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

Jodi Tims, Northeastern University

Dilma Da Silva, Texas A&M University

CRA-WP

Computing Research Association

Widening Participation

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?

CRA-WP
Computing Research Association
Widening Participation

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?

CRA-WP
Computing Research Association
Widening Participation

About Jodi: Work

Associate Dean, Khoury College, Northeastern University (2019-present)

Professor and Chair, Baldwin Wallace University (2002-2019)

Associate Professor and Computer Science Coordinator (1999-2002)

Assistant/Associate Professor (1981-1998)

University of Pittsburgh

PhD, Computer Science, 1998

CRA-WP
Computing Research Association
Widening Participation

About Jodi: Real Life

acm's women in computing
acm-w

Northeastern University

CRA-WP
Computing Research Association
Widening Participation

About Dilma - work

NOW

TEXAS A&M UNIVERSITY

Since 2014: **Professor**
Also many administrative roles:
department head, associate dean, interim director of two centers

BEFORE

Principal Engineer & Manager
Qualcomm Research
2 years

IBM Research

Researcher; Manager
IBM T.J. Watson Research Center
12 years

USP UNIVERSIDADE DE SÃO PAULO

Assistant Professor
University of São Paulo, Brazil
1996-2000

EDUCATION

GT

PhD
Georgia Tech

USP UNIVERSIDADE DE SÃO PAULO

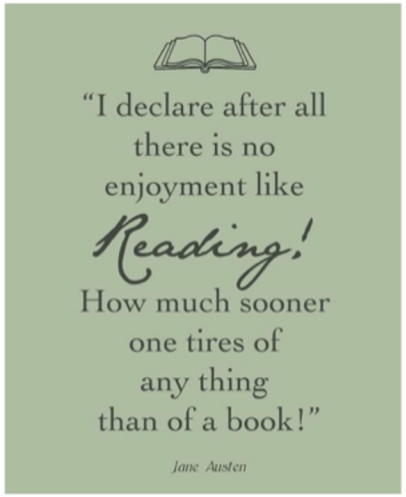
BS, MS in Computer Science
University of São Paulo, Brazil

RESEARCH AREAS

Distributed Systems, Operating Systems,
Cybersecurity, CS education, Data Science

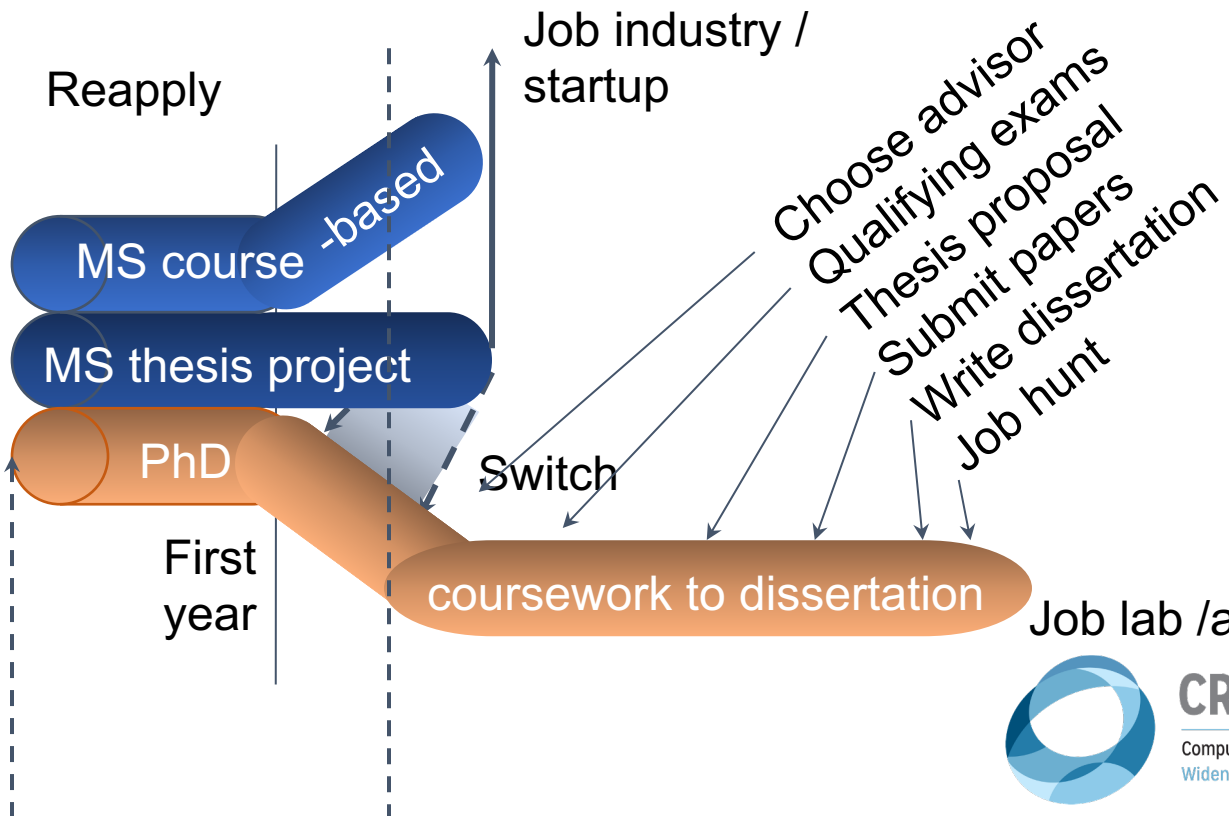
CRA-WP
Computing Research Association
Widening Participation

About Dilma – fun



CRA-WP
Computing Research Association
Widening Participation

Grad School Paths



CRA-WP
Computing Research Association
Widening Participation

Who's in the Audience?

