Grad School 101

Accel Scholars

Alex Krentsel, Fall 2024

Full Circle Moment

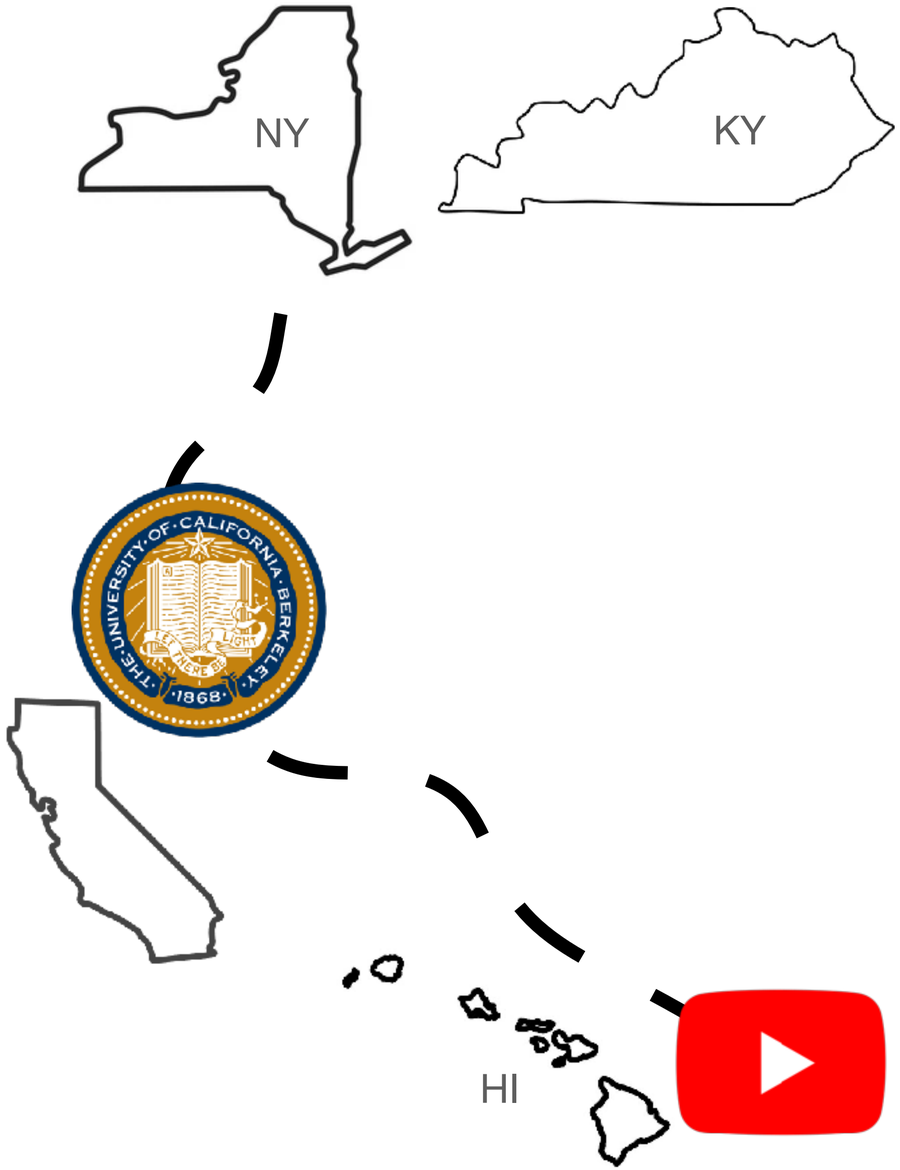
First Accel Class, in 2017

