Stephen Lee  
Teaching Statement  
University of Massachusetts Amherst

Everybody understands the importance of a good teacher. A good teacher has a positive influence not only on the student but society-at-large. As a student, I was fortunate to have excellent teachers and mentors, who inspired me to go beyond the textbooks, and I aspire to be the same to my students. My experiences in teaching courses, mentoring students, leading lab and discussion sessions both in a multi-national company and at UMass have prepared me as a teacher. More importantly, it has fueled the desire to emulate my teachers, who made learning fun and exciting.

**Teaching Experience:** Much of my teaching experience comes from developing and teaching a course in Java and Web Programming in one of the teaching centers in Tata Consultancy Services (TCS), one of the largest multi-national IT companies. I taught the course for three semesters, each of which were six months long, to CS and non-CS students graduates. This experience of teaching and mentoring the trainees lie at the core of why I pursued my Ph.D. and fueled my passion for becoming a professor. The process of teaching others helped me become aware of my own limitations, which taught me a great deal about myself. Since some students did not have CS backgrounds, I emphasized on fundamental concepts, while assuming little prior knowledge. Further, programming as an approach to problem solving, seems obvious to CS grad students, but during these lectures I realized how daunting it may appear to someone from a different discipline. I used various instructional techniques such as practical sessions, tandem coding rounds in order to help my students. We often forget how long it took us to learn something for the first time, and it takes time to impart knowledge. Additionally, during my lectures at TCS I learned the importance of patience in creating a friendly environment for learning. I was accessible to students and believe that a small dialogue goes a long way in building self-confidence and the courage to embrace failure. Among the things I found effective while teaching was to break a complex problem into a series of smaller questions, each subproblem solving parts of the bigger problem. Teaching web programming enabled me to follow this philosophy and help design assignments with increasing level of complexity — simple static websites to complex interactive web applications.

As a graduate student at UMass, I was a TA for three undergraduate courses — Problem Solving with the Internet, Programming Methodology, and Programming with Data Structures. Problem Solving with the Internet is an introductory course available to students from non-STEM fields. The office hours gave me the opportunity to have extensive one-on-one mentoring sessions and gave me the experience to mentor students from non-STEM fields. I also had the opportunity of leading discussion and lab sessions in the other two courses I TA’ed for. As a TA, I had the responsibility of reinforcing some of the concepts that were taught in the class and given the opportunity to design my own material for the discussion sessions. I prepared the discussion material in advance, often connecting the concepts to real-world applications. I found that students appreciated the concepts more when they could link it to things that are relatable. For example, indicating the use of B-tree in databases to speed up search or applications of crypto hashes in modern applications is especially gratifying. Thus, linking theory to practice is a crucial component of my teaching.

I am excited to experiment with new methodologies and technologies to improve communication in teaching. In the past, I have used Moodle to organize course materials and manage assignments, quizzes, and exams. I have also configured Mooshak to automatically judge and grade code submissions as well as administered in-class quizzes and feedback using iClickers to engage students. I plan to continue to use such tools to make learning fun, engaging and effective,
while also scaling the course to large class sizes, a common problem in our field.

**Teaching Philosophy:** One of the basic tenets of human learning is to cultivate curiosity. If one can generate interest for a subject, learning will continue both in and outside of the class. And I believe, as teachers, our responsibility is to cultivate this curiosity among students, to instill confidence. To remind them, the purpose is not to pass an exam but to learn the subject.

Students learn when they are *actively engaged*. Encouraging classroom participation and discussion is one way to achieve this. I find that quick recap of concepts, in-class quizzes and assignments are effective in keeping students engaged. For small classes, I plan to encourage every student to participate actively. As for larger classrooms, in-class trivia and quizzes can help reinforce the topic as well as engage students. Needless to say, class materials, quizzes, assignments need to be well-organized, where I mix the familiar with the unfamiliar, to keep things challenging yet within their grasp. Outside of the classroom, I plan to use forums such as piazza, where students can participate in a lively discussion on topics related to the course.

Making learning *enjoyable* is difficult but possible. I find immense joy when I create something on my own; it gives me a sense of empowerment and a path to exploring other things. I distinctively remember implementing the RSA algorithm, exploring primality test algorithm such as Miller-Rabin or Fermat’s Little Theorem, or writing my own TCP/IP stack. I plan to incorporate this philosophy into my teaching. I believe that a *maker-centric* approach, where students learn by doing tasks, in a group or as an individual, help in providing a sense of achievement and boost their confidence. At UMass, I have helped organize multiple Arduino-based workshops, wherein students created beautiful LED-lit patterns by programming micro-controllers. Watching them debug problems and self-learn in a *stress-free* environment has been very rewarding. I will strive to create a stress-free environment, both in and outside of the classroom, and design similar workshops and hands-on projects that will motivate them to a journey of lifelong learning. I also believe regular feedback from students is important, to gauge student interests and adapt my teaching to their needs. I find tools such as Google Forms effective for receiving feedback.

**Teaching Interests:** I am interested in teaching a wide range of core courses including operating systems, distributed systems, and programming to undergraduate and graduate students. I am familiar with a variety of mobile and web technologies and would be interested in teaching these courses as well. I am also interested in teaching courses that align with my research area that is at the intersection of cloud computing, data science, and Internet-of-Things (IoT). I would also like to design new seminar courses that involve reading research papers, to keep students abreast with state-of-the-art research and motivate them to think beyond established knowledge.

**Diversity and Inclusion:** Lack of diversity, especially in STEM fields, is a pressing concern today — be it gender gap or underrepresented groups — we still have a long way to go. This problem exacerbates as people join the workforce, which is ineffective in bridging the gap. Educational institutions, and more importantly, *inclusive education*, can play a vital role in this entire pipeline. In my previous job at TCS, I have mentored female and minority students, and remained invested in their growth throughout the course. Additionally, I have reached out to a broader audience by designing courses for non-CS background students, where I stressed concepts rather than precise syntax. In my teaching, I have also tried to follow the *leave no one behind* policy, providing additional attention to students that need the most. At UMass, I have mentored students in hackathons, and volunteered for events to showcase CS research to middle-school students. In the future, I shall seek to participate in outreach programs to facilitate and encourage K-12 students to pursue computer science.