Academia vs Industry: Choose Your Own Adventure

A.J. Brush, Microsoft

Lisa Wu Wills, Duke University

Thanks to previous presenters of this topic!

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A.J. Brush

Education:

- University of Washington, Ph.D. 2002
- Williams College, BA 1996

Career

- Microsoft: Microsoft Research for 12 years, 4 years on Cortana product
- Research areas: HCI, Ubicomp,

Family and Fun

- Kids: Colin (19), Ryan (16)
- Hobbies: Exercise, Reading, Travel

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Lisa Wu Wills

Education

- Columbia University, Ph.D. 2014
- University of Michigan Ann Arbor, M.S.
- University of Illinois Urbana-Champaign, B.S.

Career (reverse chronologically)

- Assistant Professor at Duke University, Postdoctoral Researcher @ UC Berkeley, Researcher @Intel Labs, back to school for Ph.D., Computer Architect @Intel (Xeon Phi, Knights product line)
- Research areas: Computer Architecture, Hardware Accelerators, Big Data Analytics, Healthcare

Fun

- Travel, Art Museums, Performance Arts, Cooking, Beach

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A vs. B: So Simple, Right?

Academia
could be:

- Professor at a research-oriented school teaching-oriented school
- Research associate Academic administration

Industry/Government/Lab
could be:

- Engineer
- Research manager
- Research Scientist
- Technical or Managerial Leadership
- Consulting
- Start-up

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All Choices are Valid!

- Do what you love
- If you don’t love what you’re doing, do something else
- A Ph.D. gives you that option
- Take ownership of what you do now and what you want to do next (your career is what you make of it)

Aspire to be **happy** - not ‘*stereotypical*'

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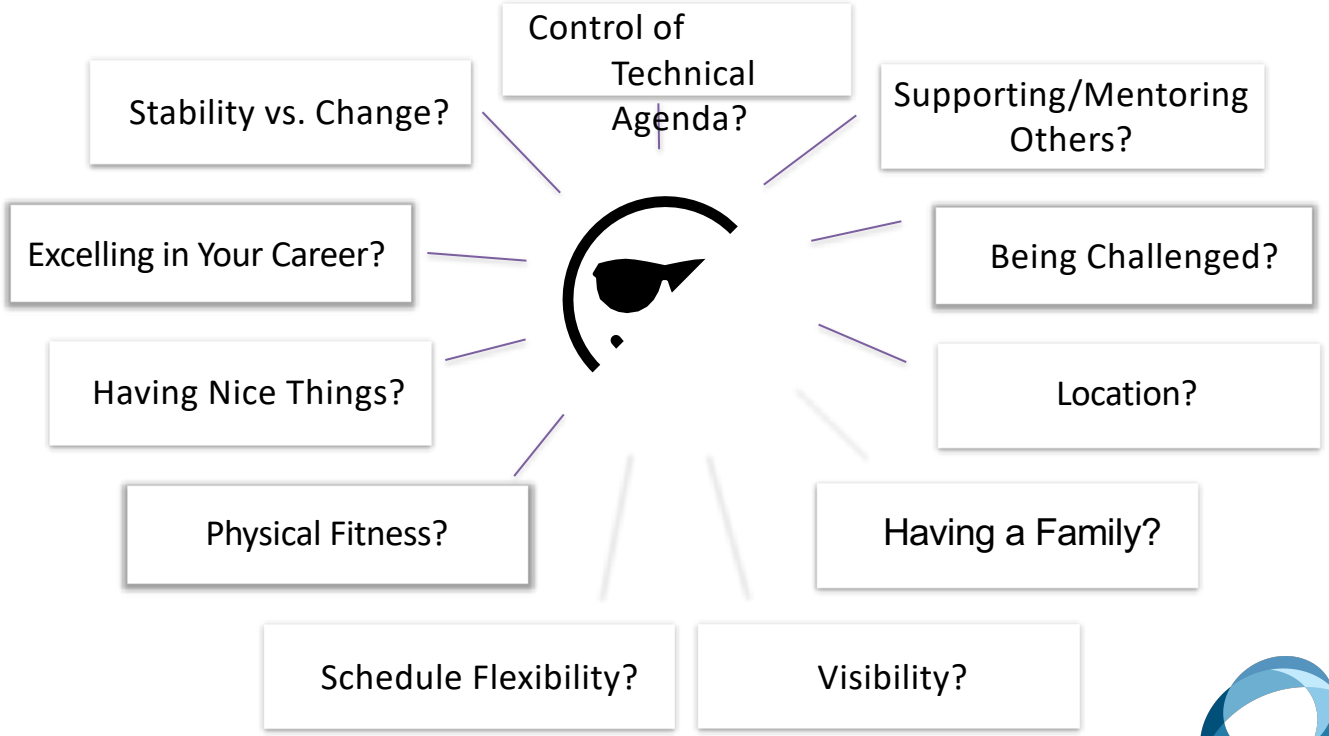
What is Important to You?

