

As a professor, my primary goal will be to serve as a catalyst guiding students toward discovering their own academic and scientific potential. Every individual has a unique life story shaping his or her goals. Teaching should be conducted in a manner that is conscious of varied interests while opening doors to explore new pursuits. My obligation will be to foster an environment that stimulates critical thinking--not merely by covering course material, but also regarding the role of science in everyday life. Science is central to meeting many of the 21st century's greatest challenges such as rising energy demand, climate change, and ever more limited resources. Our responsibility as university faculty is to introduce students to deep scientific questions and demonstrate ways that even the most basic research can have broader real-world impacts. Therefore, I am very interested in developing curriculum that incorporates peer instruction and hands-on learning experiences to drive home fundamental concepts in biology and relate them to how we understand the natural world.

During my teaching experiences at Duke University and The University of Texas at Austin, I put my teaching philosophy into practice. As a teaching assistant for the laboratory section of Duke's "Comparative Vertebrate Anatomy" course, I developed a successful learning environment. I introduced topic through figures and keywords while I encouraged students to participate in discussions synthesizing lessons across the semester in a phylogenetic context. I frequently broke them into small groups to share ideas and used photographs, museum specimens, and figures from relevant primary to illustrate concepts. My classes worked cohesively to find answers through thoughtful and collaborative discourse.

I am very interested in teaching both core biology courses and interdisciplinary courses because they provide the best route to reach a broad segment of undergraduates and attract students to science. I have been involved in teaching two excellent interdisciplinary courses: "AIDS and Emerging Diseases in Africa" at Duke and "The Biology of Biofuels" at the University of Texas at Austin. Both integrated the fundamentals of biology with public policy. Over the semester, students developed an appreciation of basic concepts while gaining an understanding of science that will help them as global citizens. The Biology of Biofuels course provided me with the opportunity to independently design both lectures and laboratory curriculum. The coursework taught students to think synthetically about how studies in ecology, physiology, and genomics could contribute to bioenergy research.

I have developed my teaching philosophy by training and lecturing students and citizens over the past decade. During this time, I closely mentored twelve undergraduate and high school students. I particularly enjoy opportunities to work with and mentor underrepresented minority undergraduates through the Howard Hughes and Summer Research Opportunity Programs (SROP) at Duke University. I insist that undergraduate students feel some level of ownership over their research projects, and encouraged them to conduct background reading on their projects. I also urge them to think critically about new avenues that they can pursue with their research beyond our time working together.

My primary goal as a mentor has been to provide students with an introduction to independent research. I emphasize the connection of their projects to broader questions in science and beyond. For example, the undergraduates who participated in my dissertation research were required to read and discuss related policy papers and mainstream media articles regarding the impact of soil salinity and droughts on global food security. Such real world supplements to science education are necessary in order to gain an appreciation of the material and communicate the value of research outside of a classroom setting.

I am interested in developing an introductory course on Genomics and Bioinformatics that will be accessible to graduate students and advanced undergraduate biology majors. Too often university courses on bioinformatics assume an already high level of programming experience, which most biology students do not have. I will split the curriculum of the course between a lecture component highlighting the latest breakthroughs in genomics and a hands-on computer laboratory section. This combined course will provide students with an exciting biological framework to motivate them to learn about programming in biology. The goal of my course will be to gradually build students programming abilities from becoming comfortable with the command line terminal, through learning basic scripting, to building full pipelines as group projects analyzing real genomic data sets. I will also instruct students in experimental design for genomics and develop their basic statistical skillset using the R programming language.

I am also interested in integrating my research program with undergraduate teaching. Over my career, I have accumulated a number of data sets that could be utilized in courses, including data sets for population genomic analysis, linking gene expression and physiological response, and quantitative trait locus (QTL) mapping of whole genome expression traits. As a professor, I will partner with other faculty to gain access to additional data sets that will be interesting to students, such as association mapping of disease traits in humans.

I plan to build a research program that will provide opportunities for graduate students to develop innovative theses. In my lab, students will be encouraged to read broadly, targeting research ideas that emerge from the synthesis of different fields. We will work together to tailor their coursework and theses to accomplish individual goals following graduation, whether this entails an academic career path or a job within industry, government, or elsewhere. Most importantly, I strive to encourage students to develop questions on their own, so that they can become independent, globally minded thinkers.