Since receiving my PhD in 2012, I have taught seven math classes at the Air Force Institute of Technology (AFIT). For reference, the primary mission of AFIT is to provide defense-focused graduate education and research, and most of its students pursue an MS in some form of engineering. Here, the Department of Mathematics and Statistics is small (students earning an MS in math or statistics account for about one percent of each year’s graduating class), and so the primary educational function of our department is to offer courses for students from the other departments. Additionally, most students at AFIT are nontraditional, specifically, commissioned officers in the U.S. Air Force who have not been in a university setting for at least 4 years. As such, the students’ familiarity with mathematics has typically faded some, and to help correct any shortcomings, I have primarily taught courses at the senior undergraduate and introductory graduate levels.

At the end of each academic quarter at AFIT, students complete a survey to evaluate each of their courses and instructors. The final question of the survey asks the student to rate the overall quality of course instruction on a scale of 1 to 5 (with 5 being the highest). Over the past two years, my average rating for this question has been 4.84, ranking me as #2 out of 16 faculty members in my department, whose average rating is 4.31 (the school-wide average is 4.21). I believe my performance on these evaluations follows mostly from certain goals I set for myself as a teacher, which I detail below:

**Research-oriented curriculum.** The first course I taught at AFIT was Applied Linear Algebra, and my class was composed mostly of first-year engineering students who would no doubt get a lot out of the course if taught properly. As such, I organized the course so that, while my lectures covered technical topics such as Gaussian elimination and singular value decomposition, the students were to complete several projects outside of class which applied the lessons in different ways. Specifically, I handpicked a few short engineering articles that involved topics like principal component analysis or compressed sensing (neither of which were covered in class), and the students were expected to apply what they learned in class to explain the intuition, the results, and how one might improve on those results. In the end, the students became more comfortable with the material, they were certainly aware of its applications, they became familiar with how to read research articles, and they learned how to write in \LaTeX (all of which would benefit their thesis research later). Due to the success of this modification to the curriculum, I have implemented similar changes to AFIT’s Graph Theory course and again found good results.

**Discussion-driven lectures.** When I was a graduate student at Princeton, I sat in on Elias Stein’s class on Complex Analysis. During lecture, while sketching a proof, he would often query the class, for example, “How would you estimate this quantity?” Students would then offer suggestions based on their current arsenal of inequalities. If a given suggestion was insufficient for the proof, Prof. Stein would quickly take an aside to demonstrate why it fell short of the goal. I attempt to emulate this discussion-driven format in my lectures. While the format is more demanding of me, I think it’s worth the effort: It not only keeps the students engaged in the lecture (even students who aren’t directly involved in the discussion), it also sheds more insight into the proof-discovery process. This is particularly effective when I teach Mathematical Methods in the Physical Sciences, which is essentially multivariable
calculus with an introduction to linear algebra. Since the students bring some experience from single-variable calculus, the discussion is a nice way for them to recall and reinforce their intuition and to apply their own ideas with my guidance.

**High expectations with clear standards.** In my few years of teaching, I have found that maintaining high standards helps my students to prioritize my class properly. For example, a student once enrolled in my Graph Theory class without having taken the prerequisite proofs class. I gave him some references for developing his proving skills (and I offered some assistance during office hours), but I made it clear that I would not cater the lectures to his deficiency. In the end, he surprised me by earning one of the highest grades in the class. In fact, students continually impress me in how they rise to the challenge of my expectations. I believe their achievement is made possible by how clear I communicate my standards. I provide grading rubrics for extensive writing projects, I return graded assignments promptly, and I disseminate answer keys when appropriate. This can certainly be time-consuming for me, but it enables my students to manage their time for success, which they do!