Learning Should Be Embodied, Shared, and Accessible

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Summary: Drawing on roles spanning Assistant Dean of Research and Curriculum Development at LIU, adjunct and invited lecturer at multiple universities, and co-instructor at Yale, I have taught across the full academic spectrum—from introducing kindergartners to AI to developing high school STEM programs to organizing graduate-level robotics colloquia. I have designed ten original courses across the computer science curriculum, including Yale's first open-access AI literacy course for non–CS majors, one of the largest-enrolled offerings in the department's history. Lessons from my research on designing robots that improve human learning outcomes inform my broader goal of creating experiences that are embodied, shared, and accessible among diverse learners. I conclude with three key areas where my philosophy and experience directly contributes to the university's vision.

Teaching Philosophy and Experience

After I delivered the keynote talk at the Department of Education's 2024 Tech Summit, several school administrators asked that I visit their students to share about my research and career path. At once, I found myself touring several public school classrooms across New York City, with one of my robots at my hip. Regardless of the audience—students from elementary through high school, teachers, school psychologists, or parents—there is a kind of magic in experiencing a machine that blinks, dances, laughs, and chats back. Even more so when teachers witness their students who have rarely ever participated begin to raise their hands, lead discussions, and show the courage to make mistakes. From this, and from the experience of having completed most years of my Ph.D. under COVID-19 lockdown constraints, I strongly believe learning should feel *embodied* and *shared*.

Embodied because knowledge should be practically applied and tangibly engaged. As in my own research on embodied AI, I emphasize ideas that move beyond paper and code into real-world function. In my courses, students have built perception pipelines from raw sensor data, optimized neural architectures under hardware constraints, and analyzed trade-offs between control accuracy and computational latency on physical robots. For example, in a module on reinforcement learning, students implemented a policy-gradient algorithm on a mobile robot, observing how abstract update rules translate into real-world behavior. When the robot overshoots a goal or fails to converge, they confront directly the gap between theoretical guarantees and physical constraints.

Shared because learning is fundamentally collaborative. I design my courses so students learn not only from me, but from each other: through peer code reviews, open-source repositories, and joint debugging sessions. In my advanced robotics and machine learning labs, students work in small teams to reproduce published results, document failures, and propose design improvements. This shared inquiry cultivates both intellectual humility and collective problem-solving. By making their process visible and critique collaborative, students come to see computation as a social practice: algorithms are written by people, tested in communities, and deployed in contexts that demand accountability. In this way, shared learning becomes both a technical and an ethical foundation for responsible innovation outside of the classroom, in the real world.

As the academic community braced for the impact of foundation models in 2022 on student life, I recognized a gap in our computer science curriculum. AI was rapidly permeating every domain—from medicine and law to banking and the arts—drawing in students who may never have enrolled in a traditional CS course but now sought to understand the technology transforming their future careers. These students were not aiming to become AI experts; they wanted to become informed, responsible users. Our challenge, therefore, was to teach future poets, policymakers, and historians to reason critically about AI's societal impact without any technical prerequisites. When we proposed the course, we often used the analogy of a driver's license: our goal was not to teach students how to build a car, but how to drive *responsibly*: to understand what AI can and cannot do, and to recognize its limitations. For the two years I taught this first-of-its-kind course offering, it has attracted one of the largest enrollments for a CS course at Yale. With my co-instructors, I published our "AI for Future Presidents" course design and pedagogical framework in *AAAI* to guide efforts at other universities [1].

Building on this commitment to **accessible, cross-disciplinary** education, I have served as a recurring guest lecturer across four departments, reaching over 350 students from Physics, Education, Psychology and Neuroscience. In these sessions, I introduce students outside of CS to my research and demonstrate how computational thinking and AI methods intersect with their own disciplines. My research (building embodied, socially intelligent robots that promote well-being across the spectrum of human functioning and ability) is inherently interdisciplinary and has led to collaborations with specialists across these fields. In both my research and teaching, I consider the same core questions: how to design systems that facilitate learning, and how to curate interactions that remain accessible to individuals of diverse backgrounds, learning styles, and experiences.

Depending on the cohort, I may depart from traditional lecture formats. For instance, in *Prompt Roulette*, students experiment with generative AI under constrained "personas" or absurd prompts, then reflect how failures expose the boundaries of model reasoning and human framing. In smaller seminars, I've hosted *Dinnertable Conversations* where our "guest" at the head of the table is an LLM-driven robot, prompting students to re-examine emergent intelligence and limits of current technology. I've organized *Ethics Shark Tank*, where students pitch bold, ethically risky ideas for autonomous systems, and peers "invest" based on feasibility and moral impact. I also engage students in visual mapping exercises that connect disciplinary concepts (e.g., "attention" in psychology versus that in transformer models) to foster AI literacy through shared conceptual ground. Across such activities, my aim is to teach technical concepts as a *conversation* (with domain experts, with peers, and at times with AI and robots themselves). The hope is that it becomes a conversation in which students feel empowered to participate actively, question critically, and continue beyond the classroom.

Prior to Yale, I served as an Adjunct Professor of Computer Science and Assistant Dean of Research and Curriculum Development at Long Island University, where I designed and taught ten distinct courses spanning the full academic spectrum—from high school pipeline programs in introductory computer science to graduate research labs in machine learning and advanced robotics. At Yale, I was a teaching fellow for interdisciplinary courses such as Computational Vision & Biological Perception and Algorithmic and Heuristic Composition (in collaboration with the Yale School of Music), for which I was nominated for the Yale Distinguished Teaching Award. Throughout my career, my courses have emphasized embodied, shared, cross-disciplinary learning.

Fit and Contribution to University Vision

This is a generalized teaching statement.

In this section, I reflect specifically on the university's overarching educational philosophy. For example, I consider current initiatives that exemplify hands-on learning, opportunities for interdisciplinary collaboration, and active integration of theory and practice. I then assess my alignment with the department's teaching ethos by identifying at least three themes and explaining how my teaching approach advances each. I include quantifiable outcomes supported by examples from my mentorship experiences in [1–3].

If you would like to review my complete teaching statement, please contact me at rebecca.ramnauth@yale.edu.

References

Undergraduate students are indicated with an asterisk (*).

[1] Kate Candon, Nicholas C Georgiou, **Rebecca Ramnauth**, Jessie Cheung*, E Chandra Fincke*, and Brian Scassellati. Artificial intelligence for future presidents: Teaching AI literacy to everyone. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 39, pages 28988–28995, 2025. Undergraduates students were mentored to independently teach section discussions for this course.

[2] **Rebecca Ramnauth**, Emmanuel Adéníran, Timothy Adamson, Michal A Lewkowicz*, Rohit Giridharan*, Caroline Reiner*, and Brian Scassellati. A social robot for improving interruptions tolerance and employability in adults with ASD. In *2022 17th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, pages 4–13. IEEE, 2022. Honorable Mention for the Best Paper Award.

[3] Nathan Tsoi, Joe Connolly*, Emmanuel Adéníran, Amanda Hansen*, Kaitlynn Taylor Pineda*, Timothy Adamson, Sydney Thompson, **Rebecca Ramnauth**, Marynel Vázquez, and Brian Scassellati. Challenges deploying robots during a pandemic: An effort to fight social isolation among children. In *Proceedings of the 2021 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, pages 234–242, 2021. Honorable Mention for the Best Paper Award.