

Teaching represents an exciting and rewarding challenge to help inspire and guide the decision makers of tomorrow. A broad understanding of a wide variety of overlapping domains is crucial to understanding the modern world. I am a passionate ‘systems thinker’ with a strong desire to facilitate critical thinking and analysis in my students. To this end it is important to enable the development of problem-solving strategies. With even a very elementary understanding of basic physical principles we can enable people to be more informed consumers and citizens. I want to teach students to think in the language of systems and to pay attention to the full life cycle impacts of the products and services we employ.

One of my most formative teaching experiences was as a Teaching Fellow in Stanford’s freshman program, *Thinking Matters: Energy? Understanding the problem, developing solutions*. The course allowed me to engage with students at a very close level, running discussion sections of between 10-15 students. Because the students had a wide range in experience and ability with technical material, we chose a ‘coaching’ model for the course, working with each student ‘where they are’ rather than using a one-style-fits-all approach. This coaching took the form of regular office hours and tutorial sessions. I greatly enjoyed the very interactive style of teaching and taking on the role of teacher-as-resource rather than simply being a conduit of information to passive students.

I believe the most important things to pass onto students in Environmental Engineering are an appreciation of the fundamental reliance of humanity on the healthy functioning of the planet’s ecosystems and an understanding of the importance of the role of energy in modern society. They should become aware of the ‘problematique’ of energy in the future - the need to provide access to modern forms of energy to a growing population whilst addressing issues of resource depletion and the environmental and social impacts of energy production and consumption. They should gain an ability to critically analyze energy and industrial production systems, through such activities as research projects, and gain motivation to explore their own chosen topics in more depth. It is also important for students to learn core competencies and transferable skills such as working in groups and facilitating group processes, time and project management, research skills, especially literature searches, experience with presenting results and critically discussing ideas.

Problem sets are absolutely necessary to ingrain new skills, especially mathematical skills and I am interested in exploring ‘flipped classroom’ models. I believe that a lot of lecture content could be delivered during non-contact hours, whereas students can benefit greatly from working through problem sets during contact time, or even in groups, if not specifically with the professor. I have benefited greatly from field trips to production facilities to grasp the sheer scale of energy operations, which is hard to understand sat in a classroom. I enjoy integrating research into teaching by having graduate students work on active research projects, for example, using courses on life cycle assessment for students to develop models results. I find that the students engage more with the course, because they can easily see an application for the knowledge or technique. To this end, I am also using service-learning models of teaching, for instance, having students learning about and conduct energy assessments for local businesses through our Industrial Assessment Center.

A perfect teaching situation is one in which the student gains a good grounding in the contextual knowledge and has their eyes opened to the bio-physical view of the world; that the course of world history can literally turn on the availability of resources. Students will be motivated by the importance of the subject to hopefully become advocates for a sustainable energy future. This can be achieved by providing the necessary knowledge in an accessible manner, suitable exercises to become equipped with the necessary skills and also observing the power of a critical perspective. My role as a teacher is to provide context and tools and also to provide motivation and passion. My biggest gauge for effective teaching is when students are engaged and excited about the topic. For me, this is the greatest reward.