PLANNING YOUR RESEARCH CAREER

Tracy Camp, Colorado School of Mines

Mike Franklin, UC Berkeley

COLORADOSCHOOLOFMINES
engineering the way

Berkeley
UNIVERSITY OF CALIFORNIA

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CONGRATULATIONS!!

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TRACY CAMP
PROFESSOR
COLORADO SCHOOL OF MINES

Wireless Networks, Mobile Networks

Research Successes

1. 30+ external grants (= $20+ million)
2. 10,000+ citations and 27 h-index (Google Scholar)
3. software used by 3,500+ researchers in 87 countries
4. ACM Fellow; IEEE Fellow

Research Failures

1. … 2. …. 3. ….

MICHAEL FRANKLIN
PROFESSOR, UC BERKELEY

Data Management, Database Systems

Research Highlights

1. Advised 20 Ph.D./Postdocs; 9 current faculty
2. AMPLab: NSF Expedition Award, DARPA, DOE, > 30 Companies
3. Berkeley Data Analytics Stack (BDAS): Apache Spark, GraphX, MLlib…
4. Founded Truviso (acquired by Cisco), now advising ~10 start ups
5. ACM Fellow, SIGMOD "Test of Time", CACM Research Highlights

Ph.D. Wisconsin 93; Asst./Assoc Prof. Maryland 93-99; Berkeley 99…

Thomas M. Siebel Professor of Computer Science

(Former) Chair, Computer Science Division, EECS, UC Berkeley

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ACADEMICS 101

- **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 (academia, govt., companies, start ups)

- **Evaluation Criteria:**
  - Research, Education, Service

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ACADEMICS 101 (CONT.)

- **FIND OUT WHAT MATTERS AT YOUR SCHOOL/DEPARTMENT**
- (hopefully) 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*
- Need to balance research community norms with your department's criteria
  - i.e., seek and consider advice from senior colleagues but don't take it blindly

