

Teaching Statement

Adwait Jog, Ph.D. Candidate, Penn State

Pursuing a career in academia holds dual satisfaction for me. While on one side I would be able to satiate my own curiosity about the new research topics, on the other side it would also enable me to transfer both basic and advanced knowledge in my field to younger minds. To effectively motivate the students towards learning and understanding fundamental concepts is a challenge for any teacher, and I am enthusiastic about accepting this challenge. I am fortunate to have experienced different teaching styles adopted in India as well as in the United States, and I intend to leverage my teaching experiences to provide quality education to the students. As a teacher, I would primarily focus on the following points.

- **Developing Interesting Course Material and Tools.** I am looking forward to bringing clarity to students about various concepts in computer science and electrical/computer engineering. I would design my lectures in an effective way so as to stimulate interest for the subject in students. This will be achieved by structuring lectures and course material to introduce fundamental concepts followed by discussion on their relevance to the current research topics. Transferring knowledge of practical applications and the societal benefits derived from those formulated basic concepts will enable students to gauge their own prospective role in contributing to the world. I will also explore the opportunities for using augmented reality (AR) devices (e.g., Google Glass). For example, embedding AR device-readable markers in the course material can enable students to obtain supplementary information related to the content in a multimedia format.

- **Student-Centered Teaching.** To generate curiosity in younger minds, I prefer to use a student-centered teaching methodology that involves active participation of students in learning. I intend to use various modes of teaching to have an interactive atmosphere in the classroom. For example, I plan to deliver lectures on fundamental concepts using effective power-point presentations, while I will revert to blackboard teaching for problem solving and group activity. I will also act as a facilitator for imparting knowledge by posing questions in the form of quizzes and class assignments, and encouraging students to work towards their solutions by participating in online surveys, creative blogs, and social sites that use a live news feed-like interface for answering questions. Such an interactive atmosphere can be both entertaining and a learning experience for the students.

- **Visits and Discussions with Computer Industry.** Working on research projects in top computer companies like Intel and NVIDIA during my Ph.D. has helped me build contacts and collaborations with them. I can, therefore, assist undergraduate students in interacting with professionals from these leading computer industries. Such interactions will not only provide students with opportunities for experimental learning of theoretical concepts they encounter in their curriculum, but will also enable them to appreciate the present demands and expectations of computer technology in the market.

In addition to these points, I will also pay close attention to the feedback provided by students for improving the overall teaching experience.

Classroom and Teaching Experience. I have been involved in organizing workshops and tutorials for students since my undergraduate days. My first teaching experience was organizing a tutorial on the SPICE tools followed by a circuit design championship for roughly 50+ sophomore and junior year students. After joining Penn State, I was a teaching assistant for undergraduate courses on computer architecture and logic design. My duties included holding office hours, setting up homework questions, grading, and responding to email queries. My real classroom teaching experience came from my tenure as a *co-instructor* for an introductory course on computer architecture for undergraduate students. I volunteered to be a co-instructor for Professor Yuan Xie and Professor Chita Das for two successive semesters. As a co-instructor, I delivered many lectures on the fundamental principles of micro-architecture and architecture. I also delivered tutorial lectures on Verilog. Overall, it was an absolutely thrilling experience for me to teach students, answer their questions, and contribute to their learning.

Course Coverage. I strongly believe that a solid background in computer architecture is necessary for all students interested in computer science and electrical/computer engineering. Therefore, I am looking forward to teaching introductory as well as advanced courses on computer architecture, which will enable students to design both better hardware as well as software. At the undergraduate level, I can teach courses on logic design,

computer architecture, and operating systems in addition to introductory courses on networking, programming languages, and compilers. At the graduate level, I am interested in teaching courses on computer architecture, performance evaluation, and applications of data-parallel architectures in warehouse-scale computers and mobile systems. Additionally, I also intend to introduce a few intra- and inter-disciplinary courses, e.g., a course that deals with applying concepts from various disciplines such as machine learning, data mining, game theory, and networking into computer architecture design. I am also committed to disseminating my developed course material to the public for the benefit of the community at large.

Mentoring Experience. I have mentored students at various levels of their careers. I mentored one master's student and helped her carve out the thesis topic. I held weekly meetings and gave suggestions for executing her research work. As a part of her thesis, she and I co-developed a framework that enables concurrent execution of multiple CUDA applications on the same GPU hardware. This framework turned out to be a very helpful tool in fostering future research in our lab. We are planning to make it open source in the upcoming months. During my Ph.D. tenure, I have also mentored and collaborated with several other Ph.D. students both at Penn State and CMU on a variety of research projects. I gave my input in developing and refining new ideas along with sharing my experiences. These collaborations have resulted in several publications at top venues.

I believe teaching has two critical aspects. The first aspect is to impart quality education to the students in terms of a solid background and fundamental concepts. The second aspect is to effectively disseminate research findings and new concepts to the community via clear, insightful, and interesting talks and publications. I am committed to both aspects of teaching, and I believe that my prior experiences as an instructor, a mentor, and a researcher have prepared me well to be a good teacher.