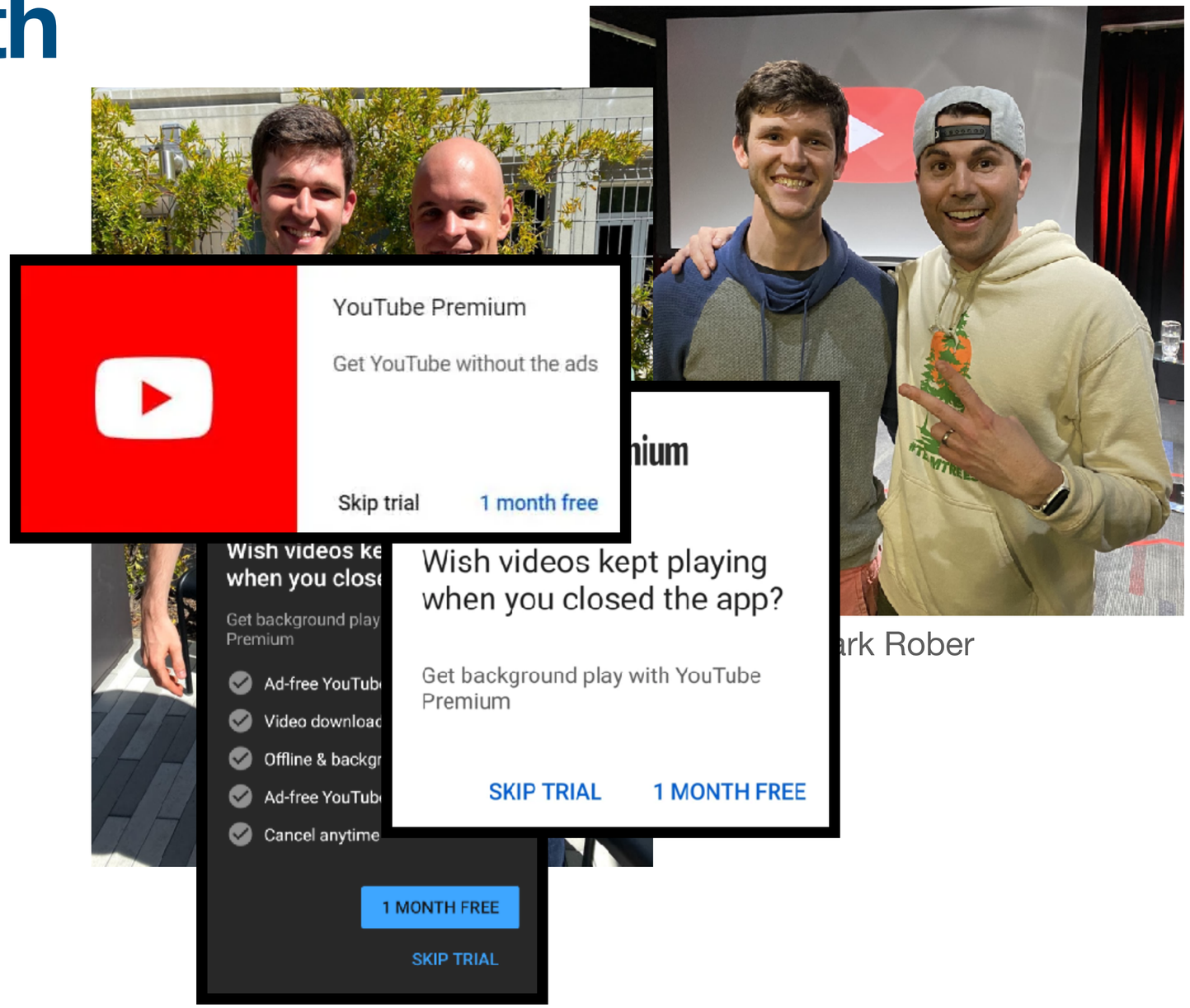
Outline

- Context on me
- What *is* grad school?
- Why to go to Grad School?
- Why not go to Grad School?
- How to get in to Grad School?

