

# Teaching Statement

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**Background:** As a postdoc at North Dakota State University, I have had the ability to experience teaching a number of different topics with different structures. I have taught Calculus III, where all of the students had a common recitation section. I have taught Calculus I where the class was split into two recitation sections taught by the same TA. I am currently teaching a larger Calculus I class with 6 recitation sections run by 5 TAs. I have also served as the sole instructor for an introduction to proofs and mathematical thinking course twice, an undergraduate-level graph theory course, and next semester I will be teaching an undergraduate-level enumerative combinatorics course. I have also served as a mentor for three Senior Capstone projects (one currently in progress), and have been working in collaboration with a graduate student on both research and software development relevant to our research.

While a graduate student at the University of Minnesota, I spent 3 semesters serving as a teaching assistant, doing recitation sections for both differential equations/linear algebra, and also honors multivariable calculus. I served as a graduate assistant for the University of Minnesota Combinatorics REU.

My teaching experience began while I was an undergraduate at the University of Michigan. During the school year, I worked as a tutor in the university-provided math lab, and was a paper grader for undergraduate and graduate courses. Over the summers, I worked at a math and science summer program for high school students, primarily as a residential assistant, but some years also as a course assistant.

## **Teaching Philosophy and Practices:**

One thing that is an important part of my teaching philosophy is an emphasis on problem solving and critical thinking skills. In almost any class you teach, there will be people that do not go on to take any more math classes. So I feel that it is important to emphasize ideas that can extend beyond the realm of mathematics. One thing that I frequently do in class is demonstrate ways that one can check if the result of a computation is something feasible, or whether it's likely that a mistake was made along the way. This is not just useful in math, but more generally the idea that one should analyze a conclusion, and re-evaluate if it doesn't make sense. Additionally, I have students improve their communications skills by having them work in groups, and emphasizing that being able to clearly communicate an idea to others is part of truly understanding a concept.

Another aspect of my teaching philosophy that I have been working on is being open to incorporating new teaching methods. I feel like it is common for people to try and emulate the teaching methods that they were exposed to and worked well for them, even when those methods may not be the best for students in general. This semester in my calculus lecture, I have been using the TurningPoint clicker system to have students answer questions to problems presented in class. This helps increase student engagement, and gives me feedback on how well they are understanding the concepts. I was also able to introduce an application

of calculus to Pokemon Go in my class this semester, using linear differentials to describe how the relative change of a Pokemon's "Combat Power" with respect to its individual values depends on the Pokemon's base stats. In my enumerative combinatorics class in the spring, I will be integrating computational exploration with Sage.

**Goals:**

One goal I have moving forward with my teaching is to incorporate more use of computers and technology. In my calculus classes, I have used the online based WebWork system for homework assignments, as it provides students instant feedback about whether or not they are doing the problem correctly. I have been actively involved in developing Sage and using it for my research, and I plan to actively use it as a tool for teaching in my combinatorics classes, and also exploring its capabilities as an educational tool for lower level courses. I have also been working on including more examples using computer interactives in my calculus lectures and homework assignments.

Additionally, I am working on creating a better collection of interactives, worksheets, lectures notes, and general course materials. This would help me reuse ideas, examples, and problems that I know students will respond well to. It would also allow me to spend more time refining my materials and working on pedagogy as opposed to recreating the wheel each semester.

Lastly, I would like to try and learn more about the methods of inquiry based learning, and how to better use them in my teaching. During my introduction to proofs class, I attempted to intersperse lectures with days spent having students working through problems and concepts together in class. I would like to try and build on that experience, and learn how to better turn that type of course into something that focuses on logic, problem solving, and communicating ideas, instead of just being about foundational mathematics.