

I have been mentored by five outstanding advisors. Each one has contributed something unique and substantial to my education, with a remarkably selfless commitment to and concern for me as an individual. This has created in me a deep sense of gratitude and obligation. My goal as an educator is to build individual students as I have been built: helping students to master material, to develop their talents, and to use their knowledge and skills on behalf of others—all while appreciating the privilege of education.

One major reason I am pursuing an academic job is to teach. While I have had many teaching opportunities—from serving on thesis committees, to mentoring high-school students in special MIT courses, to teaching guest lectures, to serving as a TA, to helping shepherd undergraduates in research opportunities—I believe that as a professor, my opportunities to make a positive difference will be significantly increased.

1. Instruction and Course Development

With a strong, comprehensive background in computer science, I would feel comfortable teaching virtually any undergraduate CS class, including discrete math, programming languages, networking, algorithms, or theory. I would especially enjoy teaching introductory or advanced classes on AI, machine learning, multi-agent systems, probabilistic graphical models, probabilistic inference, reinforcement learning, dynamical systems modeling, or time series analysis. I would thoroughly enjoy running graduate seminars on these and related topics. I am also interested in creating competition style undergraduate courses—ideally that bring together students with different skills to solve complex problems (such as robot soccer).

As I state in my research statement, science and engineering will increasingly turn to machine learning to help manage complexity in both data and systems. There is a significant opportunity for impact in developing new classes that export the tools of machine learning, probabilistic modeling and reinforcement learning to other labs, departments, or disciplines. Such courses could include reinforcement learning for robotics, machine learning for social science, modern probabilistic modeling for economics, or graphical models for engineers. Not only would such courses help us calibrate our research by understanding other people’s important problems, they would support one of my ultimate goals: to create knowledge that is widely disseminated, both to students, other researchers, and the world at large.

2. Teaching Philosophy

My primary goal as a professor is to make a difference in people’s lives. This is best done by focusing on individuals, in the classroom, in the office, and in the lab. Here are some principles that guide my efforts.

Teaching in the Classroom

The best teachers teach students, not material. My goal is to structure my classroom such that students and I connect individually as often as possible, so that I can address their individual learning styles. For example, a good way to connect with individuals is to teach them material they want to learn in the way they like to learn. As an TA at BYU, I helped restructure our Intro to AI course around a capture-the-flag tank simulator. Each element of the course taught traditional material (such as logic, theorem proving, search, or control) in the context of the development of in-game AI. The semester concluded with a tournament, where students challenged one another’s agents. The results exceeded our expectations: not only did students understand the material better compared to previous semesters, they had more fun!

Another important principle is that when we learn with the intent of teaching others, we learn better than when we learn for ourselves. Involving students in teaching other students helps them master material. My favorite classes are small group settings (often graduate seminars) where students have the chance to teach each other. I want to export this format back into undergraduate classes whenever possible, perhaps via student-led mini-lectures, student-created exams, or student-driven collaborative note taking.

Excellent technique is just as important as my high-level strategy of focusing on individuals. I am a firm believer in high expectations, clear and fair grading policies, emphasis on critical thinking, adapting to student goals, a focus on synthesis, and tight feedback loops that help me tune my teaching. New social media and technology options offer exciting possibilities for enhanced education. And I want to teach students a strong sense of social entrepreneurship, helping them tackle important, socially relevant problems.

Teaching in the Lab

The lab is where some of our most important and personal learning moments occur. Our students need more than to be handed facts: they need multi-dimensional growth, from the responsibility of lecturing to the struggles of writing a grant; from the the rigor of research to the scholarship of learning to publish in journals; and from the creativity of problem solving to the thoughtfulness of mentoring.

Opportunities for that growth must be created. My advisors set good examples of this for me by involving me in the fund raising process, by generously inviting me to join them at various DARPA and NSF funding workshops, and by sending me to conferences regularly, even when I did not have papers to present. These experiences have been invaluable personal development opportunities. I intend to both set up opportunities for my students, as well as teach them how to create their own—I may assign them to find collaborators, for example, or encourage them to organize workshops, edit special editions of journals, or find funding.

I am also committed to creating high-quality undergraduate research opportunities. I had that privilege, and it encouraged me to pursue graduate school and eventually a professorship. It gave me my first tastes of the excitement of original research and real problems. And there was a practical benefit: I hit graduate school prepared to do independent thinking and research, with a noticeable advantage over my peers.

Teaching in the Office

My goal is to be a friend to each of my students. This helps me help them—assessing their goals (professional career? teaching career? research career?), their intellectual identities (facts curator? visual mathematician? visionary philosopher?), and the kinds of educational situations they respond well to as well as those they find frustrating. The office is also a good place to reach out to socially inhibited students, who might otherwise choose not to connect, or to students who are struggling to make the grade. I want my office to be a safe place where students can share their frustrations, receive advice, find understanding, and feel supported. Solo interactions with my advisors have been key learning moments for me, and have also helped them understand me. As a result of that personal connection, I have been fortunate that they have gone up to bat for me in personal ways, which has done more for my education than any lecture.

3. Summary

Teaching is an exciting opportunity. I hope to make a difference, both for individuals and in society at large. Higher education is a privilege that is not enjoyed by most of the world, and my experiences continually remind me what it is all about: that people, not programs or statistics, are what is ultimately important.