# Job Search

*Nancy Amato, Texas A&M and UIUC*
*Mary Hall, U of Utah*
*Kathryn S McKinley, Google*

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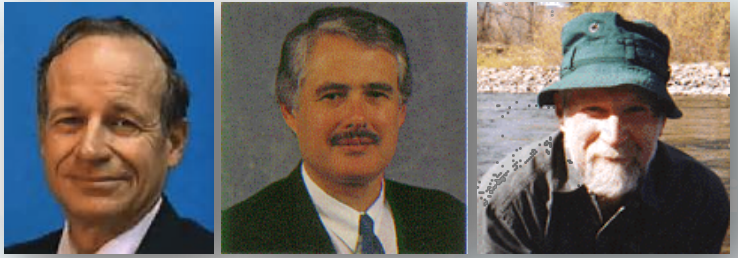
# Kathryn S McKinley

## Research

## Mantra

## Mentors



## Career

Google

Microsoft Research

TEXAS

MINES ParisTech

UMASS

RICE Unconventional Wisdom

## Family

arch Association

# Nancy in Brief

PhD Illinois: MS Berkeley; BS Applied Math & AB Econ Stanford

University of Illinois – starting 2019

- Prof and Dept Head

Texas A&M 1995-present

- Asst, Assoc, Full, Emeritus (2019)
- Grad Advisor, Interim Department Head, Engineering Honors Director

Major External Activities

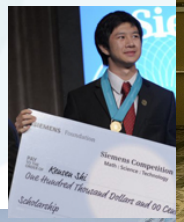
- CRA, CRA-W, NCWIT, IEEE Robotics & Automation Society
- Conference Organization: IEEE ICRA, RSS, WAFR

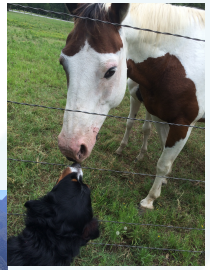
Research – Applied Algorithms

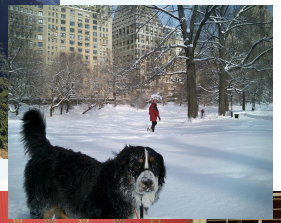
- Motion Planning, robotics, computational biology & geometry
- Parallel & distributed computing
- Group: 3 postdocs, 12 PhD, 2 MS, 4 ugrads (6 HS in summer)
- Graduated 23 PhDs (10 profs, 9 research labs, 2 postdocs, 3 startups)

Other Stuff

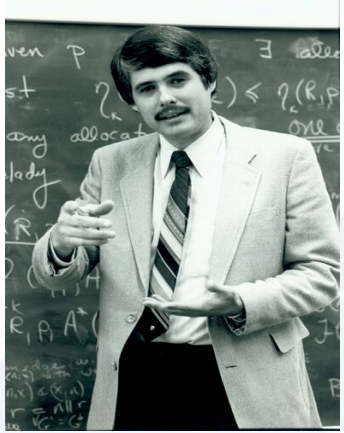
- Bernese Mountain dogs – currently Fred & Wilma
- Husband Lawrence also CS Prof – Grad School, A&M and next Illinois together
- Recent highlights: bucket trip to Machu Picchu and diving!





# Mentors



Ken Kennedy
PhD Advisor

**PhD CS, Rice, 1991**

Keith Cooper,
Linda Torczon
PhD Committee

John Hennessy

Monica Lam

**Research Scientist, Stanford, 1992-1995**

# Mary Hall

**Professor** THE UNIVERSITY OF UTAH

**Other Positions**

**Research Assoc Prof** UNIVERSITY OF SOUTHERN CALIFORNIA 1880

**Project Leader** ISI Information Sciences Institute

**Visiting Professor** CALIFORNIA INSTITUTE OF TECHNOLOGY 1891

**Family: Mark, Jackie 18, Jamie 22**

# Finding a Job

- The Landscape - know what you want
- The application
- The interview: preparing, the big day(s)
- Post Interview: waiting, deciding, negotiating
- Parting Tips

# The Landscape of Positions

*Kathryn*

# Computing PhD qualifies you for

Research positions

- Academic, Government Labs, Industrial Labs

Teaching

- Academic

Advanced Development

- Industry, University

Start up

**Titles** Post doc, staff, faculty, researcher, research scientist…

Lots of other positions!

