

## TEACHING PHILOSOPHY – KAMINI SINGHA

My learning goals, in a broad sense, are for students to improve their quantitative skills and their ability to communicate science with the public. It is important to me that students see the relevance and application of their course subject material to real life, and I do this through debate of controversial issues within my general education class, data collection and analysis in my field-based course, and the discussion of “so what?” points within my upper-division course. At all levels, I have focused on overarching course goals rather than content-specific goals, and encourage my students to observe, question, interpret, and solve problems. I feel strongly that helping the next generation understand the importance of key issues in the geosciences is fundamental to our success as a science. Additionally, I want my students to be comfortable with scientific technology, which is why I created a course about numerical modeling for scientific applications. This modeling course in particular was developed as a service course to the college; many students that I was working with were struggling with data analyses due to lack of familiarity with computer coding. I find teaching rewarding, enjoy one-on-one as well as group interaction, and have worked hard to make larger classes interactive and intellectually challenging. I look forward to teaching graduate-only courses in hydrogeology and geophysics as a critical mass of students in these areas forms at Penn State.

Active learning has been an important part of my teaching in the classroom, regardless of course size. In one of my 40-student classes (Geosc 452: Hydrogeology) this includes, for example, conducting flow and transport experiments, despite not having a classroom with a laboratory, numerical modeling, and in-class think-pair-share. In my 100-student general education class (Earth 100: Environment Earth), I break the students into groups of six throughout the semester to debate topics such as “Should we drill in ANWR?”, “Is genetic modification a panacea?” or “Should we act on global warming now?”. In teaching at both the undergraduate and graduate levels, I strive to engineer classroom settings where the students have an opportunity to learn from one another. These experiences enable them to better retain core concepts. By allowing the students to participate actively in their own education, I’ve found that student evaluations and feedback have been very positive, and I have been equally successful teaching small majors-only classes as I have been for large general education courses. I am passionate about teaching and developing new methods for learning in the classroom, and I have published some of these results in top-tier science education journals.

I additionally have focused on increasing diversity in the classroom. I have done this via the development of a three-week summer field undergraduate hydrogeophysics class with collaborators at three historically black universities (HBUs). These students, with students from Penn State, collect, analyze, and synthesize field data, build numerical models to explain their data using a research-grade computer code, and create poster presentations of their work that they present to graduate students and faculty within the College of Earth and Mineral Sciences. One goal for the course was to make partial differential equations come “alive” in a practical, applied setting focused on hydrogeologic processes. This course has been highly successful over the past three years, and provides students at the HBUs with a field experience in the geosciences not available at their home institutions, and provides Penn State students the opportunity to interact with a more diverse group of students than they often see in their courses here at University Park.

In short, my goal as an instructor is to train a diverse, capable generation of informed citizens to grapple with water resources on a changing planet. Toward this end, I have concentrated on the goals of the scientific method and developing students skilled in data collection and quantitative analysis via independent research experiences and innovative, active courses. I have found my interactions with students to be motivating and enriching, and hope to inspire within them a respect for science and for themselves as people on an ever-changing planet, full of complicated problems we need intelligent, enthusiastic scientists to think about.