



Planning Your Research Career

Tracy Camp, *Colorado School of Mines*

Julia Hirschberg, *Columbia University*



COLORADO SCHOOL OF MINES
engineering the way



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Congratulations!





Tracy Camp

Professor, Colorado School of Mines

Monitoring for Resources, Hazards, and Fun
with Wireless Sensor Networks

Research Career Successes

1. over 30 external grants awarded
2. over \$20 million in external funding
3. over 8,000 citations (Google Scholar)
4. shared software with over 3,500 researchers in 87 countries

Professor @ Colorado School of Mines

Outstanding Faculty

NZ Fulbright Scholar

ACM Fellow





Julia Hirschberg

Professor, Columbia University

Spoken Language Processing/
Computational Linguistics



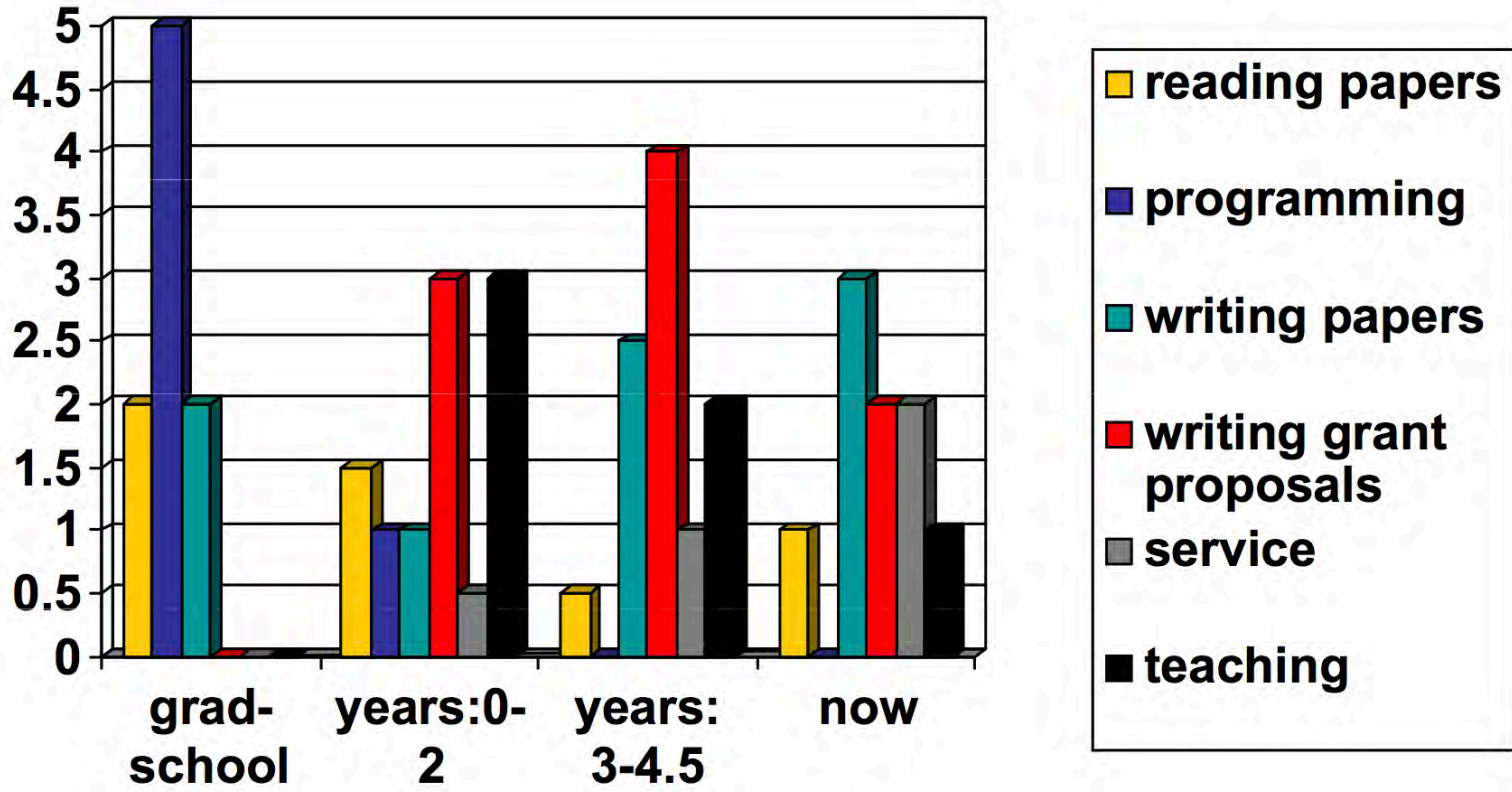
Research Career Successes

1. 15 current external grants (NSF, IARPA, DARPA, AFOSR)
2. more money than I can currently spend 😊
3. +11,700 citations: h-index 52
4. IEEE James L. Flanagan Speech and Audio Processing Award and ISCA Medal for Scientific Achievement

Percy K. and Vida L. W. Hudson Professor
and Chair of Computer Science

Fellow of AAAI, ACL, ISCA

Former Editor of Computational Linguistics
and Speech Communication



How do we spend our time?

(averaged across the academic year)



General Career Tips

- **Know thyself**
 - Strengths and weaknesses
 - Be honest with thyself
- **Be passionate about your work**
 - Enjoy what you do
 - Otherwise do something else
- Find large chunks of time to focus (plane?)
- Keep up-to-date (reviews)
- Always think “how can this lead to a paper?”
- Use start-up funds on students (not on summer salary)



General Career Tips

- Understand what it takes to get tenure at your institution, but ... *don't just stop at max*
 - Papers
 - Teaching
 - Grant \$
 - Service in/out of department/university
- Publish in one core area
 - Impact
 - Letter writers
 - TPC and journal board invitations
- Stop (or slow down) working with your advisor (after thesis papers published) ... but keep in touch!
- Use teaching to your research advantage
- Be willing to work hard ... *and don't stop when you get tenure*

What is your most important resource?

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What is your most important resource?



- **Your Graduate Students!**
 - Hire immediately
 - Lower your expectations for year one
 - Do not waste your time
 - Models of meetings: weekly/drop by/group
 - Pay for them to attend conferences
 - Make sure they can communicate in English well (find courses)



