

Teaching Statement

I consider teaching to be a social responsibility of a researcher. It is an effective way to disseminate knowledge and improve mankind and its environment. Researchers can think in diverse ways, and these varying perspectives, along with the special knowledge, flow through their students to the larger society.

Past Experience

Teaching experience. I have taught both graduate and undergraduate level courses on the design, performance, and security aspects of networks and systems for 6 years, until I joined Microsoft in 2021. Beyond expected teaching responsibilities, memorable learning experiences also make teaching interesting. One such experience I enjoyed as a teaching assistant at Aalto University (2015-16) was about building a robust and available platform that allowed students to demonstrate code injection attacks. As the students got more creative, maintaining and running the platform became more fun.

Several studies have indicated that students perform well in a pair-programming environment and learn fast in fun, friendly, and competitive game-like scenarios. Hence, the assignments of the graduate(masters)-level course on networking, which I taught at ETH Zürich (2016-21), were designed in a way that students could compete with each other in groups of two. Students could see their performances live on leaderboards, and groups achieving the best scores were allowed to present their solutions to the rest of the class. Interestingly, students with diverse academic backgrounds came up with different and interesting solutions to the same problem, an example being applying control theoretic approaches to Internet congestion control. Assignments in the older version of the same course were mostly about reading recent papers on computer networks and answering questions related to them. Part of my responsibility was to hold exercise sessions every alternate week and have long analytical discussions with students on these recent papers. This exercise allowed me to have a tighter grasp on recent research and also gain diverse perspectives on various topics.

I see teaching as an effective way of attracting students to research. During teaching sessions, I often kept aside some unstructured time to discuss recent related research with students. Frequently students would come to me after the sessions and continue the discussions. Interestingly, some of them did end up working with me on their thesis projects.

Mentoring experience. As a PhD candidate at ETH Zürich, I mentored 9 master's thesis students, 7 bachelor's thesis students, and quite a few semester project students. These interactions made me realize the importance of working closely with students: even with limited time, they managed to come up with fresh perspectives and new ideas that could often drive research forward. 4 (25%) of my thesis students have managed to become co-authors in publications. While 2 of them co-authored an IMC'20 submission which eventually received the Best Paper Award, 2 other thesis students managed to publish at HotNets'20 workshop which is as competitive as flagship conferences in other areas of computer science.

I offered thesis projects not based on grades but based on student interests. In my opinion, passion, not grades, drives research. Of course, students still need to have the desired technical background to work on the offered projects. Nevertheless, one should be more careful while recruiting PhD candidates – it is a longer-term commitment from both the supervisee and the supervisor and hence should be aligned with the career goals of the candidates and the long-term research vision of the supervisor.

At Microsoft Research - India, I have been mentoring multiple young researchers (research fellows) and interns. Out of the two 3-month interns who have already successfully completed their internship with me, one has co-authored a paper with me on network measurement which is currently under submission.

Teaching Plans

Given my past teaching and mentoring experience, I would be able to teach both graduate and undergraduate-level courses in networks and systems. If allowed, I also look forward to designing a seminar course on computer networks for graduate studies, where I could curate recent interesting research papers and engage students in writing well-structured reviews, presenting research, and having open discussions on them.

For courses that I get to teach, I would emphasize design challenges and choices. As an example, Internet transport is a great example of the co-evolution of the problem and the solution. Lecture notes should always be accompanied by well-designed assignments, such that students get to actively participate in the learning process. For the computer networks courses, for example, there are a few possibilities to make the assignments interesting for students:

- Design assignments as online competitions and/or let students explore recent research (as discussed above).
- Drive students to build a mini Internet service provider (ISP). Simply put, an ISP is a smaller network within the Internet, the latter being a complex interconnection of many such networks. This exercise allows students to acquire hands-on experience in configuring routers, firewalls, and various network management protocols.
- Introduce students to a set of useful tools that allows them to understand networks and network performance better. Such exposure would make students better prepared to tackle real-world challenges by themselves.

Not all of the above possibilities are suitable for undergraduate students, given they need more care in order to build interest in the topics. For example, they might benefit more, in general, from exposure to tools and utilities, than from reading scientific papers.

I believe in seeking feedback from students and regularly updating teaching materials and assignments. Also, great course offerings are products of successful collaborations among all participating teachers and assistants. I look forward to having discussions on curricula design and benefiting from the experiences and opinions of others involved in the process.