

Teaching and Research in Computer Science at Liberal Arts Colleges: Myths and Reality

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Abstract

Myths abound about computer science teaching and research at liberal arts colleges, especially in contrast to careers at larger universities. These myths may deter graduate students from considering liberal arts colleges when making career decisions. We will discuss the myths and realities of our collective CS liberal arts careers. Ultimately, we aim to help graduate students ponder the question, “Would I be happy at a liberal arts college?”

Audience

This panel is intended primarily for graduate students, but may also interest graduate advisers, as well as early career faculty at liberal arts colleges and similar institutions.

Introduction

Being a professor at a liberal arts college is a satisfying alternative to an academic career at a research-intensive university. Yet, many graduate students—and their advisers—have no experience with liberal arts colleges [2]. As such, students may either be unaware of or have misconceptions about career options at liberal arts colleges.

This panel aims to dispel myths about teaching and research in computer science at liberal arts colleges. We will provide both factual information about liberal arts careers and perspectives on our own choices and experiences. We intend to give graduate students a realistic basis for pondering the question, “Would I be happy and successful at a liberal arts college?”

Top Ten Myths and Realities

Myth #1: The only worthwhile faculty jobs are at research institutions.

Reality: We all find our jobs highly rewarding. Like faculty at research universities, we enjoy autonomy in our work, along with opportunities for mentoring, leadership and creativity. Working closely with students gives us the ability not only to shape future members of CS society, but also to lead the development of effective educational techniques. Finally, being a CS professor, no matter what the institution, is a highly valued career choice in today’s society: “Scientist” and “teacher” are the fourth and fifth most respected jobs in the United States [4].

Myth #2: Those who can’t do, teach.

Reality: Our PhDs are from MIT, UC San Diego, Berkeley, and the University of Washington. While we could have gotten jobs in industry or at research institutions, we chose to teach. Teaching is challenging work. To achieve the extremely high standards for teaching at a liberal arts college, we must strive for constant improvement.

Myth #3: CS has no place in the liberal arts.

Reality: Computer science both strengthens and is strengthened by the context of liberal education [5]. The liberal arts aim for “liberation” from narrow ways of thinking, preparing students not only for their first job, but for lifelong learning and ever-changing careers. Computer science degrees at liberal arts colleges often emphasize multiple approaches to problem solving, breadth of study, and communication skills, as well as a strong foundation in the study of algorithms [3]. Introductory classes attract a broad range of students. Some want to use computing to support their other studies; others (rightly) believe they need to understand computing to be informed citizens. One of the delights of teaching computer science at a liberal arts college is “seeing the light go on” for students new to CS.

Myth #4: Professors at liberal arts colleges spend all of their time teaching and have no time for research.

Reality: While it’s a challenge to balance teaching, research, service, and advising, we all have active research programs and/or supervise undergraduate student research. In fact, our institutions demand it of us.

Myth #5: Professors at liberal arts colleges don’t get to supervise student researchers.

Reality: Liberal arts colleges encourage faculty to mentor undergraduate researchers and often fund faculty-student research. While undergraduate students have less experience and require more supervision than graduate students, they are no less intelligent or creative. Surprisingly, in a recent NSF study of “Baccalaureate Origins of S&E [Science and Engineering] Doctorate Recipients,” more than half of the top 50 baccalaureate institutions are liberal arts colleges [1]. We enjoy seeing our former students go on to be successful in graduate school and in faculty careers (as well as in industry).

Myth #6: Liberal arts professors never get grants; it is not even worth applying.

Reality: Many liberal arts faculty obtain grants from the NSF, other government agencies, and industry. Three of us have prestigious NSF CAREER Awards. Another has been a co-PI on an NSF grant and looks forward to writing a grant proposal as PI.

Myth #7: At a small liberal arts college, it's impossible to find collaborators.

Reality: It can indeed be challenging to find internal collaborators at small liberal arts colleges, but it's not impossible. Many collaborations form around teaching. Further, professors at research universities are often eager to collaborate with liberal arts professors. We provide a unique perspective on how to involve undergraduates in research and on ways to integrate teaching and research. Such collaborations can help university professors strengthen the broader impacts of their grant proposals and recruit graduate students.