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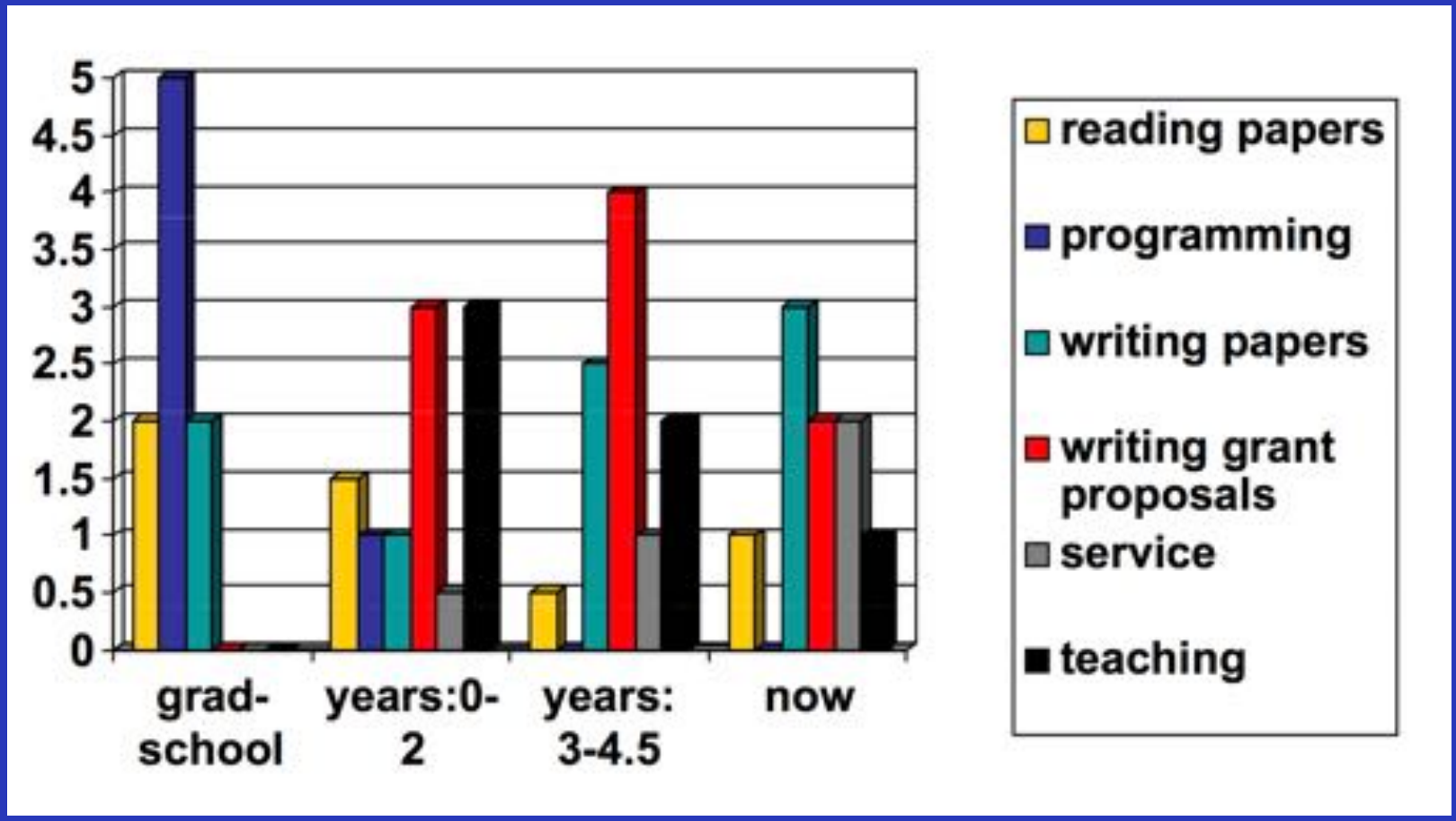
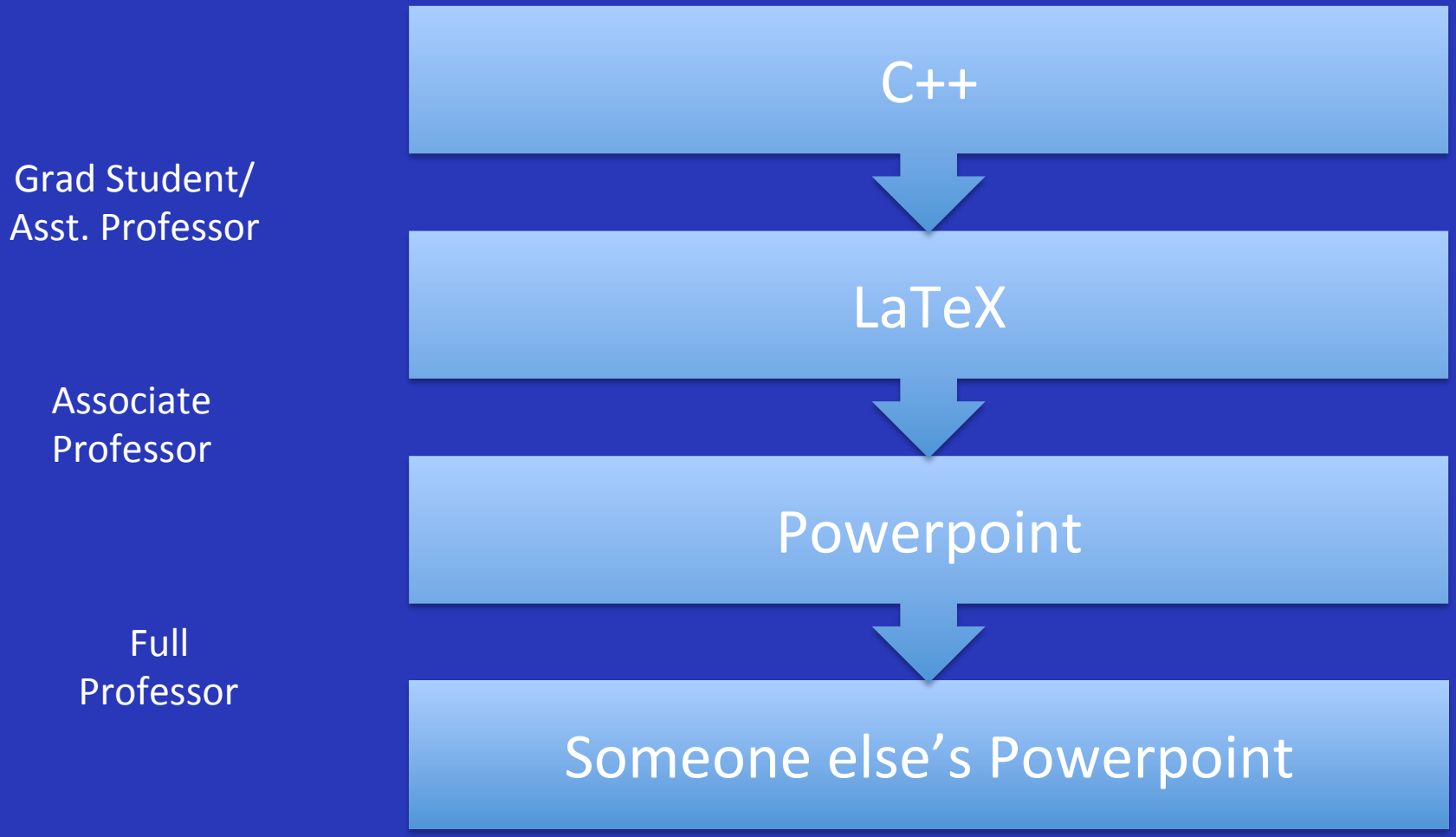


