

MASTERS VS. PH.D. WHICH ONE TO CHOOSE? HOW FAR TO GO?

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Reasons for Grad School in CS

Masters

- Change field (French->CS)
- Specialize (HCI, security)
- Change top-line credential
- Route to immigration

PhD

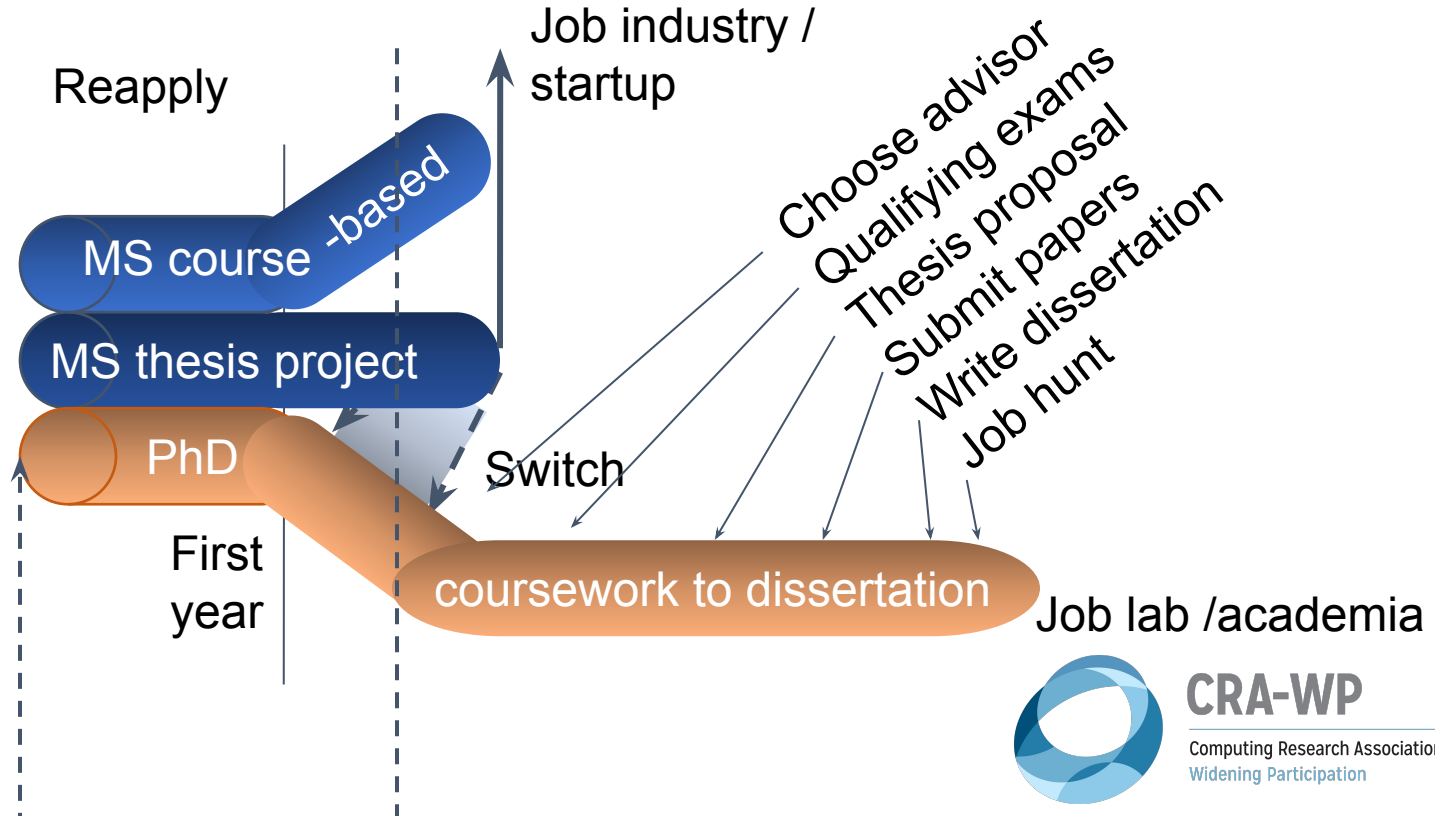
- Get a job in academia
- Research topic that inspires you



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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?