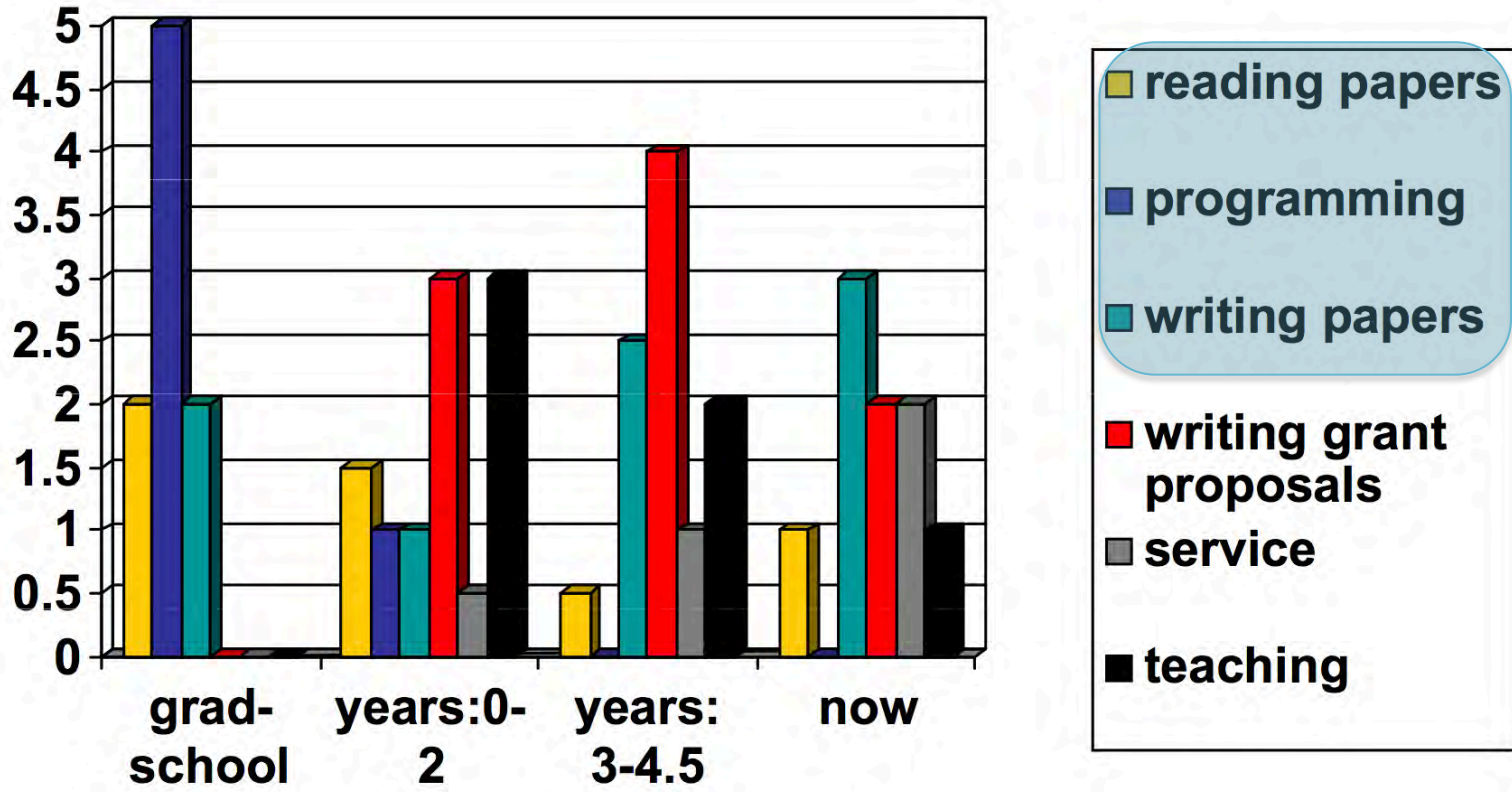
Academics 101

- Evaluation Criteria: Research, Education, Service
- Path
 - (Postdoc) → aP → AP → Tenured AP → Full
 - At some schools AP and Tenure come at the same time
 - Along the way and beyond
 - *Opportunities* for administrative and service positions in academia and government; sabbaticals and leaves
- Impact is what matters
 - Quality, not quantity, but ... *there are limits*
 - Ideas and people (students) are your legacy, not papers, but ... *great papers get you there*

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Choosing a Problem

High
Risk

- Courage: work on real/important problems
- Does it interest you?
 - Does it interest others?
 - If not, can you convince them?
- Nature of research will change throughout your career
 - Rule of thumb: Look for progress/results within 3-5 years
- Be ambitious and bold but ... *also take advice*
- Look for intersection between opportunities (for funding, collaboration) and new questions
- Don't be afraid of interdisciplinary research but ... *make sure you are well-connected in your core discipline*

High
Reward



Finding Solutions

- **Scientific method: Three Pillars of Science**
 - Experimental: Hypothesis, design experiment, run, evaluate, iterate
 - Micro-benchmarks, real benchmarks
 - Simulation
 - Theoretical: Solution is proof and algorithm or impossibility result
 - Computational
 - Algorithmic, software
 - Big Data: what can we learn from existing data?



Doing Research

- **Ask for feedback**
 - Talk about your work with colleagues, students
 - At conferences, with industry
- **Keep a research diary**
 - Always be writing down your great ideas, research decisions, and why (memory and credit)
- **Work with other people**
 - Colleagues, post-docs, graduate students, undergrad students, visitors

Collaboration: Why & How



- **Successful collaboration is a multiplier**
 - Enables you to achieve more than you can on your own, is fun, and brings new friends and colleagues
- **Unsuccessful collaboration can be a negative multiplier**
 - Wastes time, bores you, is stressful, creates hard feelings
 - Avoid if possible... but if not, leave gently



