MASTER'S VS. PH.D. WHICH ONE TO CHOOSE? HOW FAR TO GO?

A.J. Brush, Microsoft Research

Rita H. Wouhaybi, Intel Labs

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Revisiting Choices

Nearing the end of your first year in either a Ph.D. or MS program, the questions are:

1. Am I in the best program for me, based on a better understanding of
   - ✧What I want (what I love / what I dislike) in the graduate school experience?
   - ✧What I want as a future career path?
2. If not, then how do I get onto my preferred track?

Turn and Talk to your neighbor

What is my plan: MS or PhD?

What I want (what I love / what I dislike) in the graduate school experience?

What I want as a future career path?

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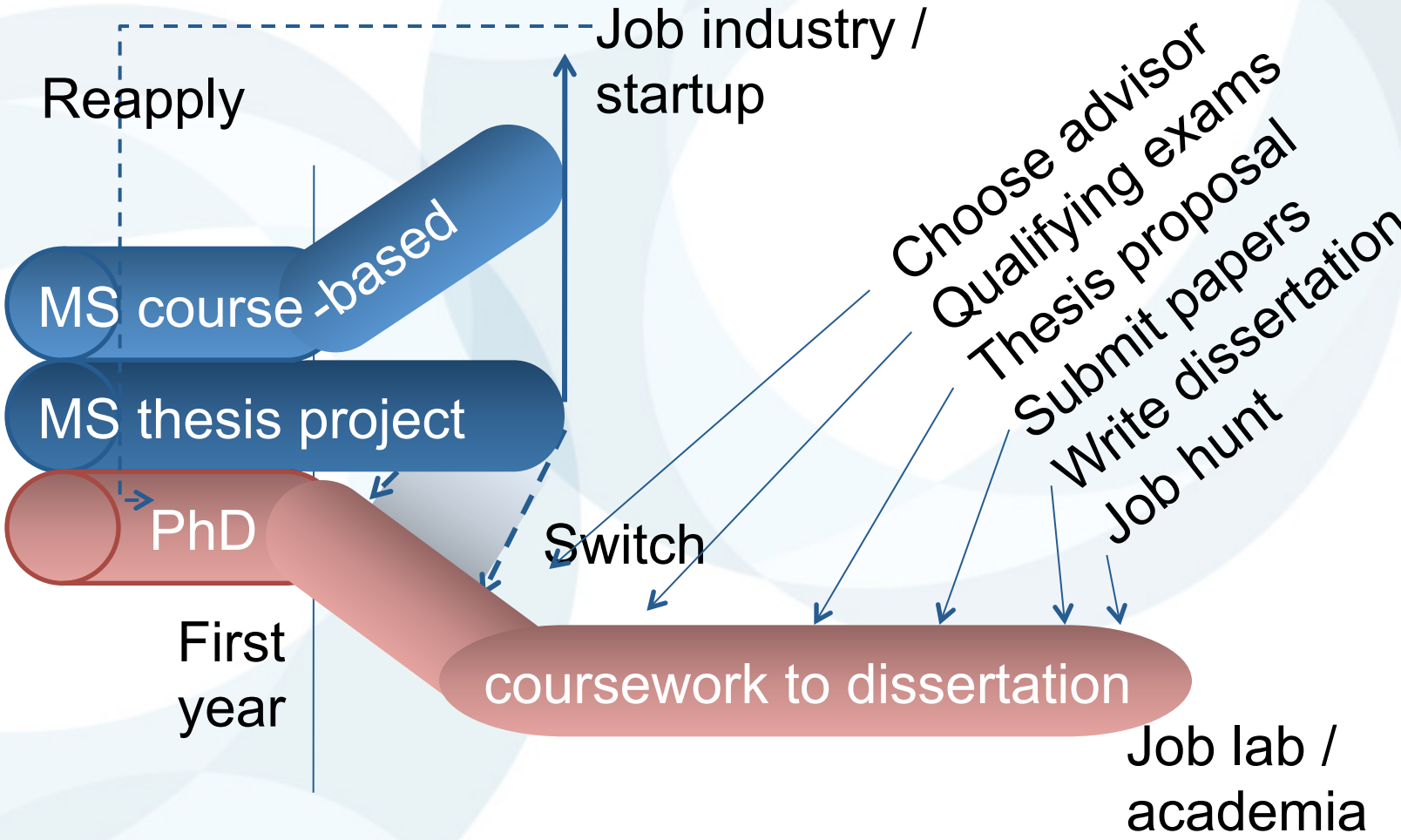
Grad School Paths



Who's in the Audience?

How many currently in master's programs?

- Course masters?
- Thesis masters?

