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

<table>
<thead>
<tr>
<th>Academia</th>
<th>Industry (non-research)</th>
<th>National Lab or Industrial Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active publishing in top tier conferences</td>
<td>Build “real” systems</td>
<td>Mix of building “real” systems and publishing</td>
</tr>
<tr>
<td>Active collaborations with academia</td>
<td>Up-to-date technical skills</td>
<td>Active collaborations with labs and academia</td>
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<tr>
<td>Establish visibility in research community</td>
<td>Understand business roadmaps</td>
<td>Address agency or company mission critical problems</td>
</tr>
<tr>
<td>“Soft” money</td>
<td>“Hard” money</td>
<td>“Soft” and “hard” money</td>
</tr>
</tbody>
</table>
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!!
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)
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

- 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
Research Track at National Laboratories
(Titles and number of “levels” may vary between labs - it's 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!
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
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!
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
Job Search: Industry Research
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!
• **Negotiate** 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
Job Search: Government Labs
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://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
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