

As an RTG postdoc at UCSB, I have taught a wide range of courses, including three at the graduate-level. As a graduate student at the University of Pennsylvania, I served as a Master Teaching Assistant and instructed two non-calculus courses, for which I received the Dean's Award for Distinguished Teaching by a Graduate Student from the School of Arts and Sciences. As an undergraduate at Kenyon College, I had the good fortune of witnessing excellent professors in action. They are a major reason I am doing mathematics today. With regard to teaching, I strive to live up to their example. In this statement, I highlight three aspects of my teaching philosophy, as it stands today. I will demonstrate the third aspect by discussing some of the undergraduate research projects I have advised.

From the start of each term, I seek to make the classroom and my office a welcoming environment for students. More specifically, I create an *informal*, but *respectful*, atmosphere in which *mistakes are okay*. Arriving early to class to chat with students sets the tone for an informal setting, one in which students can comfortably approach me at any time. At the same time, it is imperative for me that the students know they will be treated with respect, both by me and their fellow students. This last point is especially important for students afraid of asking "stupid" questions. In order to foster such an environment, I frequently use humor. And on those inevitable days when I stumble over my words, cannot make a good joke to save my life, or make mistakes on the board, I use myself as the punchline. This often eases tension in the classroom, and it makes plainly clear that mistakes are an important part of the learning process. Exposing my own imperfections is both easy for me and encouraging to students, especially those in the first years of college. I make sure they know I was sitting in their chairs at one point in my life.

The second aspect of my teaching philosophy regards nurturing the development of *analytical thinking skills*. How the students learn is just as important as what they learn. In this digital age, I use the analogy that adding new files to their brains is important for those seeking to become engineers, scientists, etc., however, for most students, the main reason they take a college mathematics course is to improve their (brain's) computational power. I do not simply mean this literally, of course. One simple interpretation is that they practice the art of consolidating what they know. In calculus courses, I work on this by strongly encouraging students to memorize a minimal number of formulas, but to also remember key ideas that allow them to derive others. A deeper interpretation is that analytical thinking is a skill to be practiced, and it is crucial to do so for many aspects of life. I specifically address this in my courses by creating homework and exam questions that require proof, the expected rigor of which depends on the class. This is time-consuming, both to construct such questions and to grade them, but I feel it is one of the most important aspects of my teaching. Struggling with proof-writing improves critical thinking skills, argumentative skills, and writing skills in general. While some students will continue to dislike mathematics

in spite of my best efforts, I always seek to come to an understanding with them that they are here for these reasons. Many students find motivation in this and, as a result, end up putting in the extra effort required to do well.

The final aspect of my teaching philosophy involves *providing opportunities for my most enthusiastic students to achieve their potential*. My strategy for this starts by sprinkling lectures and homeworks with not-for-credit, open-ended questions, and it is sustained by continual contact with students, usually outside of office hours. I have had success recruiting students to do “honors contracts” for courses (twice), paid summer research projects (three times), and senior theses (three times). In two cases, I dove into original research projects with students, both of which are ongoing and in various stages. In the first case, I am writing a paper with Jordan Rainone that will be a condensed version of his College of Creative Studies senior thesis. I plan to submit it to a journal like the Proceedings of the AMS, as I believe his work is up to that level. Failing this, I am reasonably sure he will be able to publish his work in another research journal. The second student, Yevgeniya Tarasova, did a paid summer research project with me on Weingarten surfaces in Euclidean 3-space. She is presently working on a senior thesis that seeks to classify a certain subclass of these surfaces. In both Jordan’s case and Yevgeniya’s, the summer research project involved guided, but independent, reading on a subject. In both cases, our main accomplishment by the end of the summer was simply to formulate a conjecture to work on. As all mathematicians know, reading the literature and formulating problems is a large part of what we do. The students were very proud to have accomplished this, especially in light of the fact that the subject they are studying, surfaces in \mathbb{R}^3 , is very old and well studied. Of course, working on their conjectures has been both exciting and frustrating. I take care to keep them from getting too discouraged, and I explain that frustration, coupled with dreams of success, is a significant part of doing mathematics. Another large chunk is writing abstracts, proposals, and papers on their results, and they are getting practice at this as well. Jordan is now a graduate student at the University of Trieste, Italy, and Yevgeniya is applying to graduate schools in mathematics this fall.

My understanding of good teaching has grown and evolved since my first math classes in college. Through my own professors and my own experience, I have realized what my strengths are, as well as what is most important to me, as a teacher. I feel I can engage students with my style of classroom management, which I summarize as providing an informal, but respectful, environment in which making mistakes is okay. I also feel the students in my classes acquire analytical thinking skills, in part because of my emphasis on proofs, or “arguments” as I call them in lower-level courses. I consider this my most important work as an instructor. Finally, I feel I have a positive impact on the most curious students by creating possibilities for undergraduate reading/research projects. This is without a doubt one of the most exciting aspects of my job. I look forward to refining my teaching philosophy, improving my teaching and advising skills, and interacting with new students in the years to come.