Rayhan Papar

Cambridge, MA 02139
rayhan@mit.edu | (346) 413-0808 | github.com/rayhan3333 | rayhanpapar.com

PROFESSIONAL SUMMARY

AI and robotics researcher specializing in autonomous systems, AR/VR, and applied machine learning. Published author and patent holder with experience deploying ML pipelines and sim-to-real systems to physical robots. Pursuing a B.S. in Artificial Intelligence and Decision Making at MIT, with research spanning reinforcement learning, computer vision, and human-robot interaction.

EDUCATION

Massachusetts Institute of Technology *Cambridge, MA*
Candidate for B.S. in Artificial Intelligence and Decision Making
Relevant Coursework: Linear Algebra and Optimization, Machine Learning

Academy of Science and Technology *Houston, TX*
Salutatorian. GPA: 5.61 W, 4.0 UW. 18 AP courses – Multivariable Calculus, Computer Science, Statistics

EXPERIENCE

MIT Computer Science & AI Lab (CSAIL), MERS Research Group *Sept 2026 – Present*
Undergraduate Researcher *Cambridge, MA*

- Implementing task-driven risk-bounded hierarchical reinforcement learning based on iterative refinement for safe and intelligent robotic systems. Building with IsaacLab for navigation, locomotion, and manipulation tasks across uncertain environments.

Laboratory for Computational Sensing and Robotics *June 2025 – August 2025*
Paid Visiting Researcher *Baltimore, MD*

- Co-developed a robotic laparoscopic training system presented at ISMR 2026, awarded 3rd Best Student Paper
- Contributed to an open-source ecosystem used by 1,000+ surgical robotics researchers
- Developed AR integrations for surgical training systems using Unity and OpenCV with postdocs and PhD students

Johns Hopkins University Neuro Dept *Aug 2024 – May 2026*
Research Intern *Baltimore, MD*

- Built an interactive VR brain cadaver dissection simulator as sole developer, integrated into the Nervous Systems course at Johns Hopkins. Allowed medical students to dissect, compare with medical scans, and learn anatomy in 3D.
- Presented as 1st author at the 150th American Neurological Association Conference

Insulet *May 2024 – August 2024*
Software Engineering Intern *Houston, TX*

- Prototyped a front-end mobile app with Flutter doing real-time monitoring for the Insulet diabetes pod
- Designed a Bluetooth communication system between the pod and mobile phone and user-friendly data visualizations

Jelinek Speech and Language Technology (JSALT) Workshop *June 2023 – July 2023*
Research Participant *Le Mans, France*

- Developed speech technology solutions in machine translation and large language models at Le Mans University, France, hosted by the Johns Hopkins Center for Language and Speech Processing (CLSP)

PROJECTS

Sim-to-Real for Autonomous Tumor Resection via Minimally-Invasive Robotics

- Developed an end-to-end Sim-to-Real system deployed to the da Vinci surgical robot to autonomously perform tumor resections, achieving 100% extent on 3 of 4 phantoms
- Trained robot in softbody-enabled physics simulation generated from medical scans (IsaacSim and Unity) using hybrid imitation and reinforcement learning with ML-Agents, deployed via ROS communication for closed-loop control

NeuroLens: Live Surgical Aid for Neurosurgery using AR and Deep Learning

- Visualized live 3D maps of critical brain anatomy via HoloLens 2 in AR to improve outcomes for brain tumor removal
- Trained deep learning architectures with PyTorch to automate segmentation of brain tumors, cerebral vasculature, and white matter; patented under the Cancer Moonshot Pilot Program

AWARDS

- Science Talent Search Top 40 Finalist for Sim-to-Real Surgical Robotics research
- 3rd Best Student Paper at International Symposium on Medical Robotics
- Awarded U.S. Patents #12,154,239 (2024) & #12,482,202 (2025). Live Surgical Aid.

SKILLS

Machine Learning & AI: Machine Learning, Deep Learning, Reinforcement Learning, Computer Vision, NLP
Robotics & Simulation: Robotics & Autonomous Systems, Robot Operating System (ROS), IsaacSim & IsaacLab, Simulation & Digital Twins
Programming & Frameworks: Python, PyTorch, C++, C#, JavaScript & HTML/CSS, OpenCV, Unity
AR/VR & Design: MR/AR/VR, HoloLens and Meta Quest, 3D Modeling, CAD, Fusion360, 3D Slicer