Career Paths for CS Educators

New Educators Workshop
SIGCSE 2016

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Creighton University

Who am I?

David Reed, Ph.D.
Associate Professor
Director of Computer Science & Informatics

86-91	TA at Duke as grad student, teacher in TIP (for gifted 7-8 graders)
91-92	Asst Prof at Bennett College (historically black women's college)
92-94	Visiting Asst Prof at Duke (research university)
94-00	Asst/Assoc Prof at Dickinson College (liberal arts college)
00-??	Asst/Assoc Prof at Creighton University (teaching-focused university)

Other notable activities

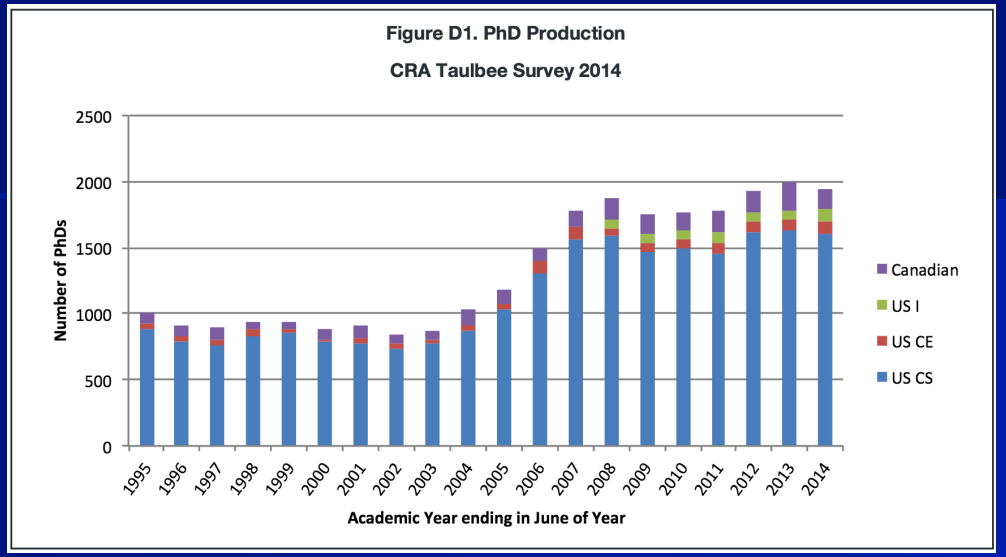
- Chief Reader of AP Computer Science (04-08)
- ACM/IEEE CS2013 Steering Committee (10-14)
- Member of LACS (99-??), CSTA Board of Directors (09-??)

You name it…

- ✓ taught weak, poorly-prepared & brilliant, precocious students
- ✓ taught small classes & huge lectures
- ✓ designed & graded tests for 20,000+ students
- ✓ designed new courses, curricula, programs
- ✓ contributed to college core, CS discipline core
- ✓ conducted obscure AI research & CS-education scholarship
- ✓ supervised undergraduate research
- ✓ wrote a text book
- ✓ served as chair, program director
- ✓ dealt with "difficult" colleagues, "interesting" deans
- ✓ split, killed, created new departments
- ✓ earned tenure twice
- ✓ managed the two-body problem, balancing family & work
- ✓ stayed (reasonably) sane

Current state of CS careers

Data from CRA Taulbee Survey:
http://cra.org/resources/taulbee/



Academic Year	Number of Ph.D.s Awarded	Ph.D.-Granting CS/CE Dept	Non-Ph.D.-Granting CS/CE Dept	Non-CS/CE Dept	Industry	Government	Self-Employed	Outside US/Canada
13/14	1940	25%	2%	1%	58%	3%	1%	9%
12/13	1991	29%	2%	0%	56%	3%	1%	8%
11/12	1929	27%	2%	0%	56%	4%	1%	9%
10/11	1782	31%	4%	0%	47%	4%	1%	11%
09/10	1772	34%	2%	0%	45%	4%	1%	12%
08/09	1747	32%	3%	0%	47%	4%	1%	10%
07/08	1877	25%	4%	0%	57%	3%	1%	9%
06/07	1775	26%	5%	2%	54%	3%	1%	10%
05/06	1499	26%	5%	1%	50%	3%	1%	13%
04/05	1189	35%	7%	2%	41%	3%	1%	12%
03/04	1032	56%	4%	0%	30%	3%	1%	5%
02/03	877	58%	4%	1%	29%	2%	1%	4%
01/02	849	52%	1%	1%	39%	3%	0%	5%
00/01	912	39%	4%	0%	49%	2%	1%	4%
99/00	881	38%	3%	1%	50%	3%	1%	4%
98/99	944	38%	3%	0%	49%	2%	3%	3%
97/98	933	35%	3%	1%	50%	4%	2%	5%
96/97	894	30%	4%	2%	54%	3%	2%	5%
95/96	915	31%	3%	2%	49%	3%	2%	9%
94/95	1079	26%	8%	1%	41%	5%	2%	16%

Research/teaching spectrum*

*not to scale

research university faculty

teaching college/university faculty

liberal arts college faculty

teaching-track faculty

instructor/lecturer

Generally speaking, it is common to move to the right over the course of a career, much less common to move left.