My Path to Grad School

A Meandering Path





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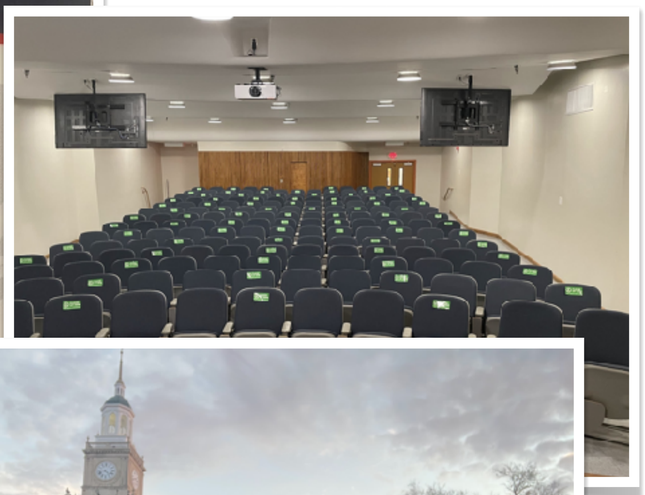
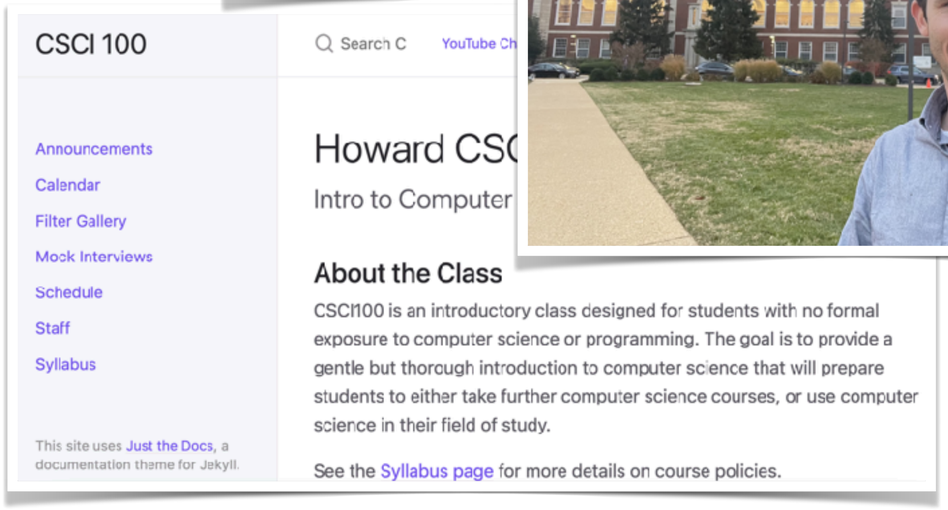
A Meandering Path





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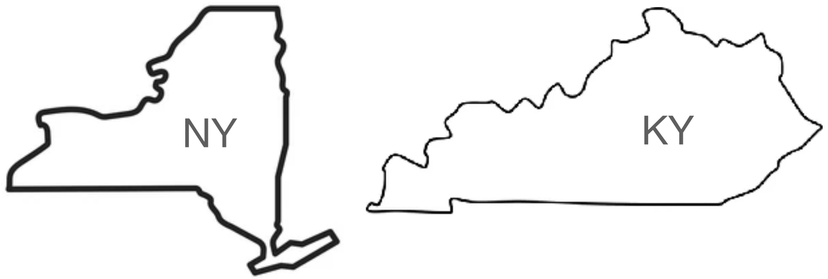

1867
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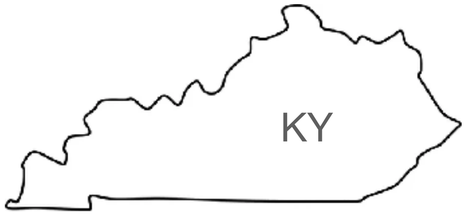
Research at Google

A Meandering Path



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DC

Scott Shenker

Sylvia Ratnasamy

Research at Google

Research at Google

What is grad school?

Grad School

- Think of it as a 5-year apprenticeship.
- Highly variable experience based on who you're apprenticed to.
- Important to pick an advisor who does things you want to learn.
- "Prestige" has more to do with advisor and less with University.
  - For ex: in systems, UW easily beats Harvard.
- "Top" grad schools are those that have very good faculty in each area.

