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?

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?

About Nada

Education

Computer Science (HCI, Computer Vision)

MS 2009 Tufts / Ph.D. 2016 University of Massachusetts / Post-Doc 2017 Harvard

Professional

IBM Research, Saint Mary's College, San Jose State University (tenure-track 2018-current)
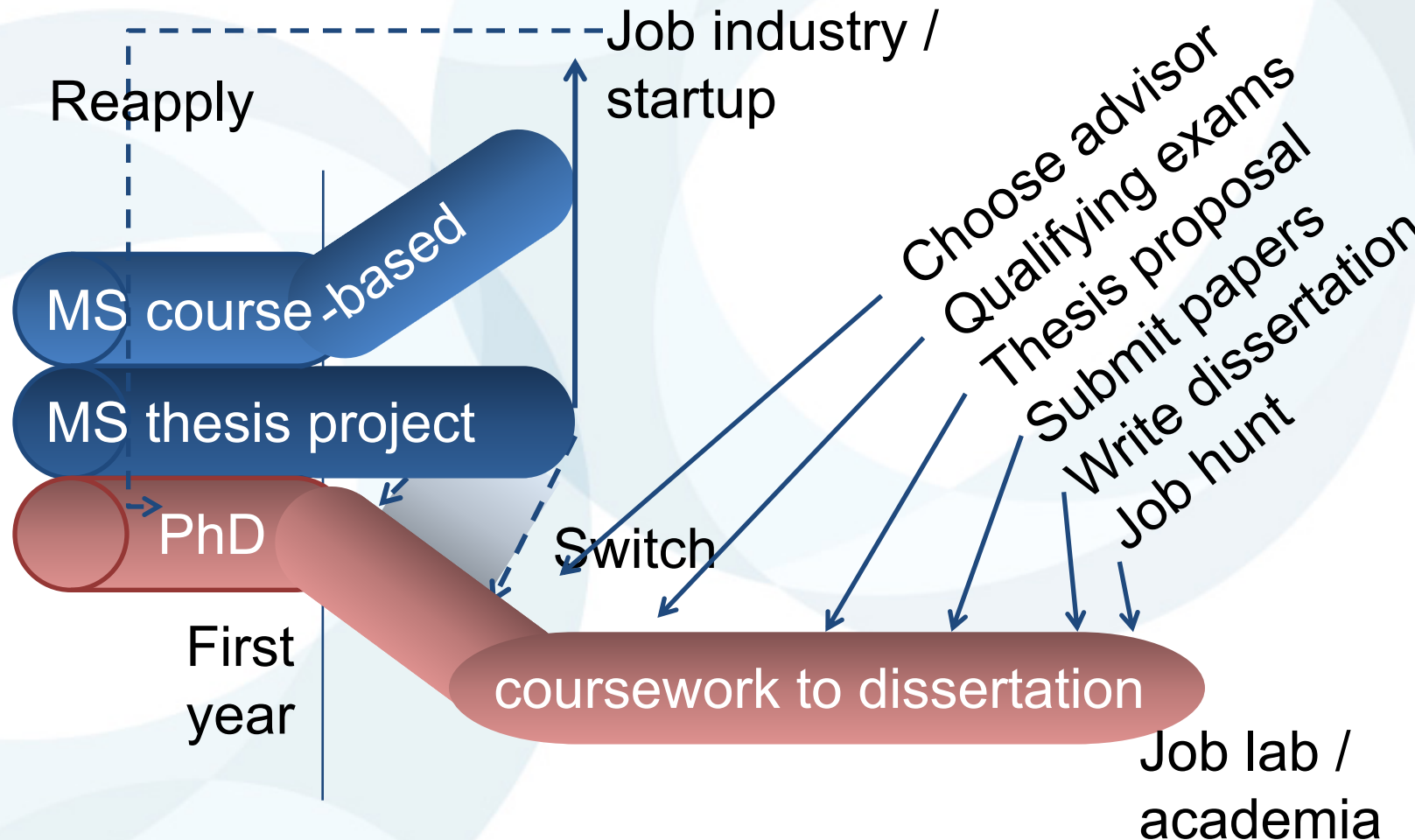
About Kim

Education

BS 1998 Clemson / MS 2000 NC State / PhD 2004 Harvard

Professional

- Internships/postdoc: HP Labs, IBM Research, Intel
- Professor at UVA 2005-2012 (tenure 2011)
- 3.5 year "sabbatical" SWE @ Google
- Director of Research @ Yahoo Labs
- Engineering Leader @ Facebook

Grad School Paths

Job industry / startup

Reapply

MS course-based

MS thesis project

PhD

First year

Switch

coursework to dissertation

Choose advisor

Qualifying exams

Thesis proposal

Submit papers

Write dissertation

Job hunt

Job lab / academia

Who's in the Audience?

How many currently in master's programs?

- Course masters?

- Thesis masters?

How many in Ph.D. programs?

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

- Might be faster

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

- Might be slower

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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 (small project)	Research is not as deep as Ph.D. Shorter commitment Less publications/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)

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

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

Lessons from the Roller Coaster

Enjoy the Ride

    The difference between scary and fun is merely perspective

    You *are* qualified for the ride. You aren't alone.

Energy is needed for the uphills

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

    Frustration and doubt are common

    Seek support from many sources (technical, emotional)

Momentum is important

    Keep moving forward. Be wary of distractions.

Riding the ride is a statement about you: persistence

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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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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

Expected to do all three well!

Define appropriate strategies

Identify gaps and misalignments

Map ideas to realistic action plans for yourself and others

XFN 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
IC4: Engineer / Research Scientist	Well-defined portion of a product/project	
IC3: Engineer	Small, well-defined portion of a product/project with clear success criteria	

Ph.D. → (IC4)

M.S. → (IC3)
B.S.

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

Network!

Where do your contacts work?
Do they enjoy their role? Would you?

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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)

It gets easier over time…

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 (no engineering) – 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
(can transfer those years from one institution to another)
Associate: Usually with tenure
Full
Chaired Professor – endowed

Administrative Ranks
Department Chair, Dean, Provost, President

Instructor – teaching & service

Postdoctoral/Research Associate

Research, (maybe) teaching, Conferences

Academic institutions, Industry

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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, (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 Research Lab 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 ☺

Questions?

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