# The Landscape

What kind(s) of position are you looking for?

- Research university? Research lab? Liberal arts college? Post-doc? Development? Start-up?

What type of environment do you want to you work in?

- Small or big department? Join established research group or start one?

Where to live? (and any significant other)

- West coast? East? Midwest? South? Urban? Rural? International?

**Confused? Apply & interview for various positions**

# Post Doc Positions

## Rewards

- Strengthen research credentials (deeper or new) for faculty position
- May gain teaching experience
- Best case: two years at top institution with great mentor
- Temporary solution to family/partner logistics

## Challenges

- Lower pay, benefits, not a student, staff or faculty…
- University status is muddy, wrt independence, respect, …
- May complicate family/partner logistics with extra moves

# Post Doc Positions

Post-docs are increasingly common in CS (standard in other fields)

Entrepreneurial so create your own project and location

- Get your own funding: NSF, ONR, …
- Industry and government labs
- Well funded research groups (often no official ads)

# University/College Positions

| Type | Degree Program | Emphasis | Important |
|---|---|---|---|
| Research Universities (R1) | BA, BS, MS, PhD | Research | Teaching and Service |
| Colleges/Universities | BA, BS, MS maybe PhD | Teaching | Research & Service |
| Selective Liberal Arts Colleges | BA, BS | Teaching & Scholarship | Service & Research |

# Academic Positions

Tenure track professorial ranks

- Assistant, Associate, Full
- Endowed Professorships

Research Faculty (not tenure track)

Teaching Faculty (not tenure track)

Instructor – Teaching and Service

Postdoctoral Positions - Research

# Research University

Rewards

- Independence, entrepreneurial, change the world
- PhD student mentoring

Challenges

- All at the same time!  research, fundraising, mentoring PhDs, teaching undergraduates, service to department, service to research area

# Research University Expectations

Publications – journals, conferences (top peer-reviewed)

Funding to support research groups and summer salary

Graduate student training (and professional success)

Reputation and impact

- Leader in your profession.
- Higher in rank: more visibility and international reputation – invited talks, conference organization, journal/editorial boards, professional organization roles.

Maybe

- MS/Undergraduate research mentoring
- Patents, software artifacts, etc

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# Research Faculty

Rewards

- Easier to get a position if you can cover most of your your salary
- Potential solution to 2-body opportunity
- Varies, but often same access as tenure-track to research resources (advising PhD students, lab space, etc.)

Challenges

- Funding sources that pay full salary are limited
- Usually, several projects needed
- Less stability

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# Teaching Focused Position

Rewards

- Impact students lives and careers
- Less multitasking, travel, stress
- University community and research opportunities
- Tenure track at Teaching Focused Institutions
- Many opportunities with booming enrollments

Challenges

- Tenure track vs non-tenure track everywhere else
- Non-tenure track: Less prestige, sometimes pay, and job security

# Research University: Teaching

Teaching Load: typically 1:1 to 1:2

Mix of undergraduate and graduate courses
from introdoctory undergraduate to core graduate course to research seminars

Teaching assistants for grading, office hours, etc.

Involve undergraduates in research

# Teaching Primary Positions

2 or more classes per term

Work closely with undergraduates and curriculum

Colleges and teaching primary Universities

- Professor (assistant, associate, full) with tenure
- Lecturer

Teaching track at Research University

Many different types/titles w/wout tenure

Teaching Professor

Professor of the Practice, Clinical Professor, Lecturer w/SOE (CA)

Lecturer, Senior Lecturer

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# Government and Industry Labs

Rewards

- Research that impacts country or industry
- Industry: higher pay
- Less multitasking

Challenges

- Somewhat less job security (no tenure)
- Fund raising
- Less independence on choosing problems
- Management changes focus and so do you!