Goal of Grad School

People say…

“Publish academic work”

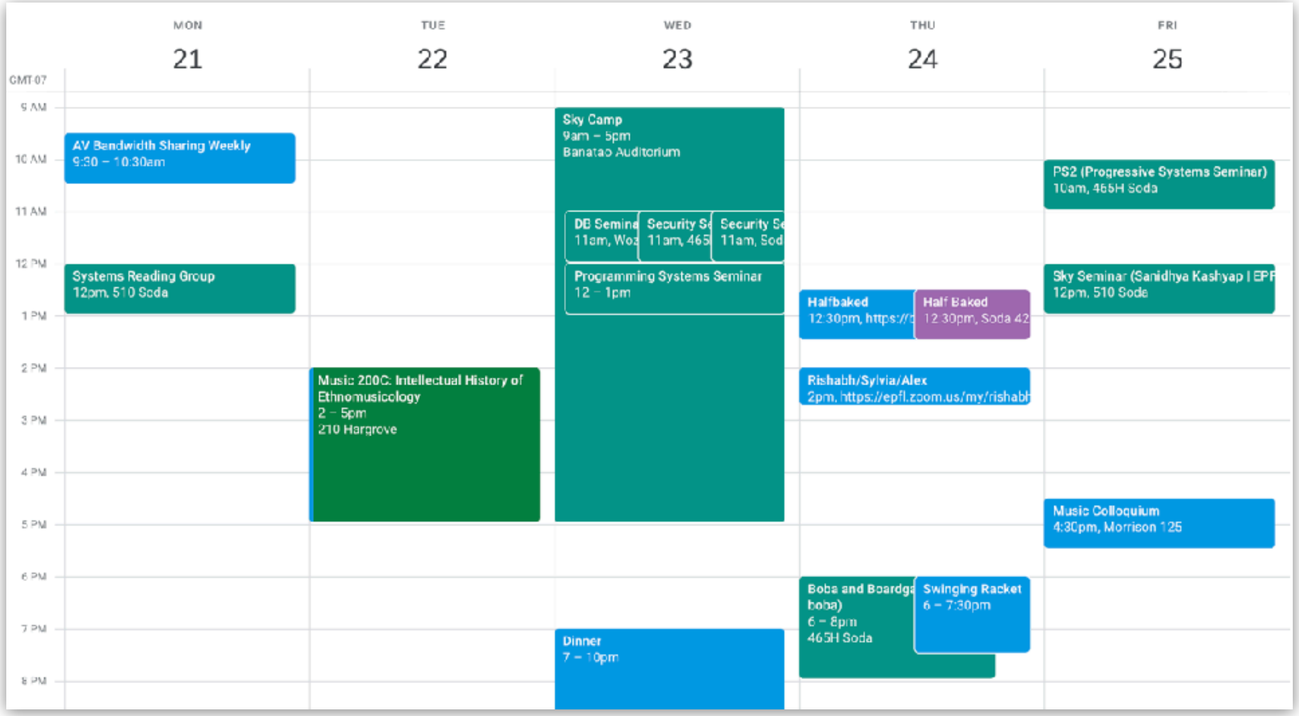
“Learn to do research”

“Contribute to academic discourse”

My experience: learn to sniff out valuable problems, think clearly, and bring structure to ambiguous spaces.