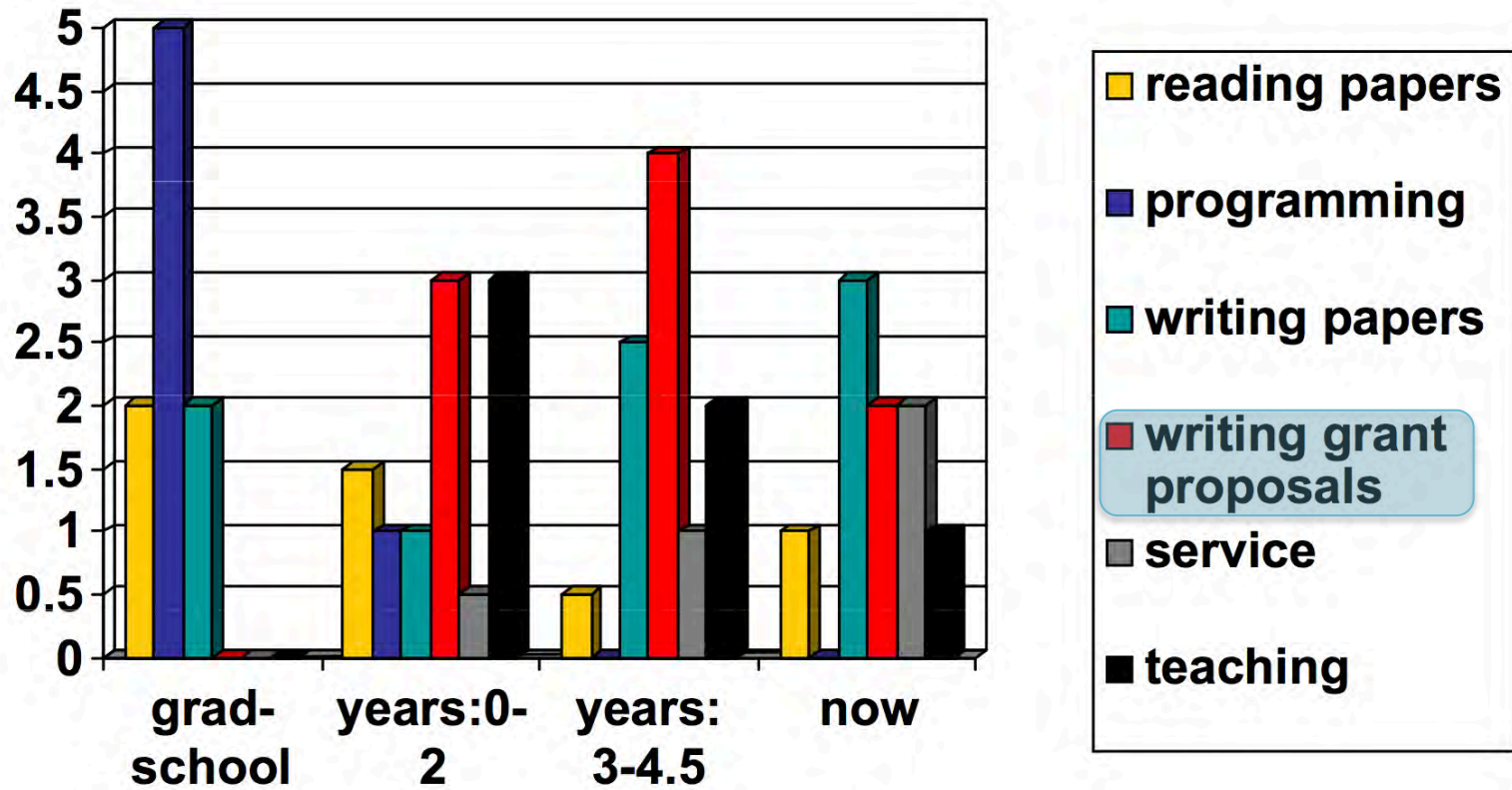
Collaboration: Do's & Don'ts

- **Do**
 - collaborate with successful people (check them out)
 - be a good collaborator yourself (timely, quality work, good colleague)
 - recruit good students (review applications, project courses (Ugrad, MS), teach grad reading class, summer REUs, siblings even)
- **Don't**
 - collaborate with freeloaders
 - learn to say no

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Funding Do's



- Visit funding agency sites regularly
 - Talk to appropriate program manager(s)
 - Volunteer to serve on review panels
 - especially for types of proposals you plan to submit
 - Expand your funding sources
- Seek advice/examples from colleagues
 - Ask successful colleagues to review your proposal and **LISTEN** to their feedback
 - Borrow sample proposals from successful colleagues
- Understand the program you are submitting to
 - Read the program announcement **carefully**
 - Read funded summaries/proposals of projects from that program

