

# Academia vs Industry: Choose Your Own Adventure

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Laboratory*

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# A vs B: So Simple, Right?

## **Academia** could be:

- Professor at research-oriented university
- Teaching-oriented position
- Academic administration
- Research associate

## **Industry/Government/ Laboratory** could be:

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



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# Turn and Talk to Your Neighbor

## What is your 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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# About me: Deb Agarwal

## Education

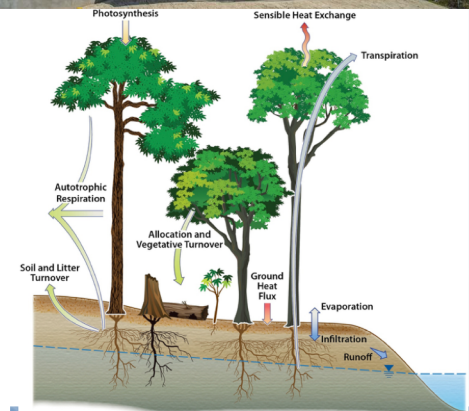
- **Purdue University - BSME**
- **University of California, Santa Barbara - PhD CE**
  - **Distributed systems**

## Career Path at Berkeley Lab

- **Intern**
- **Scientist**
- **Group Lead**
- **Department Head & Senior Scientist**

## What I work on

- **Management - Data Science Dept Head**
- **Research - Data Science - Data lifecycle topics**
- **Applied Research - Eco-informatics - Data systems supporting science**

