I pursue Computer Science education in my teaching and my research because I believe that the skills we teach students are not only necessary; they are also a powerful means for expressing creativity and impacting the world. As a researcher, I design systems to make learning CS more effective and accessible, and I carry that same design approach into the classroom. My goal is to craft a learning experience that connects with my students’ interests and goals, helping them to see the potential applications of what they are learning. I have pursued this goal over the past 8 years, with a diverse teaching experience that includes 500 hours of tutoring undergraduate students in CS and three years of developing and teaching computing curricula for middle school students.

The design of my classroom experience starts with an understanding of what works in CS education, grounded in empirical evidence. I began using pair programming in my middle school CS workshops because of studies that show it improves students’ satisfaction and code quality. However, I have also seen personally how pairs support each other and take ownership of their work. As a professor I would take the same approach, incorporating well-supported pedagogy, such as peer instruction, into my lessons and adapting it to the context of my classroom. While I am still learning how to best apply these practices, I regularly attend conferences on CS education, such as SIGCSE and ICER, where I have the opportunity to learn from experienced educators.

Like the tools I build, my classroom is designed to be student-centered, and I adapt instruction to each group of students I teach. My middle school students spend much of their free time on game consoles, the internet and smartphones, so I make my curriculum relevant by teaching them to create games, apps and websites. For undergraduate students, I also ground lessons in more practical topics, such as the 2017 data analysis workshop I led at NCSU for a group of Research Experience for Undergraduates (REU) students. I am well-prepared to teach introductory programming (for majors or nonmajors), data science, game programming, and research methods, as well as standard courses in data structures, algorithms and discrete mathematics.

My classroom is designed to improve over time. When incorporating new projects or pedagogy, I use student feedback to ensure that my lessons having the impact I expect, such as the end-of-day surveys I give my middle school students to inform our choice of curricula. However, I also have experience running more rigorous classroom evaluations. I have worked closely with CS faculty for 2 years to deploy educational tools in the classroom and measure their impacts. I hope to use my classroom as a living laboratory for improving my students’ outcomes while contributing to our understanding of CS education. I have always integrated my teaching and research, and I believe this focus builds a strong foundation for an NSF CAREER Award proposal.

Relationships with students are what make my teaching worthwhile. I have spent the past two years mentoring two undergraduate researchers in my lab, and I have been repeatedly humbled by the dedication and interest they show. We have worked together to design a UI for a programming hint system, analyze log data and write research papers. I am proud that both hope to continue their CS research, and one is currently applying to NCSU’s Ph.D. program. As a professor, I look forward to forming similar working relationships, both in the classroom and in my lab. I will work to secure funding for undergraduate research by applying for NSF REU supplements and REU site grants.

I have dedicated the past 8 years of my academic career to making computing education accessible to a diverse audience. I carry that emphasis into the classroom, shaping our middle school outreach to largely serve young women and students of color. As a professor, I will integrate equitable teaching practices into my classroom, and I will leverage my experience and my excitement to provide all my students with a strong opportunity to learn the vital skills of Computer Science.