

# Robotics Simulation Infrastructure for Scalable Sim-to-Real Research

**Faculty advisor: Prof. Chi-Guhn Lee**

Modern robotics research increasingly depends on high-quality simulation, scalable experiment infrastructure, and reliable bridges between simulated and real systems. Building these tools well can accelerate research across robot learning, manipulation, evaluation, and deployment.

This project focuses on robotics simulation and infrastructure for sim-to-real research. Students may contribute to simulation environments, data generation pipelines, experiment automation, benchmarking tools, robot interfaces, and workflows that connect simulation with real robotic platforms. The project may involve IsaacSim, IsaacLab, robotics middleware, the Trossen Stationary AI Robot, UR5 robot, and other real robots used for validation and demonstration.

## Preferred Foundation / Experience

- Strong software engineering skills in Python
- Interest in robotics simulation, infrastructure, and scalable experimentation
- Familiarity with IsaacSim, IsaacLab, MuJoCo, ROS, or similar robotics tools
- Comfort with debugging complex systems and building reusable research code
- Experience with ML experiment tracking, data pipelines, or robotics deployment is helpful
- Background in AI/ML, robotics, or simulation is a strong plus

## Why this project?

You'll build infrastructure that enables real robotics research. This project is ideal for students who enjoy both engineering and research, and who want hands-on experience with simulation, real robots, and the practical systems behind modern robot learning.

**Contact: Ramy ElMallah, [ramy.elmallah@mail.utoronto.ca](mailto:ramy.elmallah@mail.utoronto.ca); Chongyu Zhu, [chongyu.zhu@mail.utoronto.ca](mailto:chongyu.zhu@mail.utoronto.ca)**