A Few Words on Teaching

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sawyer-jack-1.github.io/teaching.html

Teaching roles I've taken on

Over the past ten years I have taken on countless different positions inside the classroom and beyond. Below I summarize a few of these roles and highlight some of the specific lessons I have learned and contributions I have made in the process.

- From 2016 until 2020, I was an undergraduate academic assistant at the University of Oklahoma, where I worked as a **tutor and grader** for various math courses. This is where I first discovered my passion for teaching up close. Even though years have passed, I still feel that this is where I learned the most about communicating with students most effectively; from understanding nonverbal cues to navigating the balancing act of independence and support while helping a student tackle a challenging homework problem.
- Starting in October 2020, I worked as a **teaching assistant** (TA) in the Mathematics Department at UC San Diego (UCSD). This has been my primary role throughout the past six years; I've assisted in teaching courses ranging from introductory calculus to mathematical statistics. At UCSD, all undergraduate courses are supported by discussion sections, so most of my job consisted of preparing and leading these sections in a number of formats. I also taught during the height of the COVID-19 pandemic, which was a very formative experience. I learned about the value of adaptability and accessibility for student learning, but it was also a challenge to witness the impact the pandemic had on student performance for the years to follow. Samples of student feedback are available on my teaching page.
- From 2022 until 2024, I left the classroom and took on a two-year fixed-term **service role** as a Senior Teaching Assistant at UCSD. In this position, I organized training sessions for new TAs, served on departmental committees, and helped hire graduate student educators for specialized roles. Some of my accomplishments in this role include:
  - *Proposing and implementing* a systematic training program for undergraduate tutors, including the hiring of new TAs dedicated to training oversight.
  - *Designing and writing* a knowledge base of training and reference materials for TAs, an effort designed to modernize and update a backlog of policies and documents which had gone unmaintained for several years.
  - *Organizing and leading* the in-class observations of dozens of TAs in order to provide personalized feedback and mentorship.
- From 2024 onward, I have also worked as a TA and **associate instructor** (AI) in the Halıcıoğlu Data Science Institute at UCSD. In this role, I have been responsible for supporting and teaching the lower-division course *Theoretical Foundations of Data Science*. In my role as an associate instructor, I drafted a full set of lecture notes for the course, which are available on my teaching page.

My teaching philosophy

When I reflect on teaching practices and ideals, I often find myself reflecting on the instructors who have had the most positive impact on my own learning journey. These educators, as a theme, often

combine a passion for their subject matter along with high expectations for their students. These two ideals are what primarily drive my course design and pedagogy.

When it comes to showing **passion** for my subject matter, I often make concerted efforts to connect what's happening in the classroom to either things that I find interesting in the broader world of mathematics or things that students will connect to on a deeper level. As a mathematician, I am often preoccupied with the visual and geometric elements of my work, so in the classroom, I often incorporate interactive visualizations of the subject matter (TikZ figures, Desmos/Python notebooks). Also, I often take opportunities to connect the subject matter in the classroom to either applied scenarios (my favorite examples include discussing p-hacking with statistics students, or how the Google's PageRank algorithm is based on random walks on graphs), or other topics such as the history of mathematics or famous open problems.

Setting **high expectations** for my students is another key component of my teaching philosophy. I believe that students rise to the level of the expectations set for them, and I try to communicate this both explicitly and implicitly in my courses. Explicitly, I do this by designing challenging assignments and exams that require students to think critically and apply their knowledge in new ways. Implicitly, I try to model a growth mindset and a strong work ethic, showing students that success in mathematics is achievable through dedication and perseverance. One of my most rewarding experiences as an associate instructor was when I conducted oral exams with data science students. After consistently setting, supporting, and holding students accountable to high expectations, I was humbled and awed when I witnessed students who had previously struggled with the material confidently and competently explaining challenging concepts during their oral exams.

How I design courses

At a **high level**, my course design practices can be described as relatively traditional for math courses. On the instructional side, I plan and prepare for regular lectures and organize these in advance around a fixed set of objectives usually informed by departmental expectations and standards. On the assessment side, I favor one or two in-person midterm examinations, a comprehensive final exam, and weekly homework assignments.

At a **low level**, my day-to-day course design is highly influenced by my teaching philosophy. For example, when designing lectures, I try to incorporate visual aids and applied examples to make the material more engaging and interesting to students. My lectures are perhaps unconventional in the way that they blend Beamer presentations for the portions of lectures more geared towards theoretical exposition and visual demonstrations, and chalkboard notes for portions of lectures more geared toward problem-solving and computation. I find that this blend helps to keep students engaged while also providing a clear structure and resources for students outside the classroom. I also strive to meticulously document my notes and make them available on my website, since I view educational writing as a rewarding component of my job as an instructor.

When designing assignments and exams, I strive to create problems that challenge students to think critically and apply their knowledge in new ways. My exams tend to be quite lengthy, as I find this allows students some additional flexibility when choosing problems to solve and also consistently leads to ideal grade distributions. My approach to homework has been challenged by the emergence of AI in the classroom. My response to this has been to slightly reduce the contribution of homework to students' final grades and to implement the requirement of handwritten solutions (via pen and paper or digital tablets).