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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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?



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Program Comparison

	Course Based MS	Research MS	PhD - PAID
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 deeper Short time (job hunt) Networking opportunities (small project)	Research is not as deep as Ph.D. Shorter commitment Fewer publication/ less impact	Long process PhD MS, and PhD from different schools MS/PhD A program where MS/PhD from the same department (faster, less courses)

Masters Career Opportunities

Types of Jobs

- Operations and IT type jobs (non-tech industry)
- Product or application development
- Research support (Contribute to prototyping and publications)

Employers

- Information Technology (IT) companies
- Companies in other industries
- Universities (Typically in support roles), sometimes in teaching positions



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Experience of the Ph.D.

Pick advisor, move from coursework to research

First submission

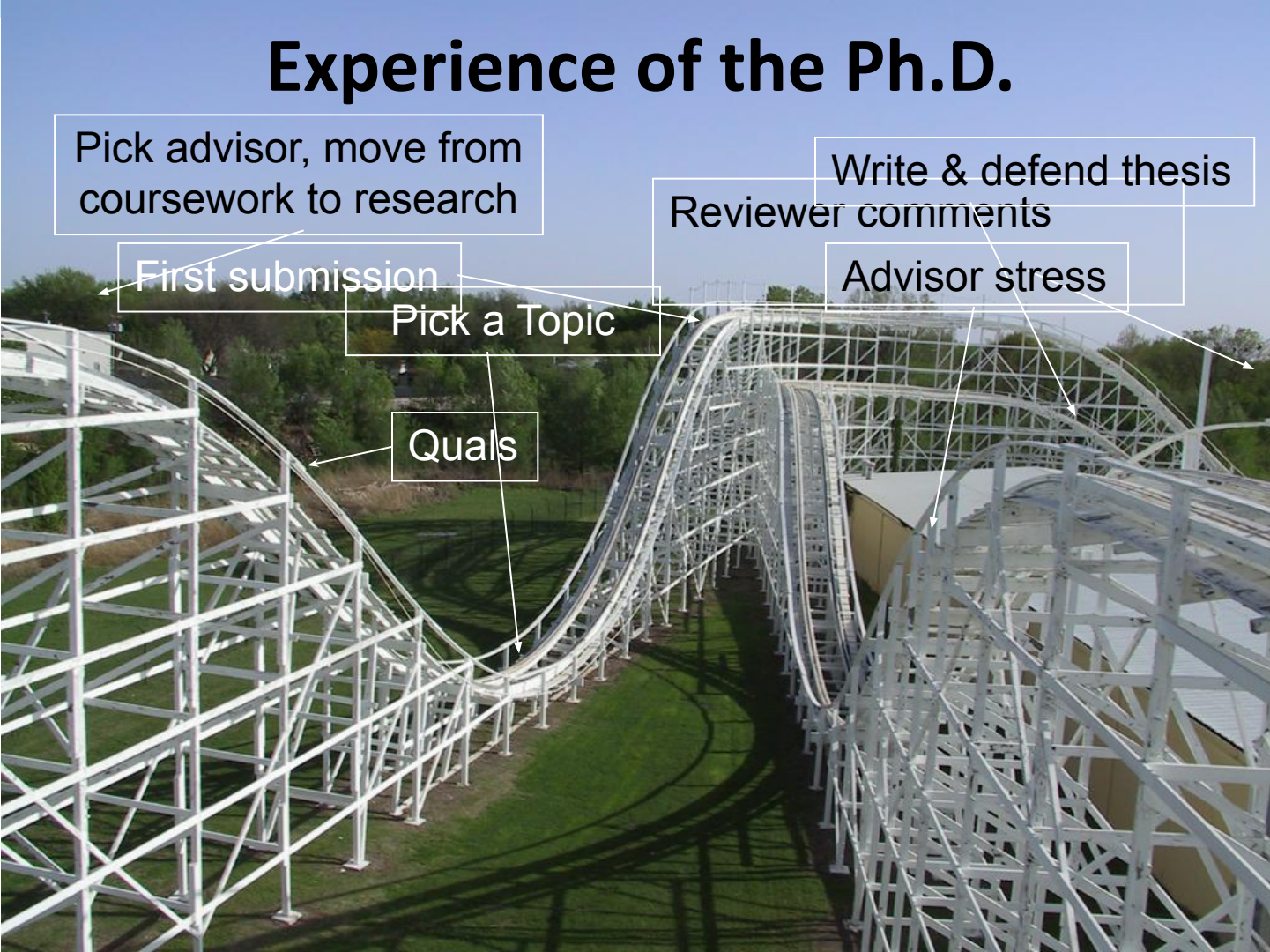
Pick a Topic

Quals

Reviewer comments

Write & defend thesis

Advisor stress



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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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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Industry Career: Focus on Impact

- **Research/Engineering Impact**

- Engage in scientific discovery, collaborate with peers, fund research
- Contribute to products, intellectual property, open source, ...
- Solve hard, practical, unsolved problems
- Take ideas over the finish line (land changes, publish)

- **Vision and Direction**

- Define appropriate strategies
- Identify gaps and misalignments
- Map ideas to realistic action plans for yourself and others

**Expected to do
all three well!**

- **Collaboration and People**

- Collaborate well with internal and external peers
- Exhibit strong communication to disseminate ideas
- Scale yourself through others, bring others along
- Influence and conflict resolution without escalation



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Technical Ladder Example

	Example Title	Contribution and Impact	Leadership Track
	IC8+: Principal / Fellow	Multiple product lines or technologies	Director: 50+ rollup
	IC7: Senior Staff Engineer/Scientist	Go-To tech lead for a collection of large projects in an area	M2: 20-50 rollup
	IC6: Staff Engineer/Scientist	Technical lead for medium sized project	M1: 5-20 rollup
	IC5: Senior Engineer/Scientist	Self-defined portion of a project, little to no help needed from tech leads	M0: 0-5 rollup
