Teaching Statement

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I have been fortunate to learn from outstanding mentors whose teaching shaped both my teaching philosophy and approach to learning, and I strive to create a similarly positive experience for my students. I instructed the undergraduate Human-Robot Interaction (HRI) course at CMU alongside a faculty member, Professor Zackory Erickson (Spring 2025). The course introduced students to interdisciplinary methods from robotics, artificial intelligence, human-computer interaction, design, psychology, and education, with the goal of preparing them to design natural and effective human-robot interactions. I delivered half of the lectures, led two in-class technical exercises, and held office hours. I also added to the curriculum a new in-class programming assignment for students to apply probabilistic modeling to an assistive application. In my final two lecture slots, I organized enrichment activities, including a guest lecture by an expert researcher in AI ethics and an Ask-Me-Anything session with graduate HRI researchers. These sessions gave students valuable exposure to current research and career paths, and students especially appreciated the opportunity to interact directly with researchers.

Teaching technical concepts in bite-sized chunks. My lecture strategy is to build intuition and motivation first before introducing technical details. I believe that ***first*** understanding why particular problems matter and what fundamental challenges make them difficult helps students more easily grasp the algorithmic approaches used to solve them. In my lectures, I relied heavily on videos, demonstrations, and real-world examples to motivate the *why* and gradually increase technical depth so that students are equipped with the intuition to engage with more complex material. For example, in my lecture on implicit communication, I introduced the concept through the idea of *"tell me X without telling me X"* and prompted a short walk through the hallway to observe how implicit signaling through motion emerges during routine navigation. This activity grounded abstract concepts in lived experiences and provided a natural transition to technical material: translating such behaviors into path-planning objectives.

Teaching for varied learning styles towards fostering independent learning. While some students with strong prior experience may grasp algorithms presented abstractly and with minimal scaffolding, others benefit when mathematical concepts are introduced concretely and explicitly. My strategy is to ***present information through multiple lenses*** so that students with varied learning styles can connect with the material in ways that resonate with them. As an example, a core concept in HRI that I covered in my lectures is modeling human decision-making, which often relies on probabilistic models of human rationality. Rather than assuming prior statistics expertise, I devoted half of a lecture to bringing all students to speed by reviewing essential probability notation and and foundational concepts such as conditional and marginal likelihoods, before diving into the models themselves. For concrete learners, I provided clear numerical examples and work through the computations step by step to illustrate how the concepts apply in practice. With the core technical content established, I took a step back and adopted an applied lens to help students see the broader applicability of these models. Recognizing that students vary in their comfort with participation, I supplemented these discussions with readings and video tutorials that allow students to explore and digest the material at their own pace. I aim to create an environment that supports varied learning approaches and builds students' confidence in directing their own learning.

Hands-On Practice. My strategy is to scaffold student projects through early in-class exercises that provide targeted support and help students build helpful starter code. I created an in-class coding exercise where students implemented their own adaptive assistive robot. The exercise broke the task into manageable components: defining observation spaces, predictive models, and planning methods. The notebooks paired step-by-step mathematical derivations with short code snippets, helping students connect abstract equations with concrete implementations. I received positive feedback from students on the course I instructed: *"Michelle is very insightful her perspective, expertise and openness was so valuable for the class"*, *"I loved this class. I really enjoyed it, thank you."*, and *"She was an amazing co-teacher and wish she could have taught the whole course."*, and *"Thank you for the engaging lectures and constant patience towards us!!"*. This feedback reinforced my belief in the value of making lectures engaging, approachable, and grounded in real-world perspective. Equally valuable to me was constructive feedback from a student who noted that the conversational nature of my lectures sometimes felt "improvised." This insight helped me reflect on the importance of balancing an interactive, discussion-driven style with clear structure and organization. I take all student feedback seriously, and I aim to continuously adapt my teaching to improve clarity, accessibility, and overall student learning.

Teaching Interests. At the undergraduate level, I am excited to teach introductory courses for majors in computational cognitive science, computer science, or robotics. At the graduate level, I am prepared to teach courses on intelligent robotics, cognitive science in human-robot interaction, and experimental design, as well as courses on robot learning foundations, including reinforcement learning and imitation learning. I also hope to develop an interdisciplinary project-based course, Human-AI Teams in the Real World, where students design and build interactive robots or AI agents and run user studies testing in contexts with real-users.