HOW DO WE SPEND OUR TIME? (AVERAGED ACROSS THE ACADEMIC YEAR)

ALTERNATIVE VIEW: PRIMARY LANGUAGE OVER CAREER



Credit (blame) to Donald Kossmann, ETH Zurich/Microsoft

WHAT IS YOUR MOST IMPORTANT RESOURCE? (ANSWER 1)

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WHAT IS YOUR MOST IMPORTANT RESOURCE? (ANSWER 1)

- **Your Graduate Students!**
  - Hire ASA you can
  - 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)

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WHAT IS YOUR MOST IMPORTANT RESOURCE? (ANSWER 2)

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WHAT IS YOUR MOST IMPORTANT RESOURCE? (ANSWER 2)

- **Your Time!**
  - Struggling students will take more of your time.
  - Even good students need time getting started. Hire deliberately and carefully!
  - Consider hiring postdocs and working with senior students (co-advising)
  - Learn to say No! (to lots of things)

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A GOOD RULE OF THUMB

- When asked if you would be willing to sign on for something where the work will be due "in six months"…
- Ask yourself: "Would I be willing to do this by next week?"

- Because eventually it will be due in a week!

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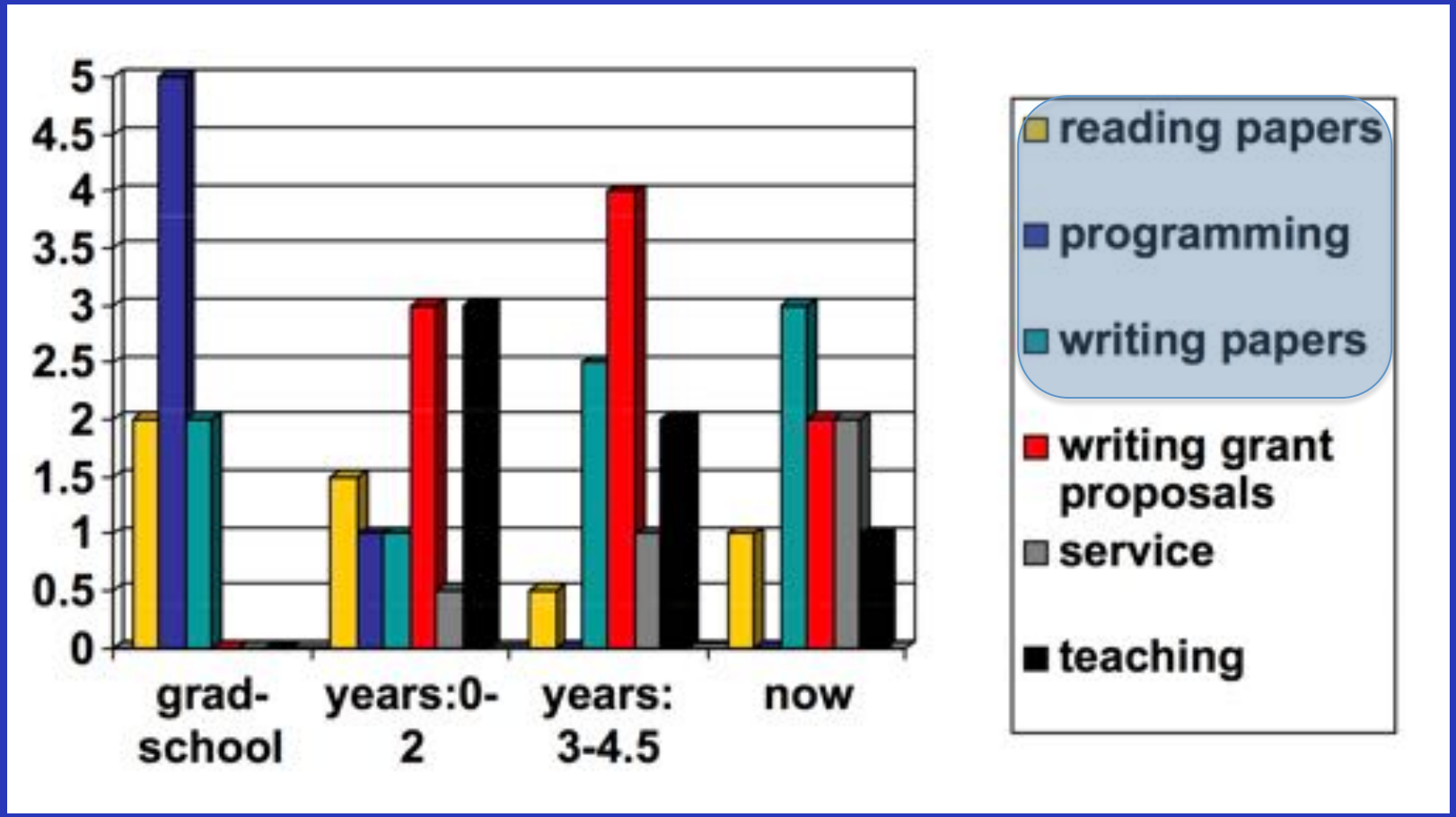
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CHOOSING A PROBLEM

High Risk

High Reward

- **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*

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CONSIDER A PORTFOLIO APPROACH

- **Pick say, 2 topics:**
- **Topic 1** – Something you are pretty sure of (usually stems from your thesis work)
  - Confident you will get results & pubs
- **Topic 2** – Something "further out there" (in time and/or expertise)
  - Expand your horizons; do something big
- For me (mjf):
  - Topic 1: Data Caching in new environments
  - Topic 2: "Broadcast Disks" and Mobile data
- **Good not to have all your eggs in one basket**
- **Good not to get pigeonholed**
- **Of course, don't spread yourself too thin**

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DOING RESEARCH

- **Get feedback/Build your brand**
  - Talk about your work with colleagues, students
  - At conferences, other schools, with industry
  - Write a blog/ use social media
- **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

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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 upfront if possible… but if not, leave gently

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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 (do learn to say no)
  - be a freeloader yourself

