

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

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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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# 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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# 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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# About Puja

## Senior Research Scientist, Apple Inc. (2014-present)

- Apple Media Products Discovery Team
- Personalization & Large Scale Recommendation Systems

## PhD, University of Minnesota (2014)

- Computer Science
- Thesis: Online Convex Optimization and its Application to Portfolio Selection

## Internships

- IBM T.J. Watson Research Center
- eBay Inc.

## MS, University of Iowa

- Computer Science; Knowledge Discovery and Data mining

## B.Tech, West Bengal University of Technology

- Information Technology



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# Where Puja Works

*Use the power of Machine Learning to help users discover content within a catalogue that is growing everyday*



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# Course vs. Research Masters

## Course Masters

- 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 Masters

- 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
<b>Educational Goals</b>	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
<b>Program</b>	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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# 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)



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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.

Pick advisor, move from  
coursework to research

Write & defend thesis

Reviewer comments

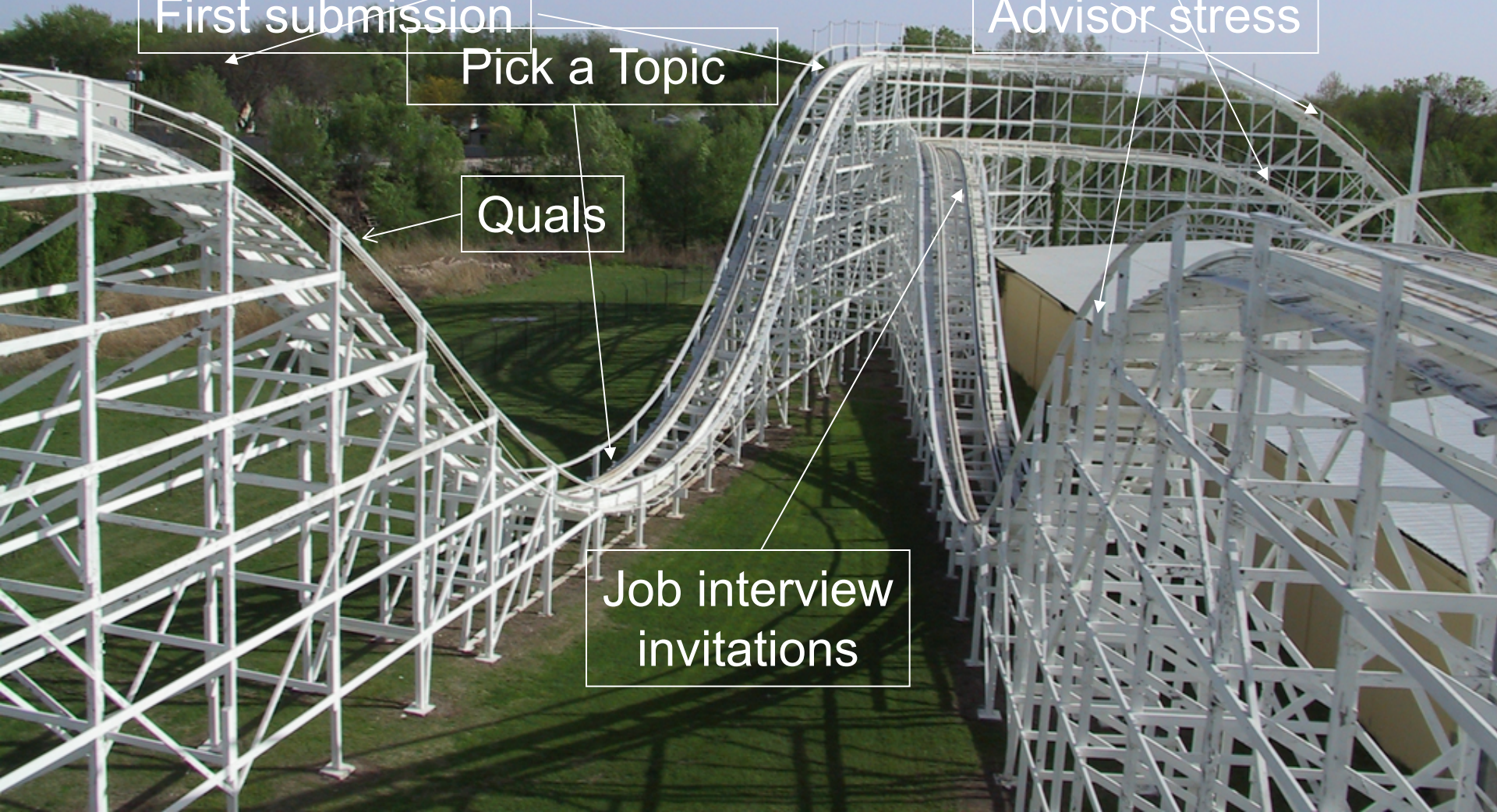
First submission

Advisor stress

Pick a Topic

Quals

Job interview  
invitations



# 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 uphill

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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# Technical Ladder Example

Example Title	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

**Expected to  
do all three  
well!**

## Service

Departmental (hiring committee)

Company-wide (promotion review board)

Professional



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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 (External)

**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/Research Associate - research



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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 is graduating soon in your field from other (top) schools

Who works at this company



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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

Corporate connections (for funding, student job placement)

## 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



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# 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

Masters – continue to Ph.D.

Success is wonderful, **happiness** is wonderful



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# Questions?



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