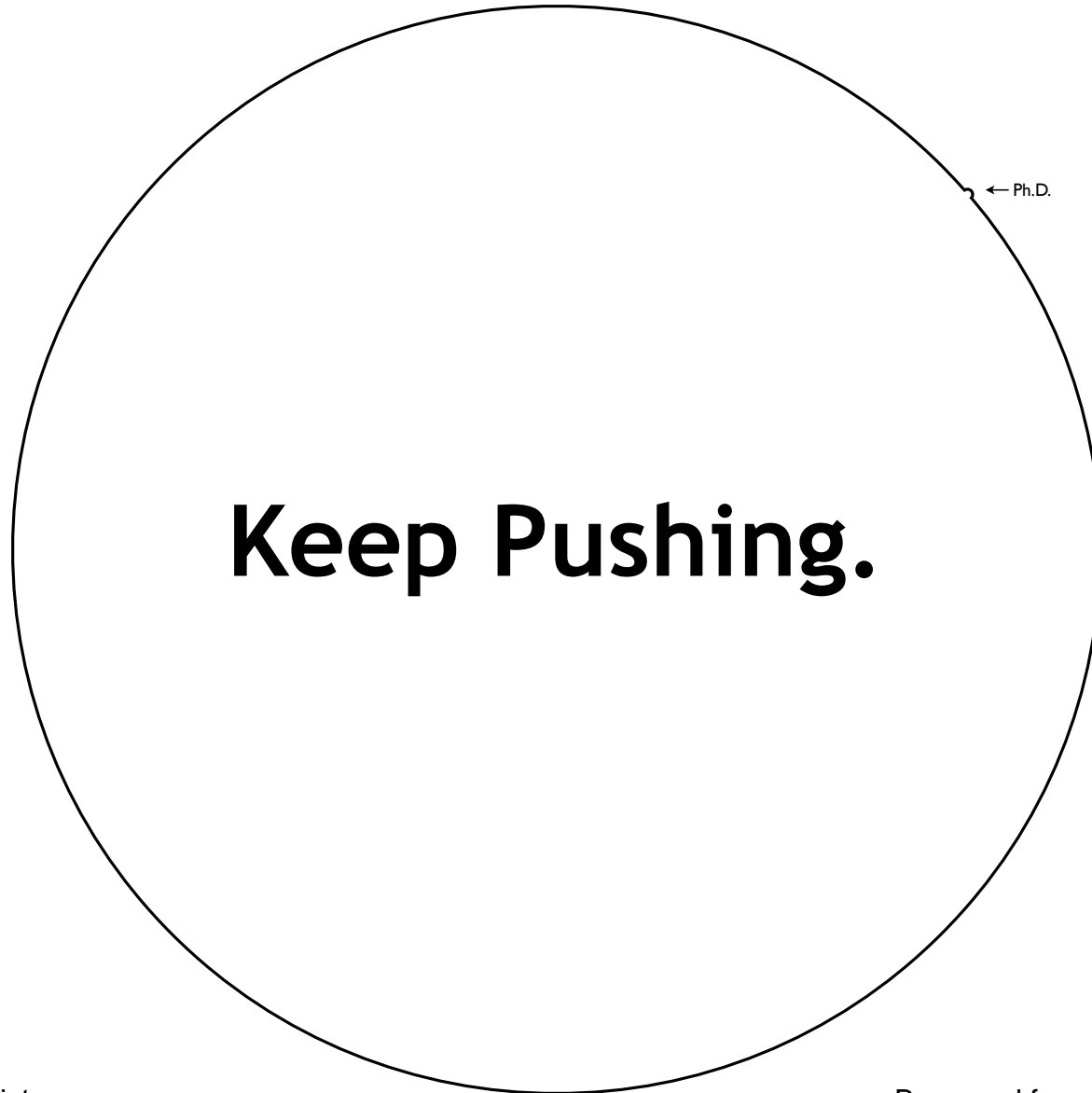
What is a PhD?



Of course, the world looks different to you now...

crowded from <http://matt.might.net>

What is a PhD?





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

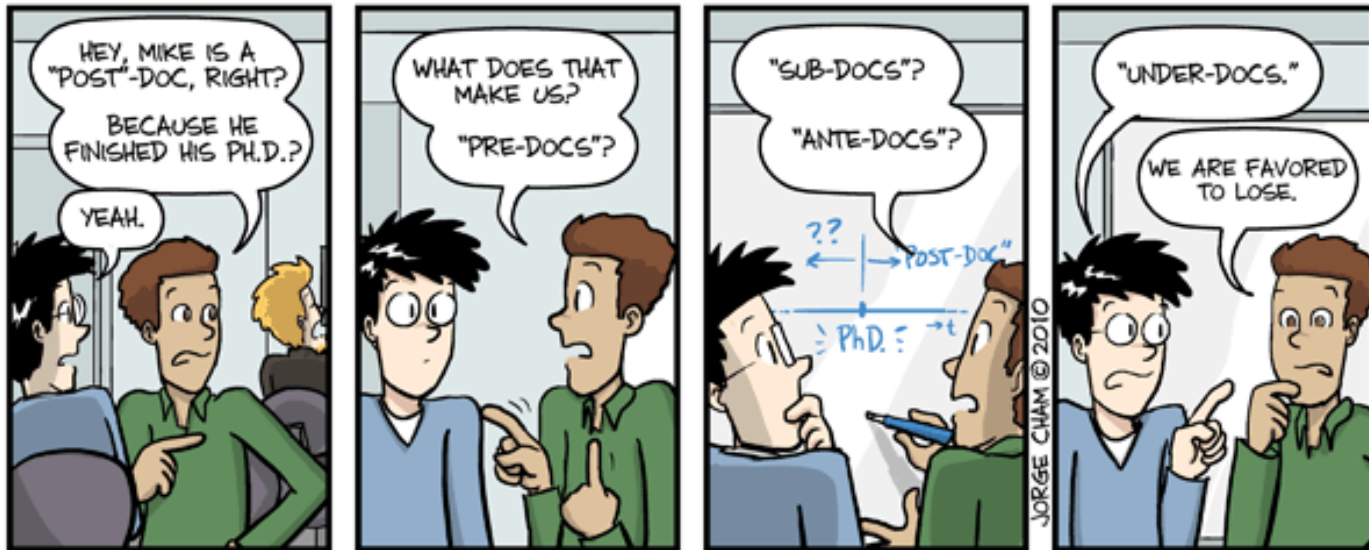
So why would anyone do a PhD?