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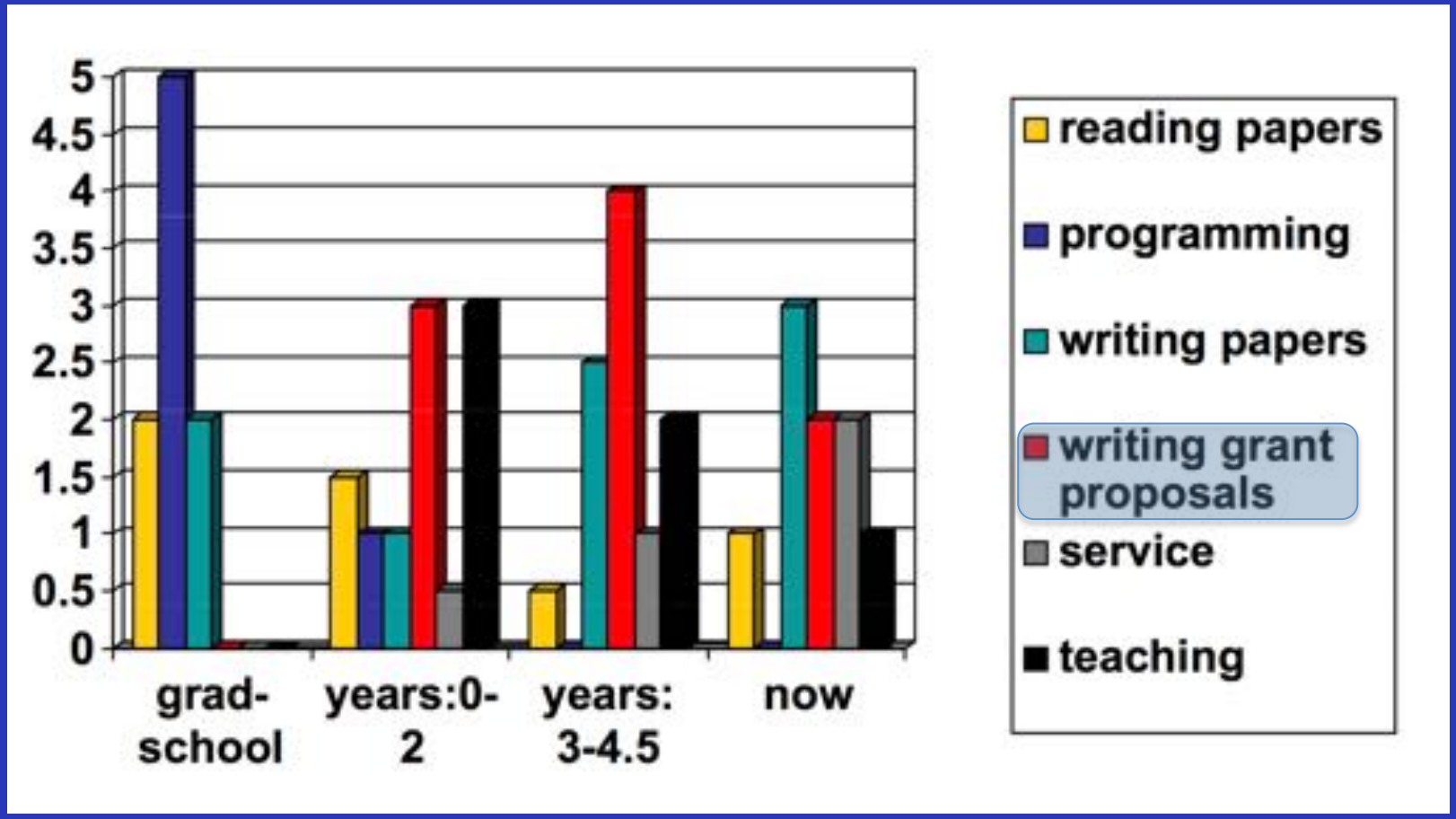
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FUNDING DO'S

- **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 (e.g., industry)

