Teaching Statement

Ngoc Mai Tran
Department of Statistics, UC Berkeley

Teaching Experience

I very much enjoy teaching mathematics and statistics. I was a teaching assistant in my second and third year of undergraduate, teaching calculus, statistics and probability. As a graduate student in Statistics at Berkeley, I have taught online introductory statistics Stat2, upper-division statistics Stat131, and Math10A, a freshman math class for biology majors where calculus and statistics are taught in parallel. Teaching Stat131 and Math10A had been a defining experience. I also lecture on occasions in the Bay Area Math Olympiad program for gifted high school students.

Teaching Philosophy

Statistics lies at the intersection of computer science, mathematics and data, and I want to convey this to the students. For example, there are three ways I would use to introduce the concept ‘distribution’ to students: writing down the mathematical definition of a probability density function, showing histograms from real data, and showing how to sample from a distribution with a computer program. My teaching philosophy very much aligns with the structure of Math10A taught by Bernd Sturmfels. In this new class at Berkeley we emphasize to students that maximum likelihood estimation is an optimization problem, and p-value calculation is finding area under curves.

The ability to quantify intuitions and observations and apply tools to solving real-life problems is essential across all fields. Therefore, I want to teach data-driven statistics; in particular, I want to use recent, real-life examples from different fields, modern statistical software, and supervise students doing hands-on research projects. In Stat131 taught by Chris Paciorek, we introduced the statistical package R to students, had them writing functions to read in data and computed linear regression models. Some of my students have applied their R knowledge to analyze data from researches done in their senior years.

Finally, I believe that mathematics is beautiful and self-discovery is a joy that students, especially undergraduates, should get to experience. I am strongly influenced by my high school education in Vietnam, where from grade 6 to 9, we derived Euclidean geometry starting from the five axioms. I believe in presenting rigorous proofs to freshmen, and guiding them through the process of discovering mathematical facts for themselves. I am convinced that this character-building experience teaches rigorous thinking and exposes students to the joy of research and discovery, a rewarding journey that is often difficult to find outside of educational institutions.

Classroom activities

Here are some activities I like to use when teaching.

• I encourage group work both inside and especially outside of classrooms.

• I like students to write-up and narrate their solutions on board, and have other students question them directly.

• As previously mentioned, I like to present the same concept through different ways: graphical display, formula, how such a concept can arise in practice, how such a concept can be simulated.