B. Aditya Prakash - Teaching Statement

Teaching has been an absolute pleasure for me. I have seen my parents teaching in their respective professions and it is one of the primary reasons I wanted to be in academia in the first place. I see both teaching and advising students as important elements in my future career.

1 Philosophy

Professors are expected to shape the knowledge of the next generation of engineers and scientists and at the same time educate students with no long-term goal in the subject in general. The two aims appear to be in tension, but I believe they are pretty much taken care of if one is able to develop in the students’ mind an appreciation of the subject’s motivation and role. My philosophy to teaching has been molded by the many excellent teachers I have had throughout. I want to emulate the ‘less is more’ philosophy of Prof. Avrim Blum, the superb organization and clarity of slides of my advisor Prof. Christos Faloutsos, and the extensive use of toy examples as teaching aid of Prof. Manuel Blum and Prof. Carlos Guestrin. Like most other things in life, I believe doing simple things right go a long way: making one’s own slides, coming a bit early to class, learning students’ names, showing them empathy, giving short mid-class breaks, using accessible pop-culture references, removing barriers by being responsive and available to questions and so on. For example, I found that it is surprising for students the first time that I know their names, and it always increases his/her involvement in class.

2 Experience

I have had several opportunities to interact, teach and mentor students while at IIT-Bombay and Carnegie Mellon. All these experiences were very rewarding and fulfilling.

Teaching Assistant: At CMU, I was the TA for two very different undergraduate classes. First I was a TA for 15-415 Database Applications by Prof. Christos Faloutsos, a heavily application oriented course with both theoretical and programming assignments. I was actively involved in the course, right from completely re-designing the course website, designing assignments, grading them and holding office hours for doubts and clarifications. I had fun designing problems which students could relate to (‘Write a SQL query to check whether a friend of your friend on Facebook is also your friend’) and covered the material at hand the same time. Second, I was the senior TA for 15-451 Undergraduate Algorithms course by Prof. Avrim Blum and Prof. Manuel Blum, a course considered ‘difficult’ and ‘rite-of-passage’ for CS and related majors. Over 120 students registered for this course, which requires five teaching assistants, and covers materials ranging from graph theory to probability theory, and different algorithmic techniques and analysis. I held recitations (‘mini-lectures’) and office hours every week and graded and helped designing problems. Interacting with students every week during recitations gave me the opportunity to re-think the material and clear any remaining doubts using my own examples. I made it a point to encourage students go beyond course material by posing challenging problems and telling them about cool applications (‘How are good cuts in a graph useful for finding spammers?’).

Additionally, the students came from different backgrounds for both the courses, many from other departments. It was an exciting challenge, during recitations and office hours, to put things in context and present motivation for many of the topics. Why should we know about database query optimization? Why do we do worst-case analysis? Why do we care how fast we can find primes? Answering these gave them a perspective on why we do computer science the way we do. I was pleasantly surprised when a Physics major walked up to me and said ’Now I understand why you guys study NP-completeness’!
**Guest Lectures and Talks:** I have also given guest lectures and talks at multiple venues both in CMU and elsewhere - for the Multimedia Databases and Data Mining class in SCS CMU, the Social Network Analysis class in the Tepper School of Business CMU, CMU DB seminars, CMU ML seminar, UMichigan information seminar, talks at Microsoft and Yahoo! Research, and many conference talks. These talks given to diverse audiences, in turn have helped me understand the importance of giving motivation, intuition and not letting people drown in details. I greatly enjoy lecturing and I consider it to be a challenge to transform difficult material and research I am passionate about into captivating, clear and highly informative talks.

**Mentoring:** I have a passion for mentoring other students and have had an opportunity to guide junior Ph.D. students as well. These interactions have led to interesting research work, course projects and submissions. As part of the Indian student organization, I also mentored new Indian students coming to CMU with their cultural and academic problems (in fact, I did this at IIT-Bombay as well). I also was a student contact for newly admitted students to CSD helping with the Open House regularly. All these experiences have taught me that every student is different, and requires the right guidance, patience and above all clarity of communication.

### 3 Teaching Interests

Given the cross-disciplinary nature of my research, I feel qualified to teach and supervise students in a variety of areas. I would be delighted to teach any course in undergraduate introductory computer science or introductory social media analysis. I can also teach advanced undergraduate and graduate courses in databases, data mining, machine learning, and applied algorithms. I also look forward to designing a new graduate course named 'Dynamic Processes on Networks'. This will be an exciting course as it will broadly cover state-of-the-art models, theory and algorithms in network-based mining and analysis combined with several interesting applications like social media and epidemiology through data exploration.