Teaching Philosophy

My teaching philosophy has been shaped and crafted by my experiences as a student, a teaching assistant, a guest lecturer, and a mentor. I believe that in order for students to learn effectively, teaching must be a conversation, not a monologue. Each course, laboratory, and one-on-one meeting provides an opportunity to make connections with students and to foster not only understanding of the subject at hand, but also the chance to instill values and attitudes that shape future scientists, teachers, and citizens. Teachers must recognize that these opportunities will have an impact on students' lives. It is critical to strive to make these relationships significant, influential, and productive. I am passionate about teaching science because the interdisciplinary nature of ecology and the diversity of content within biology provide many different ways to make profound connections and ensure that students have a chance to become informed, aware, and pro-active. In order to understand ecological science, students must learn by doing. Ecology naturally lends itself to experiential education and I feel that when students are given a forum where individuals and groups are presented tasks that are based on real-world global problems yet are tied directly to local service-based and concept-based outcomes, learning will be inherently driven by communication, problem solving, and dedication.

In addition to being a positive and influential experience for students, I want my courses and teaching to meet several objectives that extend beyond the presentation of information. Guiding students from simple recollection and comprehension of facts, to applying and analyzing what they know so they can develop and assess complex concepts within the classroom setting allows students to grow intellectually and prepares them for more complex materials and independent learning. It is important to demonstrate links between course content and broader concepts from outside the classroom. Once students can connect abstract concepts to real events and issues, more complex learning objectives are easier to introduce. Connecting broad concepts can be as simple as illustrating how ecosystem processes such as photosynthesis and respiration are linked to the global carbon cycle and climate change. When teaching non-major freshman introductory biology, I found that linking the course to the bigger picture raised students' interest in topics that previously had not appealed to them.

It is important that I teach students to embrace active self-learning. The ability to obtain, retain, review, and critique information and then to synthesize understanding while recognizing patterns and connections on one's own is key to the development of informed citizens and life-long learners. This constructivist pedagogy is especially important when students may have preconceptions about ideas that challenge course material, i.e. religious beliefs regarding evolution. I have encouraged students to develop scholarly research skills by assigning primary literature by citation only and also requiring that students lead class discussion and evaluation of materials selected by other students. I learned while assisting with BIO 346-Concepts in Biology II, which taught future secondary educators how to teach science, to use alternative approaches such as a flipped classroom and constructivism in order to foster curiosity and independent learning. While instructing Aquatic Communities laboratory, I used inquiry-based approaches where, after students were taught basic invertebrate taxonomy and identification techniques, groups created dichotomous keys for sample collections from different habitats, and then were challenged to use other students' keys to link community patterns to specific sample collection locations and habitats. This exercise encouraged critical thinking, self-learning, and practical use of the techniques and methods needed to excel later in the course, while reinforcing important learning goals such as hypothesis formulation/testing and the scientific method, and practically communicating complex biological and ecological concepts such as diversity. This lesson also allowed me to employ a diverse and dynamic approach, incorporating aspects that appeal to visual, auditory, and tactile learning styles as well as encouraging collaboration through group work.

The most fundamental goal of my teaching is to empower students with the ability to use what they have learned directly and indirectly in my courses to better themselves. This touches at the heart of many different aspects of life. By fostering acceptance and tolerance of diversity, whether it be race, gender, creed, orientation, or lifestyle, within my classroom, I lead my students by example and trust that my tolerance and acceptance will permeate into the lives of my students. Sharing my respect for the environment, ecosystem, and planet not only matters to me as a scientist but personally as well. In my lectures, I have used the agricultural setting of Wright State to link land-use with ecological threats such as eutrophication and social-economic issues, i.e. agri-business, to demonstrate that humans are members of the ecosystem and drive

ecological dynamics. This resonated with students who may have always lived around farms but never made the connection to bigger picture issues. Demonstrating how simple lifestyle choices, i.e. volunteering and consumer habits, can have reverberating effects on communities both locally and globally is a dramatic and powerful tool to raise students' awareness of environmental and ecological issues. For example, reminding students of the environmental and social benefits of volunteering for local wetland and riparian restoration projects fosters a sense of community and stewardship. Being passionately engaged and proactive is contagious, and often students will feel drawn to action by observing their mentors.

Assessing how well teaching objectives are met requires a diverse approach. Examination and final grades are not only an assessment of students' comprehension, but also reflect teaching abilities as well. I have used a range of assessment tools to ensure that I am engaging and teaching students to the best of my ability. In laboratories, I have used quizzes and small exams to determine how well students are comprehending fundamental information and both short and comprehensive lab reports to assess how well students conceptually understand the material. In lecture settings, I have used true-false and multiple choice sections in exams to validate how well I am conveying information, and short and long essay sections to determine how well students have tied information to concepts. Essay based exams also allow assessment of writing and communication skills, which are crucial for future scientists. Additionally, I have found that authentic assessment methods such as learning portfolios, oral interviews, and class discussions are valuable informal tools that allows students to demonstrate understanding without the stigma and stress of exams. Well-educated students can articulate complex ideas, defend their positions or conclusions based on evidence, and constructively critique other viewpoints in class discussion. Student evaluations are also helpful way to gauge students' satisfaction and attitudes towards my teaching. Some teaching objectives mentioned above are intangible and difficult to determine if and to what extent they have been met; however, consistent self-assessment in these areas can help guide teaching approaches.

As a Ph.D. student, I was extremely fortunate to have mentored three NSF funded Research Experience for Undergraduates (REU) students. I worked closely with these students to develop and implement a research project that fit into our ongoing research program. I found these experiences to be incredibly rewarding and challenging. Each student came from different educational backgrounds, which provided a great teaching experience. Building a student's knowledge base from the bottom up towards conducting active research was fulfilling work. It is particularly rewarding to know that each of these students are actively pursuing graduate degrees. In addition to the REU students, I have led 20 undergraduate research assistants on field crews and in the laboratory while conducting my dissertation research. As a postdoctoral researcher, I have been able to take mentoring to the next level and supervise four Master's student projects. Further still, I have begun to mentor one of these successful Master's students on his Ph.D. project where I serve as co-advisor. These students have come from many different countries, cultures, and backgrounds. My mentoring approach with both undergraduates and graduate students has been to provide support, foster curiosity, and enable self-guided learning. It is important that mentees are not simply given lists of instructions and protocols, but rather become immersed into the research itself. Understanding how to use a certain method in the field or lab is not as valuable as understanding why. I have strived to engage the students in their projects deeply and meaningfully, aiding in their development from student to scientist.

Due to the interdisciplinary nature of ecology and my diverse research experiences, there are many courses that I am interested in teaching. General biology, general chemistry, ecology, conservation biology, biogeochemistry, microbial ecology, limnology, aquatic ecology, stream ecology, biostatistics, ecosystem ecology, global changes and stable isotope methodology are all courses that I would enjoy teaching. I envision literature based senior level courses in exploring current trends in ecology. Additionally, I could teach other courses such as ornithology or avian ecology. I have several aquatic ecology undergraduate projects in mind that could serve as senior thesis projects or research based credits. Given that science is collaborative in nature, I also envision group taught courses that perhaps combine, compare, and contrast different disciplines within ecology.

I have had the opportunity to be an undergraduate and graduate student of many amazing teachers. They have changed my life and opened the world of science to me and showed me who I am. It often felt that personal. Having benefited from the passion and support of my teachers, I have felt drawn to the service of education and mentorship simply in hopes of returning the favor and doing the same for others.