How many currently in master's programs?

- Course masters?
- Thesis masters?

How many in Ph.D. programs?

CRA-WP
Computing Research Association
Widening Participation

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

CRA-WP
Computing Research Association
Widening Participation

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 publication/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)

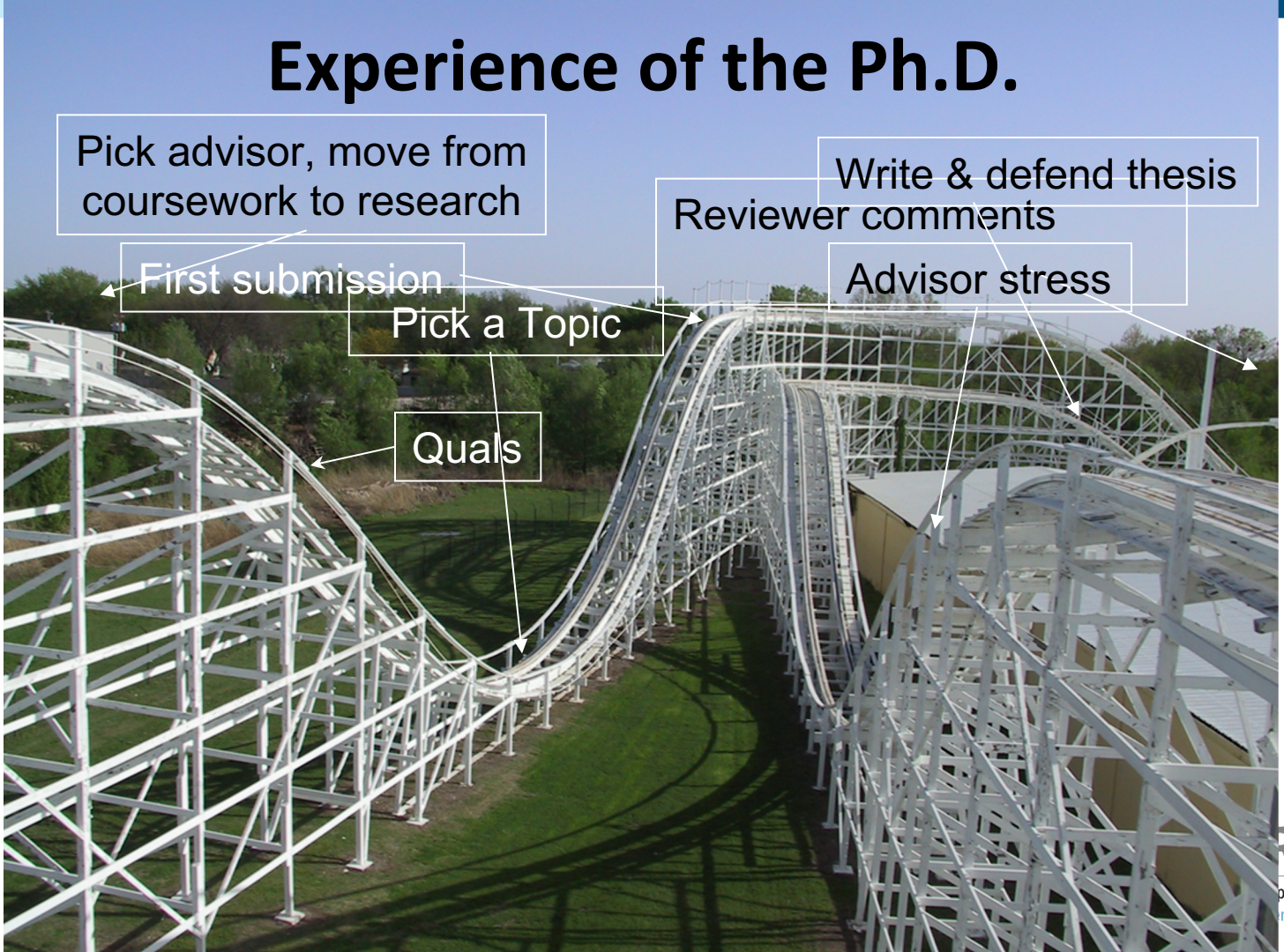
CRA-WP
Computing Research Association
Widening Participation

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

CRA-WP
Computing Research Association
Widening Participation

Experience of the Ph.D.



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

CRA-WP
Computing Research Association
Widening Participation

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)

CRA-WP
Computing Research Association
Widening Participation

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!

CRA-WP
Computing Research Association
Widening Participation

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. →

M.S. →

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?

CRA-WP
Computing Research Association
Widening Participation

Academic Career:
Different Types of Colleges

Research universities: Ph.D. program - emphasize *research*
but teaching, service 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

CRA-WP
Computing Research Association
Widening Participation

Academic Career Ladder

Tenure Track Ranks

Assistant: 5-7 years

(may be able to transfer those years from one institution to another)

Associate: Usually with tenure

Full

Chaired Professor: usually endowed

Non-tenure Track Ranks

May have promotion paths

Common ranks are Instructor, Assistant/Associate/Full Teaching Professor, Professor of the Practice

Administrative Ranks

Department Chair, Dean, Provost, President

Postdoctoral/Research Associate

Research, (maybe) teaching, Conferences

Academic institutions, Industry

CRA-WP

Computing Research Association

Widening Participation

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!

CRA-WP
Computing Research Association
Widening Participation

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)

CRA-WP
Computing Research Association
Widening Participation

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

CRA-WP
Computing Research Association
Widening Participation

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 ☺️

CRA-WP
Computing Research Association
Widening Participation

Questions?

CRA-WP
Computing Research Association
Widening Participation