Teaching Statement
Manish Jain
manish.jain@usc.edu
http://teamcore.usc.edu/manish

I pursued a career in computer science since I was drawn to it with a sense of wonder and excitement. Now, when I teach about my research or other topics in computer science, my objective is to communicate the same sense of wonder and excitement to my students. For instance, I was invited to give a lecture on introducing Computer Science: Multiagent Research to ENGR102: Freshman Academy in Fall 2011. This class had freshman from all branches of engineering. Given that the students were unfamiliar with computer science itself, I showed the students a clip of the Split or Steal TV game-show, and used it to provide the intuition for self-interested agents and the mathematical framework of game theory. I talked to them about how I had used game theory in designing software assistants in use by federal agencies like the Federal Air Marshals Service and the Los Angeles airport police. I succeeded in getting the freshmen excited about computer science, game theory and my research — about 5 to 6 students approached me immediately after the class on how they could get started working on such systems. Such experiences have confirmed for me the joy of teaching. I was invited again to present in ENGR102 in Fall 2012; the course instructor later told me that based on student feedback, I was the only presenter re-invited to present in 2012.

In fact, I was drawn to pursue a career in teaching from a very early age. I come from a family of teachers — my grandfather was the principal of a high school and a mathematics teacher. I used to see that his students, some now lead engineers in different multinationals, would come to visit him even long after he had retired. Seeing such loving and respectful relationship between a student and a teacher sowed in me the desire to be a teacher myself at a very young age.

Teaching Philosophy and Experience

I believe that teaching complements my research, and I take pride in my teaching. My teaching philosophy is to draw students to the excitement of computer science, and I have applied it in all my teaching experiences. I was the teaching assistant for the undergraduate level course CS499: Intelligent Agents and Science Fiction in Fall 2008. I taught this course with my Ph.D. advisor, helping design lectures, assignments and exams. In this course, we used examples from science fiction to bring out concepts of decision making in agent design. We used short stories by Isaac Asimov and episodes of Star Trek as the basis of class discussions: topics as diverse as agent modeling, decision making, agent conflict, ethics and emotions were all brought up by such stories and movies from science fiction. The amount of excitement the students showed in pre-class preparation as well as class discussions was extremely encouraging.

Fresh from the stimulating experience of CS499, I volunteered to be a TA for the graduate course CS543: Software Multi-Agent Systems in Spring 2009. Here, again, I helped in the design of lecture material, assignments, class projects and exams. In this class, we motivated students by giving examples from our own research about how the concepts taught in the course were being used in the real-world: we talked about the deployed security assistants in
use at Los Angeles airport and the Federal Air Marshals Service. We even designed game-theoretic scenarios played out in class, where chocolates were used to teach students the concept and computation of expected utility, and modeling of risk-averse and risk-seeking agents. Once again, my lectures led students in this class to pursue projects in game theory for security, allowing me to gain a valuable experience in mentoring graduate students.

Mentoring Experience

I have also co-advised 3 undergraduate and several graduate students. The undergraduate students that I have mentored have come from different backgrounds: they have been USC students as well as visiting students, and students sponsored by the National Science Foundation through the Research Experiences for Undergraduate (REU) summer program. I am extremely proud of the fact that all the three undergraduates that I have advised – almost autonomously – have gone on to join graduate programs and are presently pursuing doctoral studies, with two of them requesting me to write a recommendation letter for them.

The graduate students have been students pursuing MS at USC, or junior Ph.D. students in our research group. In fact, I was one of the 4 Ph.D. students invited by the Associate Chair for PhD Programs, Computer Science Department at USC to provide advise to new Ph.D. students who had just joined the department in Fall 2012. Lastly, I have also organized tutorials on game theory for security at leading computer science conferences like AAMAS 2011, AAAI 2011 and AAMAS 2012. These were all full day tutorials, ranging between 6 to 7 hours in total teaching time. These tutorials have all been well attended by both graduate students in the computer science community, as well as industry practitioners interested in using game theory for their security needs.

Future Plans

My background has prepared me to teach courses in many areas, including topics spanning computer science, operations research and economics. I would be delighted to teach established courses in the department, including but not limited to the following:

- Computer Programming
- Data Structures
- Algorithm Design
- Artificial Intelligence
- Multiagent Systems
- Game Theory
- Introduction to Optimization
- Security

I would also like to teach interdisciplinary courses, e.g., mathematical programming. I also look forward to designing and teaching new courses, with special focus on applied computational and behavioral game theory. These courses would be inter-disciplinary between computer science, operations research, psychology and economics and would introduce students to game theory and mechanism design, algorithms and mathematical programming required for analyzing games, modeling human behavior as well as applications of game theory in real world.