Over the course of my graduate school career, I have had the opportunity to teach and mentor students from the high school to the graduate level. I have had numerous teachers in my life who I thank for leading me to a degree in Mathematics; it is an honor and duty to do the same for the next generation. My goals in teaching are to develop an ability to discuss mathematics and a comfort with asking questions to motivate a lifelong interest. Teaching primarily first-year undergraduates has allowed me to introduce these ideas to new students and set them up for success in future courses. Additionally, I have had the opportunity to mentor students from the high school to graduate level In this statement, I outline my teaching experiences at the University of Utah, lessons I have learned, and plans to further my teaching skills.

My experience consists of three semesters as the instructor of record for undergraduate courses. I have taught two semesters of Calculus I for Engineers and one semester of an Algebra II equivalent course. In my final semester, I will teach Calculus II for Engineers. I have also TA'ed two graduate-level courses, ODEs and Scientific Computation. My experiences have set me well for teaching any undergraduate-level course at the start of my postdoctoral appointment.

Instructorship Experience

Creating an active and open environment for learning: I enter class each day with a plan to engage my students in an open discussion about mathematics. I openly encourage participation in lectures without requiring it. Most 50-minute class periods only contain 10-15 minutes of lecture, and the remaining 35-40 minutes are spent working on problems. I primarily utilize think-pair-share activities, where students discuss their answers with their classmates and gain confidence in their answers or verbalize questions they can ask.

These think-pair-share activities generate many questions that allow me to connect back to the lecture topic and the larger course content. While many instructors follow this pattern, my lectures facilitate an unusually high degree of participation. *I encourage large discussions in lectures by treating every student's question or comment with the same enthusiasm.* In end-of-year feedback forms, students state this as a reason for feeling comfortable asking questions. Below are a subset of the relevant feedback I received:

- "he respected all of our questions and participation... I think everyone felt super comfortable asking questions"
- "One of the worst experiences that a student can have is a professor who seems frustrated and flippant when students ask for clarification, and professor Patel clearly puts effort into avoiding this trait."

Developing skills in mathematical communication: An important aspect of learning I have increasingly focused on as an instructor is mathematical communication. Mathematics has become increasingly more collaborative and more integral to interdisciplinary work, and therefore, it is important that we speak with a common "language" to better engage with each other. Think-pair-share activities are useful in allowing students to discuss and share work, but they do not allow me to assess their skills in discussing concepts.

In the last two semesters as an instructor, I implemented two techniques designed to assess student's communication. Each Friday, students are given a quiz to be completed online via Canvas. Rather than a standard set of fill-in-the-blank or multiple-choice questions, quizzes started featuring questions such as:

$$\text{Describe in words how you would solve the following equation for } x\text{: } \log_2(x) = \log_4(x).$$

These questions intended to give students an opportunity to explain their methods in English and also prime them to think about problem-solving strategies rather than diving in head-first.

Additionally, I allowed students to earn points back on their midterm exams by assigning test reflections. This assessment promotes a deeper level of self-reflection on mathematical techniques and study habits than having students correctly solve a problem they have encountered. For each incorrect response on the exam, students were asked to describe 1) how they attempted to solve the problem, 2) the question in their own words, including what concepts from the textbook were being examined, and 3) how they would approach the problem if it appeared again on the final exam. In both the quizzes and reflections, students were assessed on their ability to determine an appropriate strategy for solving problems and to describe the strategy to another.

While student responses to quizzes and reflections improved over the semester, I believe I can take these ideas further in future teaching semesters. I would like to incorporate short-response and essay-based questions within exams or before exams rather than in the reflections only. For example, questions like the one above would be given in two parts: in part one, students would describe a problem-solving strategy, and in part two, students would implement said strategy.

Mentorship Experience

In addition to my roles as an instructor, I also spent significant time participating in mentorship and mathematical outreach activities. In my own high school and undergraduate experiences, I participated in programs like the Mathworks Math Modeling Challenge and was advised by graduate student mentors, and it is a pleasure to do the same for young students in Mathematics.

I have acted as a mentor to several undergraduates and graduate students through various programs within our department. For example, I participated in our department's Directed Reading Program for three semesters, where I led an upper-division undergraduate student through an introductory numerical analysis course emphasizing solutions to SIR-type disease spread models. I have also acted as a mentor for incoming first-year PhD students in two cohorts to help them prepare for written exams and to help them transition into life as a graduate student. Each of these interactions is far more intimate than teaching a seventy-person lecture, and therefore, instruction and mentorship were tailored more specifically to their interests or questions.

I have spent several years participating in and judging math modeling competitions at the high school and college levels. These activities allow me to work with a much smaller group of students than in my instructorship positions and continue developing student appreciation for mathematics and its applications. As a past competitor of similar competitions, I recognize their usefulness as a first experience in using math to tackle a novel real-world problem as a team, and I hope to help foster a lifelong interest in mathematics by preparing students for these competitions.

Along with several other graduate students and postdocs, I implemented a series of workshops intended for students from 11th grade to second-year college students that gave a foundational introduction to formulating, building, and analyzing models. In partnership with the Society for Industrial and Applied Mathematics (SIAM), these workshops were designed to prepare high school students for the Mathworks Math Modeling Challenge. In the future, I hope to develop new methods for fostering math communication skills between students to foster better collaboration. I also plan to continue my work with SIAM to continue building content for mathematical modeling and to continue judging for the competitions themselves.