Life as a Grad Student

Day-to-Day

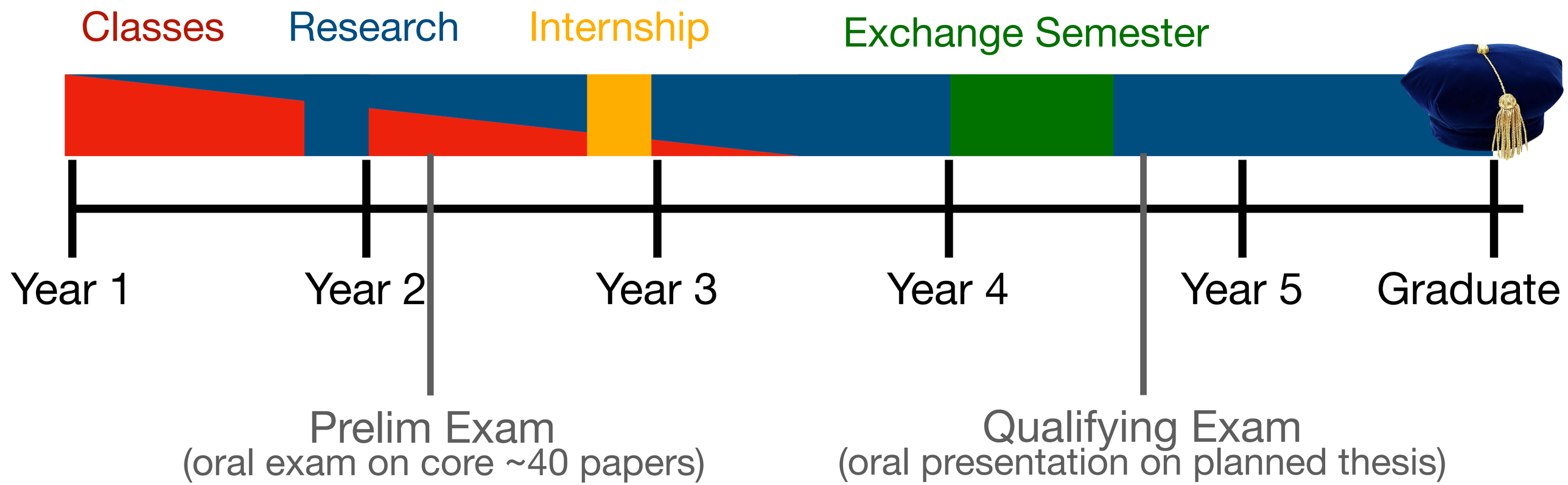


- Soda, soda, soda
- 0-2 meetings a day
- Research talks 2-3x per week
- Advisor meeting 1x per week
- Read a few papers a week
- Occasionally go to class
- Lots of time at a whiteboard and coding

Life as a Grad Student

Over the years

- Travel for 1-2 conferences a year, but generally time spent on campus.



Masters vs PhD

Masters	PhD
You pay tuition (**$50k**) + expenses (**$25-40k**)	Tuition is free, you get *paid* (**+$48k**)
Typically 2 years (1 year at Berkeley)	5 years in AI/ML 6 years in Systems
Varying degree of advisor support, usually working with senior PhD student	Close apprenticeship with professor advisors
Produce a thesis covering one conference-quality paper (~20 pages)	Produce a thesis covering a new research direction over 3-6 papers (~100-200 pages)

(For CS PhDs, you get a masters “along the way” for free when you finish your classes)

Types of Masters: Class-based vs Research

- Class-based:
  - Generally called “M. Eng.”, but occasionally M.S. (such as Stanford’s)
  - No advisor, no thesis/research component, more semesters of classes
- Research:
  - Always called “M.S.”
  - Assigned advisor, required research component, some classes, produces thesis

My advice: Absolutely **do *not* do** a class-based masters

- Berkeley classes are super hard, you’re already very well prepared
- For any specific topic, you can *always* go through material on your own
- Academia doesn’t respect it, industry doesn’t need it

Should you go to grad school?

