

Teaching Philosophy

I developed most of my teaching and mentoring approaches instinctively, in reaction to my own experiences throughout academia. More recently, I have tailored my course design to address the gaps in student preparedness as perceived by potential employers and documented in the APLU-NACTA 2020 executive report. As an educator, I strive to build an identity and protocol of empowerment and inclusivity into everything I do. Transparency is a central tenant of that mission and personal brand. My pedagogical approaches are rooted in published scholarship of teaching and learning (SOTL) research, and I leverage my administrative and service roles to complement my pedagogical innovation by advocating for students and developing program structures to support faculty and students.

I want my undergraduate students to know that you don't have to wait until graduate school or have a fancy lab to "do science". I want my graduate students to build confidence in their communication and mentoring abilities, and to trust themselves as leaders. I want each of my students to feel that science is immediately relevant, instead of a plug-and-chug exercise, and to feel empowered to explore and share their diverse perspectives – and to know that those diverse perspectives contribute as much value to science as their data. I cultivate critical thinking through active learning, and expose students to current techniques and paradigms to foster practicing scientists. As an educator, I use three strategies to initiate students into the greater scientific community:

1. I show students that there is no single type of person who is a scientist.
2. I cultivate a classroom culture where students feel safe and encouraged to engage in discussion.
3. I challenge students to participate in authentic scientific research.

My efforts to dispel the various stereotype threats surrounding (and amplified by) the "ivory tower", and to empower students (including the general public) with scientific understanding, are important steps toward science literacy and belonging. These "broader impacts and outreach" efforts are often valued as line-items for grants in academic settings; but for me they comprise scholarly efforts to build reciprocal, collaborative, long-lasting partnerships with my students as well as the public.

Experience

I began teaching gifted high school students at the NC Governor's School in 2011. In my [Biodiversity](#) class (see [syllabus](#)), students first established the ground rules of ecology as they apply to the visible world by comparing biodiversity patterns at three sites on Salem College campus. Next, students cultured soil microbes from each habitat to investigate symbiosis with plants. Our protocol was [published](#) as part of an ongoing citizen science partnership with the Dunn lab at NCSU. In 2017 I revised my course to focus on [Microbial Ecology](#) (see [syllabus](#)) and developed a [novel lab](#) to culture flour microbes, to complement the global Sourdough Project. Many of the inquiry-based learning modules that I originally developed for citizen science have since been adapted for use in undergraduate and graduate classes (i.e., [Sourdough for Science](#)).

At Duke University, I was awarded a Bass Teaching Fellowship to develop an undergraduate microbiome course based on my dissertation research (see [syllabus](#) and [blog post](#)), for which I won the [Dean's Award for Excellence in Teaching](#). My students evaluated primary literature, interacted with diverse microbiome researchers, and completed novel research projects instead of mid-term or final exams. At the end of the semester, one student appreciated that there was "more intellectual freedom in this course than is typical of an undergraduate course so I feel like I was more engaged in learning." (See [BIO 490S evaluations](#).)

Since July 2019, I have re-designed three existing courses at NC State University (AEC 460: Field Ecology, AEC 400: Applied Ecology, and AEC 502: Introduction to Biological Research) and developed three new classes: a "flipped" course (AEC 245: Global Conservation Ecology), a Course-based Undergraduate Research Experience (CURE, AEC 495/592: Gut Microbial Ecology), and a professional development seminar for graduate students (AEC 630: Learning to Teach Effectively). My scholarly efforts to build long-lasting reciprocal and participatory partnerships with my students as well as community members have been recognized with the inaugural [Engaged Scholarship Award](#); and I received the [Outstanding New Faculty Advisor Award](#) for mentoring students enrolled in the Applied Ecology minor.

Methodology

I learn everyone's name and preferred pronouns on the first day of class. I read a land acknowledgement statement crediting the Skaruhreh-Tuscarora and Lumbee tribes as the original inhabitants of what is now NCSU campus, and pledge my intent to decolonize science by empowering students to become stewards of their own education. I tell students that scientists are not defined by knowing all the answers, but by how they tackle unsolved questions. I can guide students through concepts and material that I know, but I acknowledge that students will likely ask questions I won't be able to answer. In those cases, we can use research tools to find an answer together.

