

TEACHING STATEMENT

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INTRODUCTION

I consider teaching an essential part of my growth as a scholar. Being able to communicate abstract ideas effectively to an audience, part of who might not share the same level of enthusiasm for the subject and help them gain an appreciation for it, is a vital part of my role as a mathematician. The 2017 – 2018 academic year is my fourth year as an instructor of record for various undergraduate Mathematics course at the University of Chicago, during which time I have taught and assisted in classes ranging from introductory to Honors levels, geared towards both Math majors and applied/interdisciplinary elements, including some advanced high school students, all with great feedback. Additionally, I have mentored several undergraduate students through the Directed Reading Program (DRP) and the summer Research Experience for Undergraduates (REU).

PHILOSOPHY AND GOALS

From the first day of class, I try to make lectures as much engaging and interactive as possible, and make sure that the material is fun and challenging to learn while being accessible at the correct level to my students. I frequently ask questions and take enough pauses to ensure that they get a chance to catch up with hard concepts. My students have praised my enthusiasm, positivity, and willingness to help them both in and outside the classroom, and often commented that my colorful mathematical drawings on the blackboard and physical cues helped them understand difficult materials easily. Two of my U. Chicago students wrote the following comments in their evaluation.

"he is just fantastic at instilling a love for math. I had no intention of majoring in Math at the start of the year, and these 2 amazing quarters completely changed my mind."

"[he] goes out of his way to explain things, and even beyond his role as an instructor, he cares about his students."

Inclusive classroom. I am constantly working hard on developing new teaching techniques in order foster an inclusive classroom and effectively help every student coming from diverse backgrounds, both mathematical and cultural. While actively monitoring the classroom dynamics to make sure no one feels isolated, I try to provide equal attention and helpful honest criticisms to both the capable and the less experienced students. To encourage collaboration among them, I have sometimes led discussions in small groups on a particularly difficult problem, or had them mathematically model real-life scenarios relevant to them. For example, in my standard Calculus class, I asked them predict the ticket availability over time for the 'summer breeze' concert at the university using ODEs and calculate the probability for getting their preferred seats. This included contingencies for reduced interest due to long queue length and possibilities of some students hoarding tickets in order to to sell them later at higher price. Some of the students used words like 'quest's and 'adventure's to describe these small projects in their feedback.

It is important to me that students are treated as individuals, multiple perspectives and experiences are valued and promoted, and each of them is encouraged to push through challenges and setbacks in order to achieve their goals. I strongly advocate using technology in lectures (e.g. using Mathematica to visualize complex three dimensional pictures, beamer slides for quick presentations, and other online resources like wikipedia etc.) to supplement the books, and use Canvas (previously, Chalk) to maintain an online community where they can grow by helping each other. Many of the shy students find their confident voice in the online forums when they realize that others hold similar opinions or that it is entirely acceptable to have differing viewpoints.

Teaching outside the classroom. I firmly believe that the process of teaching is not confined to the classroom and it is important to keep curious minds busy by engaging them in intellectual discourse in their spare times. E.g. in my linear algebra course, I encouraged interested public policy

students to write computer programs implementing algorithms like Gauss-Jordan elimination and QR decomposition. In my current optimization and linear programming course, I am working with some economics majors on game theory projects about prisoner's dilemma and lowest unique bid auctions.

Over the past 3 years, I have mentored 8 undergraduate students through the *Directed Reading Program* (DRP) and the summer *Research Experience for Undergraduates* (REU) on a wide array of topics from geometry, linear algebra, topology, dynamics of group action etc. We usually met twice a week for about 10 weeks, for a flipped classroom style meeting, where the students would discuss a paper they have read and any original work they have done, followed by me outlining the next possible direction of approach and available useful literature. In both cases, I also helped them learn mathematical writing and coached them for an end-of-quarter presentation or written paper.

I have experience in training high school students for *Indian National Mathematical Olympiad* at both regional and national levels, and have worked with *Math Circles of Chicago* as a volunteer TA and once as a judge for their young math symposium, QED. Several times over the last years, I have also given colloquium style talks in pizza seminars and specialized invited talks in student seminars in front of my peers.

Assessment policies. I have always prioritized rewarding academic growth of a student throughout the quarter over raw examination scores. Although the course structures are geared mainly towards summative assessments with weekly quizzes, midterms and final exams, I try to incorporate some aspects of formative assessments with regular feedback on assignments, and opportunities to make up grades by identifying mistakes in exams and taking follow-up in-person oral quizzes to show their understanding. I have often been praised for my fair grading policy despite moderately hard exams.

Self improvement. As a way to improve my teaching and my students' experience, I always strive to create a supporting environment where they feel comfortable to approach me with their queries. I give opportunities for anonymous bi-quarterly evaluations and try to continually improve myself based on their suggestion. In a complimentary direction, I have attended several teaching workshops (organized by *Chicago Center for Teaching*) and improv classes (led by Heather Barnes from *Second City Training center* in Chicago) in order to learn about handling unexpected questions during lecture and ensure more active participation from my audience.

TEACHING IN UNIVERSITY OF CHICAGO

At the University, I have taught independent section of course, usually with 15 – 30 students each, for an average 3 hours a week. As an instructor, I was responsible for designing my own course curriculum, planning lectures, designing and grading exams, holding office hours, and assigning homework. I have also mentored teaching assistants, coordinated junior tutors, and have myself worked as a teaching assistant for a year-long *Honors Calculus* sequence. The list of courses is as follows.

1. A year-long rigorous one-variable and multi-variable *standard Calculus* sequence (taught thrice) for science, economics and Math majors.
2. A quarter of *Elementary Functions and Calculus* sequence for non-science (mostly History, English, and Theater) majors. Teaching students with very little technical background was an unparalleled learning experience.
3. An intensive summer course on *Linear algebra* that met for 6 hours a week for five weeks.
4. A *Mathematical Methods for Social Science* course (taught twice) focused towards vector calculus, optimization theory, and linear programming.

CONCLUSION

I have been and always will be very passionate about teaching. While I believe to have presented an excellent track record of success at varying level of subject material and teaching styles, I continue to learn new techniques and improve my skills to this day. I enjoy working with undergraduate students both in classroom and on extracurricular math activities and look forward to any future endeavors to that end.