Must-haves vs. Nice-to-haves?



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Grab a piece of paper

What is your current plan?

Industry vs Government vs Academia vs Undecided?

Why?

How do you enjoy spending your time?

What are your goals in a job?

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Government Research Labs

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Government Research Centers

DOE, DoD, NASA, NSF, DHS, NSA, NIST, NRC, FAA, …

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Why Work at a Government Lab?

- Opportunity to work on problems of national and international importance
- Chance to make a difference
- Work on cross-disciplinary teams with other scientists

Scientist Track

- Postdoc
  - Named - small project internally funded
  - Regular - working as a primary on an already funded project
- Research Scientist
  - Significant leadership roles in projects
  - Smaller projects on own
- Scientist
  - Leadership of projects and proposals
- Senior Scientist
  - Recognized international leadership in area of research
  - Leadership of large-scale projects

Advancement metrics similar to a research university

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Applied Research Track

- Software Engineer
  - Developer on a research project
  - Leadership on development activities

Advancement metrics related to deliverables on projects

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What Can You Do Now to Prepare?

- Internships at government laboratories
- Gain experience working on team projects
- Learn how to lead teams
- Build communication skills
- Learn about the various labs
  - types of work
  - qualifications required
  - citizenship requirements
  - funding models

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Industry Research Careers

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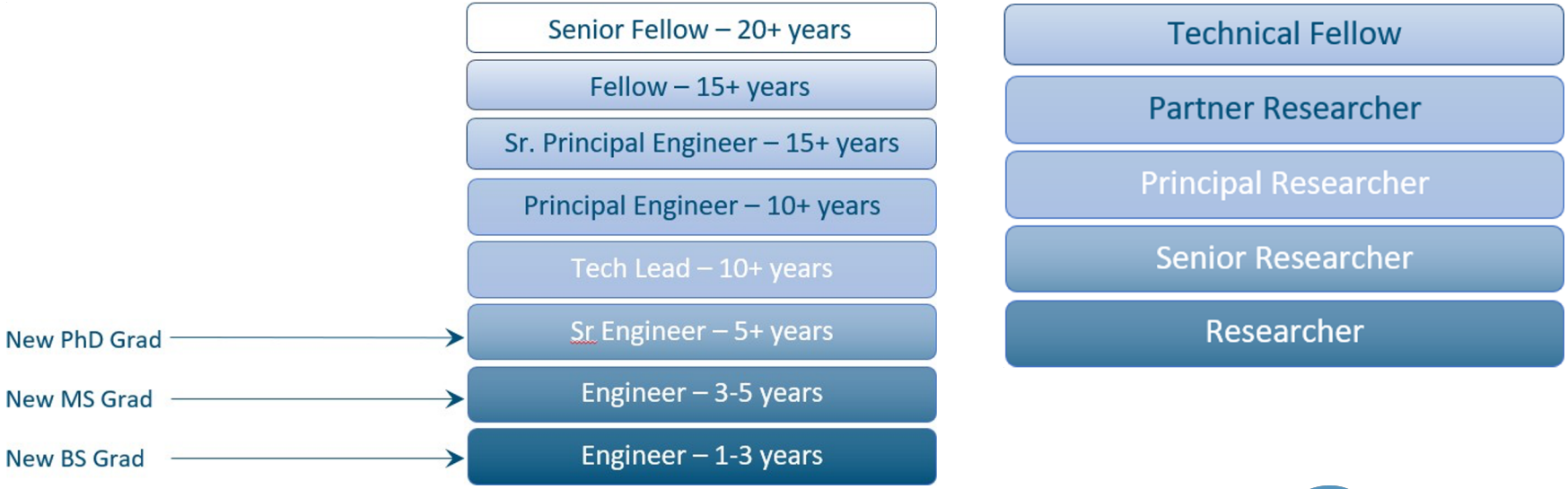
Industry Careers