# Government & Research Lab

Impact the organization

Setting the direction of the research

Publish

Research area leader

Do more yourself (some interns, post docs, staff)

Raise funding

# The Application

*Mary*

# Where to Apply

- Identify “stretch”, “eye-level”, and “safety” positions
- Check ads: CRA, CACM, IEEE Computer, departmental websites
- Apply if the call mentions all areas
- Certain research areas can match the hiring goals for more than one department (e.g., CS, ECE)
- Keep an open mind! You might be surprised what you end up liking the best

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# Your Application

- Cover Letter
- Curriculum Vitae (CV)
  - Degrees, research and teaching experience, jobs held, honors and awards, papers published, professional service, ...
- Research Statement (2-3 pages)
  - What are your key contributions? What is your vision for your future research?
- Teaching Statement (only academic,1-2 pages)
  - What is your vision? What do you want to teach? How do you create an engaging classroom?
- Letters of recommendation (3-5 people)

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# Identifying Letter Writers

- Letters are very important
- With your advisor, choose people who are
  - Familiar with your research
  - Respected in the research community (preferably, full professors or established research leaders)
  - Expected to write a meaningful and positive letter
- Consider (in addition to advisor)
  - Members of your research community with nearby research
  - Internship advisors
  - Members of your thesis committee
  - Other professors at your institution
- Give letter writers a copy of your application material

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# Planning Your Job Talk: Job Talk vs. Conference Talk

| | Job Talk | Conference Talk |
|---|---|---|
| Introduction | Explain big challenges in your area. Then use as context to motivate your work. | Motivate your approach but assume area is understood. |
| Outline | Figure/graphic that captures the entire body of your work. | Follows the paper to be presented. |
| Technical Portion | High level, not dense. A little technical detail ok to interest experts, but circle back to explain impact of each result. Cover in detail ~2 papers and summarize others. | Goes deeper into technical details, and often shows how you are building on state-of-the-art. |
| Contributions | Contributions of your body of work. | Contributions of paper. |
| Future Work | Critical ending, explains your plans. | Minor part of conclusion. |

* Acknowledge your collaborators, perhaps with pictures at the beginning.

# Preparing Your Job Talk

- Get input from your advisor
- Take the time to get it right
- Give a practice talk, and include students working in other areas who will give honest feedback
- Practice until you can deliver it smoothly
- Consider watching a videotape of your talk
- Have a backup copy (in the cloud, on a USB drive) in case you have a last-minute technical problem

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# The Selection Process

- Some departments/labs ask for letters for all applicants, others only for the selected ones
- Some departments will let you know that there is a “no match,” but often you will not hear *anything*
- Few applicants will be invited for an interview
  - Telephone interviews are becoming more common (very common for teaching institutions and labs)
- Differences:
  - Four year institutions start earlier than research universities
  - Government lab hiring is notoriously slow

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# Congrats – you’ve got an interview!

*Nancy*

# Preparing for an Interview

- Do your homework – understand the organization!
  - Know the research areas and accomplishments of the people you will meet (read a few papers); prepare questions for **them**.
- Find answers to
  - What are the strengths (and weaknesses) of the organization, institution, group, department? Educate yourself about those areas, e.g., read abstracts of recent best papers in the area.
  - How might your research capabilities complement and integrate with the organization/department?
  - What role does the group/department play in the institutional structure?
  - Why are you interested?

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# The Big Day(s)

- Don’t set up a crazy travel schedule
- Get plenty of sleep, eat healthily, and wear comfortable clothes
- Enjoy and have fun
- Try to imagine yourself in the environment
  - Do you like the organization/environment?
  - Do you want these people as your colleagues potentially forever?
- Remember: you are interviewing them too!

