Teaching Statement

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Teaching is all about communication and finding new ways to convey complex material. Because students enter college with a wide variety of life experiences and background information in the field, this means that teachers must constantly find new ways to engage with the subject and connect with their students. This challenge is what makes teaching so fun. Through these aspects of teaching I gain a deeper understanding of the material. Through different student perspectives we find new connections across disciplines and within the subject that lead to exciting questions. In a classroom, we get to learn together, build new knowledge, and challenge existing frameworks. In short, my students and I get to think creatively and foster a passion for lifelong learning.

Developing Creative Thinkers

Simply put, my goal for any class is for students to construct their own knowledge. My role as instructor, therefore, becomes facilitating this construction by providing students with the necessary learning tools. To accomplish this, To accomplish this in teaching the "Microbial Pathogenesis" graduate course at Duke, I led my section in lively journal club discussions to reinforce the material covered in lectures. At the undergraduate level, I introduced relevant literature during office hours and have designed a course around primary literature and experimental design. While graduate students are expected to interpret the methods and findings in articles more independently, I find that the same methods with more guidance engage undergraduates as well. In preparation for each class meeting, students read a section of a published paper and complete a brief assignment. We begin the semester by focusing on the introduction and methods to build a working knowledge of current knowledge and techniques in the field. During this time, we also work together in groups and as a class to interpret the data presented in the paper. As the semester advances, students interpret the data individually, and group activities during class meetings focus more rigorously on developing follow-up experiments and challenging the authors' interpretations. By the end of the course, students are able to quickly identify the main conclusions from scientific papers, accurately interpret data in the context of the field, and develop new questions and experiments to push the field further.

Based on feedback from students, this approach successfully builds students' ability to critically evaluate data and conclusions, promotes a deeper understanding of previous findings in the field, and develops higher order thinking as students work together to design experiments. Additionally, because students are encouraged to work together during class, they feel comfortable asking questions and sharing their ideas with the class. Ultimately, this approach to teaching builds critical thinking skills that are easily transferred to any discipline and improves student learning.

Creating Lifelong Learners

Fostering creative thinking through these active learning techniques also promotes student excitement and engagement with the course material. From my experience leading discussions in the graduate level course "Microbial Pathogenesis," I found that this excitement leads students to ask more meaningful questions and become genuinely invested in developing approaches to answer those questions. As an instructor, there is nothing better than having a student propose a creative use for an established technique or seeing a team pull from multiple disciplines to design a novel approach. To support their endeavors, I provide feedback throughout the design process and challenge them to think through the unexpected outcomes of particular techniques. For example, I may provide a paper that contradicts their hypothesis or help them find complementary techniques to bolster their conclusions.

Having the tools they need to form and address their own questions, students gain confidence in their ability to develop solutions to complex problems. This confidence builds their excitement for learning. When students are excited about learning they are more engaged with the world around them and are able to succeed in any career path. My ultimate goal as a teacher is to ignite in my students a passion for learning that pushes them to become engaged, informed, and successful problem solvers in society.

Teaching Outside the Classroom

Throughout my career, I have also enjoyed teaching science to the general public. In addition to my two main teaching goals, developing creative thinkers and fostering lifelong learners, these outreach opportunities raise a third teaching goal: producing informed citizens who think critically about popular science in the media. I applied this goal successfully to my work with the Duke Molecular Genetics and Microbiology outreach group.

As outreach coordinator, I designed a new curriculum for our outreach events that applies the same principles I use for undergraduate courses to an elementary school audience. For example, at each event we start with a brief introduction to microbes; how big they are, what they do, what they look like. Then, using this background students develop hypotheses about where microbes live, how we get rid of microbes, and how microbes know what lifestyle to lead. They test these hypotheses through a series of short activities and experiments. At the end of the event, we discuss what students learned about microbes, what surprised them, and what was cool and unexpected. We incorporate information about good microbes and provide additional information about how we interact with microbes in the discussion to reinforce what they have learned and increase their curiosity for the subject. Overall, this new, active learning-focused approach has been met with very positive feedback (Wonder Connection Newsletter, 2018-19 MGM Outreach Coordinator).

Although these activities are taught at the elementary level, I have found that we reach a much larger audience by engaging the parents at these events. Furthermore, these frequent outreach events allow me to practice teaching and continue to expand my knowledge of biology – small children let you know clearly and immediately when you are not engaging and they ask seemingly random questions that you must relate back to the topic at hand. These interactions have improved my teaching at the undergraduate and graduate level by challenging me to view biological concepts through many lenses, both in terms of comprehension and background, and have aided in the development of my teaching goals.

Developing a Reflective Teaching Practice

As I continue to gain experience teaching, I look forward to adapting my courses to new technology and discoveries, as well as adjusting my approach based on feedback from colleagues and students to meet the needs of my students and fulfill my teaching goals. I will obtain this feedback through student course evaluations and discussions with colleagues who observe my teaching. Based on feedback I have received so far, I have adjusted my teaching style to include calling on students for contributions (from these mid-semester evaluations) and giving students more time to think through oral responses (from these peer evaluations). These adjustments, particularly those from the student evaluations, improved student participation in class and led to positive student evaluations at the end of the course. I am excited to continue learning as I interact through teaching with bright and curious minds and to foster creativity to develop lifelong learners.

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Courses I Can Teach

Introductory Biology
Microbiology (syllabus)
Molecular Biology
Microbial Pathogenesis
Genetics, Genomics, and Bioinformatics
Biostatistics
Introductory Chemistry
Biochemistry
Molecular Plant Biology
Plant Pathology
Plants and Climate Change
Science Illustration

Courses I Have Taught

Microbial Pathogenesis	Spring 2019 TA Graduate Level Course Student Enrollment: 12 Office Hours by Appointment	Course Materials: Course Schedule Discussion Assignments Student Evaluations Mid-semester Student Evaluations End of Semester Peer Evaluations
Biochemistry 301	Spring 2018 TA Undergraduate Level Course Student Enrollment: 217 Office Hours 2h per week	Course Materials: Recitation Assignments
Independent Study	Spring 2024 – Spring 2025 Undergraduate Level Course Students: 2 total	Course Materials: Syllabus