I have taught, mentored, and advised a number of undergraduate and graduate students over the course of my academic career. I find the process of working closely with students very rewarding, and I especially like guiding students as they acquire new skills and apply them to their own projects. My teaching philosophy is to provide an environment for **exploratory learning with technical feedback**. Having studied and worked across Math, CS, and ECE departments I am qualified to teach **graduate courses on graph theory, algorithms, and complexity**. I would also be very happy to teach **undergraduate courses in programming, discrete math, and probability**, and would enjoy working with the department on developing and maintaining the undergrad curriculum.

Teaching Approach

I began teaching and mentoring during my undergraduate studies at NCF. Because NCF is an exclusively undergraduate institution, all teaching assistants and graders were peers, usually in their Junior or Senior year. I TA'ed for numerous classes, and in particular I was a general TA in the quantitative resource center my Junior and Senior years. There I helped students with any CS or math coursework they brought - from set theory to object oriented programming to algorithms. This was a particularly enjoyable experience that helped me realize I enjoy teaching, and it was one of the motivating factors that lead me to graduate studies.

My teaching approach is to provide students with theoretical and technical knowledge applicable to their projects in and out of the classroom. As a teaching assistant for *Programming Tools and File Management* at UIC, I taught students intermediate aspects of the Python programming language, as well as networking and data visualization packages. The students then had to complete a final project for the last half of the course, using their newly acquired knowledge. I observed that students engaged with this methodology, and at the end of the course I received positive feedback: "**He [not only helped] with course material but is also a great mentor for students new to the CS Field.**" Beyond this student's review, I observed the class engaging with the long-form project that required concrete application of course material. I viewed my role as a technical specialist in the language — I avoided interfering with their project goals and code, instead I guided students through intermediate challenges they faced in moving from an engineering idea into functioning code. This perspective naturally ports to other courses, even those which may lack the structure for a long-form project.

In the more advanced *Introduction to Data Structures* at UIC, as a TA I introduced weekly quizzes as another engagement tool for students. The purpose of this course is to familiarize students with the C++ language in parallel with learning basic data structures. My philosophy is that smaller assessments such as quizzes should be used primarily as a feedback device for students, and less as a high-stakes grading tool. I received student reviews affirming that my methodology worked well for them: "**[the course] made for a good learning environment in which we could actually try and focus on learning the material without the fear of losing points on the quizzes.**" In my own experience as an undergraduate at NCF I found low-stakes exploratory learning beneficial, and I try to incorporate this where possible in my approach. Trying to solve a hard problem and failing is a much more enriching and effective learning strategy than successfully completing an easy problem, especially at the undergraduate level.

In addition to classroom teaching I've also participated in tutoring and outreach efforts. I was an instructor for UIC's *Young Scholars Program*, a summer program for high school students where we teach using exploratory based techniques. I gave lectures on mathematical modeling of disease spread and computability. For my lectures I prepared Python simulations beforehand, and the students seemed to enjoy these homebrew visuals over ready-made content. I also designed worksheets that gradually built up in difficulty so that all students had a chance to work on challenging and stimulating problems. I was proud to have modified some problems from my own introductory graduate studies as approachable problems for the more advanced students.

Teaching Interests

I have taught and studied across Math, CS, and ECE departments, so I have first-hand experience with the strengths, challenges, and goals of a diverse body of students. I have also taken a multidisciplinary approach to my own research which readily maps to my ability to teach a variety of courses. I am qualified and eager

to teach undergraduate courses in data science, theory, discrete math, data visualization, machine learning, and introductory through advanced Python. I am also excited to contribute to curriculum development for undergraduate data and computer sciences.

My current research puts me in a fantastic position to teach graduate courses on machine learning (theory and practice), data science, algorithms, networking, and complexity. I am particularly interested in teaching theory courses at the graduate level, and making these accessible and exciting to students who may have entered CS from a non-theory angle.

Advising and Mentorship

I am lucky to have an ongoing mentorship with two graduate students in my advisor's lab. One student, Mr. Srivastava, is working very closely with me on projects in gossip networks. We were already quite familiar with each others work before I joined the lab, and my approach is to let him ask the research questions and I give guidance and proof ideas when necessary. This has proven very fruitful (see my research statement for more details), and I anticipate ongoing collaboration and mentorship with him post-UMD. My other mentee, Mr. Karakaya, is interested in the theory of LLM's. I have taken a more hands-on approach with him, and guided our research down various paths. I also suggested some coursework he should take in parallel with our ongoing efforts. He initially came to me after reading a few theoretical LLM papers, and we began follow-up work on a paper and topic he proposed, focusing on new concentration inequalities for tokenization. We are nearing the completion of this project.

As an advisor I balance giving freedom and guidance to the exciting research questions posed by my advisees. It is my responsibility and joy to engage with their hard questions, and begin new research directions I could not have come up with on my own.