# Typical Academic Interview

- ~2 days
- The interview talk (preferably early, not at the end)
- 30-minute one-on-ones
- Meet with department head/chair (and dean)
- Meet with a small group of grad students
- Meals

*Goal: Get an offer*

*How: Convince them that you will add strength to their department in important areas (research, teaching and service) and will be a collegial department citizen*

# The Job Talk

Preparing your Talk

- Provide enough background so people outside your area of research can follow
- Clearly state the problem and identify your specific contributions
- Show you understand any limitations of your approach and/or your results
- Thank your collaborators
- Include future research ideas and interests

Tips

- Get input from your advisor
- Give practice talks to a wider audience at your institution
- Consider any feedback you get
- Get the audience to ask questions, even weird ones, and to play difficult personalities
- Video your talk and (gulp!) watch it
- Practice, Practice, Practice
- Have a backup copy of your talk

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# Questions You Will be Asked

- ***What is your vision for the field?***
- What  was the novel insight and/or long-lasting scientific contribution of your thesis work?
- What do you want to work on next and why?  What would you write in a proposal?
- How do you choose problems to work on?
- Why you are interested in this institution?
- What courses would you like to teach and why?
- What is your philosophy about teaching students?
- Do you have questions for me?

# Questions You Should Ask

- What's the best thing about the department?
- What was the last major decision the department made and how was it made?
- Do you collaborate with other faculty? Could you tell me more about that?
- Graduate students
  - What jobs did the top students from your department get in the last few years?
  - How many students are supported as RAs? TAs?
- Do you do any interdisciplinary research?
- What is the teaching load? How are teaching assignments made?
- Who was the last person to get tenure and what were the strengths of their case? And who was the last person who was unsuccessful and why?
- Do junior faculty have a mentor? Chosen how?
- What did you do yesterday?

# Tips

- Be enthusiastic!  Show passion about something.
- Interpersonal skills are important.
  - Do they want you as their colleague?
  - Don't say negative things about other institutions or people.  It can come back to haunt you.
- Be authentic, tell the truth (but you don’t have to answer all questions)
- Remember you are representing your advisor, your department, your university.
- Go to the bathroom when you need a break, take notes, etc
- Consider when or whether to mention any two-body situations

# After the Interview

- Evaluate how it went – revise your materials if necessary
- Talk to your advisor
- Follow up with anything you said you would do
- File for travel reimbursements promptly
  - Read the instructions carefully and keep copies of receipts
- Send notes thanking people you particularly enjoyed talking to
- Okay to contact the chair/lead if you have an another offer

# Activity

Get with a partner and practice answering questions.

Question: If you join us, what will you do in your first year?

Question: Do you have or plan to have children?

# An offer!
# waiting, deciding, negotiating

# Negotiating an Academic Offer

- Resources, $$, …
  - Salary
  - Start-up package: student support, summer salary, travel funds, lab and student space, travel, etc
  - Subsidized housing, moving expenses
- Starting date and time till tenure
  - A January start *may* buy you extra time on the tenure clock
  - Tenure clock issues (clock credit, clock stoppage)
  - Pre-tenure sabbatical?
- Teaching
  - Teaching load reduction
  - 1st year teaching assignment
- Other
  - Help with obtaining an H1-B visa (if you're non-US)
  - Partner placement assistance
  - child care facilities/cost

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# Negotiating an Industry Offer

- Compensation
  - Salary
  - Signing bonus
  - Equity (stock)
  - moving expenses
- Starting date

# Negotiating Tips

- If you never hear “no”, you're not asking for enough
- But know when not to apply this rule

# Activity

Get with a partner and practice negotiating.  One of you is the chair, one of you is the chair. The chair should say no to something.

You have a higher salary offer from X University, ask the department chair to match it.

You need special equipment, ask for it.

Your partner also is graduating, see if they will interview your partner.

