TEACHING STATEMENT

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Teaching Philosophy. My goals are to have students remember and intuit the mathematical topics we want them to learn, to have them develop into independent learners, and to enhance their ability to apply their knowledge to new settings. Some of the ways I strive to meet these goals are summarized as follows.

- I employ active learning activities and alternative classroom/grading formats to help students learn material, and I provide them with a supportive environment in which to do so.
- I focus on preparing my students for their futures by showing them the utility in mathematics and how to apply it.
- I engage in self-reflection to continually improve my efforts.

These ideas are expanded upon below.

Overview. The student body at my graduate institution (UIC) was comprised of over 60% students of color, and it is primarily sourced from the urban Chicago Public Schools system. UIC is also both a Hispanic-Serving Institution and an Asian American and Native American Pacific Islander-Serving Institution. In addition, many students are first generation university students. My teaching methods partially developed over my six years at UIC in response to the diverse needs of the various learning styles of these undergraduates. These methods were further refined by my time at Boston College and at Wellesley, a historically women's college. I frequently employ active learning strategies in my classrooms, since it has been suggested that active learning has the potential to increase the success of those typically underrepresented in mathematics. Active learning classes take the diversity of students into account not just by giving a voice to those who may have been ignored before, but also by soliciting more perspectives when problem-solving. I employ in-class polls to break up lecture and get my students immediately thinking critically about material. I will also have them work with their neighbors to discuss these questions. Similarly, during weekly discussion sections I have had my students work in groups on worksheets and occasionally present solutions to the rest of the class. And the past three semesters, I have incorporated group problems sets into my lectures, where students spend part of each class working with each other at the board to solve a list of questions.

I have utilized alternative grading schemes in my classroom. My spring 2023 linear algebra course employed mastery-based grading. I created a list of topics I wanted my students to learn and tested them on these topics over 7 biweekly exams. Problems were essentially graded all-or-nothing, but students had multiple attempts during the semester to demonstrate their mastery of the topics. I used this format as it places an emphasis on feedback and student revision, which is a primary place that learning occurs. This style also gives students greater autonomy in their learning and reduces the stress associated with traditional grading formats. The semester felt like a success based on student performance and feedback. This past academic year, I implemented a similar mastery-based format for my Calculus classes. I think the built-in reattempting from a format like this is helpful for first generation college students, or students from underrepresented groups, since it may ease any math anxiety they might have developed, and frees them to focus on learning.

I am continuing to use these multi-chance assessments in my courses this fall. Select documents regarding my implementation of these ideas can be found the teaching portfolio linked above.

I believe we have a duty to prepare students for their futures, which in our setting usually means for their major classes. As such, I try to frame my courses in a way to make them still relevant to other subjects. One way I have tried to do this is by placing an emphasis on parameters (potentially unknown constants, like a, b, and c in the quadratic $y = ax^2 + bx + c$). This gets students thinking more abstractly and gives them practice understanding the covariance of the letters in equations they deal with in other subjects (chemistry, physics, computer science, life sciences, etc.). This allows me to, for example, derive a reaction rate equation with parameters from chemistry using an integration with partial fractions during my Calculus 2 classes. While a member of a coordinated course in Fall 2022, I helped design documents for working with parameters as well as helped pilot material on their applications. We also ran material focused on showing applications of calculus. As examples, we discussed the 1986-1990 tax bubble as a derivative problem, and investigated animal foraging habits (equivalently, student study habits) as an optimization problem. Furthermore, I have ran versions of Calculus 1 and 2 designed specifically for life and social science majors, with a focus on applications to biology, economics, and medical sciences. Beyond the classroom, at Wellesley College's Institute for Math and Democracy I have been directing a student project on multi-member districting and its impact on elections. This independent-study type project offers a student the chance to learn how math can be used to help answer questions of current political relevance. Moreover, this past summer 2025 I supervised a project done by high school students on the applications of geometry to combating gerrymandering.

Outside of the classroom, I helped organize the Boston College satellite of Math For All. This conference is an inclusive environment for participants to engage in mathematics at all levels. This provides them with a professional development opportunity and students have reported their presentations have directly led to internships. More generally, I believe we have a duty to make mathematics a more accommodating and equitable endeavor. One way I try to achieve this, beyond Math For All, is by making my courses cost-free: lectures are self-contained and only free and open source software is used. In some cases (Calculus 1 and 2) I have gone as far as to prepare handouts on course topics for students to reference during lectures. I also have used class discussion boards to help connect my students with each other to build a classroom community. Towards connecting students to the broader community, I frequently have a homework question that has them review websites devoted to underrepresented groups in math (e.g., the AWM, Lathisms, Mathematically Gifted and Black) and find someone they identify with, explaining to me what is inspiring about that person. This helps them identify with another person in mathematics and realize there is a place for them too.

I engage in self-reflection, thinking critically about what went well and what can be improved. This has led me to consider alternative grading schemes, an example being my experience with mastery-based grading. In addition, the past few years I have noticed that student preparedness for the calculus sequence has been dropping. For my Spring 2025 Calculus 1 course, I reordered content to better accommodate students who were underprepared. I ran through most of the Calculus 1 material solely for algebraic functions. Then during the last few weeks, we ran through it again for transcendental functions, reviewing their properties as needed. This greatly increased student buy-in (in my opinion) and helped them focus on learning the concepts instead of fighting the anxiety around being behind. I recently did a similar reordering of material in my Calculus 2 classes, putting series before integration to equalize the start of the class for students coming in with different backgrounds.

Another example of self-reflection is my review of student feedback—from surveys, course evaluations, conversations, etc.—when revising a course for a new semester. Things that I have changed include assignment due dates (changed to midnight to help students working jobs), assignment

format (adding additional challenging written homework sets as exam preparation, or scaffolding challenging problems to make the more approachable), and adjusting the number of midterm exams (so students have more accurate grade information before drop deadlines). This incorporates student voices into my course design, which helps them stay relevant and can make them more accessible to students from under-represented backgrounds. I also try to stay current with modern teaching techniques by reading articles and attending or organizing seminars on pedagogy. For example, this academic year I am organizing a math pedagogy seminar in Wellesley's Math Department, and last fall I attended a reading group in Wellesley's Physics Department on teaching in the age of generative AI.

Future Goals. Some objectives I have for the future include the following.

- I would like to implement long term group projects to emphasize the usefulness of the topics being learned.
- I would like to solidify the incorporation of parameters into all the classes I teach.
- I would like to find ways to further reduce student anxiety around assessments and mathematics in general.
- I would also like to continue incorporating the the ideas and material from the Calculus for life sciences classes I have run into any calculus class, as I believe it is important for students to see the utility and real-world motivation for these ideas, and not only the math theory.
- I believe there are many benefits of introducing a first year linear algebra course, such as it being more relevant and equitable than calculus is for non-major students, and I would love to design and pilot such a class.

Pursuing these objectives, among others, would help me meet my goals that were outlined above.