

I believe scientists have a responsibility in developing the next generation of critical thinkers to solve the grand challenges of both the present and the future. My primary goals are to 1) improve the ability of students to make clear, reasoned judgments 2) develop skills in reading and evaluating primary literature and 3) improve both written and oral communication skills.

Scientific inquiry is central to my teaching philosophy and therefore to the way I design my courses. Students come into the classroom with an incredible diversity of abilities and interests. Effective teaching means meeting a student at their level and fostering their development in way that respects their interests and abilities without being authoritarian. In my courses I strongly encourage students to ask questions and explore topics of their own interest within a field and have found that strategy to increase both engagement with the material as well as comprehension. For example, I give students the freedom to explore any line of questioning they find interesting as long as it is within the limitation of the materials and timeframe available in the course. Mastery of a skill such as statistical analysis is often not fully realized until the student applies the skills to a dataset they have collected themselves. Creativity in assignment formats (blog, videos, art etc.) allows students to engage with the material in a way that highlights their own strengths.

I believe the most successful courses are those that take an integrative or multidisciplinary approach. Because no one instructor can be an expert in all topics, I am especially interested in team taught courses and in designing courses that incorporate guest lectures from experts or practitioners that are applying knowledge on the ground. In this age of technology, knowledge in almost any subject area is out there and accessible. My goal as an instructor is to show student where to find it, how to evaluate, interpret and place it in context and how to contribute to it. In this way I help my students learn to teach themselves.

Establishing a culture of collaboration in the classroom also means balancing lecturing with leading discussions and having the flexibility to tailor coursework towards areas of interest identified by the students. Flexibility is also essential in the balance between creating a comfortable classroom environment and encouraging students to move out of their comfort zones to learn new skills.

I am especially interested in helping undergraduate learners develop their skills in reading and evaluating primary literature. Primary literature plays a central role in my courses and assignments. I regularly use examples from the literature to illustrate concepts in my lectures, paying particular attention to the interpretation of figures and tables. I generally assign an article for each lecture or module in a course, which is associated with a set of comprehension questions due before the start of class. I expect students to incorporate primary literature in their writing assignments, which are generally modeled after scientific papers, and in their presentations, which take the form of a talk presented at a scientific meeting.

In addition to designing assessments, the atmosphere (sense of community) of the classroom is important in understanding how well I am meeting my objectives for the course and student comprehension. It is important to me that students feel comfortable to ask clarifying questions or let me know when they don't understand. In a large class setting it is often easiest to accomplish this by incorporating iclicker questions.

At XX University I hope to teach a combination of survey courses and skills based courses. In a survey course the undergraduate student should have a general sense of the field including its history and the current state of knowledge, how new information is generated in the field and the field's important contributions in the context of the larger body of scientific knowledge. I strive to incorporate both the foundational and current literature in the field including examples from my own research. In an advanced survey course such as Agroecology, I expect students to develop their sophistication as critical thinkers, make connections between related concepts and write concise and well-supported arguments.

In a skills course, I will expose students to the full scientific inquiry process from evaluating published literature and forming testable hypotheses to statistical analysis and scientific writing. I build the foundations of these skills in classes like Introductory biology labs and explore them more fully in an upper-level course for advanced undergraduates and beginning graduate students. In upper level courses I have integrated teaching and research in innovative ways. For example, students in my Applied Statistics and Experimental Design course used my study system (cultivated strawberry) to ask novel questions and design their own experiments, which resulted in a publication based on the work done in the course.

In both coursework and mentoring the most challenging aspect is encouraging students to become independent thinkers. My approach in both is to first show students a skill, do it with them and then encourage them to do it on their own. During a student's first weeks in my lab we read classic and important papers before narrowing down a research topic based on the student's interests. Doing projects with students rather than giving students a project is essential for teaching basic field and laboratory skills and modeling expert problem solving. This model has worked well for the ten undergraduate students I have mentored. These types of collaborations with students have led to three co-authored publications.

I believe it is important to continue to develop my own pedagogical skills throughout my career. To keep up with innovations in instructional methods and technologies I have made a habit of regularly consulting the literature on instructional practices in higher education, which I plan to contribute to when appropriate. As part of my professional development I have developed a portfolio where I track and reflect on my experiences and progress.