

## Statement of Teaching Philosophy

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With the increasing demand for quantitative skill sets in the wildlife and fisheries profession, I have focused my teaching efforts on applied statistical methods. I am particularly excited by the prospect of developing and teaching undergraduate courses that meld the field and quantitative methods used to study wildlife and fish populations, while encouraging higher levels of scientific inquiry and the development of sound research methodology. My teaching philosophy focuses on three main tenets:

### **Experiential and Project-based Learning**

Formal classroom instruction should rely on **experiential and project-based learning** approaches whenever possible. As a Harrar Scholar of Teaching Excellence in 2018 to 2019, I developed and taught an undergraduate course for students in the Wildlife and Fisheries program (WFS) at Pennsylvania State University. The course, titled WFS 497: *Estimating population vital rates for management and conservation*, integrated hypothesis development with data collection and analysis to provide undergraduate students with experiences in research methodology as well as a foundation in population analysis. The course focused on the estimation of population parameters such as survival, recruitment, movement and abundance, using long-term studies conducted by faculty and graduate students in the department.

*The emphasis on hands on learning really helped me to grasp the concepts being taught. -Anonymous Student, WFS 497, Student Rating of Teaching Effectiveness Survey*

I designed WFS 497 as a **project-based course** in which students completed two projects – one individual and one group project – that both culminated in an oral presentation and a written scientific article. For each of these projects, students were able to directly contribute to **data collection** and then **use these data to answer novel questions** of their own design. This **applied experiential** approach increased and sustained student engagement with challenging material. In addition to key problem-solving and effective communication skills, students developed **self-efficacy** and teamwork skills that will benefit them long after graduation.

*The best part of this course was that it integrated the use of all levels of study design. In other courses, we have learned about the importance of study design, but only theoretically. This course walked through all levels of study design from field work to analyzing data while giving us experience in each area. It cemented a lot of the concepts we look at in some of the basic WFS courses. -Anonymous Student, WFS 497, Student Rating of Teaching Effectiveness Survey*

Student-centered strategies such as experiential and project-based learning allow students to take ownership of their own education, which has been amazing to see firsthand. Based on this success, I plan to implement other experiential and project-based learning in my future courses.

### **Capacity Building**

In addition to providing students with valuable field skills and experience, I have focused on helping students develop the critical thinking and analytical skills that will help them succeed beyond their years as an undergraduate. For example, R has become the ‘go-to’ programming software for the wildlife and fisheries sciences, yet the majority of WFS students at Pennsylvania State University did not have an opportunity to develop this essential skill. As part of a supervised teaching experience in 2017, I redesigned all computer-based laboratory exercises for WFS 446: *Wildlife and Fisheries Population Dynamics*, with the goal of increasing student engagement and providing students with basic **programming experience in R**. This is a required course for graduating seniors that focuses on the theoretical concepts and statistical

estimation of mammalian, avian, and fish populations. Despite any initial frustrations associated with learning R, students appreciated having the experience to navigate their way in a base computer coding language while also learning key concepts in population dynamics. The materials I developed for this course are still in use today.

*Learning R is a very important aspect of [wildlife and fisheries sciences] and having a chance to learn modelling in a small class helps me engage and learn the [material].* -Anonymous Student, WFS 497, Mid-semester Feedback Survey

I relied on student feedback from WFS 446 when developing WFS 497, which was also entirely based in R. Based on this feedback, I developed an accessible tutorial that gave students relevant experience with creating, manipulating and plotting data. We gradually built on these core concepts with weekly programming exercises using their project data, which greatly improved student confidence and independence in programming. By the end of the semester, students were able to access various R packages, including *unmarked* for occupancy and *RMark* for capture-recapture analyses, and create professional-looking figures using their own code.

*I really enjoy working with my own code and troubleshooting problems and applying what I learn in class to real datasets.* -Anonymous Student, WFS 497, Mid-semester Feedback Survey

Ultimately, this fostered a more dynamic collective learning environment where students were eager to help and engage with each other about the course material.

### **Inclusive and Responsive Teaching**

I strive to create an inclusive environment in every class I teach. Students in WFS 497 represented a variety of backgrounds and included non-traditional learners as well as students with learning and non-apparent disabilities. To accommodate and engage this diversity of learning styles, I used inclusive strategies such as “think-pair-share”, and group evaluations of peer-reviewed literature that fostered discussion and collaboration among students. Perhaps the most successful technique I employed was the use of an anonymous **mid-semester feedback survey**. In this survey, students provided input regarding the pace of the class, clarity of the material, and suggestions for improvement.

*I would like to see more real-life research articles that incorporate the statistical strategies we are working on in class. It is really helpful for me to see how the topic is applied in the "real world."* -Anonymous Student, WFS 497, Mid-semester Feedback Survey

I reported back to the students with a summary of the results and changes I would be implementing to improve their individual and collective learning experiences throughout the semester. In response to the above comment, for instance, I modified the end-of-semester project to provide students with the opportunity to critically read and evaluate literature on a species of their choosing. Through this exercise, students learned about the peer-reviewed scientific process and the particular ways in which capture-mark-recapture methods are employed.

I plan to expand on mid-semester surveys to elicit student feedback via other classroom assessment techniques, such as weekly **muddiest point surveys**. Muddiest point surveys not only provide instructors with a concise feedback device, but also ask students to reflect on their own learning experiences, which can deepen their understanding. By implementing these two strategies in tandem, I will be able to create an inclusive environment in which every student has a voice in their education.