

TEACHING STATEMENT

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I find that one of the most fulfilling aspects of being a mathematician is in sharing my knowledge through teaching and research supervision. From smaller upper-year courses to larger introductory ones, *I strive to provide a meaningful learning experience by adapting to student needs, motivating through examples, and communicating effectively.* These three guiding principles help me to make each semester one in which students can be confident that they didn't just pass the course - that in their own words, they actually "got it". For me, a class is a success when I see students walk away equipped with a stronger analytical ability to use in their future careers.

When someone attends my class, I want them to feel excited about learning and comfortable enough to ask questions. This requires a motivated and accessible approach to teaching, which includes reviewing content, providing multiple examples, and encouraging questions to gauge understanding (this is especially important in an online setting). I find that students respond well when I am also enthusiastic and excited about what I am teaching.

Another facet of teaching is the supervision of research. I have assisted in the co-supervision of a number of summer undergraduate projects, which has been particularly significant for me since my own research career began in this way. This interface between research and teaching has been invaluable to my own growth as a mathematician. I have noticed that teaching fosters my own research, and some of my most productive semesters have been those as an instructor and supervisor.

My personal style of teaching has been shaped by these roles, and I would like to mention a few situations which highlight my approach:

Online Learning: The COVID-19 pandemic forced most classes to be taught virtually, and many instructors like myself had to adapt to an unfamiliar format of teaching that came with its own set of challenges. For example, delivering lectures remotely made it difficult to gauge student understanding, and I imagine that many students felt disconnected (especially first-year students without prior university experience). I found it important to request regular student feedback and to adjust my approach accordingly.

There were also many benefits to online teaching. Working with platforms like Microsoft Teams allowed me to communicate with students throughout the day, providing a forum to post questions and receive quick replies. Students also had access to recorded lectures, and seemed more willing to ask questions during live lectures. Even with the return to in-person classes, I anticipate keeping certain elements of the online method. I look forward to exploring hybrid class formats that use technology and an online presence to deliver an effective learning environment.

Student Well-being: The stress and anxiety that accompanies university life seems more pronounced in the shift to online learning. While I am sure there are students that prefer the flexibility of this new environment, there are also those who feel alienated and overwhelmed. Requests for accommodation due to mental health, anxiety and fatigue were common in my first semester of teaching during the pandemic. For these students, the

new learning environment was not ideal. I was sensitive to these issues, and took time to respond to each and every concern.

I am dedicated to refining this student-focused approach to ensure that no one feels left behind in my class. This is easier to accomplish in smaller classes, and is more challenging in larger introductory courses. Adequately preparing students by providing them with the tools needed to succeed is vital to their confidence. Sample tests, written-out solutions, and extra resources all help in this regard. Communicating clear and realistic goals, and not changing those expectations on tests and exams is also important.

Supervision: I had the opportunity to co-supervise three different undergraduate research projects this past summer. By drawing on the experience of my postdoctoral supervisors, I was able to assist with the various aspects of student supervision. Differences in subject backgrounds and research interests required each project to be adapted to the strengths of each student. In one instance, a student was very interested in cryptography and its intersection with algebraic geometry. Although cryptography was outside my general expertise, I did have a previous curiosity about the use of resolution of singularities algorithms in cryptography. I proposed the research topic a possible choice, and we decided to pursue the idea.

As a co-supervisor, I had to learn how to explain advanced topics at an undergraduate level, plan realistic goals and deadlines for the student to work with, and advise each student on how to best navigate their approach to a solution. It was a very different experience being on the other side of the research equation, and I look forward to expanding my supervision responsibilities.

Outreach: One particular teaching experience has been quite memorable for me. Each year, Cornell University runs a series of three seminars at the local Ithaca High School in a topic of advanced mathematics. Three years in a row, I designed classes and assignments on topics that included basic algebraic geometry, combinatorics and number theory. I was amazed to see a genuine enthusiasm for mathematics. I remember one lesson where I taught them about projective space, smashing their long-held belief that parallel lines can never meet. The wonder that they had that day was refreshing. There is a certain fulfillment in watching my students discover mathematics; in getting excited over concepts which I have considered routine for some time.

In the course of regular teaching duties, I also try to encourage students to explore beyond the curriculum. In fact, I had a past calculus student who enjoyed my class so much that he decided to change his major to mathematics, even considering a career in academia. He became inspired when I highlighted some advanced topics during lectures and office hours. He told me about the lack of exposure to mathematics in this hometown, and this first math course had ignited his long-held interest in mathematics. Such stories make teaching so rewarding for me.