Philip (Yizhou) Huang

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Education

Carnegie Mellon University, Ph.D. in Robotics — Aug 2023 – Present
GPA: 4.12/4.33. Research: Multi-robot task and motion planning (Advisor: Jiaoyang Li)

University of Toronto, M.Sc. in Computer Science — Sept 2021 – Aug 2023
GPA: 4.00/4.00. Research: Task and motion planning (Advisors: Florian Shkurti, Tim Barfoot)

University of Toronto, BASc. in Engineering Science — Sept 2016 – Jun 2021
GPA: 3.88/4.00 (Major: Machine Intelligence)

Selected Publications

- Benchmarking Shortcutting Techniques for Multi-Robot Arm Motion Planning, IEEE IROS 2025 [video]
- APEX-MR: Multi-Robot Asynchronous Planning and Execution for Cooperative Assembly, RSS 2025 [pdf][video]
- STAMP: Differentiable Task and Motion Planning via SVGD, IEEE R-AL 2025 [pdf][video]
- Field Testing of a Stochastic Planner for ASV Navigation Using Satellite Images, IEEE T-FR 2024 [pdf][video]
- Stochastic Planning for ASV Navigation Using Satellite Images, IEEE ICRA 2023 [pdf][video]
- Continual Model-Based Reinforcement Learning with Hypernetworks, IEEE ICRA 2021 [pdf][video]

Academic Experience

Robotics Researcher, AI for Robot Coordination at Scale Lab, CMU — Sept 2023 – Present

- Developed an asynchronous multi-robot planning framework that achieved **48% faster execution** compared to sequential planning and 36% compared to synchronous planning on average.
- Designed a multi-level reasoning framework for **the first dual-arm robotics system** for customized LEGO assembly using commercial bricks, integrating physics engine, task and motion planning, and real-time control. Received **media coverage** in Modern Machine Shop.
- Building a generalizable skill graph and ontology for autonomous robot assembly with the ARM Institute.

Robotics Researcher, Robot Learning & Vision Lab, University of Toronto — Jan 2020 – Aug 2023

- Conducted **km-scale, fully autonomous field tests** of ASVs equipped with GPS, vision, and sonar in ROS.
- Proposed a novel stochastic planning algorithm using satellite images, achieving a **15% improvement** in expected travel time across 1000+ unique lake environments.
- Developed a continual model-based reinforcement learning approach with hypernetworks and demonstrated state-of-the-art performance across diverse robotic simulations, including manipulation tasks.

Object Detection Co-Lead, University of Toronto Self-Driving Car Team — Feb 2018 – Aug 2020

- Led the perception team in a three-time winning effort at the SAE AutoDrive Challenge.
- Published **open-source LiDAR detection software** on GitHub (**280+ stars**) for academic and industrial use.

Industry Experience

Machine Learning Engineering Intern, Qualcomm Inc., Toronto, Canada — May 2019 – May 2020

- Streamlined neural network compiler test apps in C++ for Snapdragon SoCs, **reducing test time by 20%** for a team of 15+ engineers; reduced inference latency by over **15%** for custom compiler profiling tool.
- Developed an Electron.js GUI tool to visualize neural networks and automate test execution to **accelerate daily developer workflow**.

Skills

Languages and Tools: Python, C++, Javascript, HTML, Julia, MATLAB, Bash, VLM, PyTorch, Docker, Linux, Git
Specialties: Multi-Robot Systems, Task and Motion Planning, Manipulation, Field Robotics, Perception Systems