

# Masters vs. PhD

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# Revisiting Choices

Nearing the end of your first year of graduate school, you have some questions to ask:

- Am I in the best program for me?
- Now that you've had a year under your belt, you have a better understanding of:
  - What I want from the graduate school experience?
    - Likes?
    - Dislikes?
  - What I want as a future career path?
- If not, then how do I get to my preferred track?
  - An Opportunity to Course Correct!

# Exercise: Turn And Talk To Your Neighbor

- A. What is your plan? MS or PhD?
- B. What do you want from the graduate school experience?
  - Likes?
  - Dislikes?
- C. What do you want as my future career path?

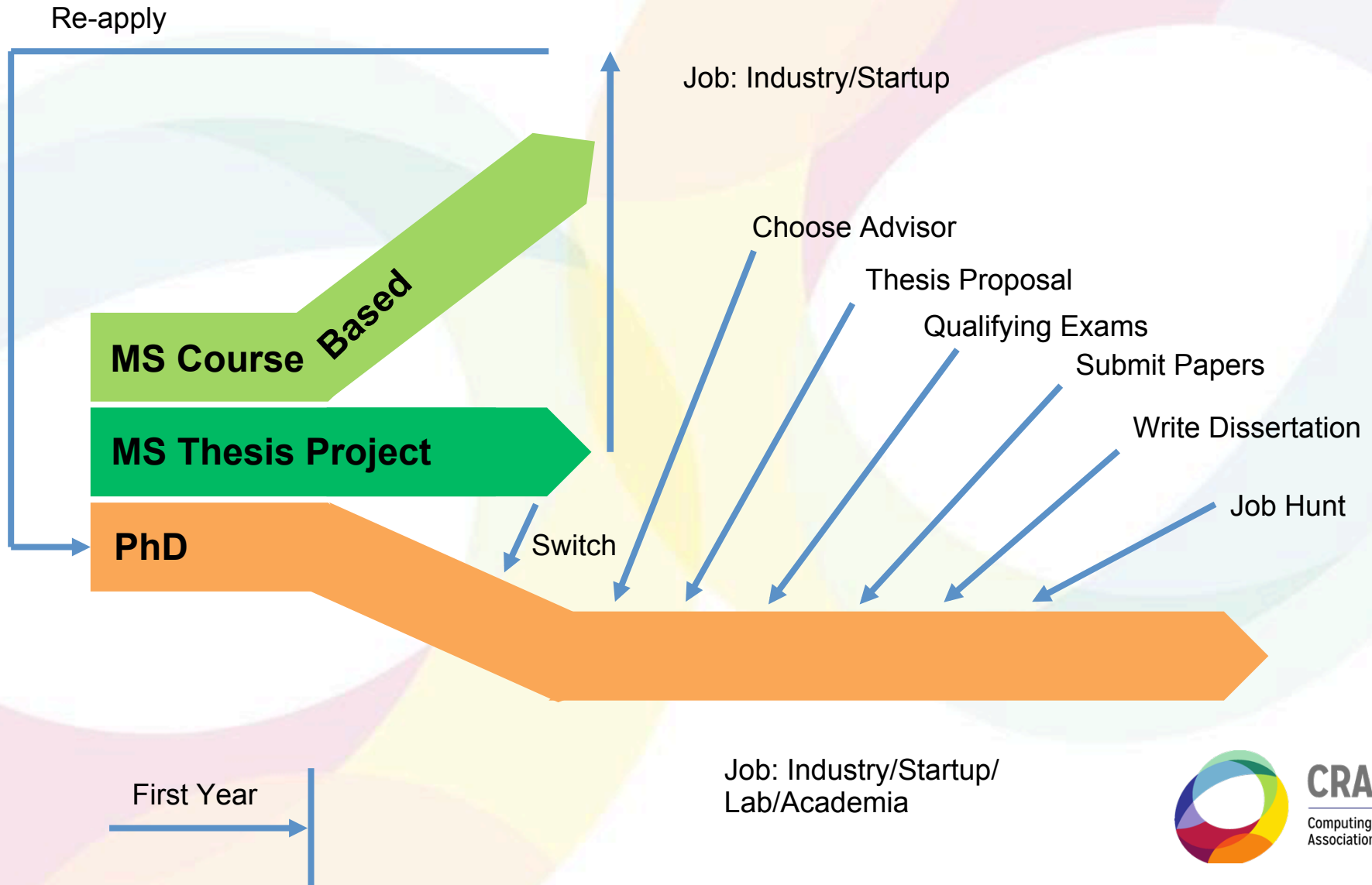
# Who's in the audience?

How many currently in master's programs?

- Course masters?
- Thesis masters?

How many in PhD programs?

# Grad School Paths



# MS: Course vs. Research

## *Course Masters*

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

# 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 PhD Shorter commitment Less publications/ impact	Long process

# MS 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)



# PhD 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

# Experience of the PhD



# 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 and doubt are guaranteed.
  - Things can/will go wrong!
- Momentum is important
  - Keep moving forward. No side trips to distract.

# 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-wise expert, Impacts a product
PhD →	Research Scientist	Product, Project Methods	Expert in area of contribution
MS →	Senior Engineer	Portion of a Product/ Project	Working knowledge in one area of contribution
BS →	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 about technical solutions to problems
- Technology Transfer
  - Contribute to company's products, client engagement, 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

# 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!

# Different Types of Colleges

- **Research Universities:** PhD program – emphasize research, but teaching and service important
- **Colleges/Universities:** MS program – emphasize teaching, research and service also important
- **Selective Liberal Arts Colleges:** BS program -- emphasize teaching with research a close second, but service important
- **Teaching-Oriented Colleges:** BS program – emphasize teaching and service but research can be expected

# Academic Career Ladder

- **Professorial Ranks**
  - Assistant: Tenure-track, 5-7 years
  - Associate: Usually with tenure (life-time appointment)
  - Full
  - Chaired Professor – endowed
- **Administrative Ranks**
  - Department Chair, Dean, Provost, President
- **Instructor – teaching and service**
- **Postdoctoral/Research Associate – research**



# 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
  - Build your professional network, communications, negotiation, making yourself visible
- Check your competition
  - Who is graduating soon in your field from other (top) schools?
  - Who works at this company?

# 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 you don't have to
  - Professor-in-training programs, course
- Service
  - Organizing student organization/support groups
  - 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

# The B. Algorithm!

- `if (I.LoveLoveLoveProgramming)`
  - `PursueMasters()` // industry, entrepreneurship
- `Else (I.LikeProgramming && I.WantMoneyBefore30) {`
  - `if (RAND(0, 1.0) < 0.6)`
    - `FinishBachelors()`
  - `Else`
    - `PursueMasters();`
- `}`
- `Else if (I.LikeProgramming && I.BelieveTheTruthIsOutThere)`
  - `PursuePhD(); /* research, tenure track, teaching, industry, labs, entrepreneurship */`
- `Elseif (I.DontLikeProgramming) {`
  - `FinishBachelors();`
  - `BecomeASurfer();`
- `}`

# All Choices Are Valid

- People move in all sorts of directions
- Start PhD program – exit after Masters
- Masters – continue to PhD
- Success is wonderful, **happiness** is wonderful