Xiaomin Lin | Teaching Statement

xiaominlin.github.io

I am dedicated to empowering students with both theory and practice, instilling a mindset of critical thinking, and nurturing a forward-thinking, creative perspective. Inspired by Stephen Brookfield's The Skillful Teacher, which emphasizes reflective teaching as essential to student empowerment, I seek to actively engage students in their learning journey. To this end, I have assisted in teaching large and small courses, mentored undergrad, MS, and Ph.D. students, led focused research subgroups, engaged the broader community through conference courses, reached out through exhibitions, and contributed to developing an online learning experience.

In the classroom— At the University of Maryland- College Park, I served as a TA for Computer Vision (CMSC 426), assisting 184 undergraduate students in mastering complex concepts in computer vision. Introducing technical skills in such a large and diverse classroom setting poses unique challenges. To support student learning, I conduct tutorials and office hours with hands-on coding sessions, using practical applications to illustrate abstract concepts. I also facilitate discussions, guide peer reviews, and provide feedback on assignments. Recognizing that computer vision can be daunting, especially without prior experience, I strive to make the material accessible by engaging students with targeted questions to build their confidence and by fostering an inclusive, supportive learning environment.

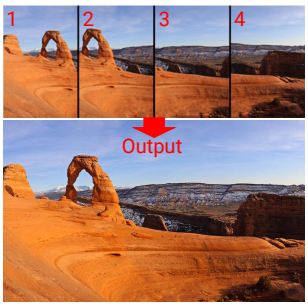
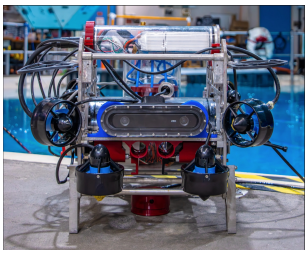


Image Stitching Project in CMSC426 at University of Maryland, image modified from PRG website

Additionally, in Electrical Engineering Capstone design (ENEE408I), I support over 45 students across 15 teams as they design and build autonomous robotic systems. This course allows me to teach core concepts in both computer vision and robotics. As students develop their robots, I introduce fundamental computer vision concepts, such as Camera Calibration, Homography, and Image Filtering, and robotics concepts such as Differential wheeled robots which they learn along with interacting with the real robot. Students have consistently praised my approachability, patience, and responsiveness to their concerns[1], noting that I am "extremely helpful" and "always prepared." They have highlighted how my discussion sections were "far more valuable than the lectures"[2] and appreciated my ability to provide clear explanations and practical examples, which "made sure to go over the important concepts for exams." Many teams noted that my support outside class hours and valuable feedback on projects were instrumental in helping them succeed.

Mentoring: At the University of Maryland, I was trusted to lead a research subgroup within the Perception and Robotics Group (PRG) and the Smart Sustainable Shellfish Aquaculture Management (S^3AM) project focused on underwater robotics, environmental monitoring, and remote sensing. My mentorship includes supervising 2 undergraduate, 8 MS, and 4 PhD students, resulting in 8 publications. This mentorship extends to sponsoring six mechanical engineering capstone projects, guiding over 16 groups in developing innovative mechanical designs for underwater robotics. At Robotics @ Maryland (R@M), I have also supported underrepresented students, helping them excel and gain confidence in designing and implementing real-world underwater robotics applications. I introduced the idea of using computer vision and sonar for navigation and detection, which proved instrumental in their advancement to the semifinals at 2024 RoboSub Competition.

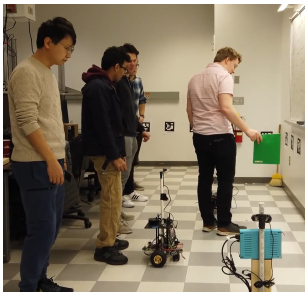

Customized Underwater robot developed in R@M, image from R@M.

Off-Campus: I actively engage with the public to introduce AI concepts to new audiences and gain fresh perspectives for teaching. As an instructor for AI4ALL in 2019, I co-led a summer residential program at the Brendan Iribe Center, bringing AI to high school students from underrepresented backgrounds. This three-week program, conducted in partnership with the Iribe Initiative for Inclusion and Diversity in Computing, emphasized project-based learning and mentorship. Teaching AI fundamentals to students with diverse experiences required adapting complex concepts into engaging, accessible formats. The program had a transformative impact, with many participants describing it as a "life-changing experience" that inspired them to pursue careers in AI and technology.

AI4ALL participants got involved with Robotics and AI in a three-week program, image from AI4ALL Program

During my career, I have consistently prioritized providing students from underserved communities with opportunities to engage with advanced technology. For instance, I mentored a high school student from a resource-limited background in robotics, introducing them to foundational concepts and fostering hands-on experimentation. This experience instilled confidence and skills that enabled them to pursue a collegiate career in robotics, continuing on a path toward innovation and discovery.

Next Step Teaching is a skill that requires ongoing development, and I am committed to fostering growth through reflection and feedback. I believe reflective teaching is a path to empower students by adapting my methods to their needs. In alignment with efforts to support women and underrepresented minorities in STEM, I prioritize inclusive teaching practices, including project-based learning, collaborative exercises, and discussions on ethics in AI and robotics. By blending these concepts, I strive to create an engaging learning environment that empowers all students.



ENEE408I Final project demo with me monitoring the students on the far left in the white, image from Huy Do.

I am eager to teach courses that align with my expertise in robotics, artificial intelligence, and machine learning. These courses span essential and advanced topics in AI, machine vision, and robotics, providing students with a solid foundation to excel in modern engineering fields.

Additionally, I would propose several courses that reflect current needs and my research expertise. For undergraduates, I would introduce **Computer Vision** and **Robotics Planning**, equipping students with foundational skills in image processing and robotic decision-making. At the graduate level, I would offer **Advanced Computer Vision**, covering contemporary frameworks and techniques, and **Multimodal Learning**, focused on integrating data from multiple sensory modalities. These additions would broaden the curriculum, giving students access to cutting-edge topics in AI and robotics.