

## TEACHING STATEMENT

I first wanted to pursue a career in academia because I loved to teach. Before I understood what a research program was or the details of tenure, I knew that I enjoyed sharing my passion and knowledge with people. Helping someone to understand something new has always been a very rewarding endeavor for me. Teaching physics specifically presents a challenge and an opportunity in this regard. The perception that it is a very difficult subject, and the anxiety that often produces can make it difficult to get students to engage with the material. If you can encourage students to engage, then this can become a rewarding opportunity to change students' perceptions about physics, and their own abilities.

Student success in physics does not come from the ability to memorize and recall equations or statements from a text. Instead, the most successful students are those who can decipher useful information, think critically about how to solve problems, and explain their reasoning to others. To be a successful physics instructor, it is clear that one must go beyond just teaching the equations and formulas, and provide opportunities to develop and practice these critical skills. My goal as a physics instructor is to promote student engagement and success by implementing three key strategies into my lectures: emphasising problem solving strategies, making lectures as interactive as possible, and using multiple methods to assess the students' understanding.

My lectures are heavy on the use of example problems, as I believe the best way to learn how to solve physics problems is to work them out. This also allows me to demonstrate and get the students to practice the problem solving skills and strategies we develop. After introducing a new concept, I will use an example or two to guide students through the problem statement, show them how to identify the useful information, and build a road-map that connects the given information to the desired final answer. In addition to my own worked examples, I like to make this more interactive by giving students practice problems they can work out in small groups. I answer specific questions and address misunderstandings as they work, and then have the students present elements of their solution until there is a final class version that students can compare their own work to.

I have also found it to be very beneficial to occasionally use more slightly more difficult problems that push students to think critically about the material and extend it to a new situation. Giving students in-class time to work in groups on these problems encourages student engagement, creative thinking, and promotes the same problem solving strategies. The first time I implemented this as part of the Preparing the Professoriate (PTP) program, over three quarters of the students provided feedback that these problems helped them to gain a better understanding of the material, and almost 90% of the class reported that their problem solving skills improved. This self-reporting was backed up by an overall reduction in the variance on the students homework scores by around 30% as compared to the same class from the previous year.

Finally, in addition to all of the above interactions with students to assess and gauge their comfort level with the material, I also use methods to ensure that I am constantly receiving feedback from the students in my class about the class material, pace, and anything else that I can control to improve their learning environment. Using online class tools, I prompt students after each class about what material they are still struggling to understand, or questions they had after the last class. I compile these responses before the next class and begin by addressing any major concerns or misunderstandings shared by the majority of the class (and encouraging anyone whose questions weren't addressed to visit office hours). Additionally, I found

it easy to use clicker-response questions with anonymous responses to assess the students understanding of concepts. By giving them the anonymous response they are likely to answer according to their honest understanding rather than asking people around them, and the clickers provide immediate feedback if students are struggling with the current subject.

My experience teaching at NC State University has been deeply rewarding and enlightening. I have had the opportunity to teach a variety of classes through my own teaching assignments, guest lecturing, and participation in the PTP program. I have gained valuable experience and useful insight in how to make myself a better instructor, as well as methods to encourage student engagement. I am now looking forward to a career in academia where I will hopefully have many more semesters to teach and continually improve.