

Effective teaching is an essential part of all aspects of my career. As an interdisciplinary researcher, my research life depends on effectively communicating mathematical ideas to scientists with minimal mathematical backgrounds. So, my teaching cap always needs to be worn even while acting as a researcher. In the classroom setting, I strive to create an atmosphere students are comfortable and motivated to learn regardless of their academic backgrounds.

Many of the courses I have taught have been interdisciplinary. The primary challenge in teaching these courses is the student's diverse academic training. My goal is to make the methods material accessible to students whose primary training is either in the mathematical or biological sciences. To do this, I define biological terms carefully and explain basic mathematical concepts. Group work can help by allowing students to learn from each other. Final projects can allow students to tailor the tools and techniques known in the course to their unique academic backgrounds. I make sure to meet with each student individually to discuss their projects, suggest research topics, and offer advice on what could help them better understand the material they study.

I have used computer labs in many of the courses I have developed. Mathematically inclined students can gain mathematical intuition about the systems they study from these labs. Students trained in the biological sciences often relate to simulations more easily than to the equations underlying these systems.

Becoming a better teacher is a career-long commitment for me. I have benefited from several resources in the department and throughout the university to improve my teaching skills. An essential source of feedback has been CRLT. I have asked them to observe my teaching in several classes and met with them to discuss how I can improve my courses. For courses where I did not use CRLT evaluation, I gave out a midterm questionnaire to allow students an opportunity to provide anonymous feedback on what would help them learn.

I aim to teach both the tools of mathematics and how they are applied. Rather than only learning facts, I present wrong theories and have students question them. I often motivate theories by the biological or physical problems that inspired them. Historical facts can bring new life to the subject. This includes discussions of why ideas, which now are rarely questioned, were so important when presented. These teaching techniques will help motivate students and improve their critical thinking skills.

I have been lucky at Michigan to interact with some highly talented students. Teaching them is a significant responsibility. It has also been a lot of fun.

The courses I have developed have focused on biological rhythms, the neuroscience of music, modeling vision, and wearable data science. These courses could find students analyzing my wearable data, performing the Bach Trio Sonatas on a pipe organ, or a visit to a museum to study how an abstract painting is visually processed. I was nominated and a finalist for the Provost's teaching innovation prize. MIT Press published my textbook on biological clocks, rhythms, and oscillations.