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# Parting Tips

# What is Often *Not* Said

- Most faculty get tenure
  - Most departments hire expecting/hoping to award the person tenure
  - Hiring and mentoring of junior faculty is expensive, in time and money
- Academic research positions provide the most flexibility in terms of future options
  - Often difficult to move from a teaching position to an industrial position
  - Often difficult to move from a teaching or industrial position to a faculty position

# 2-Body Opportunities: When to tell?

**In the cover letter**

- Useful only if it involves two academic positions
  - If it involves a different department, it allows the departments to explore options early

**After invited for an interview**

- They have already decided they are interested in *you*
  - Make it clear what you will accept

**During the visit**

- Can discuss your needs and the options
- Can be distracting to the interview (consider only discussing with head/chair)

**When an offer is made**

- There may not be enough time

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# Related Links

- J. Wing's "Tips on the Interview Process" http://www.cs.cmu.edu/afs/cs/usr/wing/www/talks/tips.pdf
- Appropriate and Inappropriate Interview Questions; http://www.purdue.edu/oie/Search_Screen/FacultySearchScreenManual.pdf (Page 34)
- CRA's Taulbee Survey http://cra.org/resources/taulbee/

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# slides from old talks – here to see what we may want to borrow

# Example of Different Expectations

- **Research Institutions**
  - 60% - 80% Research
  - 10% - 35% Teaching
  - 5% - 10% Service

- **M.S./B.S. College or Teaching focused at R1:**
  - 50% - 80% Teaching
  - 10% - 30% Professional Development
  - 10% - 20% Service

# Job Search in ~2 years? What to do now?

- Publish great work!!
- Keep a list of potential future research ideas
- Figure out if you want a research focused or teaching focused position
- Cultivate your professional network: conferences, seminars, mentors … meet people
- Communications skills matter: writing, speaking!

# Job Search – Closer to Getting Out

- Prepare CV and research/teaching statements
- Get these materials reviewed
- Talk to advisor/other faculty where to apply
- Apply to several places
- Prepare/Practice interview talk
- Be assertive!

GOOD LUCK!

# Resources

- J. Wing's "Tips on the Interview Process"

  http://www.cs.cmu.edu/afs/cs/usr/wing/www/talks/tips.pdf

- CRA's Taulbee Survey

  http://cra.org/resources/taulbee-survey/

- CRA-W Career Mentoring Workshops:
  http://www.cra-w.org/ArticleDetails/tabid/77/ArticleID/50/Career-Mentoring-Workshop-CMW.aspx

- On Academic Life:
  http://blogs.scientificamerican.com/guest-blog/2013/07/21/the-awesomest-7-year-postdoc-orhow-i-learned-to-stop-worrying-and-love-the-tenure-track-faculty-life/

# Resources (cont'd)

- On Post-Docs:

  http://cra.org/resources/bp-view/best_practices_memo_computer_science_postdocs_best_practices/

- Tips on doing an academic job search:

  http://matt.might.net/articles/advice-for-academic-job-hunt/

  http://people.mills.edu/spertus/job-search/job.html

  https://homes.cs.washington.edu/~mernst/advice/academic-job.html

- Job Ads:

  http://cra.org/ads/

# Acknowledgement

Modified slides from Julia Hirschberg, Susan Rodger, Dilma Da Silva, and Rita Wouhaybi.

# GOVERNMENT/NATIONAL LAB POSITIONS

# Government Lab Environment

- Projects tend to be collaborative, multi-disciplinary and often large in scale
- Working on science problems of national priorities (national security problems at many labs)
- Opportunities to get involved in pure research and applied research problems
- Work on problems that require new research solutions
- Advise graduate students through university affiliation and internships
- Opportunities to collaborate with academia and industry

# Government Lab Research

- Mix of soft money and block funding (depends on the lab)
- Research projects need to fit with the priorities and interests of the agency
- National facilities/resources (leading edge capabilities)
- Encouraged to publish research papers (unless classified research)

