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

First year

MS course-based
MS thesis project

Choice advisor
Qualifying exams
Thesis proposal
Submit papers
Write dissertation
Job hunt

PhD

Switch

Job industry / startup

coursework to dissertation

Reapply

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
# Program Comparison

<table>
<thead>
<tr>
<th>Educational Goals</th>
<th>Course Based MS</th>
<th>Research MS</th>
<th>PhD</th>
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</thead>
<tbody>
<tr>
<td><strong>Acquire knowledge via coursework,</strong> Get a taste of research</td>
<td>Acquire depth &amp; project skills (thesis) Learn the skills for more research</td>
<td>Do original high-impact research</td>
<td></td>
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</tbody>
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<tr>
<td><strong>Courses are more deep</strong> Short time (job hunt) Networking opportunities (small project)</td>
<td>Research is not as deep as Ph.D. Shorter commitment Less publications/impact</td>
<td>Long process <strong>PhD</strong> MS, and PhD from different schools <strong>MS/PhD</strong> A program where MS/PhD from the same department (faster, less courses)</td>
<td></td>
</tr>
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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)
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
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)
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

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

Expected to do all three well!
# Technical Ladder Example

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

Network!
  Where do your contacts work?
  Do they enjoy their role? Would you?
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!
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
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
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)
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*
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?