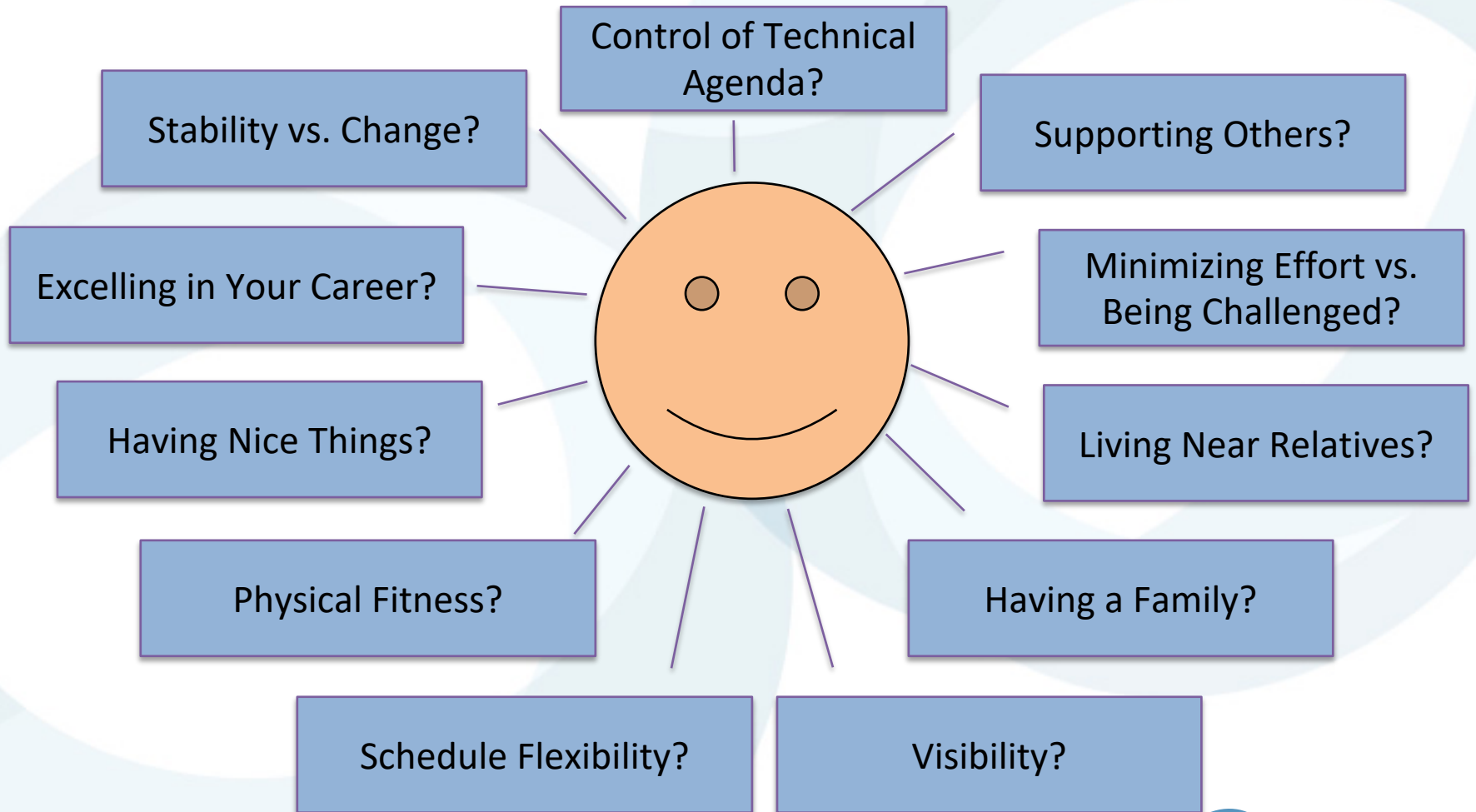


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# What is Important to You?

Must-haves vs. Nice-to-haves?



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# Does What You're Doing 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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# Government Research Labs

# GOVERNMENT RESEARCH CENTERS



- DOE, DoD, NASA, NSF, DHS, NSA, NIST, NRC, FAA, ...
- Mission-driven research and development



# 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



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# 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



# Dr. Patty Lopez

General Co-Chair, 2013  
Grace Hopper Celebration  
of Women in Computing  
Conference



NMSU Computing  
Research Laboratory  
Vision and Robotics  
Researcher  
(PhD, Computer Science)



Intel Corporation (2008-present)  
Sr. Platform Applications Engineer,  
Datacenter Group (aka "the Cloud")

Hewlett Packard Co (1989-2008)  
Product Software Development,  
Color & Imaging Scientist

New Mexico State University  
(BS, MS, Computer Science)

HP Tech Camp – on team  
that planned and delivered  
the first camp ~2006

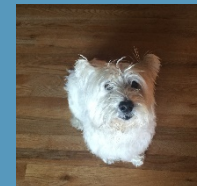
Married with family  
3 kids, 1 dog



Artificial Intelligence

Computer scientist Derek Partridge, left, psychologist Victor Johnston and graduate student Patty Lopez of New Mexico State University have been invited to tell colleagues at a European conference

In July about their work in teaching a computer to think. The highly controversial field of artificial intelligence is a blend of psychology, biology and computer science.



# Industry Careers

<b>Role</b>	<b>Visibility</b>	<b>Flexibility</b>
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

