

Teaching Statement

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I view effective communication, mutual understanding, and mentorship as my defining characteristics not only within my role as an educator, but as a mathematician in general. It is my philosophy that at its core, teaching is an ultimately interpersonal endeavor. Regardless if someone is advising a PhD student, teaching a topics course in cutting-edge mathematics, or giving an introductory course in algebra, being attentive to the students' goals and learning style is essential. What propels a student to better engage with the material and hone their analytical thinking skills might differ from a graduate student to a non-STEM major, and each deserves careful consideration. Only once I have made this effort to understand these aspects of my students, am I able to fine tune an approach to a particular class, or a specific student's office hours, that will effectively incorporate the diversity of the students' motivations, thinking processes, and goals.

This has been a core philosophy I have applied to each situation where I have fulfilled an educational role.

- Throughout graduate school at the University of California, Berkeley I served as a graduate student instructor for classes ranging from introductory calculus to advanced linear algebra. I formed meaningful connections with my students, and consistently received favorable reviews. I was honored to be nominated by my students, and eventually receive, the Outstanding Graduate Student Instructor award.
- While at the University of California, Berkeley I served as the instructor of record for two courses in undergraduate number theory. I surveyed the students at the beginning of the course in order to tailor the optional ending material to meet their needs. I received very positive reviews from students of all levels, and was happy to hear from several students that this course inspired them to pursue graduate school in mathematics.
- I was inspired to start the Berkeley chapter of the [Directed Reading Program](#) (DRP), and carried this out with the help of two other graduate students. The DRP is a mentorship program aimed at pairing interested graduate and postdoctoral students with undergraduates. The goal of these pairings is to help interested students explore new and exciting topics they may not otherwise be exposed to, in a low-pressure and supportive environment. This resulted in countless success stories. In addition to co-founding the Berkeley chapter of the DRP, and administering it for several years, I personally mentored several undergraduate students. Some of my proudest moments were when, on two separate occasions, my mentees communicated to me that their DRP experience was an important factor in their decision to pursue graduate school in mathematics.
- In a less formal capacity, since my early undergraduate years, I have taken an active role in mathematics on the web. This includes heavy involvement at mathematics forums such as math.stackexchange.com, as well as at my own [personal math blog](#). At both of these sites, I took the opportunity to explain parts of mathematics that I was both passionate about, but which also mystified me at one point or another. The general theme was to try and explain to others what had once confused me —ideas that seem like 'obvious' but powerful 'secret knowledge' held by those more experienced in the topic. I have been immensely gratified to have many graduate students come to me and tell me how personally meaningful and helpful they have found my writings. While at a conference in Hanoi in September of last year, a young Vietnamese graduate student told me that I was his mathematical idol, and asked for a selfie to show his mathematical friends. This was one of the most surreal and humbling experiences I have ever had, and this sort of impact is precisely what keeps me writing about mathematics.

All of these experiences not only helped shape my teaching philosophy, but also helped me refine my methodology of how to apply it in practical situations.

Being a Graduate Student Instructor at Berkeley helped bring into focus the necessity of having students actively engage with material, and articulating their thoughts. A memorable example of this occurred when two students during an office hour were confused about two, essentially complementary, parts of implicit differentiation. I paired them together, and (with gentle prodding from myself) had them explain to each other what did and did not make sense about the concept. Before the exercise they were individually ground to a halt. Once they interfaced with a peer their issues became less theoretical. Verbalizing their (mis)understanding, and taking advantage of the diversity of perspectives present in their small group, was the magic injection of oil needed to get the cogs turning again. While a microcosmic example, the philosophy that material must be directly confronted and verbalized, ideally to another peer, is something I often apply when teaching my classes. This usually takes the form of small-group work, with a directive that each person must take turns explaining a problem they are struggling with.

Being the instructor of record demonstrated to me the importance of tightening the organizational aspects of my teaching. A great philosophy is useless if you do not have the organizational framework to implement it. I learned the importance of planning my course material far in advance, and how to adapt to the classes (often unpredictable) sticking points. In line with my philosophy, I also learned the value of frequent 'check-ins' with the students in the form of anonymous feedback. Last, I realized the importance of having well-crafted

tests/homework and test/homework policies. They must strike the tenuous balance in difficulty necessary to be diagnostic but not discouraging. It is necessary to gauge students improvement, both from the practical perspective of providing a grade and also as a personal-growth yardstick for students. It is essential, however, that this process not be demoralizing. Learning to moderate the difficulty of my quizzes and exams was an important learning experience for me during these courses.

While I learned many administrative lessons (e.g., resolving conflicts between mentors and mentees) from heading the Berkeley chapter of the DRP, some of my most impactful lessons came from my role as a mentor. I learned the value of ensuring that I do not unintentionally become overbearing as a mentor. I initially found it difficult to not let my enthusiasm carry me away when mentoring students, often (implicitly, accidentally) imposing my own goals and perspectives on them. While this came from a place of good intention, it often left the students less motivated and less confident, and ultimately contradicted the teaching philosophy I hold. Learning how to temper my excitement and determine what is the correct level of help to let an individual student explore things on their own terms, while supporting them in the pursuit of their explorations, was a difficult but important lesson for me.

Finally, contributing mathematics online, via both mathematics forums and my own blog, has taught me the value of *mathematical storytelling* (to steal a turn of phrase from Bianca Viray and John Voight). At all levels of mathematics, no idea occurs in sterile isolation —each has its own story to tell—and uncovering this story is pivotal towards presenting ideas in an understandable way. Examples of my own mathematical storytelling that I am particularly proud may be found in the following two links: <https://math.stackexchange.com/a/4653014/16497> and <https://ayoucis.wordpress.com/2017/10/02/a-fun-enough-talk/>. I believe that my commitment to the concept of mathematical storytelling is one of the reasons that my writings have resonated with many graduate students who, like me, saw the technical underpinnings of various ideas but were missing the narrative.

I believe that the quest to refine my teaching philosophy, and learn how to best practically implement it, is a never-ending journey. In the last few years, being in a research-focused stage of my career and in jobs where institutional educational roles were prohibited, my recent progress has been limited. That said, the value of these past four years is two-fold. On the one hand, it has really allowed me to develop into the full-fledged researcher I had always hoped to be. On the other hand, this lack of instructional opportunities really clarified to me the central role that teaching and mentorship plays in the personal fulfillment I gain from professional mathematics. I look forward to continuing this never-ending journey during this next stage of my mathematical career.