Teaching Statement
Frederic Sala

I am excited to continue to teach and mentor students; it is a great privilege and one of the main reasons I am seeking an academic position. Teaching and mentorship have had a huge impact on my intellectual development and I hope to be able to similarly impact others. To do so, I plan to build on my experience in teaching and mentoring students of diverse backgrounds and levels of expertise across several areas of engineering and computer science.

Teaching In the fall of 2016, I served as the main teaching assistant for UCLA's EE131A class on probability. This class was taught online to students who are working full-time and have diverse backgrounds; the majority of the students were seeking an online masters degree. I designed homework assignments, discussion materials, recorded a weekly discussion session, and held weekly office hours online. My experience with the class was both challenging and rewarding. I especially worked to develop the ability to communicate mathematical concepts over the Internet—while this was quite different from my experience in learning probability, I received positive feedback. I worked with students with a wide variety of backgrounds and problem solving experience—often connecting the problems to real-world engineering challenges that many of the students faced in their full-time work.

I have also served as a mentor for Stanford Computer Science's popular CS 229 machine learning class. I had the opportunity to mentor five teams that worked on projects related to the use of non-Euclidean geometry in machine learning, an area that I have worked on for my research. The project groups were similarly very diverse, including undergraduate CS students, graduate students in mathematics and physics, and members of the Stanford SCPD professional development program.

I strongly believe in reaching out to and inspiring younger students. During my Ph.D. at UCLA, I taught and mentored high school students involved in the summer Los Angeles Computing Circle (LACC) program. I designed short modules to introduce students of varying backgrounds to topics in computer science and engineering; the modules I taught included social networks, web services, and machine learning. I also mentored students to produce a comprehensive project involving programming, applications, and demos. This experience was both challenging and rewarding: the students had very different backgrounds—some with significant experience in programming, while others were being exposed to it for the first time. I enjoyed tailoring the approach to the appropriate level for each student. Some of the students I mentored ultimately chose engineering as a major and career field.

Similarly, I presented a lecture on information theory aimed at high school students for the Oakland Summer Math Institute (OUSMI) in 2017. I participated in OUSMI in 2005 and 2006 as a high school student, and it was one of the experiences that inspired me to study mathematics and engineering. I am proud to have had the privilege to help introduce the next generation of students to the wonderful world of signal processing and computer science.

These experiences have led me to seek to build and teach new courses. For example, I am excited to teach courses on machine learning that combine both theoretical results and experimental and computational work. I believe this approach is an excellent way to understand the underlying theoretical principles while seeing their effects on practically-useful models. I am also excited to teach a variety of courses in machine learning, statistics, signal processing and systems, and other introductory topics across computer science and engineering.

Mentorship The approach I have taken to mentorship combines strong and frequent support with ownership and responsibility. I seek to provide students with tractable projects that they can own and build. At the same time, I work to ensure that these projects have enough runway, based on my own investigation, that I am confident in the project’s potential. I enjoy frequently meeting with and supporting the students I am mentoring. I provide advice on both the project at hand and general aspects of being a student at the undergraduate or graduate levels—dealing with stress and time management, course and career planning, the research process, and other areas. I also try to impart my own sense of excitement and wonder of the process of learning and performing research.

I have had the pleasure and good fortune of mentoring and learning from many wonderful students and collaborators during my time as a graduate student and postdoctoral scholar. While doing my Ph.D., I mentored Clayton Schoeny (Ph.D.) on codes correcting insertions and deletions. This area became one of Clayton’s main research interests; he published an innovative paper on this topic [7], and we further collaborated on a paper on data reconstruction [5]. At UCLA, I also mentored Shahroze Kabir (MS) on protecting data to be used by linear models, leading to our paper [3] and Kayvon Mazooji (MS, now a Ph.D. student at UIUC) on data reconstruction.
As a postdoctoral scholar at Stanford, I have been lucky to mentor Paroma Varma and Alex Ratner (Ph.D. students) especially on the theoretical aspects of automatically labeling training data with weak supervision, resulting in a series of joint papers improving and extending the weak supervision framework [4][6][8]. I mentored Ines Chami (Ph.D.) on hyperbolic embeddings and graph techniques. Some of our conversations led to her first-author paper at NeurIPS on hyperbolic graph convolutional networks [2] as well as our joint paper on embedding knowledge graphs [1]. I have also mentored Beliz Gunel (Ph.D.) on the use of hyperbolic geometry for NLP techniques, Shiori Sagawa (Ph.D.) on automatically generating labels for time-series data, and Mayee Chen (Ph.D.) on the limits of learning graphical models with latent variables.

References