Role	Visibility	Flexibility
Engineer	Low	High
Research scientist	Medium	High
Engr/Research Manager	Medium (all internal)	Medium
Corporate leadership	High	Low
Consulting	Low	Varies/Low
Government	Medium	High
Start-Up	Low (initially)	Low

The same role can vary significantly from company to company

Research/Engineer Ladder Examples

Titles vary across companies, also management track



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Industrial Research Career

Differences and similarities with academia

Research Agenda

- May depend on company's interests
- May be more applied than pure
- May change as company changes

Publishing Papers

- Typically encouraged – extent varies
- Not always a requirement for success

Creating Patents

- Strongly encouraged
- A requirement for success

Research Funding

- Internal project approval
- External funding for joint University-Industry initiatives

Tech Transfer

- Critical goal for industrial researchers - Typically hard!
- Patents and open source contributions count

Participate in conferences

- Technical Program Committees
- Organization committees
- Standards Committees

Teaching/Students

- Interns and student mentorship
- University collaborations
- Ph.D./Masters student advising
- Teaching opportunities

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How to prepare for an Industrial Research Career?

Similar to what you would do for an academic career

- Learn about the research process: identify important research problems, problem formulation, build solution artifacts, publish
- Go to conferences: learn to network
- Learn to “pitch” your research ideas, know your audience

Internships in industrial research and product organizations, start-ups

- Learn about the company you work for: leadership, products, services, growth areas, customers, market segments, competitors
- Interactions between business units and research

Evaluate what you really enjoy doing

- Tangible vs open ended problems
- Seeing your research realized into products and used by customers
- Publishing and Teaching/Mentoring

