Ph.D. Career Paths & Job Search

Kim Hazelwood, Facebook
Susan H. Rodger, Duke University
Outline

• Introductions
• Academic Positions
  • Research Focused Positions
  • Teaching Focused Positions
• Research Positions in Industry/Labs
• Job Search
Susan Rodger

• My path
  • BS Math/CS NCSU
  • MS, PhD Purdue
  • Rensselaer Poly. Inst. – Assistant Professor
  • Duke University – Professor of the Practice (Pop)
    • (Assistant Pop, Associate Pop, Pop)
  • Research – CS Education, Visualization, Tools learning CS, integrating computing into K12
Susan Rodger

• Fun - run/swim/hike, baking, cats, writing Wikipedia pages
Kim Hazelwood

• My path
  • BS CpE (Clemson), MS CpE (NCSU), PhD CS (Harvard)
  • Postdoc Intel
  • Asst, Assoc Prof (Univ of Virginia)
  • 10 year sabbatical at Google, Yahoo Labs, and Facebook

• My research
  • Early: Comp architecture / compilers / binary translation
  • Now: Systems and Machine Learning (PyTorch!)
Kim Hazelwood

• Personal side

4 Daughters  Running  Travel  Sewing
Academic Positions
Expectations of Academic Positions

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

• Teaching
  • Active teaching, mentoring, advising
Expectations of Academic Positions

• Administration/Service
  • Internal – Dept, school/college, university
    • Committee service - admissions
    • Grad advisor
    • Chair, Director of Graduate/Undergrad Studies
  • External
    • Professional societies
    • Govt Agencies
    • Outreach
## Types of Institutions & Positions

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<th>Type</th>
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<th>Primary</th>
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<td>Undergrad oriented</td>
<td>B.S., B.A.</td>
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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
Academic Research-Focused Positions
Research Focused: Research Expectations

• Publications – journal, conferences, workshops
• Funding to support research group and 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
  • Maybe:
    • MS/Undergraduate research mentoring
    • Patents, software artifacts
Research Focused: 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, fellow/leadership training opportunities
• External: Program committees, Funding panels, Professional society involvement, organize workshops
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
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 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!!
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
Academic Teaching-Focused Positions
Types of Teaching-Focused Positions

• Small College/University
  – Professor with tenure
  – Lecturer/Term Faculty
  – Professor of the practice

• Research University
  • Variety of types/titles
  • Teaching Professor
    • Professor of the Practice/Clinical Professor
    • Lecturer with SOE (California)
  • Lecturer/Senior Lecturer
Expectations of Teaching-Focused Positions

• Primary workload is teaching
  • 2-5 courses per semester
  • Significant office hours, advising
  • Wide variety of courses at all levels

• Scholarship/Professional Development
  • Mentoring undergraduate research
  • Current in technical/pedagogical aspects of discipline

• Service
  • Department – curriculum, outreach, advising
  • University – committees
  • Encouraged – conferences, professional societies
Research at Teaching Universities

• Financial support limited
  • May be startup funds or small institutional grants
  • Typically small or no budget for student support

• Release from teaching is not guaranteed
  • May get load credit for research mentoring
  • Some have summer research programs

• Utilizing undergraduate research programs helps
  • CRA-WP DREU program
  • REU programs through NSF
Preparing for Teaching-Focused Career

• Take every opportunity to gain relevant experience
  • TA positions
  • Instructor of record for one or more courses (often possible at lower levels, summer)
  • Training by university center for teaching excellence
  • Ask for written evaluation of teaching from peers/mentors

• Don’t ignore scholarship
  • Know how your research interests can involve undergraduates
  • Engage in the educational community (e.g., SIGCSE)
Challenges of Teaching-Focused Career

• Student demands can be very high
• Finding time for scholarship/research
• Finding collaborators for research
• Over-involvement in service
• Infrastructure (computer services, grant administration, etc.) may be more limited
• Perceptions of prestige
• Salary differential
Rewards of Teaching-Focused Career

• Student/Alumni relationships run deep
• Colleague relationships extend across the university
  • Fosters interdisciplinary work
• Opportunities for departmental and university leadership
  • Director of Undergraduate Studies
• May better align with personal goals/interest
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
Job Search
Faculty Positions - By the Numbers

• Hiring for a single position can bring in hundreds of applications
• Phone interviews can be some small percentage of all applicants
• Between three to eight applicants brought to campus for interviews
• One offer made to top interviewee
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 2-3 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 Interview**
  - Typically 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!
  - Feel free to run to bathroom!
  - Bring energy bars
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
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
Where to find job listings

- CRA: [http://cra.org/ads/](http://cra.org/ads/)
  - Submit materials to CRA database
- ACM: [https://jobs.acm.org](https://jobs.acm.org)
- Chronicle of Higher Ed: [https://chroniclevitae.com/job_search/](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?