Funding Do's

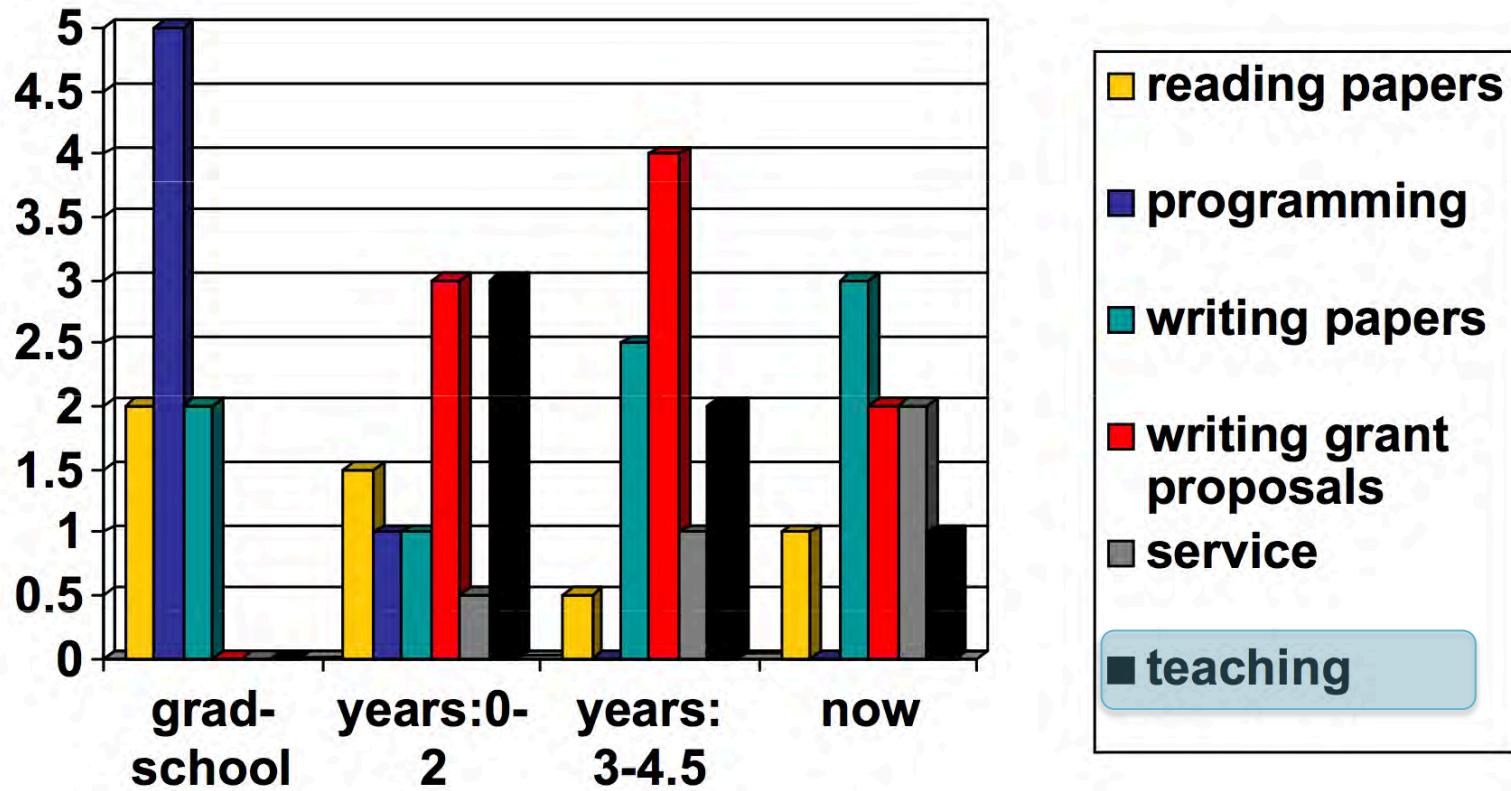
- Fund your research through a variety of sources
- If at first you don't succeed, try, try again
 - Read reviews carefully
 - Don't take it personally
 - Talk to program manager
 - Be persistent
- Write a few GOOD proposals
 - Immature ideas/plans rarely get funded
 - Borrow sample proposals from successful colleagues
 - **Seven criteria** for a GOOD proposal (handout)

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Educating

- Take educational responsibilities seriously
 - **Teaching**: developing new courses, curricula, and degree programs
 - **Advising** students (both grad and undergrad)
- Find a balance between teaching and research
 - You can spend **100%** of your time on teaching and still not do the best you can do
 - Time for teaching doesn't just mean preparing and giving lectures
 - Making up homeworks, labs, exams, managing staff and infrastructure
 - Online learning is hot now but not for assistant professors