Journey of a PhD student



- “When can I finish?” (if ever)



WWW.PHDCOMICS.COM

“prelim”

“proposal”

“comp”

“defense”



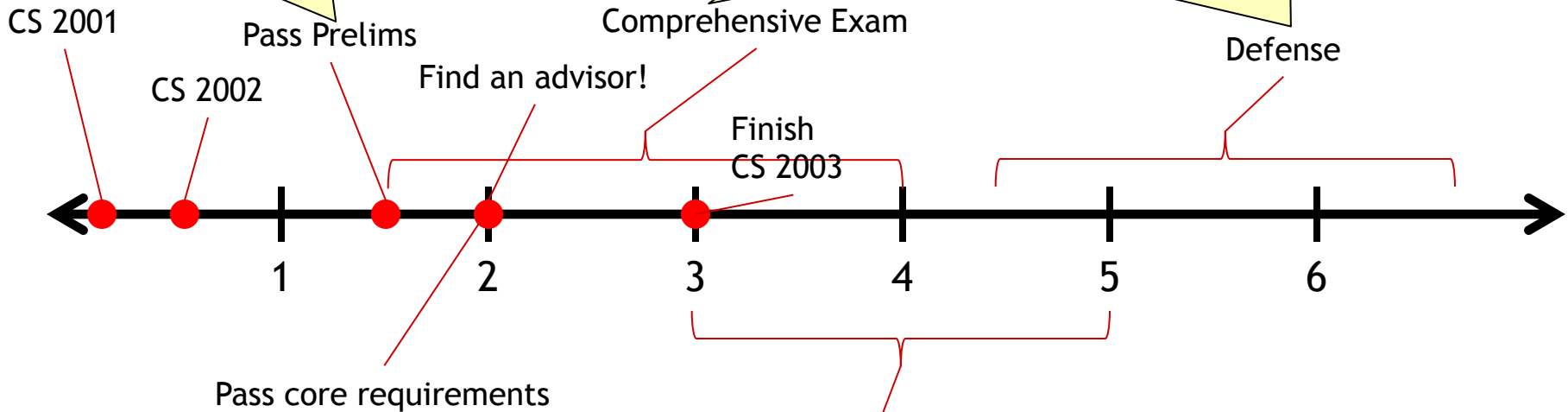
The (Abridged) PhD Timeline at Pitt



- Coursework only
- 4 Classes, A- or better
- CS 2100 - 2899 only
- Can count towards core reqs

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

- The big show...
- At least 8 months after proposal



- One course from each of
 - AI / Database
 - OS / Networks
 - Architecture / Compilers
 - Theory / Algorithms
- At least a B in each

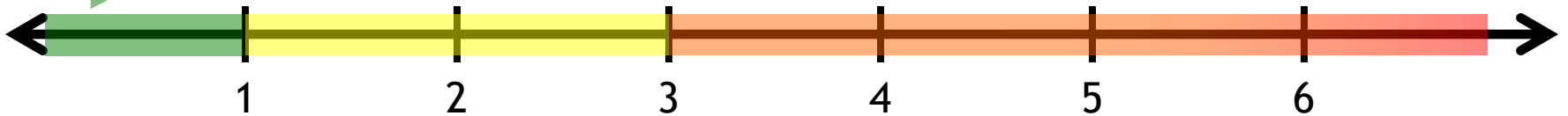
Dissertation Proposal

- “Contract” for PhD
- Committee: 3 CS + 1 external

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



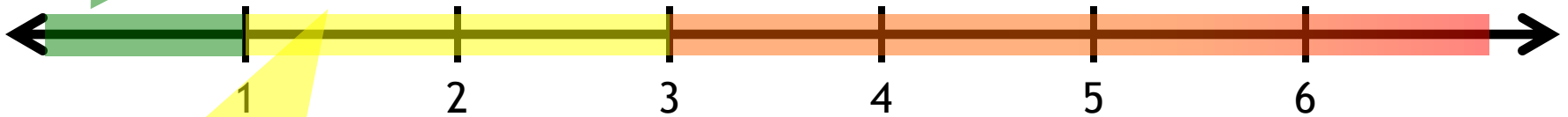
After a meeting:

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

Tips for Success



- Work hard to finish course requirements
- Identify research areas/professors of interest
- 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...

Tips for Success



- Work hard to finish course requirements
- Identify research areas/professors of interest
- Begin reading papers & discussing area

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



- Attend group meetings
- Read several papers per week
- Research! Develop your niche.
- Work on time management skills

- 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!