# Additional Notes

- Typically looking for long-term employees (even when a term-position is advertised)
- Postdoc salaries pre-defined so no negotiation
- Joint appointments with university possible
- Some positions have a citizenship requirement
- Ask about evaluation criteria and management structure (different at each lab)

# INDUSTRY POSITIONS

# Why Consider Industry?

- You want to see the impact of your work in the ***real world*** on ***real users*** with ***real data***
- You want to expand your skill set and gain exposure to a wide range of technical challenges
- You want flexibility in choosing your geographical location-industry provides greater options
- You like working with diverse multi-disciplinary experts (EE, CpE, CS, etc…) in a multi-geo environment
- Opportunity to collaborate with varied stakeholders (govt., academia, industry)
- Leadership opportunities—own a project or own a functional area of a larger project
- Career development and growth opportunities — targeted development programs for growth

# Industrial Research Lab

- Often considered innovation engine of the company
- Research aligned to corporate objectives with a strong focus on strategic visioning/innovating  for the future(5-10 yrs out)
- Focused on product roadmap impact as well as knowing where the puck is going for the business
- Innovation not just invention
- Usually 3 phased approach to innovation- Research, Prototype (proof of concept), Transfer- seamless pipeline to market
- Opportunity to collaborate across the Labs, company, external partners (industry, academia, govt.) on your project
- Personal accomplishment- see the impact of your work on real users

# Industrial Research Lab

- Ability to build acumen in adjacent research areas outside of your primary area of interest
- Experience the full life cycle of development from research to product
- Publish papers/file patents
- Personal accomplishment- see the impact of your work on real users
- Risk Taking is valued
  - Failing Fast, Fail Forward- ***"Better a $1M failure in the Lab than a $1B failure in the Fab"***
- Diversity of talent and expertise

# Industry Job Search

- Attend industry events and professional conferences (SWE, CRA-W, Grace Hopper) to meet company reps, hiring managers
- Present at conferences to build your network
- Leverage the connections that your professors have with companies you are interested in
- Create a profile on the websites of companies that you are interested in
- Identify a work environment that is aligned to your values, goals, work style
- Research the company and try to set up informational 1x1's with folks in the group that you have interest in
- Network, Network, Network!

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# Preparing for an Interview

- Be able to speak to how your research is applicable to the company
- Be able to articulate your research in three parts:
  - challenge, results, impact
- Don’t assume everyone you are talking to has a PhD.
  - make it plain and simple
- Speak to your leadership abilities across a variety of scenarios always conveying outcomes/results/impact
- Share examples of collaboration for results
- Don’t apply if you have an aversion to coding: to many, it’s considered an art, and should not be dismissed!
  - Akin to applying for an academic job and stating that you don’t like to write papers or give talks.

# Industry Research: Interview

- Similar to academic/government lab search
  - one day of 1:1 interviews + a job talk
- The match between your research and the company's objectives should be fairly obvious ✔
- Having a personal contact with a researcher in the lab is invaluable:
  - Will let you know about new ventures or proposals to which your research applies
  - Will invite the right people to your talk
- Demo of your results is a plus
  - evidence that your ideas work!

# INDUSTRY POSITIONS
# (not in Research Labs)

# Industry: Software Engineering

- Emphasis on making things work
  - Simple may be better than clever
- Challenges often involve complex interacting software built across groups
  - Lots of interaction
- Many project choices and frequent movement between projects.
- sequential short-term projects vs. parallel long-term projects:
  - both possible and both can work
  - Choose wisely (get help from mentors!)

# Industry:
# Software Engineering Concerns

*Will my expertise go stale?*

*Will I just be a developer?*

*Am I leaving research behind ?*

*If I change my mind, can I work at research lab or academia?*

# Industry (Research and non-Research) Offer / Compensation

**Title**

Base Salary

- Expect to share info about competing offers
- Salary growth probable once on board

Additional Compensation

- Stock options and units
- Retirement plans and matching funds
- Incentive bonuses
- Medical insurance
- Other perks

Ask questions!

Get wise regarding negotiation

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