Teaching Statement

My passion for teaching over the last 12 years has led me from serving as a high-school tutor to lecturing undergraduate and graduate classes with hundreds of students throughout my academic career. I have given tutorials at three top-tier Computer Science conferences, guest lectures at Stanford and Maryland, invited seminar lectures at multiple universities, and mentored students ranging from undergraduates to junior PhDs. I regard it as a privilege to help educate a diverse student body and equip them with the skills and knowledge to address pressing open challenges.

As a teacher, I always aimed not only to give students the necessary tools to complete the assignments at hand, but to instill in them general strategies to break difficult problems into more tractable subproblems, and to develop practical intuitions of when complex methods and theoretical assumptions apply. I enjoy teaching the basic and advanced techniques by connecting them to real-world examples and challenges, that I feel students would understand more easily. My TA office hours were regularly attended by well over a dozen students at once, so I would cluster them into small groups and encourage them to discuss their ideas with each other. Students connected with my approach; their evaluations reported my clear communication, clarification of materials, and thorough feedback. This taught me that encouraging students to help each other is often the most effective way of teaching.

TEACHING AND LECTURING

I experience lecturing and teaching as incredibly rewarding and have seized this opportunity whenever possible, lecturing on topics as diverse as network analysis and computational social science. In my lectures as a TA, I taught classes of 30-100 students to develop their fundamental understanding of the concepts and taught them the advanced mathematical tools needed to solve the problems. My enthusiastic teaching style was very appreciated by the students and my lectures consistently got highly positive reviews. Beyond lectures as a TA, I have given multiple guest lectures, including in Stanford’s graduate-level Analysis of Networks and University of Maryland’s undergraduate-level Machine Learning. My passion for teaching and lecturing also led me to help design Stanford’s “Analysis of Networks” course with Professor Jure Leskovec. While teaching, I have focused on ensuring (a) students understand the fundamentals and (b) know how to connect those fundamental concepts to real-world challenges.

Research can inform teaching and serve as a bridge to longer-term student interest in the area. In Stanford’s “Mining Massive Datasets” and “Analysis of Networks” courses, I designed and mentored course projects for over 30 students. These projects were distilled versions of real research problems in order to help students gain experience in tackling open problems. I intentionally seized this opportunity to also teach students effective communication skills and technical writing, which will serve them beyond the class and academic setting.

TUTORIALS

I have also had the opportunity to focus on communicating state-of-the-art research on the topic of “online malicious behavior understanding and detection” in the form of three tutorials at top-tier conferences in Computer Science (KDD 2017, WWW 2017, and ASONAM 2016). In all three cases, the tutorials covered an overview of techniques for taking a behavioral and graph modeling approach to understanding malicious content and user behavior online, and how general machine learning techniques I positioned both tutorials to be accessible and valuable both to practitioners and researchers. It was very rewarding to explain research I am passionate about, introduce new material to participants in an intuitive but still precise manner. It was a very valuable experience answering questions, bridging different backgrounds people have and making it so that everyone interested in networks learned something new. I consider it a challenge to transform difficult to understand material into comprehensible and highly informative talks that keep the audience interested and engaged.

MENTORING AND ADVISING

Throughout my time as a postdoc and graduate student, I have had the opportunity to mentor and advise a number of talented students at Ph.D., masters, and undergraduate levels. My philosophy towards advising is to provide a strong structure or research scaffolding for my students while also making sure to give them space so that they can take ownership over their projects. My previous and ongoing mentorships have resulted in publications at top-tier venues, such as ICDM, ACL, and on-going submissions at top-tier conferences, and my previous undergraduate and master’s students have been inspired to pursue Ph.D. at institutes such as the Carnegie Mellon University.
A key component of my mentoring approach is identifying the goals, strengths, and weaknesses of my students in order to help them grow in their research careers as well-rounded scientists. I have worked with students who are exceptional programmers but struggle with communication, as well as brilliant social scientists who are trying to transition into computer science and learn new computational skills. I encourage these students to leverage their strengths, while also mentoring them to improve their skills in areas where they are less well-versed. To achieve this goal in a general way, I seek to help students to understand how to “debug” their scientific process—from choosing research projects to managing large-scale machine learning experiments. For example, I teach students the importance of designing minimal working versions of their complex models, of error analysis, and of “sanity checks” or unit tests in machine learning software.

I also have a strong commitment to community building and improving diversity. I believe that research can only benefit from a diversity of ideas, and I have consistently worked to provide positive mentorship to underrepresented groups in the STEM community. I currently mentor two female students in their research, one Ph.D. student and one Master’s student, and I hope to continue encouraging diversity and engaging in positive community-building as a faculty member.

BUILDING COMMUNITY
I am convinced that the best research happens in vibrant communities. Therefore, I became the main organizer of workshops: MIS2: Misinformation and Misbehavior Mining on the Web at WSDM 2018, and co-organizer of the workshop CyberSafety: The Fourth Workshop on Computational Methods in Misinformation and Misbehavior at TheWebConf 2019. The aim of both these workshops is to bring together researchers and practitioners in a platform to communicate, exchange ideas, and collaborate. For the MIS2 workshop, I led this project end to end, drafting the original concept, devising a program, inviting the guest speakers, soliciting and selecting paper submissions, and guiding attendees through the event. This experience was very rewarding; the workshop was overflowing, and the WSDM organizers invited us to repeat it in 2019. I led the CyberSafety 2019 workshop by putting together a team of researchers from academia and industry. The workshop will be held in May, 2019. In graduate school, I started a machine learning reading group which was regularly well-attended. I was incharge of reading group’s weekly meetings, setting the agenda, scheduling and hosting guest speakers, and deciding on readings. All these activities showed me that I thrive on tasks akin to those on a professor’s daily agenda.

ANTICIPATED COURSES
Given my research and academic background, I would be well-suited to teach a number of courses related to machine learning and data science, including Data Science, Network Analysis, Machine Learning, and Artificial Intelligence. In addition to teaching existing courses in these areas and potentially offering advanced graduate seminars in areas such as computational social science and data science, I also look forward to the opportunity to create and design new courses at both introductory and advanced undergraduate levels. Three examples of such courses are sketched below:

1. **Hands-on Data Science.** This project-based course will seek to teach students the ins-and-outs of practical data science, with a target audience of advanced undergraduates or beginning graduate students. The core units of the course will be dataset collection, data cleaning, visualization, model selection, and practical insights about statistical hypothesis testing. In contrast to an applied machine learning course, the emphasis of this course will be on what happens before and after a machine learning model is applied (e.g., how to select and clean data, and how to use the output of a machine learning model to test scientific hypotheses). The goals of this course are to imbue students with practical knowledge and strategies for data science, and also to teach them how machine learning and “Big Data” can be used to answer scientific questions.

2. **Information Networks and Graph Analysis.** This course will introduce students to network science and the analysis of large information networks. It has two aims: to demonstrate how theoretical results from computer science and sociology can lead to a better understanding of the behavior of real-life networks, and to equip students with the knowledge to analyze these large graphs. In the first half of the course, students will learn the theoretical foundations of network analysis, including random graphs, power laws, cascading behavior, clustering, and community detection. In the second half, they will study practical applications and apply learned concepts to analyses of real-world networks.

I am looking forward to the opportunity to teach, advise students and become a professor.