## **Teaching Philosophy for Ross Gore**

A university encourages students to appreciate profound ideas from different cultures and disciplines and to use them in new, creative and interesting ways. As a professor I encourage every student I teach to embrace this appreciation and innovation. I make every effort to achieve my goal through the following actions:

**Always strive to improve everyone.** Throughout my formal education I studied teachers I admired. What was it about them that led to their clearly effective pedagogy? Common to all of them was an undying resolve to improve everyone –them and me. Their commitment has resonated with me. I never want to reach a point where I take my teaching skills for granted; instead I want my skills to be constantly evolving. I contribute by treating each group of students as a new set of teachers who can help me learn how to better meet the needs of future students. I know that my effectiveness with students will hinge on the methods with which I choose to encourage them to. Specifically I will strive to instill the following:

- Learn how to investigate problems, not memorize a book. During lectures and on tests I include questions where the answer is not a single lecture note or passage in the textbook (i.e. 'What is the best sorting algorithm?'). Good questions require students to combine everything they have learned about a topic and defend a position. By encouraging students to fully develop their ideas, and not just to take notes, I expect to promote critical thinking and teach a flexible strategy for answering a lifetime of questions. I do not want them to think of college as the time in their life where they were focused on learning, but the time they were taught to learn for life.
- **Realize that chance favors the prepared mind**. Knowledge begets knowledge. I want students to realize that problem-solving strategies are an extremely useful kind of knowledge for acquiring and understanding new knowledge. I work with students to demonstrate how a limited number of strategies can address thousands of new problems. I want students to realize the more problems they see and solve in their life, the less likely they will be to get confused or frustrated when they encounter a difficult problem elsewhere.
- Understand that different perspectives can yield innovation. Knowledge of many subject areas provides a cross fertilization of ideas that frequently leads to innovation. "Eureka" moments are the product of our unconscious minds working on a problem, using previously studied materials and methods. My courses expose students to literature, music, art and mathematics to assist them in understanding the concepts of recursion and self-reference, which are frequently described as computer science and data science topics, but actually underlie a variety of disciplines. My goal is for my students to realize that the greater the storehouse of knowledge, and the wider its range, the more creative the solution.

I take these three concepts as givens in the art of teaching. Efforts for improvement of my skills include constant assessment of the methods and means I use to succeed in awakening students to the importance of these concepts. Additionally I always seek to identify and employ methods for effective delivery. In an era of growing importance of online delivery, I strive to ensure quality is not sacrificed as economics push academic institutions in the direction of lower cost instructional methods. I am excited about the opportunities newer technologies bring us for improving pedagogy.

Always strive to keep non-majors engaged. Learning to program is a difficult accomplishment for data science majors and non-majors alike, but majors have a

motivational advantage over their non-major peers in introductory courses. Majors have chosen to pursue programming; whereas, non-majors are required to do so regardless of their opinions of its value or utility. To keep non-majors engaged in the introductory course I teach programming (and data science) as an art as opposed to a science. I demonstrate to them that data science has more in common with music and mathematics than it does with a laptop, science or engineering. I introduce data science as the study of imperative, "how to", knowledge and contrast it to mathematics - the study of declarative, "what is", knowledge. By taking this approach and decoupling data science from computers I am able to engage majors and non-majors alike on a level playing field at the onset of an introductory course.

**Always practice and profess the excitement of discovery.** The beauty of a vibrant university is the range of opportunities it presents for discovery. The beauty of data science is the range of applications it has across all disciplines. I am excited about the prospects of awakening all students I meet to the rare opportunities they have with data science in the university.

As a practitioner and proponent of discovery, I am committed to sharing my enthusiasm with students. I still remember having my first "Aha!" moment, tracing through a program in my introductory computer science course. My insight came from looking at my code as a mathematical function as opposed to a computer program. I'll never forget that multidisciplinary approach I took to completing the assignment and the euphoria I felt basking in the joy of my discovery. I strive to teach students the skills to unearth their own discoveries as they work through assignments, pursuing innovation looking at their problems through different lenses. I want to instill in them the need to experience the joy of discovery. Above any material I can convey in a lecture, pursuits of discovery will prepare them to be productive employees, innovative leaders, researchers and life long learners.

**Always invite participation.** Students are at their best when they feel comfortable. I want to create an environment where students know I am excited to teach and they feel encouraged to participate. In the past, I have arrived fifteen minutes early to the classroom/laboratory to talk to students about their progress in my courses and in other courses. Students have commented that these conversations put them at ease and made them more excited to share their concerns about the course with me. Along with continuing this practice I will:

- **Create different types of opportunities for participation.** I make students a part of in-class demonstrations and take in-class polls to encourage less-verbal students to participate. I believe this is especially important for international and female students who may be intimidated to participate in a data science course. I also offer anonymous feedback opportunities where students can voice their concerns about the course without their identity being known.
- **Use leading questions to teach students.** I have found that with a series of leading questions, students can provide most of the implementation for a given algorithm or proof. Referencing students' contributions by name as the algorithm or proof takes shape gives the students' a sense of ownership over the material.
- **Citing examples of classroom material in popular culture.** Referencing popular culture keeps students excited about data science once a lecture is finished. In the past I have cited examples of algorithms implemented in commercial products and referenced movies portraying applicable concepts.

• Foster a sense of community. I want to help create a sense of community. While office hours are listed on the syllabus of every course I teach, students know that if I am in my office then my door is open to them. I want to work towards keeping the students engaged outside of class and showing off the research center to those students with all students, regardless of their major.

**Always be mindful of incorporating research in the classroom.** One of the great things about being in a field as underdeveloped as data science is that current research problems can be made accessible to students even in introductory courses. While most of education is about learning what is known, I believe the best students often find it more interesting to learn about what is not known yet. I will dedicate myself to incorporating my own research into the courses I teach. This is partly for selfish reasons – I hope to attract the best students to work on my research projects – but mostly because I find the research work I do exciting and interesting, and hope to convey that to the students.

Teaching is a passion. There is nothing else in my professional life that brings the same joy and exhilaration. While I am fortunate to have found something I am so passionate about, I feel that I have a responsibility to work hard for my students. It is a great gift and a great responsibility to share the discipline I love with others.