

Jorge A. Méndez

Teaching and Mentoring Statement

Through being an instructor, guest lecturer, and teaching assistant (TA) for over ten courses at Penn and Universidad Simón Bolívar (USB), I have learned to tailor my teaching to each class: an undergraduate first year course should help students learn to learn while retaining concepts that will be useful for future courses; on the other end, a Ph.D. seminar should introduce junior scholars to a new research field and guide them to think about open problems in relation to their own work. I especially value dedicating ample time to the harder concepts, which in my experience drive the most learning. Similarly, through mentoring undergraduate and graduate research I have learned to adapt to individual skills, interests, and professional aspirations. As a faculty member, I will continue to specialize my teaching and mentoring styles at various granularities: from most broadly for large undergraduate courses, to individually for graduate students in my research group.

My teaching highlights the subtleties that make concepts hard to grasp. As a **TA at USB**, I taught recitations for up to 100 undergraduates via interactive problem sets constructed to uncover the nuances of the concepts. After being **head TA** for *Intro. to Machine Learning at Penn* with Prof. Eric Eaton, he invited me to give guest lectures for various courses. I led my first **lecture** on big-O notation and correctness for 200 students, for which I planned minutiae such as word choices and reformulations that would help students grasp difficult concepts. The class followed along, asked questions, and rewarded my effort with a round of applause that still drives me today.

Later, I **taught a small course** on *Python Programming* at Penn **as the instructor**. Gearing to students' interest in practical applications, I devoted two thirds of the lectures to libraries on scientific computing, data analysis, machine learning (ML), image processing, and web development. Weekly assignments targeted concepts that students struggle the most with. For example, the assignment on NumPy taught vectorization, a concept that is difficult to assimilate, via processing a data matrix in multiple ways with vectorized computations. Students completed the assignment in an average of only five hours, yet were able to consistently apply vectorization in later assignments. My latest iteration of this course received 88% good or higher ratings on student evaluations.

At Penn, I have **mentored** eight men and women (**two undergraduate, four Master's, and two Ph.D. students**) in our lab. I aim to give undergraduates a gentle introduction to research, encouraging them to explore topics outside of their expertise to acquire skills for data analysis, mathematical problem formulation, and experimental design. My efforts for graduate students focus on framing their work for publication by helping them scope it as a novel research hypothesis, a technically sound methodology, and a comprehensive empirical or theoretical analysis. Most recently, I mentored a Master's student's thesis on non-stationary lifelong learning, meeting weekly with her (beyond meetings with our main advisor) and guiding her through technical challenges.

As a professor, at the undergraduate level I am most interested in teaching robotics and ML, and would also be excited to teach optimization, linear algebra, programming, data structures, and algorithms. At the graduate level, I would like to propose a course on non-stationary ML, an increasingly relevant topic that is rarely taught in current curricula, covering out-of-distribution generalization and multi-task, lifelong, and meta-learning. I hope to teach a course on robot learning, focusing on the challenges of data collection on real robots and of learning with noisy data. Throughout ML courses, I would discuss the ethical implications of data-driven learning.

I value personalizing research advice, so I plan to lead a small academic group. I will complement my teaching by mentoring undergraduate researchers, and will pair Ph.D. and Master's students, giving the former the opportunity to gain mentoring experience. Additionally, my time in industry taught me the importance of feedback, both positive and negative. I will incorporate a rigorous two-way feedback loop in my group, providing actionable guidelines to students and listening to what they need from me. This will improve the Ph.D. experience and yield better-prepared researchers.