Reasons *not* to go to Grad School

- “I want to make money and enjoy life” $\Longrightarrow$ grad school doesn’t pay much…
- “I want to be paid more when I graduate” $\Longrightarrow$ near-equal salary
- “I want to chill before going to industry” $\Longrightarrow$ grad school is a grind
- “I loved undergrad, I want more!” $\Longrightarrow$ grad school more like a job
- “I’m not sure what I want to do, I need more time”

  $\Longrightarrow$ lots of easier and quicker ways to find clarity
- “My parents told me I should do it, and they’ve been right before…”

  $\Longrightarrow$ totally different context in CS, in silicon valley, in age of ML explosion

Reasons *to* go to Grad School

- “I want to be a professor, lecturer, or industry researcher” $\Longrightarrow$ all require PhDs
- “Freedom to follow own ideas/research directions” $\Longrightarrow$ great freedom in PhD
- “I want to do a deeply technical startup” $\Longrightarrow$ PhD depth is unmatched
- “I want to learn how to do research” $\Longrightarrow$ PhD is the place to do that
- “I want to think 5+ years out”

  $\Longrightarrow$ much of research process is imaging the world 5+ years out, what’s missing?
- “I want to work with / learn from academic Person X”

  $\Longrightarrow$ apprenticeship gives you un-matched access to top people

Reasons that shouldn't sway you either way

- "I like mentoring people"

  ⟹ Both allow for lots of mentoring. Good managers do lots of this in industry!
- "I want to be deeply technical"

  ⟹ Lots of deeply technical roles in industry
- "I want to do a startup eventually"

  ⟹ Industry good for getting plugged into startup community, but lots of startups come out of academia research, esp. in systems and ML
- "I'm smart, and smart people do _____"

  ⟹ Tons of super smart people in both academia and industry

But really, should you go to grad school?

- Entirely context dependent for what you want to do. Grad school is long & hard.
  - Consider the opportunity cost.
- **Critical**: know *why* you're doing it and what you want to get out of it. Ex:
  - "I want to properly learn how to do research."
  - "I want to learn how to recognize community needs and build open source ML infra." (…go to Ion Stoica's group)
  - "I want to be able to join an industry research group."
  - "I want to learn advanced theory." (…go to a theory group)
  - "I enjoy research thinking, working independently, and having complete ownership over my ideas."

Path to Grad School

Finding your Research Area

- Broad categories: ML/AI, robotics, systems, theory, HCI, …
  - Publishing cycles vary from 3-6 months in ML to 1-2 years in systems
- Each area has own style of thinking:
  - …“Layers of abstraction” for networking systems
  - …“attacker/defender games” for security
  - …? for ML?

Look for something where the thinking style is exciting and clicks for you, and research environment matches your lifestyle.

Path to Grad School

…if I were in undergrad again

- Aim to sample classes in ML, systems, theory to see what thinking you like
- Read some papers in your area of interest, join a reading group
- Find a grad student to try research with
  - …ask your GSI, ask your prof in office hours, cold email (correctly)
- Be *consistent* in your research attempt, not flaky
- Take the GRE (maybe)
- Apply

Admissions: Behind the Scenes

- Core thing to communicate: “Demonstrated research ability”
- I was on admissions committee at Berkeley last year
  - Acceptance rate for top programs: 0.5–2%
  - Grad student committees filter from 1000s of apps to top couple hundred
  - Professors review to select their top 1-2 each
- letter of recommendation is very important, mores than just publications
  - We reject some people with 4+ publications
  - We accept some people with 0 publications
- Masters not necessary or even expected
- Come talk to one of us Accel alum PhDs for advice on building your app…

Misc Slides

Product SWE vs Systems Research

- **Focus**: drive user-facing metrics
- **Effect**: Move as quickly as possible
- **Time split**:
  - Coding (30%)
  - Design Docs (30%)
  - Meetings (40%)
- **Project timelines**: 2-4 months
- **Promotion**: metrics-driven, clear business impact

- **Focus**: Predict and solve system problems based on trends.
- **Effect**: understand as deep as possible
- **Time split**:
  - Whiteboarding/Prototyping (35%)
  - Reading/Research (30%)
  - Coding (20%)
  - Meetings (15%)
- **Project timelines**: 1-2 years per project
- **Promotion**: eventual production landing

More Topics of Discussion

- How to pick an advisor?
- Choosing where to go?
- Special note: how to come back to grad school from industry?
- Publishing your first paper
- Deciding between schools
- 5th year masters?
- …