

Teaching Statement

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Coming from a family of teachers, I was fortunate to see the hard work behind teaching and the effort to make the lecture engaging, motivating, and thought-provoking. I was always fascinated by parents' happiness after a good class or discussion with students, which became a key reason for my pursuit of an academic career. I am fortunate to have had several inspiring teachers and mentors throughout my academic life. I consider it a privilege to give that back to the community via my teaching and mentoring.

Teaching Experience. My first experience with teaching goes back to my undergrad days when I used to teach underprivileged children of nearby villages that did not have the resources to attend regular schooling. I realized that building connections with students, noticing the smiles on their faces as they comprehend, and watching them develop their skills over the course are used to give me an immense level of happiness and satisfaction.

As a Ph.D. student in a joint degree program, I had the opportunity to be a teaching assignment both at IITK, India, and NUS, Singapore. I have served as a Teaching Assistant (TA) nearly every semester during my Ph.D. journey. This allowed me to acquire teaching experience in a variety of courses both at undergraduate and graduate levels, with varying strengths of 35 students to 200 students. Moreover, each course was taught in a significantly different style ranging from offline classes to online classes to whiteboard teaching, and I learned a lot from the variety.

I was a TA of varying courses such as Mathematics for Computer Science, Parallel Algorithms, Introduction to Artificial Intelligence, and Knowledge Compilation and Representations. As a TA in these courses, I helped organize the course content, design and grade the assignments and exams, and conduct exams. I have organized several extra sessions to take students' questions and provide detailed feedback on their projects and assignments that help them expand their understanding. In addition, I served as a head TA for Introduction to Artificial Intelligence (Fall 2021) at NUS, which received the highest teaching effectiveness rating among all the course offerings in the past decade. As a head TA, I had additional duties, such as dividing and managing the tasks among the other 23 TAs and ensuring that each task was completed on time.

Tutorials. I believe my role as an educator goes beyond the confines of the university and involves informing the greater community of the developments in my field of expertise. With Prof. S. Akshay, Prof. Supratik Chakraborty, Prof. Kuldeep S. Meel, Prof. Subhajit Roy, I have presented a tutorial at Conference on Artificial Intelligence (AAAI 2022) on [Automated Synthesis: Towards the Holy Grail of AI](#). As an effort to reach the broader community and encouraged by feedback obtained from the AAAI tutorial, we further presented a half-day tutorial on Automated Synthesis at International Joint Conference on Artificial Intelligence (IJCAI 2022).

Teaching Interests. As a faculty member, I am excited to teach undergraduate courses in a broad spectrum of areas including but not limited to Discrete Mathematics, Introduction to Artificial Intelligence, Logic in Computer Science, Algorithms and Data Structures, Programming Languages, and Software Engineering. These courses will build basic foundations of the underlying ideas and principles, along with hands-on experience in using them for solving practical problems. I am excited

to teach more advanced courses such as Artificial Intelligence, Advanced Logic in Computer Science, Automated Reasoning, and Computer-Aided Verification at the graduate level. The courses will be designed by giving more rigorous treatment to formal topics and covering foundational ideas in more depth. I envision most of these courses as interdisciplinary project-based courses aimed at exposing students to the recent research directions in the corresponding fields.

I am also interested in designing a course covering targeted areas' advanced material. One example is a course on formal methods and their applications in which students are introduced to techniques such as synthesis, verification, and model checking. I believe students can further enrich the diversity of applications and could allow them to learn about many cutting-edge technologies in a single class. The course aims to bring students to the point where they can progress on new problems that advance the state-of-the-art, so they will focus heavily on recent academic literature and include an in-depth project exploring open problems.

Mentoring Philosophy When it comes to mentoring, my goal is to challenge students such that they can realize their full potential without frustrating them. Every student and research problem is different and will require different support and advice. I try to adapt in the best possible way to the students and their particularities.

During my Ph.D., I got the opportunity to mentor Arpit Kumar (an undergraduate at IITK), Chaman Agrawal (3 months Intern at NUS (2020)), and Rohit Gupta (a master's student at IITK). I introduced them to the area of synthesis and formal verification. Chaman and Rohit decided to work on synthesis, while Arpit chose to work on formal verification. I served as their first point of contact for brainstorming ideas and provided weekly guidance. I encourage them to have frequent checkpoints on their progress, which keeps students motivated to solve challenging problems. It was a rewarding experience for me to see them grow in ability and confidence throughout their projects. Overall, I have learned as much from these students as they have from me. My mentoring experiences have taught me how to explain problems to students at different maturity levels, improve my interpersonal skills, and organize my thoughts well so that my advice can be crisp and compelling.

Lastly, my adviser used to tell me, "it is okay to make mistakes unless you are not repeating them and you are not working with an infinite pool of mistakes." This has led me to understand the following, which in my opinion, are the key lessons to keep in mind while mentoring: (i) let the students learn and improve by learning from their own mistakes; (ii) build a relationship with your students, so they feel comfortable telling you about their mistakes, which is the backbone of a healthy atmosphere to work and progress.

I am excited to apply lessons I have learned during my Ph.D. journey and through mentoring experience to young researchers and to learn more lessons.