Given the immediacy of information on the internet in this modern era, the role of an undergraduate education can no longer solely be the transference of knowledge. I believe that classroom teaching remains a powerful and profound way of explaining ideas, as part of an essential process that is the true goal of a liberal arts education. This is especially true in a field fraught with conceptual nuances such as mathematics. My main objectives in teaching math are (1) to develop fluency and confidence in mathematical skills and (2) to impart a better understanding and appreciation of what math actually is and how it may be used to solve problems.

Confidence, fluency, and a sense of exploration. An essential part of teaching is building confidence in students’ own intuition and engendering a bold sense of exploration. To solve a problem, a student must be willing to make a full attempt at each idea, keeping in mind that incorrect attempts at a solution are an essential part of the process. After obtaining a degree of comfort with standard mathematical techniques, I encourage students to be bold in problem solving and avoid this fear of mistakes. Whether trying to prove a large theorem or solve a basic algebra problem, this dual sense of comfort and exploration is crucial. Developing fluency in standard algebraic manipulations, confidence in applying these basic tools, and a spirit of exploration in problem solving are key parts of my teaching philosophy. I strive to leave my students with the confidence to fully engage in problems involving math that they may encounter in during their education or in their careers.

Overcoming misconceptions. Students are frequently encumbered by the misconception that mathematics is solely number-crunching computation or a series of executable steps to realize a final answer. In teaching, I try to stress that math is the ability to think abstractly about a situation, to recognize emerging patterns and then to apply these abstract concepts in various settings. Symbolic manipulation and technical terms are just the tools needed to accomplish this goal. While comfort with these tools is important for doing math, they are often barriers to learning and to appreciating the greater structure and beauty in mathematics. I try to emphasize a more conceptual viewpoint to give a better sense of what math is, and thus how better to actually learn math. Math exists in precise statements; moreover, undue complication leads to confusion. I make it a point to clearly state concepts, definitions and theorems in a simple and transparent form. This helps students recognize the formal patterns and natural structure of mathematics, and de-emphasizes rote memorization of formulas and complicated calculations.

Implementation of teaching methodology. Comfort with the basic rules needed to solve math problems comes from seeing many examples and doing practice exercises. After teaching a concept, I always try to immediately apply the idea in an example and do multiple related problems. I often choose examples and problems that hint at greater patterns and generalizations. When answering a question in lecture, I try to guide the student through simpler examples until he or she is lead to the solution. I prefer to present examples in many different forms, and often produce my own material
using \LaTeX, MATLAB and other technological and visualization aids. Seeing these examples and doing practice exercises helps build students’ confidence and fluency in problem-solving skills.

Another facet of my teaching methodology is creating an active and engaging learning environment. This, in part, comes from my energetic and enthusiastic lecturing style, which helps keep students interested. Another technique I used in a freshman calculus course was peer-instruction through group worksheets which helped get the students involved and promoted exploration through problem solving. A sample worksheet problem might ask the student to recognize different derivatives and formulate conjectures on possible differentiation theorems. During an introductory college algebra course, I had students present homework problems on the board, leading them through other examples and variations. I have also used online question forums for students to discuss the material, ask questions, and post answers.

An important aspect of creating a positive learning environment is honesty, both in providing clear and consistent expectations of students and evaluating student progress. I am always clear about what will appear on a test and try to provide rigorous exam review sessions and detailed solutions to previous exams. On the other end, I encourage students to be honest with their own mistakes and confusion to avoid the habit of tricking themselves into believing they fully understand something.

**Pedagogy outside the classroom.** Apart from traditional teaching roles, I have also taken on several undergraduate mentorship projects. I played an important part in developing the Directed Reading Program (DRP) at the University of Maryland. This program pairs graduate student mentors with undergraduate mentees in a semester-long reading course. I served on the graduate student committee for the DRP, helping develop the structure of the program. I also served as a graduate mentor in the DRP on a project based on sections of the textbook *Primes Numbers: A Computational Perspective* by Richard Crandall and Carl Pomerance. Finally, I have also served as a graduate mentor in the Experimental Geometry Laboratory at Maryland.

Towards the end of my graduate career, I was also involved in the Goucher Prison Educational Partnership (GPEP). This program provides men and women incarcerated in Maryland with the opportunity to pursue a liberal arts education through Goucher College courses and college preparatory courses. While presenting new challenges, GPEP gave me the invaluable opportunity, through volunteer tutoring and teaching, to work with non-traditional disadvantaged students in a non-traditional setting.

**Math pedagogy and educational improvement.** From my career in undergraduate education as well as my own undergraduate experience, I understand the worth, meaning, and importance of a high-quality liberal arts education. Teaching well is not easy. I consider it a responsibility that requires a good deal of time and thought, patience and persistence. But part of the challenge and enjoyment lies in the fact that to be able to properly explain mathematical concepts requires a strong understanding and a driving curiosity to reach such an understanding. Simply put, teaching is learning, and I view teaching as a core part of my growth as a mathematician.