- **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

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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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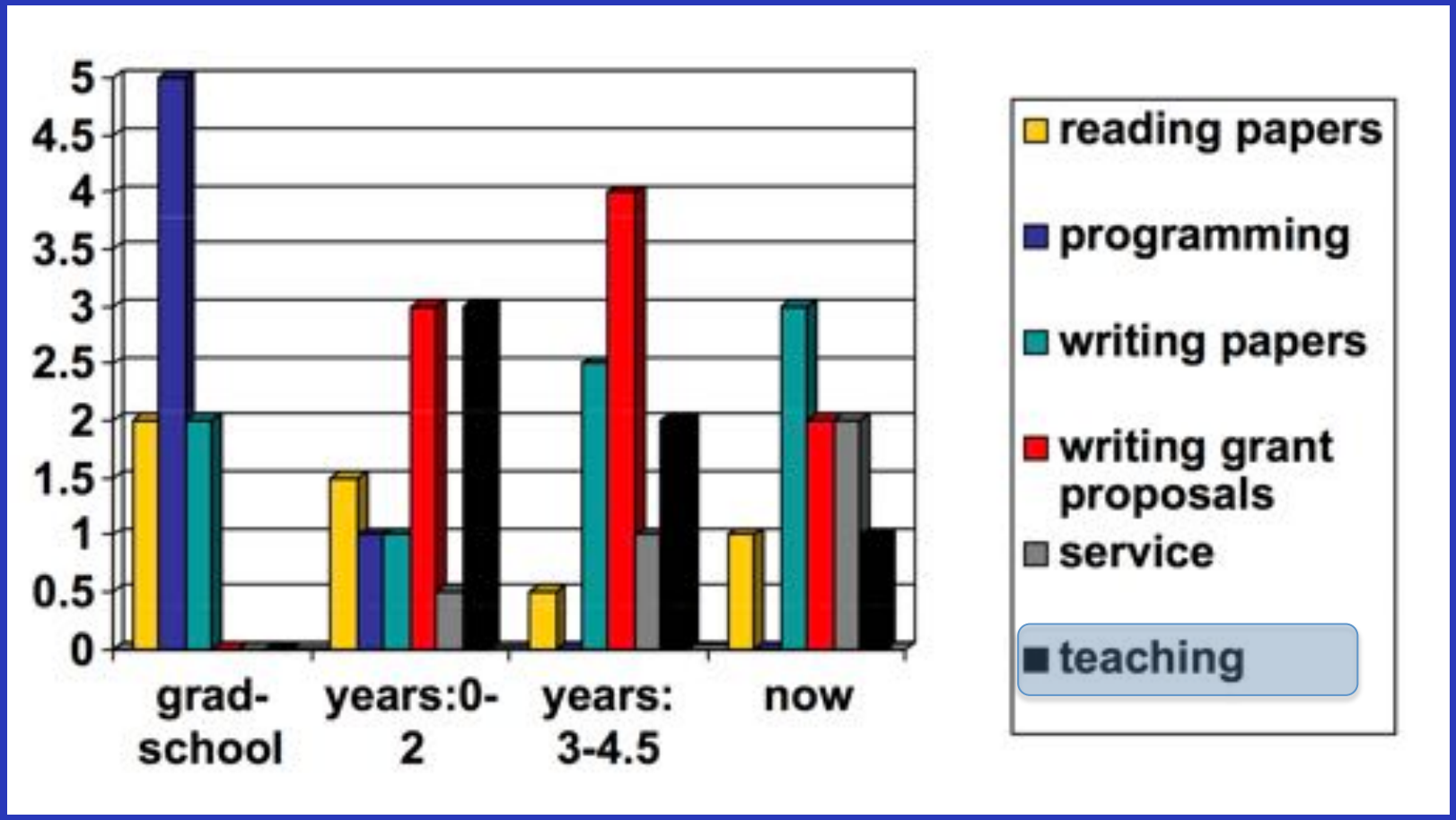
Lesson One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EDUCATING

- **Take educational responsibilities seriously**
  - **Teaching**: developing new courses, curricula, and degree programs
  - **Advising** students (grad and ugrad, postdocs)
- **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

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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)