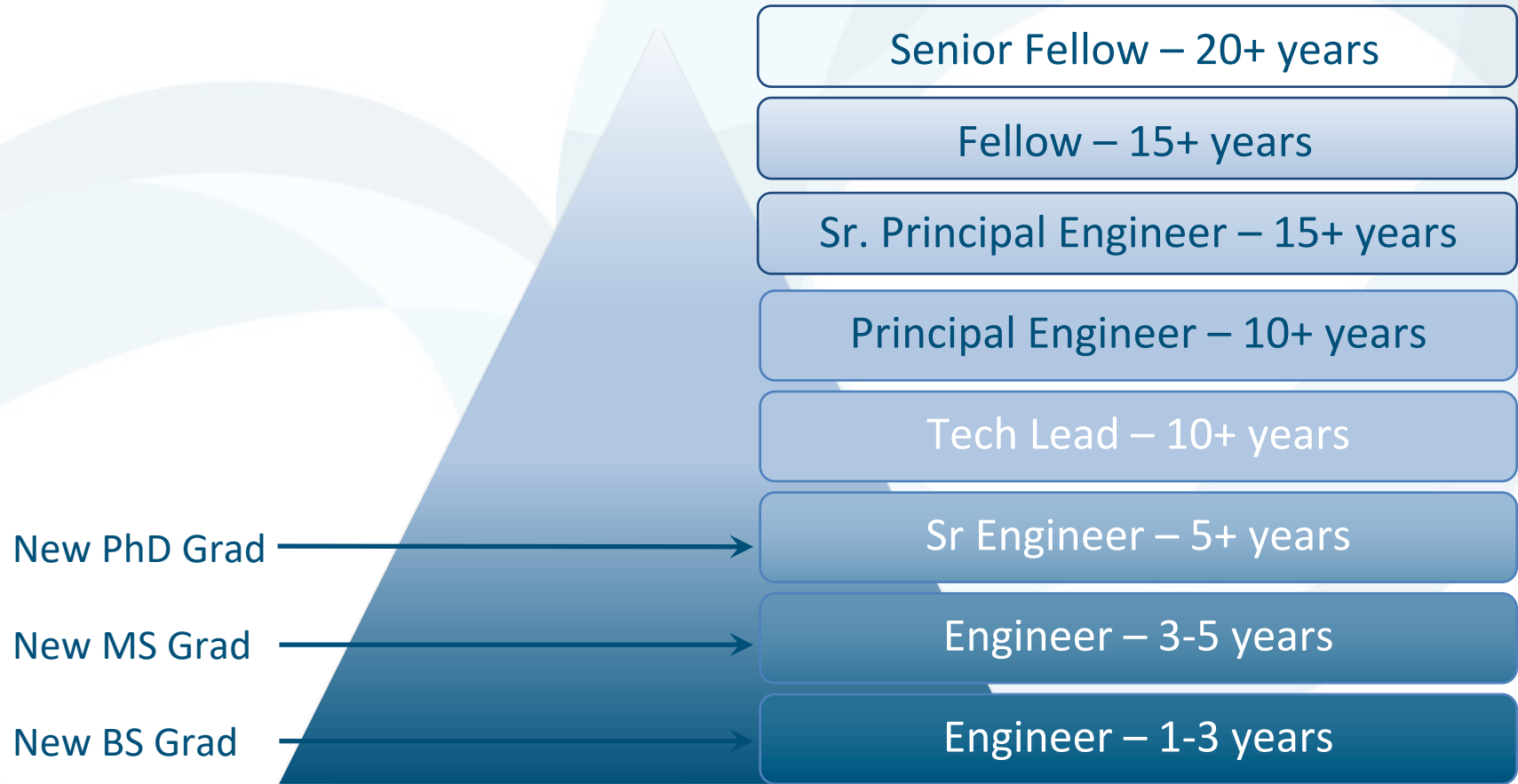


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# The Engineering Ladder

Titles may vary across companies



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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

# 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

Can vary significantly on course load  
Some roles offer tenure equivalent

## Postdoctoral/Research Associate

Usually on “soft money”



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# Traditional Professor/Instructor Roles

## Research universities

- Ph.D. program - emphasize *research, funding*

## Teaching-oriented colleges

- B.S. program – emphasize *teaching, service*

## Public vs. Private

- 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
  - Professor-in-training programs, courses
- **Service**
  - Organizing student organizations/support groups – Women in CS
  - Working on department committees
  - Volunteering at conferences



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# Career Change

# Moving Between Industry and Academia

## From University to Industry/Government

- Must build real systems
- Establish visibility and knowledge in industry
- Need to pass 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)



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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 PhD gives you that option
- Take ownership of what you do now and what you want to do next

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



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# Questions ?



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