

Teaching Statement

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As a graduate student, I have had the privilege to contribute to *eight* courses and mentor *five* graduate students. I learned a lot from this experience. It strengthened my resolve to pursue a career in academia where I get the privilege to not only teach but also advise undergraduate and graduate students.

Lectures. I have given multiple lectures for the undergraduate (Computer Networks [2]) and graduate (Advanced Computer Networks [3]) classes at Princeton. In my lectures, I pay special attention to instilling excitement about the material and help students discover new interests. For example, in my lectures, rather than speaking exclusively in the abstract, I motivated content-delivery networks with cat videos and used real-world configurations from Princeton’s network to explain firewalls and border routing. I believe a good lecture should discuss recent research advancements, showing students how the field is still evolving and how they can contribute to making an impact of their own.

Course Development. I have also contributed to the development of two new courses: **Software-Defined Networking** (SDN) and **Securing Cyberspace with Big Data** [4] at Georgia Tech (with Nick Feamster) and Princeton University (with Walter Willinger), respectively. The SDN course was offered both in-class [6] and online [5]. The online version, offered over Coursera in Summer 2014 and 2015, drew tens of thousands of students.

Programming Assignment. Given the vast array of careers that students embark upon after graduation, it is crucial to provide them with transferable problem-solving skills. I believe programming assignments are the right medium to hone such skills. I have contributed to the design of multiple programming assignments for the networking courses at Princeton and Georgia Tech.

My approach is to translate cutting-edge research into programming assignments. It not only exposes students to latest developments in the area but also adds a new dimension to the research itself. For example, my experience designing programming assignments for the *SDX* [11] and the *Sonata* [12] projects forced me to make the programming interface for these systems more intuitive and easy-to-use. This experience was especially useful while training network operators—deploying my solutions in the production network.

Continuing Education. The Coursera course provided me with an opportunity to reach out to thousands of students from different age groups and with diverse backgrounds. Many of them were mid-career networking employees honing their skills to embrace the changing ecosystem, *i.e.*, shift to automated programmable networking. Being able to contribute to such a massive workforce retraining was a gratifying experience for me. This experience also helped my research. For example, we used one of the programming assignment as a user study quantifying how *Kinetic* [9] makes it easier for network operators to express stateful policies.

My teaching experiences confirmed that I enjoy teaching at all levels and over all mediums. I am looking forward to opportunities for teaching introductory courses including **computer networks**, **cybersecurity**, and **big-data systems** at the undergraduate and graduate levels. I am also interested in developing interdisciplinary graduate courses that combine the areas of *networking*, *security*, and *data science*.

Advising. I was privileged to get an opportunity to mentor five graduate students on specific projects. I supervised Robert MacDavid with Jennifer Rexford on the *iSDX* [8] and PathSets [10] projects. I mentored Rüdiger Birkner from ETH Zürich with Laurent Vanbever and Nick Feamster on the *iSDX* [8], *SIDR* [1], and *Sonata* [7] projects. I am currently mentoring Rob Harrison with Jennifer Rexford on the Sonata [7] project, Bridger Hahn with Nick Feamster on the IoT security project, and David Liu with Nick Feamster and Mike Freedman on co-designing machine learning and query planning algorithms. I have also mentored many junior students: Hooman Mohajeri, Disney Yan Lam, and Laura Roberts; at Princeton.

As a mentor, I try to help students discover their interests, help them identify problems where they can capitalize on their strengths, and develop a taste for research. For example, with Robert MacDavid (background in theory) and Rüdiger Birkner (background in systems), I worked on the design of the encoding algorithm and the design and implementation of production-quality prototype, respectively for the *iSDX* project [8]. Giving them a well-defined problem, tailored to their strengths, at the beginning boosted their confidence to do research and make an impact. For example, Robert applied the techniques we developed for the *iSDX* project to more general settings (beyond Internet Exchange Points) and the project won the **best paper** award at ACM SOSR 2017 [10].

I will promote my students to interact with developers and operators working “in the trenches” to learn about real-world problems. To facilitate this, I will encourage them to go out for industrial internships, especially during the early years of their graduate studies; and attend operational meet-ups and conferences, *e.g.*, North American network operator group (NANOG) meetings. Among the gamut of operational problems, I will provide constructive feedback to my students helping them to iteratively refine their ideas and identify impactful problems that require a more principled solution.

References

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