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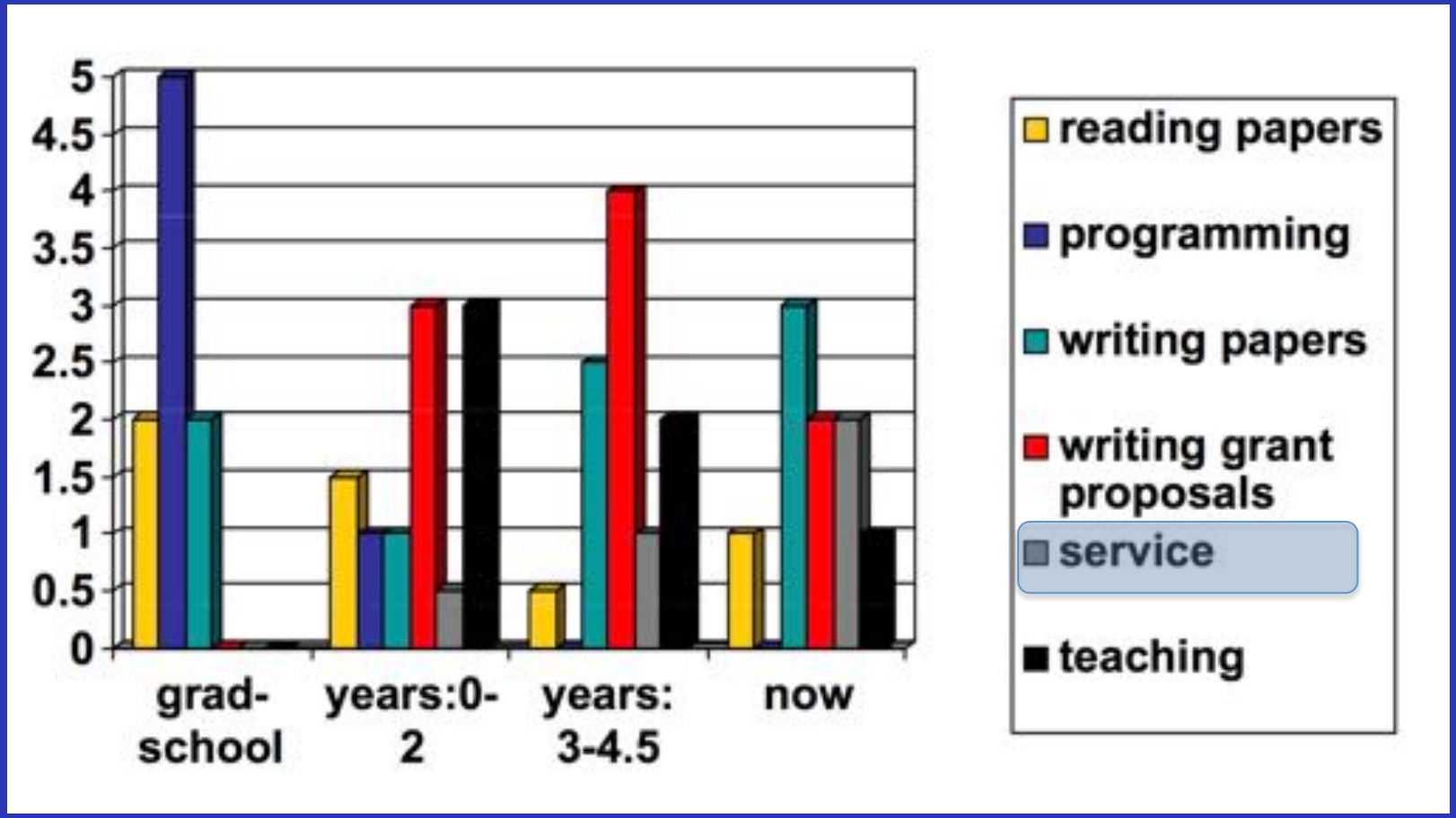
SERVICE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SERVICE FOR TWO COMMUNITIES

- **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

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Other Advice

NETWORKING

- **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

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COMMUNICATING

- **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 as publications too

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OTHER ACADEMIC CAREER ADVICE

- Don't obsess about tenure
  - **Focus on good work** and tenure will come but … *keep getting feedback and listen to (most of) 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!

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OTHER ACADEMIC CAREER ADVICE

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

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… AND HAVE SOME FUN ALONG THE WAY!

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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

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