Teaching Statement

I view teaching and mentoring as complementary to research and have made both a priority throughout my career. During my undergraduate and graduate studies, I worked as a teaching assistant for over 10 semesters in the areas of Math, Artificial Intelligence (AI), and Human-Computer Interaction (HCI). As a graduate fellow in the Program for Interdisciplinary Education Research, I took numerous classes in Learning Science and spent over 80 hours observing teaching in practice in a K-12 classroom. In my current position as an assistant professor at Drexel, I have taught two classes in Drexel's Data Science Master's program, designed and taught two new courses in the area of Human-AI Interaction, and designed a curriculum for Drexel's new master's program in AI and Machine Learning (ML). These experiences have shaped my teaching and mentoring philosophy.

Incorporate learning science principles and technologies. When teaching two Drexel Data Science courses, I updated the courses to include three new elements. First, I instantiated a flipped classroom model by creating multiple short videos that each cover a single topic. With students able to watch the lecture content outside of class, I restructured class time to focus on collaborative activities. Second, I used knowledge checks to promote retention and learning. I designed a series of quizzes aligned to video content that students could take before coming to class. Finally, I developed a new tool to automatically grade students' programming assignments written in Python. With this tool, students can submit their assignments prior to the deadline, get formative feedback on how they can improve before their final submission, and have the chance to learn and adapt immediately. I have been working to incorporate these changes into more classes in Drexel's Data Science and AI/ML master's programs.

Provide students with metacognitive support. A key factor in the success of adult learners is their ability to engage metacognitive skills, such as self-regulated learning. To support these competencies, I have been experimenting with the use of an "ungrading" model in my classes. Under this model, students start the term by providing me with a short essay on their goals for the class and their career. Throughout the term, I do not provide students with any numerical grades. Instead, I provide them with substantial qualitative feedback on each assignment and ask them to regularly reflect on and evaluate their own learning and performance. At the end of the term, each student provides me with the course grade they believe they deserve with an accompanying justification. Since implementing this policy, my students have had higher assignment completion rates and the quality of their submissions has improved. Surprisingly, I have found that students self-evaluate to have the full spread of grades (e.g., A's, B's, and C's). This model empowers students to take ownership of their learning and frees me to push students to take more risks with their ideas without negatively affecting their grade. On a midterm course evaluation, one of my students reflected: *"Instead of thinking of the course in terms of deadlines, it was much more optimal for me to reframe how I thought about school in general, and seeing each week as learning opportunities. My thinking went from "what do I need to do this week?" to "what can I learn this week?".* As demonstrated by this student, this model promotes intrinsic motivation and helps teach students to be more reflective and engage in self-regulated learning behaviors, which are linked with enhanced student learning outcomes.

Leveraging feedback to improve learning. I regularly collect feedback from my students and use it to improve my classes. For example, multiple students from my Human-AI interaction class commented on how they wished the class was slightly longer. After discussing this feedback as a class and coordinating across everyone's schedules, we extended the remaining classes by 15 minutes. I find that promptly responding to student's feedback increases their engagement and investment in the course.

Provide students with social support. I believe it is important to provide students with social support, especially in the context of the COVID pandemic. Many students are taking all virtual classes, which makes it difficult for them to develop new social ties. These relationships play many important roles in

student success, such as positively affecting a student's motivation, giving them a sense of belonging and security, and providing them with connections that are important for career success. To foster social connections, I utilize short ice-breaker activities at the beginning of each of my classes. This gives students the opportunity to start each class by speaking up and to learn about one another. While this exercise sounds simple and silly, I have found it to be extremely effective and well received by my students. Many of my students share on their course evaluations that they value the ice breakers, look forward to interacting and learning with their peers every class, and have found a sense of community that persists outside class as a result of these activities.

Creating an inclusive environment that fosters diversity. I believe that diversity is essential to the success of academic and scientific communities. In my classes, I explicitly work to foster as diverse a range of ideas and perspectives as possible. When designing my Human-AI interaction course, I intentionally included a broad range of perspectives on each topic (e.g., including readings that represent different sociocultural and AI perspectives). I designed my course so it would be accessible to students from a broad range of backgrounds (e.g., HCI and AI) by creating multiple course project pathways that require varying levels and combinations of prerequisite skills. The ungrading model also provides a means for me to be more inclusive. For example, when one of my student's missed an assignment because she was working full time and raising two children while completing her graduate studies, the ungrading model provided the flexibility to redefine the assignment in a way that maximized her learning outcomes without penalizing her grade due to external circumstances. Lastly, over the past few terms, I have been exploring approaches for better engaging students from online sections, such as developing in-class group activities that pair together students from the online and in-person sections using Zoom.

Personalizing mentoring to each student's needs. I have mentored students from a diverse variety of backgrounds, including Education, HCI, CS, AI, ML, and Data Science. Every mentoring relationship is different, so I always start by working to better understand each student's goals and experiences, which makes it possible for me to personalize my guidance to their unique needs. In the beginning, I work closely with my students and shift into a more supporting role as their research competencies grow. Using this apprenticeship approach, my students are able to publish quickly, learn while doing, and grow as independent researchers. In a nomination for the Drexel Outstanding Mentor of the Year award, one of my students said, *"He always makes time to help me when I get stuck, whether through Zoom or Slack. He is always prompt with his replies and never annoyed by how many questions I ask. He always tries to make me feel included in the lab…[and] he would encourage and challenge me to look for solutions with a different perspective."* Another one of my students nominated me for the list of top technologists building Philadelphia's future saying *"[Chris is a] wonderful mentor and one of the most gifted technical people I have ever worked with."*

Courses I could teach at Georgia Tech. I am qualified to teach courses in the areas of AI/ML, HCI, Learning Science, and Data Science. However, my experiences uniquely qualify me to teach *human-centered AI classes*. I would like to design and teach a class on **Cognitive Systems**. The cognitive systems discipline *"designs, constructs, and studies computational artifacts that exhibit the full range of human intelligence" (*Langley, 2011). A course I developed at Drexel and would like to continue to teach is **Human-AI Interaction**. This course sits at the intersection of AI and HCI and explores topics such as the design of human-centered AI technologies, AI ethics, and the human context for AI technologies.