Career paths

I will focus on the 4 common types of faculty positions

1. research university faculty
2. teaching college/university faculty
3. liberal arts college faculty
4. teaching-track faculty

I identified exemplars of each type of position & asked

1. What do you like most about your type of position?
2. What characteristics/goals suggest this career path?
3. What advice do you have for someone starting this path?

Research university

this is the world grad students are most familiar with

typically, research is central to the faculty member's career (and his/her advancement)

- writing grants, conducting research, supervising grad students, running seminars
- some teaching expected, but maybe only grad students or undergrad with significant TA support

some universities appreciate good teaching

- bad teaching can cost you tenure, but good teaching alone won't earn it

Exemplars

Dan Grossman

Associate Professor
Department of Computer Science & Engineering
University of Washington

Duncan Buell

Professor
Department of Computer Science and Engineering
University of South Carolina

note: both are researchers
who also value teaching

What do you like?

"You juggle several different things: research, undergraduate teaching, graduate teaching, advising, service work, grant-writing, and more. I know that sounds like a 'minus' but it's not: you get to pick out the interesting parts and as your career progresses you get to change how you divide your limited time to pursue new interests. Also, lower teaching load, expert TAs, more advanced courses, ..." – Dan Grossman

"There is a variety of things that one has to do. If my research isn't something I want to do precisely at this moment, I can always work ahead in the homework assignments for my class, or do something else besides banging my head against the wall." – Duncan Buell

What characteristics?

"You should enjoy leading a large research agenda, writing large grants, writing several papers a year, and working closely with PhD students for 5+ years of their lives because it is not an optional part of the career, at least not for the first 15-20 years." – Dan Grossman

"It requires a belief in one's own abilities (because it can be hard to measure success in research and because one will be judged by others) but also a realization that one can feel successful even if one doesn't garner the highest honors possible. There also has to be a willingness and a desire to put in enormous effort." – Duncan Buell

General advice

"Get lots of advice from more senior mentors, but if you really want to do something, don't ask for advice about whether you should do it: If the advice comes back "no" it becomes much harder to answer "yes". So seek advice when you're honestly not sure what you should do." – Dan Grossman

"I think the most important thing in order for someone to become successful is to have a plan, and some goals that are realistic, and to keep at it. Plans will of course change, but having a plan against which the changes can be measured helps calibrate things and keep one from going too far off on a tangent." – Duncan Buell

Teaching university/college

smaller universities or colleges may place more emphasis on teaching

- tend to be tuition-driven, not grant-driven, so more attention paid to students & teaching
- typically B.S. only, or possibly M.S.

while teaching load is higher than at research universities, they still expect research/scholarship

- typically, lower expectations regarding grants/publications (but not always, so be careful)
- limited grad students, so research may involve undergrads

Exemplars

Liz Johnson
Associate Professor and Chair,
Department of Computer Science
Xavier University

Jody Paul
Associate Professor
Department of Mathematical and Computer Sciences
Metropolitan State University of Denver

What do you like?

"I like the idea that I am making a difference in the future of individual students and, therefore, in the world through them. Whether I'm teaching majors or non-majors, I like the feeling that what I do matters." – Liz Johnson

"The fundamental reason for my choice is that I really love the population of students we address. My institution welcomes students from all walks of life and circumstances, including all levels of academic preparation... At research institutions those who primarily teach have second-class status compared to those with a research focus. At teaching-oriented schools the difference is less extreme." – Jody Paul

What characteristics?

"It's essential to have a love of teaching, a good sense of humor, and an ability to multi-task. It's not necessary to be an extrovert at heart -- I'm certainly not -- but you do need to be able to connect with lots of different types of people -- both colleagues and students. The job can be exhausting at times, especially for junior faculty members -- you have to love it." – Liz Johnson

"A preference for teaching and educational investigations, versus conducting domain research." – Jody Paul

General advice

"If you are still in graduate school, get some experience teaching. Best is experience that allows you to run your own class, but any experience that puts you in front of students is good. If you are a new faculty member, seek out mentors you trust, both in your department and out. They can give advice, commiserate, congratulate and are just downright essential. " – Liz Johnson

"Be diligent in checking the extent to which the stated mission of an institution translates into what is in fact rewarded. In actuality, many "teaching-oriented" schools primarily reward research grants and publications." – Jody Paul

Liberal Arts College

even more student-centered than teaching universities

- typically, small departments and small enrollments
- faculty must teach a wide range of classes
- greater emphasis on faculty-student interaction, e.g., independent studies

while scholarship and publications are expected, grant writing may not be essential

- selective conference papers (e.g., SIGCSE) & online resources may count as well as journal articles
- student involvement in scholarship is expected

Exemplars

Valerie Barr
Professor
Computer Science Department
Union College

Deepak Kumar
Professor
Department of Computer Science
Bryn Mawr College

What do you like?