Ph.D. →	IC4: Engineer / Research Scientist	Well-defined portion of a product/project	
M.S. → B.S.	IC3: Engineer	Small, well-defined portion of a product/project with clear success criteria	

What can I 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
- Network!
 - Where do your contacts work?
 - Do they enjoy their role? Would you?



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Academic Career: Different Types of Colleges

Research universities: Ph.D. program - emphasize *research*
but teaching & service also important

Masters granting colleges/universities: - emphasize *teaching*
but research & service also important

Selective liberal arts colleges: B.S. program (no engineering) – emphasize
teaching with research a close second, but service important

Teaching-oriented colleges: B.S. program – emphasize *teaching & service*
but research/professional development is often expected



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Academic Career Ladder

Tenure Track Ranks

Assistant: 5-7 years
Associate: Usually with tenure
Full
Chaired Professor: usually endowed

Administrative Ranks

Department Chair, Dean, Provost,
President

Non-tenure Track Ranks

May have promotion paths
Common ranks are Instructor,
Assistant/Associate/Full Teaching
Professor, Professor of the Practice

Postdoctoral/Research Associate

Research, (maybe) teaching
Academic institutions, Industry



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What can I prepare for an academic job?

- **Research**

- Apprenticeship: learn from advisor, doing it, and others
- Grant writing
- Corporate connections (for funding, student job placement)

- **Teaching**

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

- **Service**

- Organizing student organizations/support groups – Women in CS
- Working on dept. committees
- Volunteering or reviewers at conferences
 - (ask your adviser for help)



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Moving Between Industry and Academia

From University to Industry

- Must build real systems
- Establish visibility and knowledge in industry
- Work in industry during summer/sabbatical

From Industry to University

- Must continue publishing
- Establish visibility in research community
- Teach few courses as an adjunct professor; volunteer to give talks or workshops at high schools

The earlier the switch, the easier it will be



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All Choices are Valid!

People move in all sorts of directions.

Start Ph.D. program – exit after Masters

Masters – continue to Ph.D.

Ask for advice ... until you get the advice you want 😊



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Questions?



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