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Teaching statement

In our research driven careers we sometimes forget that our future legacy is as much in our contributions to the advancement of science as in the lives we influence as educators. Though sometimes regarded as related but different tasks, research and teaching are in my mind two faces of the same coin. I like to say that we have to excel in research so that we have interesting things to share; and that we have to excel in teaching so that things we share actually sound interesting and compelling. I am passionate about teaching. Among those things that I value most from my four-year teaching experience at the undergraduate level, is that it has strengthened my conviction towards pursuing a career as an educator. I think we are given wonderful opportunities to work with people during a stage of their lives that they will always regard fondly. Teaching is clearly about giving students solid knowledge and skills in Electrical and Computer Engineering. But I think students are entitled to more than that.

In my teaching efforts to this day, I always strive to provide the intuition behind the techniques and theories being presented, and to draw the students' attention to the fundamental concepts underlying the material taught. In addition, when presenting basic mathematical concepts or abstractions, I seek to identify the potential applications of these concepts in the solution of real-world problems. This can help attract and uphold students' interest, which is, in my view, a crucial element of effective teaching. One of my goals as a teacher is to get students to think critically, instilling on them a taste for challenging what they are taught. As engineers and scientists we spend most of our time challenging established or perceived facts, and this is arguably the way we mature and manage to solve problems. Moreover, I favor an accessible and interactive teaching style that invites student participation. Guided class discussions that encourage the students to think of potential solutions to a given problem are a great tool, especially at the graduate level.

Some of the best lectures I attended were given by senior professors in the mid or late years of their careers. I do not think this is a coincidence, but a manifestation of the fact that it takes years to become a good educator. I accept my limitations and strive to become a better teacher. I encourage students to express their comments about their progress, my teaching ability, and the way the course is structured by providing them the opportunity to formally evaluate these aspects. It is always a positive experience to address their concerns and make changes as needed. I put significant effort in creating an enjoyable classroom environment and usually develop friendly relationships with students, which is helpful in getting valuable feedback.

I am a strong believer of wedding research with the university's educational mission at both the graduate and the undergraduate levels. Given the opportunity, I think that most students would embrace with passion the possibility to work in research projects and learn invaluable skills in the process. Even though undergraduates have to be inculcated the core concepts of the field in the short span of four years, I think they could greatly benefit from closer interaction with faculty research projects. Class and stand-alone student projects are a good vehicle for this interaction conveying some of the excitement of research and serving as a

bridge to graduate school or industry careers. When working with undergraduate students in a senior designs project at the University of Minnesota, I was pleasantly surprised by their ability to understand and actually implement state-of-the-art sparsity-aware statistical learning algorithms for network health monitoring. I also enjoyed mentoring graduate students and helping them to develop critical thinking as well as improve their research skills. Being one of the most senior members in the Signal Processing in Networking and Communications (SPiNCOM) group, I was given the opportunity to supervise two junior graduate students, Morteza Mardani and Brian Baingana. This was a very rewarding (and ongoing) experience which has led to four journal and seven conference publications.

Teaching interests and plans

Based on past experience, I found all aspects of teaching to be stimulating and rewarding: lecturing, interacting with the students, formulating problem sets, and lab experiments. As a junior faculty, I would be pleased to teach in basically all topics of the undergraduate Electrical Engineering curriculum. In particular, I have a solid background in Signal Processing, Detection and Estimation Theory, Social Network Analysis, Optimization, Wireless Communications, Networking, and Control Theory. I would welcome the opportunity to teach basic topics such as Circuits, Signals and Systems, Digital Signal Processing, Communications, Data Networks, and Probability and Stochastic Processes. I would also enjoy directing lab and project courses in my areas of interest. At the graduate level, I would be interested in teaching and enhancing courses in Digital Communications, Machine Learning, Wireless Communications, Compressive Sampling, Networking, Detection and Estimation, and Wireless Sensor Networks.

Moreover, I am keen on introducing an advanced-level graduate course focusing on the particular area of sparsity-aware statistical learning from high-dimensional data. Topics to be covered include: i) overview of application domains (preference measurement, social and complex network analysis, medical and bioinformatics, online personality assessment); ii) basic theory and methods for supervised learning (linear methods for regression and classification, nonparametric techniques, regularization); iii) sparsity for complexity control and robustness control (least-absolute shrinkage and selection operator (Lasso) and basis pursuit, homotopy and proximal gradient algorithms, performance guarantees and oracle properties, outlier-aware data models); iv) compressive sampling algorithms and fundamental recovery results; v) unsupervised methods (clustering, graph partitioning, low-rank modeling for matrix completion, robust principal component analysis); and vi) challenges and algorithmic advances towards learning from 'Big Data' – distributed, real time, and parallel processing. I would also be interested in teaching a graduate level course (or seminar) focusing on the area of network science. The goal of the course will be to familiarize students with the latest research developments in distributed information processing and decision making over complex interconnected systems, as well as in statistical analysis of graph data to e.g., identify latent structure, patterns, and anomalies. The target audience is expected to be interdisciplinary, and accordingly the discussed methods will be illustrated through examples involving social, information, communication, transportation, power grid, and biological (e.g., gene regulatory, protein, brain) networks. Through a final class project the aim is to give the participants the opportunity to tackle a large, interesting problem that relates to their own research on networks, providing them with hands-on experience with real-life network datasets.