Ph.D. Research Career Paths & Job Search

Outline

- Quick Introductions

- Overview of Positions
  - Academic, Private Industry, Government Labs

- Job Search

- Questions!

Comparisons:
Academia, Industry, Government

Academia	Industry (non-research)	National Lab or Industrial Research
Active publishing in top tier conferences	Build "real" systems	Mix of building "real" systems and publishing
Active collaborations with academia	Up-to-date technical skills	Active collaborations with labs and academia
Establish visibility in research community	Understand business roadmaps	Address agency or company mission critical problems
"Soft" money	"Hard" money	"Soft" and "hard" money

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Academic Positions

Expectations of Academic Positions

- Research
  - Engage in scientific discovery
  - involve graduate and undergraduate students
  - fund research

- Teaching
  - Active teaching, mentoring, advising

- Service
  - Internal (dept) and external

Institutional Expectations Differ!

- Research-Focused Positions
  - 50%-80% Research
  - 10%-40% Teaching
  - 5%-10% Service

- Teaching-Focused Positions
  - 50%-80% Teaching
  - 10%-30% Professional Development/Scholarship
  - 5%-20% Service

Research Expectations (at research institutions)

- Publications – journal, conferences, workshops

- Funding to support research group / summer salary

- Graduate student mentoring (and their success)

- Reputation and Impact
  - Higher in rank: more visibility and international reputation – invited talks, conference or journal editor/boards, professional or roles

Teaching Expectations

- Teaching load: typically 1:1 to 1:2
- Mix of undergrad and grad courses
- Teaching assistants for grading and course help
- Promotion and Tenure:
  - Good/Excellent research required
  - Good teaching required (poor teaching unacceptable)
- Remember
  - Teaching & students are why we are in academia
  - Everyone can learn to be a good/competent instructor

Research Focus: Service Expectations

- Be selective: chose roles where you can have impact and engage – "power" committees

- Pre-tenure: prioritize service with research goals

- As you progress, more opportunities

- Internal: grad admissions, faculty search, …

- External: Program committees, Funding panels, organize workshops

Challenges

- Balancing the three roles – same as in grad school
  - All three can be infinite sinks
  - Should not spend all time on one
  - Remember your mentors – they can help!
- Networking – forcing yourself to talk to others
- Pressure of tenure and promotions

Rewards

- Love of research and freedom to do research that you want
- Working on research with graduate students
- Involving undergraduates in research
- Making friends across disciplines and the world
- Variety and flexibility of work
- Creating the kind of career that you want – Independent (as long as you meet expectations)

Some Advice: pre-tenure years

- Find mentors and professional cohorts

- Choose your teaching and service so they are synergistic with your overall career plan

  - Prioritize

- Collaborate if you can

- Learn to say no politely and suggest alternative

- Enjoy your work and colleagues!!

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Research Positions in Industry/Labs

Research in Industry

- Comes in various forms
  - Applied research and research-to-production
  - Exploratory research and advancing the state of the art
  - Team projects or independent research
- Roles tend to be focused on research outcomes (fewer distractions)

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Types of Industry Research Positions

- Permanent positions: Research scientist, research engineers, leadership
- Short-term positions: Postdocs, sabbaticals, contracts

Industry Research: Pros & Cons

- Benefits:
  - Focus, resources, collaborators

- Challenges:
  - Research freedom depends on environment
  - Performance reviews can encourage short-term focus, risk aversion

Research Positions in Government Labs

Government Labs

FFRDCs by Location

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

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, multi-institution teams with other scientists

There's no single way to succeed as a researcher in the national labs

What do the national laboratories value?

Technical Skills
- Depth
- Breadth
- Innovation and creativity

Leadership
- Project leadership
- Program management
- Line management
- Informal leadership

Impact and Consequence
- Program impact
- Discipline impact
- Consequence of error
- Management/sponsor visibility

Collaboration and Service
- Number and type of technical collaborations, Mentoring
- Contributions to a positive work environment, interpersonal skills, teamwork
- Professional service, Lab service

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Research Track at National Laboratories

(Titles and number of "levels" may vary between labs - its important to understand how the levels relate to experience and responsibility)

- Postdoc
  - Named - small project, often 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

Job Search

Faculty Positions - By the Numbers

- Hiring for a single position can bring in hundreds of applications
- Phone/zoom interviews can be some small percentage of all applicants
- Between three to eight applicants per open slot brought to campus for interviews
- One offer made to top interviewee; some places over-offer when multiple slots

Faculty Job Application Documents

- Cover Letter

- CV

- Research Statement

- Teaching Statement

- Diversity Statement (some)

- Reference Letters

- Sometimes, online forms (extract information from your CV).

- Essay-type questions (Australia/UK)

Cover Letter

- Customize it
  - Name of chair of search committee
  - Exact position (include reference number)
  - Name of School
- Highlight your accomplishments
- Include courses you can teach (if asked)
- Depending on teaching or research position highlight that aspect first
- Demonstrate your interest in school/position
- Proof read!

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CV

- Standard Information
  - Standard info (contact details, education, work experience
  - Awards and Honors
  - Publications with full citations
  - Service
  - References
- What we look for (in a glance):
  - Holes in Education/employment
  - Number and quality of publications
  - Teaching experience

Teaching Statement

- Introduce your teaching philosophy

- Relate your teaching activities to your philosophy
  - Concrete activities you've done related to philosophy

- Teaching-based activity
  - Teaching
  - TA
  - Student mentoring

- About 2 pages

Diversity Statement

- Some institutions are now asking candidates to provide a diversity statement

- Statement showing commitment to diversity

- Demonstrate evidence of an activity related to diversity, equity and inclusion through research, teaching and/or service endeavors

- Discuss future plans

Research Statement

- Introduction - general field/ research topic

- Different sections
  - Doctoral research (cite your work)
  - What are you currently working on? (not new grads)
  - What do you plan to work on next?

