

Statement of Teaching Philosophy

Arunima Ray

Department of Mathematics, Rice University,
6100 Main St, Houston, TX 77251-1892.
math.rice.edu/~ar25 • arunima.ray@rice.edu

I am interested in teaching mathematics for the same reason that I chose it as a career, namely, an appreciation of its elegance and beauty. It's a shame that the average college student does not appreciate mathematics; however, I believe that interactions with an enthusiastic teacher can change this.

In short, I deeply enjoy mathematics personally, and teaching it is an opportunity to show others why.

1 Motivation

Teaching as a challenge. Most non-mathematicians I meet are either scared of math ('I was so terrible at it in high school!') or consider it to be useless ('I'm never going to use calculus in real life!'). I enjoy the challenge of trying to change their mind. As a teacher in a lower-level class, I am in essence engaging each of my students in an extended debate where I aim to convince them that mathematics is within their grasp and worth learning. I have had success in this by highlighting the many ways mathematics may be applied to different fields and by focusing on its critical thinking and problem-solving aspects.

Teaching to foster appreciation of mathematics. Simply, I find mathematics to be quite beautiful, and it is a pleasure to introduce motivated students to its charm. On several occasions, while teaching or TAing, students have asked me about my own research. As a topologist (and a knot theorist in particular), I have been able to describe to them a subject which has many easily-stated, tangible problems while being quite different from anything they have seen before as undergraduates; generally these overviews are greeted with sincere appreciation and pleasant surprise that mathematics can show up in such an unexpected realm. This has been a very memorable experience for me and I am excited about the prospect of guiding students in their forays into higher mathematics.

2 Techniques

Utility and practicality. A course is successful to the extent that each student gets something out of it. To that end, I have started each of my classes with a short written survey to determine the interests and background of my students, and tailored the course accordingly. For instance, in a Calculus class consisting primarily of Biology majors, I would use examples from population dynamics, disease propagation, etc.

In lower-level courses, I focus strongly on the transferrable aspects of the material, particularly if the class is composed primarily of non-majors. A Sociology major taking Calculus as a core requirement might never use the particular formula for integration by parts again in their life; however, the problem-solving skills needed to determine the best way to compute an arbitrary integral are essential to any field. A central component of my Calculus II course was thinking of the topics we covered (integration techniques or convergence tests) as a toolbox; I would ask my

students to critically look at each given problem and determine the most suitable tool from their toolbox to apply to it. Framing a calculus class as a medium in which to learn critical thinking skills got through to the students, who then realized that they were learning something valuable as opposed to merely fulfilling a degree requirement.

Creating a learning atmosphere. A key part of my teaching strategy is creating an environment where questions are encouraged, both in class and in office hours. I frame myself as a mentor and resource. I let my enthusiasm for mathematics show, and my energy at the blackboard sets the tone for each lecture. I make a conscious effort to learn names quickly and respond to questions with a significant amount of positive reinforcement. By cultivating a friendly and approachable persona, I have been successful in drawing students into comfortably speaking out in classes and expressing their doubts.

Ongoing self-evaluation. I constantly evaluate my teaching style and pace to ensure efficiency. In addition to the standard evaluations at the end of the semester, I make a point of conducting anonymous midterm evaluations; I have found that students are more forthcoming about their comments mid-semester since they can themselves benefit from a solution. The day after receiving midterm evaluations, I go over them in class—addressing concerns and discussing how I intend to respond to them. Even if I am unable to make any major changes in response to midterm feedback, the fact that I seek them accurately indicates to the class my desire to teach them to the best of my abilities, and the students respond by working to their fullest ability in turn.

3 The future

In some sense I have been teaching all my life—starting with tutoring my peers in middle school and high school, as an Undergraduate Laboratory Instructor in college, to being a Teaching Assistant and Instructor in graduate school. While I have made significant improvements in my teaching during this time, I am looking forward to expanding my abilities and exploring new teaching techniques. In particular, I hope to incorporate more group work and active learning components into my teaching style. I am excited about the prospect of adapting my teaching skills to a new academic environment where I can draw from the experience of other dedicated educators to continue to grow as a teacher.

4 Student comments

I would like to close with some comments from student evaluations for the courses I have taught or been a Teaching Assistant for. Complete course and instructor evaluations are available upon request.

Calculus II, Fall 2011, Rice University.

- Aru is definitely the best teacher I have had at Rice. She explained the theories behind mathematical concepts and then went on to provide varied, useful examples. I wish other classes gave as many examples. For an engineering major, examples and applications of concepts are very important to me, and Aru definitely gave many of those.

- I . . . consistently felt in class that my views of math as a subject evolved. Every class period involved some further development of fundamental concepts (rather than monotonous practice, the new ideas were nicely blended with the practice).
- Aru was outstanding. I don't have any complaints whatsoever. When we had problems, she changed her style to accomodate the class. I'm sad I can't take another class with her =[
- Math is also not my favorite subject but she made it seem interesting to me. I do not have a single negative thing to say about Aru. She is one of the best professors I have had in my educational experience.
- Although this class has very difficult material, the [sic] Aru's ability to listen to our feedback throughout the semester made it very easy to handle and even enjoyable.
- Everyday, I would be shocked to see how the time had flown by. She is one of the most engaging instructors I have ever had.
- She clearly loves math, and this shows in the form of her math jokes and excitement when teaching. Her interest in it is infectious. Outstanding MATH 102 course with Aru.
- Math 102 isn't very difficult. The course was very good because of its small size and the instructor was great.

Honors Linear Algebra, Fall 2012, Rice University.

- I also want to comment on his TA Aru. She is up there with one of the great math teachers I've had and makes math fun at times. I'm glad she is getting her PHD and hope she will teach lucky students someday.

Calculus II, Summer 2011, Rice University.

- I am very content with the class so far and I have truly started to enjoy doing math again, which is great!
- Definitely do not change your approach to math and your enthusiasm. It really dictated the attitude of the class, which was a very fun atmosphere to learn in.

General Biology Laboratory, Fall 2007, SUNY Geneseo.

- I'm very unconfident [sic] in biology. You make me not feel stupid :) and in fact even sometimes make me feel smart!
- Helped me understand the context of this lab as it relates to the rest of my college career.
- I feel more comfortable talking to Aru than any of my teachers or ULIs.
- Everybody respected you and felt like they could relate to you at the same time.

General Biology Laboratory II, Spring 2007, SUNY Geneseo.

- You are a good teacher, but speak with more confidence and you would be a great teacher.
- Good job! You have inspired me to become a ULI/ULA someday.

General Biology Laboratory I, Fall 2006, SUNY Geneseo.

- You are so willing to answer everyone's questions, that was very helpful. (Some ULIs/TAs will barely acknowledge your existance [sic].)