Teaching as a Research Tool

- Teach in your immediate research area
- If possible, teach a research course where students:
 - Read/present papers
 - Define research topics with your help
 - Write and present their finished papers
- And you:
 - Select papers that you want to read, as well as seminal papers
 - Read and give excellent feedback on their project reports (and potentially lead to collaboration with students and/or students' advisors)



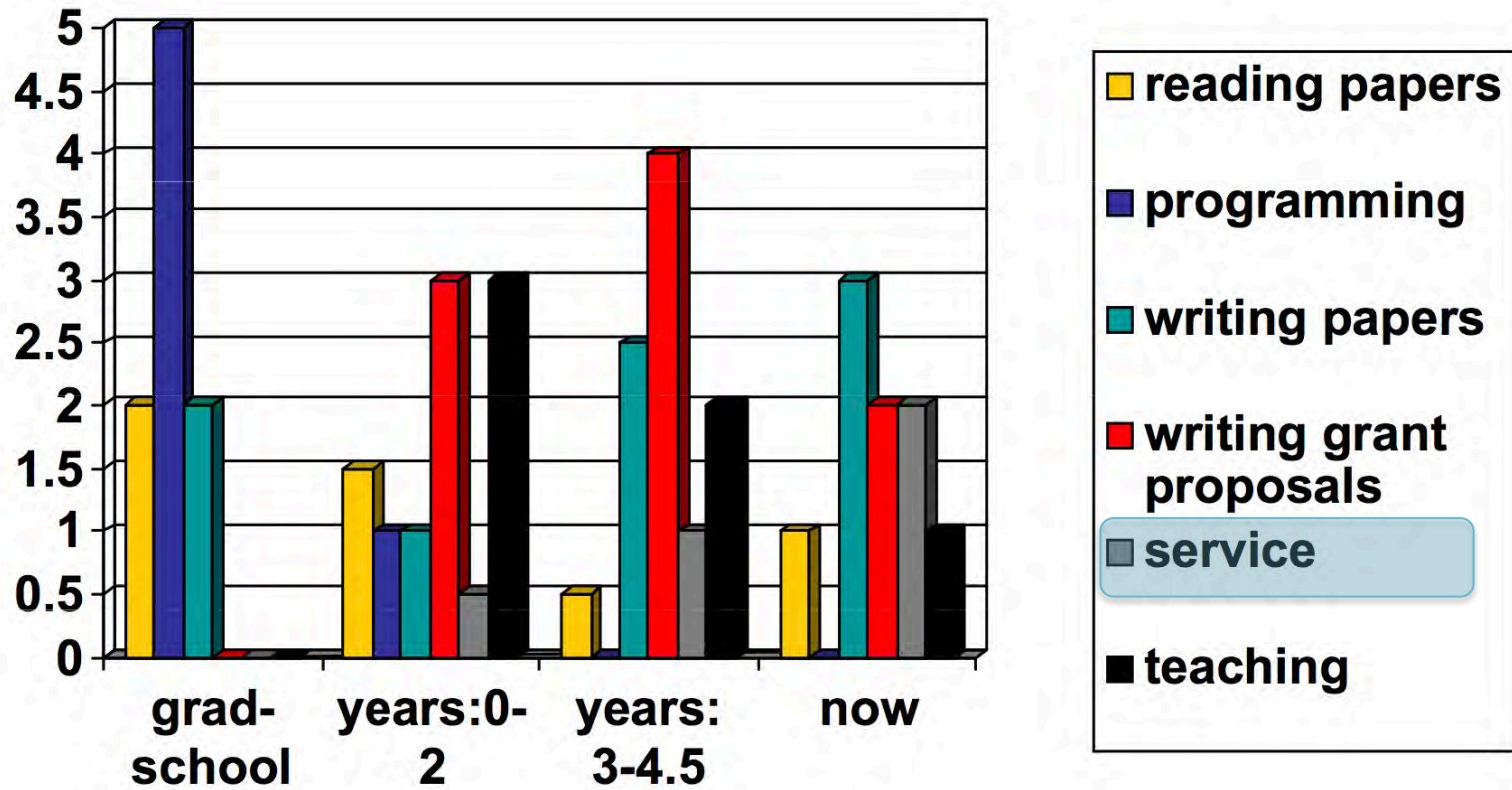
Communicating

- **Networking is enormously important**
 - Always ask questions at conferences...*you can prepare in advance* **(introduce yourself!)**
 - Introduce yourself to senior people in field and program directors at conferences and workshops but ... *don't neglect your peers*
- **Meet colleagues on campus ... including other fields that might produce collaborations**
- **Speaking**
 - Know your audience
 - Practice all your talks
- **Writing**
 - Know your audience
 - Publish in top conferences and top journals but ... *not only in these*
 - Workshops are for getting ideas out quickly and getting early feedback ... and they count too as publications

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Service for TWO Communities

- **Research community**
 - Early on:
 - Program committees
 - Panel or ad-hoc reviewer for funding agencies
 - Reviewer for journals and conferences
 - Later:
 - Program chair, journal editor, conference organizer, organizational boards and officers