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Academic Careers

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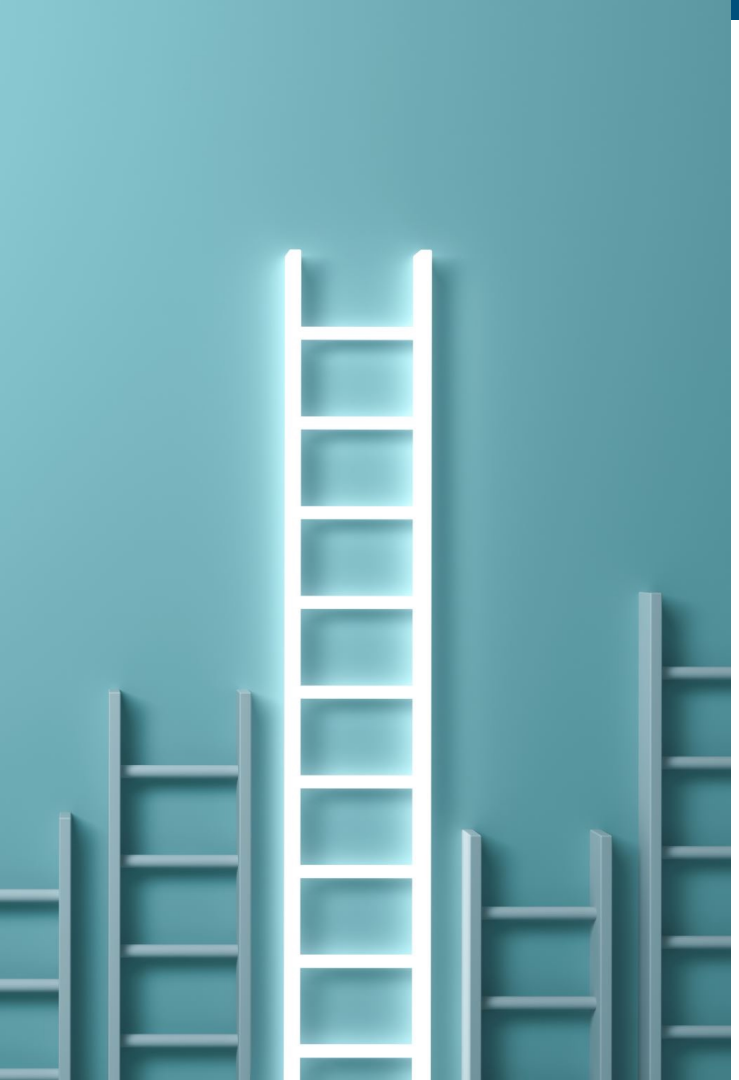

Academic Career Ladder

Professorial Ranks

- Assistant: Tenure-track, 5-7 years
- Associate: Usually with tenure
- Full (no set time limit to achieve)
- Chaired Professor – endowed

Administrative Ranks

- Department Chair/Head, Dean, Provost, President

Teaching Faculty/Professor of the Practice

- Teaching load varies based on institutions
- Some institutions offer tenure-track for PoPs

Research Associate

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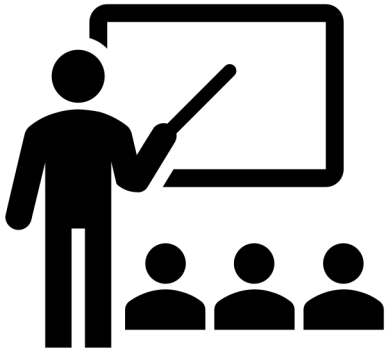
Traditional Professor/Instructor Roles

Research universities (e.g., R1 institutions)

- Ph.D. program - emphasize research, funding (also need to show reasonable teaching and service)
- Managing a research team – Manage funding sources, manage students' projects, manage publications

Teaching-oriented colleges

- B.S. program – emphasize *teaching, service*
- Develop/Update curriculum



Public vs. Private

- Impacts funding structure
- Class sizes, student interactions, research group sizes

U.S. vs. Canada vs. Europe

- Impacts funding structure

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What can I do now to prepare for an academic job?

Research

- Apprenticeship: learn from advisor, write papers, collaborate
- Grant writing: Help out on proposals, read successful proposals
- Corporate connections (for funding, student job placement)

Teaching

- Guest lectures, teaching assistantships
- Education minor, teach a summer course on your own

Service

- Organizing student organizations/support groups – Women in CS
- Working on department committees as student liaison
- Volunteering at conferences
- Join PC shadowing program when you are a senior grad student

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Career Change

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Moving Between Industry and Academia

From University to Industry/Government

- Must build real systems
- Establish visibility and knowledge in industry
- Look into sabbatical programs
- May be a technical interview

From Industry/Government to University

- Must continue publishing
- Establish visibility and reputation in research community
- Need to pass an academic interview (presentation, strong publication record)

This will be easier/harder at different times in your career.

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Does What You're Thinking Align With What's Important to You?

- What you value most could change over time
- Absolutely no one is in your exact situation
- A PhD gives you options
- Be true to yourself and your values
- Don't be afraid to course correct at any point in your career

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Questions

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