TEACHING STATEMENT

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Throughout the past few years I have been involved in teaching mathematics in a variety of different settings. During my time as a PhD student and postdoc, I have taught eight courses ranging from first-year general introduction to proof, linear algebra, and calculus courses to a third-year group theory course. I have coordinated five of those courses, which involved making decisions about the syllabus and creating assessments. Additionally, I have been a teaching assistant for a wide variety of courses, from first year linear algebra and calculus to Master's level pure mathematics courses and just about everything in between.

As part of my teaching assistant duties, I have been a part of several online courses. These have included courses in the University of Waterloo's Masters of Mathematics for Teachers program, which is a professional master's degree for high school mathematics teachers. During the COVID-19 pandemic, I transitioned a first-year Linear Algebra course entirely online for the last four weeks, and have taught a 550 student first-year Calculus course entirely online, both at McGill University.

My efforts in my roles both as a lecturer and teaching assistant have led to winning two teaching awards as a PhD student, both awarded by the department of Pure Mathematics at the University of Waterloo. The first was for outstanding teaching by a graduate student in a teaching assistant role, and the other for outstanding teaching by a graduate student in a lecturer role.

Outside of the undergraduate classroom setting, I have co-supervised a summer research undergraduate student at the University of Manitoba. I am also passionate about mathematics outreach, and I have created and run courses for the Math Circles program at the University of Waterloo, which is an after school enrichment program for local high school students. I have also been a tutor three times at the Australian National Mathematics Summer School (NMSS), which is a 2-week summer program for senior high school students from all over Australia. In September 2017 I was fortunate enough to be given the opportunity to speak to a general audience at a TEDxSalon talk at the Fields Institute about low-dimensional topology.

All of these experiences have shaped my teaching philosophy, which has four main tenets:

Mathematics is not a spectator sport. I strongly believe that regardless of how clear or engaging an instructor is, nothing will benefit a student more than battling with problems or concepts themselves. During my lectures I ask lots of specific questions to help disrupt the tendency for students to focus solely on copying down notes and to get them actively thinking. I often try to guide the class to come up with the statements of theorems and proofs themselves before I present them formally. I provide lots of exercises and encourage the students to struggle with the problems they cannot immediately complete. Getting stuck is still progress, especially if a student can identify why a problem is difficult. It is very rewarding to see a concept click for a student after they have been working hard on understanding it for a few days or weeks!

Developing intuition is important. Simply presenting a student with a formal definition or a proof of a theorem often does not translate to understanding. I believe it is extremely important to motivate definitions and theorems with a generous dose of examples, and to provide many different ways of thinking about the same concept. For example, the notion of linear independence captures the idea of vectors pointing in different directions. However, the formal definition obscures this somewhat, so I dwell on how it really does capture the idea.

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Mathematics has meaning outside the classroom. It is far too common a perception from students that mathematics is all about following arbitrary rules to manipulate symbols, with a total disconnect from the fact that these rules reflect reality. I emphasize this whenever I can. I like to break up every lecture with a short anecdote about applications of the material they are learning, or a story about the history of the subject, or just about mathematics in general. This helps remind students that the subject at hand actually has meaning when they leave the classroom. At the very least the anectodes give them a breather!

Anybody can learn mathematics. Like some clichés, I believe this one to be true! Oftentimes when a student claims they don't 'get' mathematics or can't do it, they have a confidence problem rather than a lack of understanding. The obstacle I have witnessed most is a fear of being wrong, which leads to students not trying to solve problems that they don't immediately know how to do. I like to combat this by telling students at the beginning of term that I expect them to be wrong loudly and with conviction. I find that being wrong and learning from it is one of the best (and surprisingly enjoyable) ways to learn!

For me, teaching is a very enjoyable and rewarding activity. I have had many students approach me saying that they never knew mathematics could actually be interesting and meaningful, or simply that they feel like they actually understand a subject they never thought they could. When I hear things like this, I know that I have done my job.