- **University community**
 - Program, Department, School, University committees



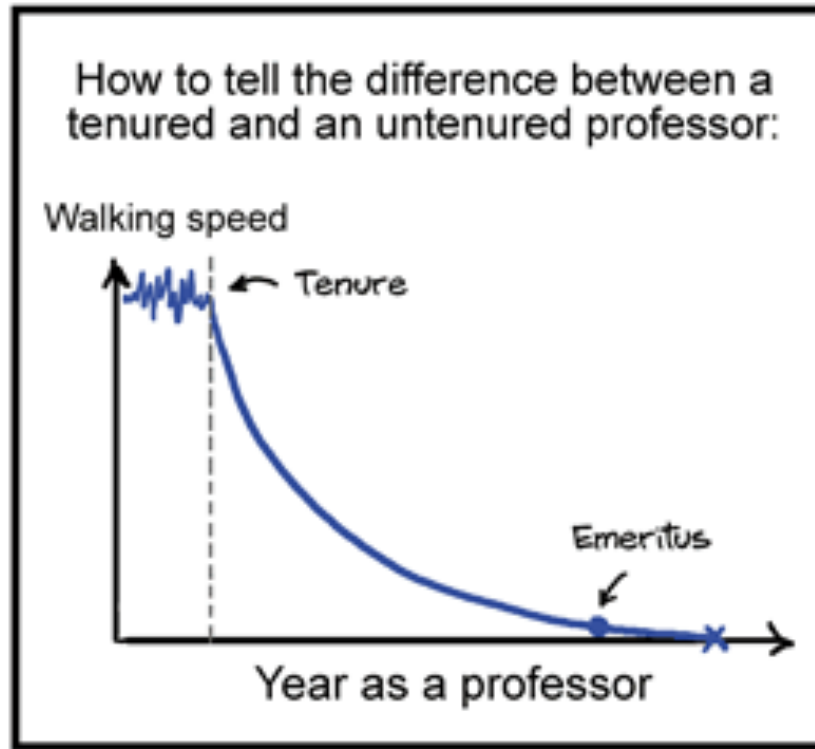
Other Academic Career Advice

- **Don't worry about tenure**
 - **Just do good work** and tenure will come but ...
keep getting feedback and listen to it
 - Your university went through a lot of trouble to hire you and wants you to succeed
- **Make sure you have a “buddy” on the faculty and several mentors (both on and off campus; both in and outside your field)**
 - Your mentors will change over your career
- **Take sabbaticals and leaves as they are offered**
 - Leave home: go to other schools, industry, government, abroad
 - There is **never an ideal time**, just do it!

Other Academic Career Advice



- **Students** are the coin of the academic realm
- **Family and friends** are the coin of the real world
- **POINT:** Make time for yourself, your family, your friends, **AND**



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AND have some fun along the way!



Resources

- Prior presentations at previous CRA-W/CRA workshops
- Dave Patterson's Non-Technical Talks
 - <http://www.cs.berkeley.edu/~pattersn/talks/nontech.html>
- Jeannette Wing's "Twelve Tips for Department Heads from an NSF Perspective"
 - <http://cacm.acm.org/blogs/blog-cacm/54177-twelve-tips-for-department-heads-from-an-nsf-perspective/fulltext>
- Advice about everything:
 - <http://web.engr.illinois.edu/~taoxie/advice.htm>