

# Ph.D. Career Paths & Job Search

Kim Hazelwood, Facebook

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# Outline

- Introductions
- Academic Positions
  - Research Focused Positions
  - Teaching Focused-Positions
- Research Positions in Industry/Labs
- Job Search



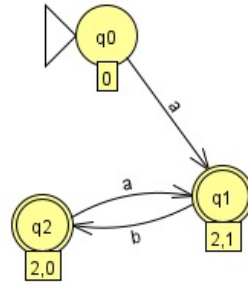
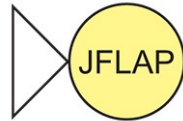
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# Susan Rodger

- 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

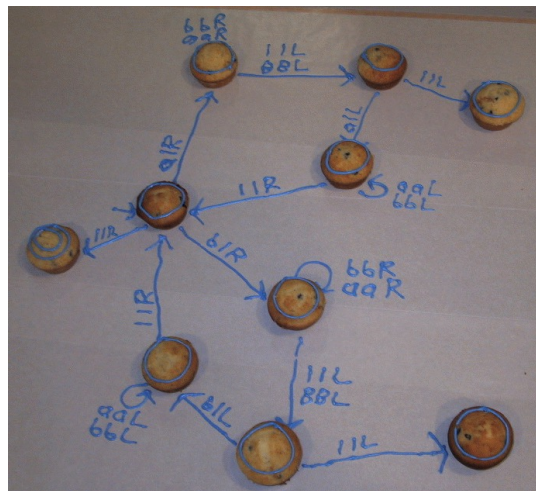


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# Susan Rodger

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



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# 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!)



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# Kim Hazelwood

- Personal side

4 Daughters

Running

Travel

Sewing



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# Academic Positions



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# Expectations of Academic Positions

- Research
  - Engage in scientific discovery
  - involve graduate and undergraduate students
  - fund research
- Teaching
  - Active teaching, mentoring, advising



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# 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



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# Types of Institutions & Positions

Type	Degrees offered	Primary	Important
Research universities	Ph.D.	Research	Teaching & Service
		Teaching	Scholarship/Research & Service
Colleges/ universities	M.S.	Teaching	Research & Service
Selective Liberal Arts Colleges	B.S., B.A.	Teaching	Scholarship/Research & Service
Undergrad oriented	B.S., B.A.	Teaching	Service & Research



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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



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# Academic Research-Focused Positions



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# 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



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# 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



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# 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



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# 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



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# 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



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# 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)



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# 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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# 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



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# 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



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# 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



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# Academic Teaching-Focused Positions



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# 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



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# 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



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# 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



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# 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)



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# 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



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# 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



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# Research Positions in Industry/Labs



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# 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



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# Industry Research: Pros & Cons

- **Benefits:**
  - Focus, resources, collaborators
- **Challenges:**
  - Research freedom depends on environment
  - Performance reviews can encourage short-term focus, risk aversion



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# Job Search



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# 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



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# 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)



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# 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



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# 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



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# 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



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# 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 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



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# 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



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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



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# 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/](https://chroniclevitae.com/job_search/)
- Teaching position? Join SIGCSE, job listserv
- Other Listservs, e.g., in your research area



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# 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/](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?*



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