My candid introduction provides a non-threatening venue for students to offer varied perspectives born of their diverse academic and personal backgrounds. Across the semester, I integrate assignments that require and motivate students to develop transferable skills that have professional value beyond the classroom. Literature review, data analysis in R, and data visualization can all be applied across disciplines toward an array of careers in academia and industry. Many of the assignments are also iterative, to deliberately integrate reflection and time-management. By the end of the course, I want my students to feel confident in their knowledge and skills and prepared for the next stage in their chosen academic / career path.

My course design challenges students with greater autonomy than they are accustomed to in a traditional classroom setting. Students are not limited by access to content; I focus, instead, on using active learning to help students connect information to discover important underlying concepts. A typical “lecture” is punctuated with critical thinking challenges to interpret a relevant figure and engage in group discussion. These “cogitation breaks” enable me to check for student comprehension and correct misconceptions before they take root; but I also take advantage of these opportunities to highlight real world case studies. My examples highlight scientists from diverse backgrounds and emphasize the many ways that course concepts manifest across systems and scales – including traditions practiced by indigenous peoples across the globe.

Facilitating these types of class-wide exchange not only fosters a collaborative environment, but also empowers students by emphasizing the importance of their individual contributions during informal, real-time, formative assessment via hands-on activities that make global issues personally relevant. For example – in [Global Conservation Ecology \(AEC 245\)](#), students collect and weigh their trash and recycling for a week to measure and extrapolate their personal impact. More recently, students mapped which specific ecosystem services are provided by green and blue spaces in Raleigh, and compared park distribution to median income, bus lines, and greenways to investigate environmental justice (i.e., who pays for ecosystem services, versus who can actually access them). These exercises challenge students to critically curate and analyze class data in Excel, and to apply concepts to real-world contexts at the local and individual level. In [Applied Ecology \(AEC 400\)](#), students complete a series of case studies to practice interpreting ecological datasets from my own ongoing research projects (e.g., evolutionary drivers of gut and mammary morphology, and the impact of helminths on gut microbiome and health metrics). We also complete weekly “jigsaw” exercises to synthesize published research and apply a single concept (e.g., predation) across diverse systems (e.g., raptors, mammals, arthropods, agriculture) to identify common themes versus context-dependent distinctions. In [Field Ecology \(AEC 460\)](#), after completing a series of short-term (1-2 week) labs to practice field methods and data analysis, students work in groups to design and execute original research projects over an 8-week period. Students design each project to address a gap in the published literature, and present their results to an audience of peers and professionals. While students are initially intimidated by the responsibility of leading discussion and designing their own experiments, my teaching approach empowers participants to take initiative as independent thinkers and collaborative scientists.

Professional Development

I solicit feedback from students and colleagues across the semester and compile data to assess my own progress as an instructor and identify ways to improve my teaching. I also engage in a variety of professional development and community-building efforts to review the literature of data-informed and peer-reviewed pedagogical approaches; to develop my own Scholarship of Teaching & Learning (SOTL) practices and research program; and to share my efforts across a professional network that spans local, national, and international scales. As I learn how to better support student learning via diverse approaches and modalities, I continuously update and refine my existing course materials and assignments – as well as the surveys and ClassEval questions I craft to assess the efficacy of specific teaching efforts.

In addition to these dynamic, perennial efforts associated with individual classes, I strive to cultivate a departmental community of enthusiasm and support around teaching through a series of teaching workshops that I host at the end of each semester to celebrate instructors’ successes and collectively strategize innovative approaches for our classes. Within the department, I facilitate new course development and continuing improvement for junior and senior faculty regarding course structure, HyFlex delivery, classroom technologies, in-class activities, grading schemes, course scope and advertisement, and refinements for permanent status (including formatting and fielding feedback from CALS-CCC and U-CCC). Beyond the department, I have guest-written Faculty Forum blog posts for the Office of Faculty Excellence; contributed to workshop trainings on open education for NCSU Libraries; participated in a NSF-RCN STEMBUILD incubator to develop a novel tactile teaching tool; and participated in HHMI Inclusive Excellence workshops and seminar series to make research and learning more accessible.