How many in Ph.D. programs?

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Course vs. Research Master's

Course Master's

- Breadth of knowledge may qualify you for marketing, project management, product management roles
- If that's what you want, take some business classes!
- Lack of major project may be a handicap for development roles

Research Master's

- Deep project may qualify you for more interesting development roles
- Much more attractive for a research lab position
- Thesis will help with publications

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Program Comparison

	Course Based MS	Research MS	PhD
Educational Goals	Acquire knowledge via coursework	Acquire depth & project skills (thesis) Get a taste of research	Do original high-impact research Learn the skills for more research
Program	Courses are more deep Short time (job hunt) Networking opportunities	Research is not as deep as Ph.D. Shorter commitment Less publications/ impact	Long process

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Master's Career Opportunities

Types of Jobs:

Operations (consulting, system administration, technical support/ troubleshooting, web site management)

Product or application development (design, code and/or test new software, User interface design, human factors analysis and testing, technical documentation, program or product management, project management)

Research support (Contribute to prototyping and publications)

Employers:

Information Technology (IT) companies (Software, hardware or services companies, Start-ups, Spectrum of established companies (small to big)

Companies in other industries: (Banking, insurance, telecommunications, healthcare, environmental engineering, manufacturing, travel, …)

Universities (Typically in support roles)

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Ph.D. Career Opportunities

Research or advanced development in industrial research labs

Development leadership roles in industry

Technical project management / leadership

Academic research and teaching in a university as a professor

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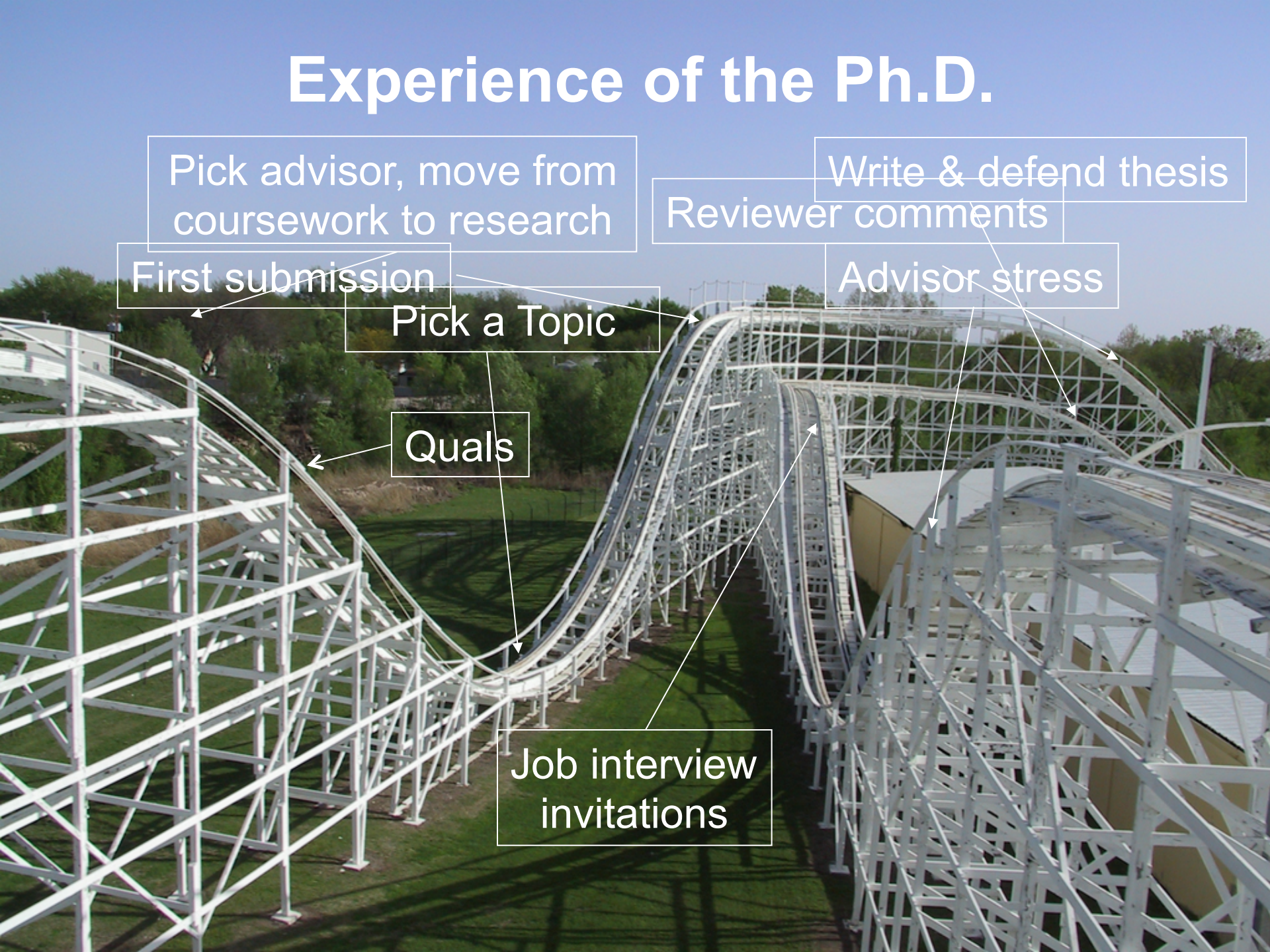
Experience of the Ph.D.