"I love having real interaction with my students, both inside and outside of the classroom. I can have students to a lot of hands-on work with supervision (even in some classes that don't have an official lab component), and try to use a lot of question-answer style of lecturing of running my class. The second important thing is that I can have significant collaborations with faculty in other departments." – Valerie Barr

"Focus of my position is equally on doing good scholarship AND teaching. CS in the liberal arts context goes beyond the engineering aspects to CS as discipline of intellectual inquiry with a healthy dose of a sense of history, critical thinking, its place in the broader society, and relationship to other academic pursuits." – Deepak Kumar

What characteristics?

"It helps to want to actually deal with students, to be social, to value interaction. If you are someone who wants to hide away in your office, or be on campus just two days a week, to "lecture and leave", then the small college experience is not for you!" – Valerie Barr

"The ability to recognize and take advantage of opportunities offered by liberal arts colleges to rethink and innovate the curriculum (i.e. Not a cog in the big wheel.). A commitment to engaging students in research and lifelong mentoring of students." – Deepak Kumar

General advice

"Research productivity will be slower if you are at a liberal arts college. You have to be okay with that, be willing to not measure your 'success' against that of your grad school peers who go into research institutions. For those still in grad school -- get whatever teaching experience you can in grad school and make sure that at least one of your letter writers can address your teaching." – Valerie Barr

"Faculty positions at liberal arts colleges are NOT teaching jobs. In fact quite the opposite. They give you the freedom to carry out your scholarship. But, you do need a deep commitment to sharing your scholarship through your teaching. You also have to be a good teacher." – Deepak Kumar

Teaching-track

instructor/lecturer positions are always options

- can provide flexibility, chance to gain experience
- depending on the school, may be viewed as 2nd class
- may not carry full benefits or security of employment

many top-tier schools have introduced teaching-track faculty positions

- provide higher status and greater job security
- allow gifted teachers to focus on classes without research expectations
- usually cover intro courses (so research faculty don't have to) and possibly more of the undergrad curriculum

Exemplars

Dan Garcia

Senior Lecturer (with Security of Employment)

Department of Electrical Engineering and Computer Science

UC Berkeley

Julie Zelenski

Lecturer

Computer Science Department

Stanford University

What do you like?

"The delight in teaching new-to-computing students. Not having to worry about a paper trail or grant writing for promotion. Feeling 'Parental' -- nurturing young students from frosh through senior. Getting to play -- writing a new project, learning a new tool, etc. Knowing you're making a difference in kids' lives (who graduate and tell you that years later)." – Dan Garcia

"High expectation about teaching effectiveness coupled with low teaching load. I have time/focus to invest in a superb job on the one (or at most two) courses I am teaching and I feel my efforts are recognized and rewarded." – Julie Zelenski

What characteristics?

"Loves people, outgoing. Loves computer science. Loves to be on stage with hundreds of students (i.e., enjoys the spotlight). Enjoys managing staff. Is reflective, always wants to improve. Is a perfectionist, optimist, cheerful. Can handle ~30 initiatives going on at once." – Dan Garcia

"Very strong interest in teaching, not hoping to do much/any research, appreciate or at least ok with any different-class-citizen arrangement re: teaching versus research faculty (note I didn't say second-class, but depending on the institution YMMV)." – Julie Zelenski

General advice

"Your career can easily fill 120 hours a week. The trick is keeping it between 40-80, and knowing how and where to set boundaries. Nurture incredible staff, include them in all decisions. Who you know is just as important as what you know. Network early, often. Don't be afraid to try something crazy, new." – Dan Garcia

"Get experience as a grad student — find opportunity to move beyond head TA/preceptor type duties if possible: co-teach with experienced instructor, teach summer course, etc. Come to SIGCSE!" – Julie Zelenski

Bonus quote

"When I'm teaching, I'm often nervous, frustrated, or worried but almost always enthusiastic and excited as well. **When things go well, I'm exhilarated**.

When I'm doing research, I'm often nervous, frustrated, or worried and rarely particularly enthusiastic or excited. **When things go well, I'm relieved**."

– NEW 2016 mentor Steve Wolfman

My advice

the SIGCSE New Educators Workshop has been collecting "Things I wish I had known…" from experienced faculty

- check out http://dave-reed.com/NEW/advice.html

- ✓ be passionate

  do what you love and don't be afraid to show it

- ✓ be social

  network across campus & with CS colleagues (SIGCSE listserv, CRA-W, …)

- ✓ be politically aware

  be very careful when walking into a new school/department

- ✓ be realistic

  you can only do so much, so prioritize and pick your battles