Myth #8: Professors at liberal arts colleges spend all of their time with students (or in meetings) and don't have lives outside of their work.

Reality: We all have rich lives outside of our work. We all have spouses and most of us have children. We are involved in our communities and our circles of friends. We have hobbies, athletic pursuits, and personal projects. Moreover, our caring students know this, and when we work too late at night, they (usually) tell us to go home.

Myth #9: Strong candidates for faculty positions at research institutions are even stronger candidates at liberal arts colleges.

Reality: While some people think of liberal arts colleges as a backup plan if they don't get a university position, this is a mistake. The liberal arts job market is highly competitive. Furthermore, search committees at research institutions and liberal arts colleges look for different things. Research institutions primarily want faculty who will be excellent researchers; liberal arts colleges want faculty who will be excellent teachers and scholars. While all Ph.D.s have extensive training and experience in research, becoming a strong candidate for a liberal arts job requires seeking opportunities for training and experience in teaching [2].

Myth #10: The same cover letter can be used in every job application; no one reads it, anyway.

Reality: When applying to jobs at liberal arts colleges, the cover letter is critical. Along with the teaching and research statements, the cover letter is a primary means for the search committee to winnow candidates early in the process. Because liberal arts colleges are small and often have distinctive missions, it's important that each new hire is a good fit. The cover letter should show that the candidate has investigated the institution and thought about how they would contribute. Moreover, it should

show that they understand the liberal arts context and want to be there [2].

Plan of Action

Each of the panelists works or has worked at a different liberal arts college. We are all in the middle years of our careers, and thus can provide perspective on job seeking and hiring, the early years, the tenure review process, and how life changes afterward. However, we are diverse in many other ways, and can speak to different kinds of experiences working at liberal arts colleges. Our institutions are geographically diverse, some in urban areas and others in small towns. Some of us attended liberal arts colleges, while others earned bachelor's degrees at large universities. We differ in our research and teaching interests, and represent computer science departments as small as 4 faculty and as large as 11. One has a non-tenure-track position, while another left a tenured position at a liberal arts college for a tenured teaching-track position at a research-intensive university.

The panel will proceed as follows. After brief introductions, the moderator will address the question, "What is a liberal arts college?" Then she will present the top ten myths; a designated panelist will respond to each myth with realities from the literature and her own experiences. The remaining time will be spent addressing questions from the audience.

We plan to use our time as follows:

Introductions	Moderator & panel	5 minutes
What is a liberal arts college?	Moderator	5 minutes
Myths and realities	Moderator & panel	30 minutes
Q&A	Audience, moderator & panel	20 minutes
Total		60 minutes

If there are not enough questions from the audience, the moderator will pose questions to the panelists, such as,

- Why did you choose a liberal arts career?
- What do you enjoy most about your work?
- What are the biggest challenges or frustrations?
- What does a typical week look like for you?
- What is your teaching/service/advising load?
- What are your students like?
- Where do your students go after graduation?
- How is research supported at your institution?
- What does your department look for in a job candidate?
- What are expectations for tenure at your institution?
- What is the tenure/pre-tenure review process like?
- What is it like to be in a non-tenure-track position?
- How do you balance work and other parts of your life?
- How has your work changed over the years?
- What does it take to be happy and successful at a liberal arts college?

Outcomes

The first goal of our panel is to increase awareness and understanding of liberal arts colleges among computer science graduate students (and their advisers). In particular, we want to dispel common misconceptions. In so doing, we hope to provide graduate students with information and perspectives to help them decide whether to apply for liberal arts jobs. In addition, we hope to provide mentorship to early career faculty at liberal arts colleges and similar institutions, as well as graduate students who have decided to pursue a liberal arts career.

Moderator/Panelists

Janet Davis (moderator) is in her seventh year at Grinnell College; she was promoted to Associate Professor with tenure last year. Grinnell is a liberal arts college of 1600 students located in rural Iowa. The CS department has 5 faculty and graduates 10-20 majors per year. Beyond her research area of human-computer interaction, Janet enjoys teaching introductory CS, computer systems, software development, and technology studies. Janet's current ambition is to introduce a community-based projects course to Grinnell's CS curriculum. Janet is an active contributor to multiple scholarly communities, including those around participatory design, persuasive technology, and computer science education. Janet loves living a 5-minute walk away from her office and downtown, which lets her have lunch with her work-at-home husband.