- Remember: read by experts in area and non-experts

- Assess if your work good fit with department
  - Does your area strengthen our current areas?
  - Teaching – can undergraduates participate?
  - Research – Is this a good area for funding? Future work?

- Limit to 2-3 pages

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Reference Letters

- 3-4 letters
- Writers must address your skills for the position
- Writers have freedom: can discuss time gaps
- This is one of the most critical components of your application
- Some tips:
  - Academics typically know how to write such letters
  - Letters from the same writer for two applicants can be compared
  - Help your writers!

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After the Faculty Application

- Phone/Zoom Interview
  - Typically ½ hour to 1 hour
  - With Chair or search committee
- In person interview and talk
  - 1-1.5 long days (breakfast to dinner)
  - 1 hour research talk
    - Specialists and non-specialists
    - Don't go over, leave time for questions
  - Teach a course (if teaching position)
  - Meetings with: Chair, faculty, Dean, other departments
- Offer and Negotiation

- Hints
  - Start working on your talk early!
  - Practice talk
  - Get help!
  - Bring energy bars

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Industry Research Applications

- Rolling applications

- Requires much less lead time

- Process is standardized and company specific
  - Full interview loop including a talk

- Roles are decentralized
  - Recruiters tend to be tied to specific orgs/teams, so find the team / org first

Interviews

- Could include a pre-screen (i.e., phone interview)
- Do your homework
  - ✔ Lookup the people you will interview with
  - ✔ Lookup the group/team
  - ✔ Read the open position (open req) closely for details that you might have missed
- Mock/practice interviews
  - ✔ Have a short technical pitch on your thesis ready
  - ✔ Research questions that may be asked
  - ✔ Practice interviews

Interviews (2)

- If there is a talk (same as academic):
  - ✔ Rehearse, rehearse, rehearse
  - ✔ Have polished slides: call out important points, use visual material, dig deep technically
  - ✔ Be professional when answering questions but don't let them derail you
- Don't be offended if they didn't have time to read cv/papers closely or attend talk
- Ask questions: This is your chance to figure out if you want to work there
- Is this a place you can see yourself grow?

Offers

- Congratulations!
- <u>Negotiate</u> whatever you care about
  - ✔ Start date
  - ✔ Salary (even if outside your comfort zone)
  - ✔ Signing bonus
  - ✔ Stock options
  - ✔ Moving package
  - ✔ Campus and flexibility
  - ✔ Presenting work at conferences
  - ✔ Consider all *strong* offers

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Government Research Applications

- Very similar to the Industry experience, though the time scales from interview to offer may be slower

- Advice for getting your foot in the door:
  - Internships help! Post-docs can lead to staff scientist positions. And also use your network.
  - Conferences are a great place to make connections for future jobs.
  - Personal discussions may open up opportunities (sometimes a job can be posted when a good candidate is identified).
  - Apply, even if you don't meet all the "desired" qualifications.

Additional Resources

Where to find job listings

- CRA: http://cra.org/ads/
  - Submit materials to CRA database

- ACM: https://jobs.acm.org

- IEEE: http://careers.ieee.org

- Chronicle of Higher Ed: https://chroniclevitae.com/job_search/

- Teaching position? Join SIGCSE, job listserv

- Other Listservs, e.g., in your research area

Resources

Thanks to prior grad cohort speakers

CRA-W Career Mentoring Workshops:

https://cra.org/career-mentoring-workshop/

On Academic Life:

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

http://dynamicecology.wordpress.com/2014/02/04/you-do-not-need-to-work-80-hours-a-week-to-succeed-in-academia/

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/

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

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Final Thoughts

Questions?

Backup Slides

Academic Postdocs

Continue research with another mentor

- Expand network, stronger record, etc

- a new field

Funding

- Fellowship you apply OR university/department

    OR professor research grants

Best-case Scenario

- 1-2 years, good mentor, high-ranked school that will help you transition to the academic position you want

- Already have tenure-track position, defer start for 1-2 years

Challenges of Academic Postdocs

- Lower pay (compared to faculty, industry)
- Role in the university
  - Not a student, but not faculty
  - Depending on school, can feel isolated
- May not have independence
  - Working on PI's grant
- If you have a family, can be difficult to move for a temp position

Research Faculty/Scientists

- Role is almost entirely focused on research
  - Little or no teaching and service
- No tenure: All "soft money" – grant writing
- May be dependent on another PI
- Possibly easier work/life balance

Postdoc Applications

- Usually a two year position
- Think about what you want to do
  - Very similar to what you do now
  - Something that extends your current work
- Talk to people
  - Your advisor, faculty in your area
  - Postdocs in your area
- Interview process usually informal, easier to get
- Use them to:
  - Move to more prestigious institution
  - Move to different area
  - Get skills you didn't have before

Gaining Skills in Graduate School

- Research
  - Apprenticeship – learn from advisor and others
  - How do ideas come? How to organize research?

- Teaching
  - Teaching experience (TA)

- Service
  - Dept committees, organize student groups, volunteer at conferences