Teaching Statement

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1 Teaching Experience

The Department of Mathematics at North Dakota State University takes pride in forging a quality teaching experience for its graduate students. Every semester held a different teaching experience, and my experience ranges from acting as teaching assistant for introductory freshman-level courses to acting as primary instructor for more advanced courses.

I have acted as Teaching Assistant for College Algebra, Calculus I, and Calculus II. I have also acted as primary instructor for Calculus I, Calculus III, freshman level Linear Algebra, Differential Equations, and Introduction to Proof Writing. This last course is the first "pure math" course offered at NDSU, and is required of all math and math education majors and minors; usually this course is only taught by professors, because it is considered a gateway course allowing access to all senior-level courses. Thanks to my background in applied mathematics, I am capable of teaching both applied mathematics courses as well as pure mathematics courses.

2 Teaching Philosophy

Every teacher I have known has been wrong. Consequently, I consider teaching an exercise in two parts: humility and adaptability. I cannot know every teaching or learning style and I cannot know what works for any given student. I can, however, analyze my experience. I can bend over backwards to excite my students. Every day in the classroom is an experiment on how to describe a concept: I may walk into a classroom with wildly unrealistic expectations from my students met with thundering silence, or my students may surprise me with their enthusiasm and scope of knowledge. A fundamental mistake a teacher can make early in their career is to

convince themselves they know what they are doing, and one of the most effective things a teacher can do to improve themselves is to, at the end of the day, analyze and pull apart their experiences to see where they were wrong. To improve, we must discover our own failures.

The problem is this: the primary burden on teachers is not to convince students to work hard for good grades. Indeed, the primary burden is to convince their students to work hard to learn the material, which is entirely different. I am satisfied if a student walks out of the class with a C if they walk away knowing the material. I am very dissatisfied if a student walks out of the class with an A and then promptly forgets all of the material. This is a moral obligation, as mathematics mistakes can be multi-million (if not billion) dollar mistakes; they can involve the collapse of bridges and buildings, probes slamming into the surface of Mars, and worldwide economic collapse. My primary job, then, is to get my students as engaged in the material as possible.

I am particularly well-equipped to convince my students because of my history. I flunked out of college the first time I attended; for the majority of my college career, I was a poster boy for why you should attend class, to study outside of class, and to attend office hours. I was a horrid student. I thought the point of school was grades, not education. I liked learning, but I hated working for a grade, and so I disliked school. Consequently, I seek to inject every recitation and lecture with something that can get someone passionate about the material, regardless of what it is. I have played with origami hyperbolic paraboloids, fourth-dimensional cubes made from pipe cleaners, extra credit projects in applied mathematics like mathematical biology, and beautiful images from algebraic number theory that rival the complexity of the worlds most stunning cathedrals. At some point, my instructors and their passions for their work inspired me to spread the love and make teaching an integral part of my career. Im not sure where the tipping point was for me, but I can recall at least one contributing event.

On Valentines Day, 2005, I found myself at two oclock in the morning huddled in an office the size of a closet, squatting in a pile of chalk dust on institutionalized carpet, surrounded by textbooks, binders, notebooks, paper, filing cabinets, half a dozen exceedingly pitiful and smelly undergraduates, and other such detritus one might expect in a physics professors office twelve hours earlier in the day. I had already flunked out and had been re-accepted to college by this point, but I was still under the impression school was about grades. I was crouched in this cramped space for a grade. My physics professor had put off time with his family on the holiday to extend his office hours the night before the most horrifying exam I have ever taken. I was shocked that this man, who didnt know me personally (and, in fact, called me

Brian), would put such effort into my grade. I then realized that he didnt care at all about my grade; he cared about my understanding of the material. This was new to me. This teacher cared about expanding his students horizons and would bend over backwards to help a student understand the material. He had been teaching for a few decades, but he was more passionate about teaching than anyone I had ever met.

The first day of class, teachers sometimes announce that students will get out whatever we put into the course, but that is not the whole story. Students and teachers both get out whatever they put in, and the contribution is a feedback process. If the students only care about grades, teaching them is a heavy burden. If an instructor teaches like they are obligated to, not like they want to, learning the material is a heavy burden. The latter is an experience every one of us has had, and the former is an experience every teacher has had, and those experiences are ugly.

Amazing things happen when enterprising instructors can energize their students and infuse into them a passion for the material and students recognize that their teacher is a valuable resource. As a teacher, all I can do is contribute to my half of that equation and do everything in my power to get my students interested in the material.