Jeannie Albrecht (panelist) is a newly promoted Associate Professor in the CS Department at Williams College, and an Adjunct Professor at the University of Massachusetts, Amherst. Williams is a liberal arts college located in rural, western Massachusetts with 2000 students, 8 CS faculty members, and 15 majors per year. Jeannie has taught classes in introductory CS, data structures, operating systems, and distributed systems. Her research focuses broadly on computer systems and green computing. She is an NSF CAREER award recipient, and is involved in the Global Environment for Network Innovations (GENI) project. Jeannie also enjoys coaching the women's ultimate frisbee team, and spending time with her husband, who is an Assistant Professor in the ECE department at UMass Amherst, son (age 2), and dog.

Christine Alvarado (panelist) is a Lecturer with Security of Employment (a tenured teaching-focused professor) in Computer Science and Engineering (CSE) at the University of California, San Diego. Prior to coming to UCSD, she was a tenured Associate Professor in the CS department at Harvey Mudd College (HMC). Harvey Mudd College is a liberal arts college located in Claremont, CA with ~750 students, 10 CS professors, and ~40 CS majors per year (and rising). At HMC Christine helped develop several programs and courses which increased the percentage of women in CS at HMC from a historical average of 12% to the 35-40% average it has enjoyed for the last six years. She is the recipient of an

NSF CAREER award and an NSF CPATH award. She has two sons (ages 1 and 3) and a husband who is also a professor in CSE at UCSD. Her recent move to UCSD was, in part, to solve a 120-mile two-body problem she and her husband had been balancing for 7 years.

Tzu-Yi Chen (panelist) is an Associate Professor of computer science at Pomona College, one of five undergraduate colleges in the Claremont Consortium. Pomona's CS department has 4 faculty, rising enrollments, and 20-25 majors a year. She teaches a range of courses including a first-year critical inquiry seminar, introductory computer science, discrete math, and algorithms. She loves mentoring students and is involved in outreach to groups traditionally underrepresented in STEM and in higher education. Her research interests include combinatorial scientific computing, complex networks, and computer science education. She is the recipient of an NSF CAREER award, has served as department chair, and is continually working with her husband on balancing the demands of two academic careers and two children (ages 2 and 5).

Sohie Lee (panelist) is in her thirteenth year of teaching computer science at Wellesley College as a Senior Instructor of Science Laboratory (a non-tenure-track position). Wellesley is a women's college with 2300 students outside of Boston. The CS department has 9 faculty and currently graduates about 20-25 majors per year. Sohie teaches many different hands-on courses, including introductory CS in Java and Python, website design, MATLAB, and Data Structures. As a graduate of large universities, Sohie greatly appreciates teaching and mentoring CS women at a small liberal arts college. She and her husband have three children (ages 9, 13, and 14). Sohie loves that her job allows her the luxury of summers off; she happily spends her summers traveling and just hanging out with her kids.

References

- [1] Burrelli, J. R., Rapaport, A., and Lehming, R. 2008. Baccalaureate origins of S&E doctorate recipients. Rep. 08-311, National Science Foundation.
- [2] Davis, J., and VanDeGrift, T. (2006, June). The Journey to a Teaching-Oriented Faculty Career: A Handbook of Advice for Graduate Students. In *Proceedings of the 2006 ASEE Annual Conference and Exposition*.
- [3] Liberal Arts Computer Science Consortium. 2007. A 2007 model curriculum for a liberal arts degree in computer science. *Journal of Education Resources in Computing*, 7, 2, article 2.
- [4] Van Riper, T. (2006, July 28). America's most admired professions. *Forbes.com*. Retrieved from http://www.forbes.com/2006/07/28/leadership-careers-jobs-cx_tvr_0728admired.html
- [5] Walker, H, and Kelemen, C. (2010). Computer science and the liberal arts: A philosophical examination. *ACM Transactions on Computing Education*