Lessons from the Roller Coaster

The ride is similar for most people

You *are* qualified for the ride. It's scary for everyone.

You aren't alone. Share your experiences.

It takes externally applied energy for the uphills

Your advisor will be a key person (later session on this).

Seek support from many sources (technical, emotional)

There are a lot of downhill sections

Frustration & doubt are *guaranteed*. Things can go wrong.

Momentum is important

Keep moving forward. No side trips to distract.

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Setting Research Goals

- PhD research requires redefining success
  - Class performance is not as important as before
- In research, nobody knows the answer!
  - And half the challenge is in asking good questions!

You're in the pilot seat

not yet sure of your destination

need a capable crew to help you fly

- Network, mentors, friends.

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Technical Ladder Example

	Level	Contribution and Impact	Expertise
	Fellow/Senior Fellow	Multiple product lines or technologies	Top tech leadership, impacts the industry
	Principal Engineer/Senior PE	Group product line or technology	Technical authority, impacts a business
	Senior Staff Engineer	Multiple Products	Project-wide expert, impacts a product
Ph.D. →	Research Scientist	Product; Project Methods	Expert in area of contribution
M.S. →	Senior Engineer	Portion of a Product/Project	Working knowledge in one area of contribution
B.S. →	Engineer	Portion of a Product/Project	Working knowledge in one area of contribution

Industry Career: Research and Industry Impact

Research

- Engage in scientific discovery, collaborate with peers, fund research (but typically later in career, possibly internal funding)
- May involve university faculty and students
- Develop creative thinking around technical solutions to problems

Technology Transfer

- Contribute to company's products, client engagements, open source, intellectual property…
- Demonstrate strong problem-solving skills
- Publish work and engage with academia

Service

- Departmental (hiring committee)
- Company-wide (promotion review board)
- Professional

Expected to do all three well!

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What can I do now to prepare for a job in industry?

Complete a project(s)

- Industry has shifted considerably to applied research

Get an internship(s)

- Try out a corporate culture, job type, industry
- Find mentors/supporters of your career
- Publish your work with co-authors

Acquire key skills

- Building your professional network, communication, negotiation, making yourself visible

Check your competition

- Who works at this company
- Who is graduating soon in your field from other (top) schools

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Academic Career: Research, Teaching and Service

Research

engage in scientific discovery, involve graduate and undergraduate students, fund research

Teaching

active teaching, mentoring, advising

Service

Departmental

University

Professional

Expected to do all three well!

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Different Types of Colleges

Research universities: Ph.D. program - emphasize *research* – but teaching, service important

Colleges/universities: M.S. program- emphasize *teaching* – but research & service also important

Selective liberal arts colleges: B.S. program – emphasize *teaching* with research a close second, but service important

Teaching-oriented colleges: B.S. program – emphasize *teaching & service* but research can be expected

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Academic Career Ladder

Professorial Ranks

- Assistant
  - Tenure-track, 5-7 years
- Associate
  - Usually with tenure
- Full
- Chaired Professor – endowed

Administrative Ranks

- Department Chair, Dean, Provost, President

Instructor – teaching & service

Postdoctoral positions/Research Associate - research

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What can I do now to prepare for an academic job?

Research

- Apprenticeship: learn from advisor, doing it, and others
- Grant writing

Teaching

- Teaching experience, teaching assistantship, teach some even if don't have to
- Professor-in-training programs, courses

Service

- Organizing student organizations/support groups – Women in CS
- Working on department committees
- Volunteering at conferences

Moving Between Research Lab and Academia

From University to Industry

Must build real systems

Establish visibility and knowledge in industry

From Industry to University

Must continue publishing

Establish visibility in research community

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All Choices are Valid!

People move in all sorts of directions.

Start Ph.D. program – exit after Masters (half of AJ's graduate cohort)

Masters – continue to Ph.D.

Success is wonderful, **happiness** is wonderful

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