

Ethan Jeong

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SKILLS

Languages: C, C++, Python

Firmware & Embedded: STM32, RP2040, ARM Cortex-M4, FreeRTOS, I2C, SPI, CAN, CMake, Make

Robotics & AI: Unitree G1, Jetson Orin, ROS2, Nav2, DDS, PyTorch, Isaac Lab, Isaac Sim, PPO, SLAM

Platforms & Tools: Linux, Git, Docker, GitHub Actions, GDB, RViz2

EDUCATION

B.Eng. in Computer Engineering - Toronto Metropolitan University

Expected April 2027

• Dean's List Fall 2023, Winter 2024, Winter 2025

EXPERIENCE

Research Assistant

December 2025 — Present

Intelligent Systems & Robotics / Micro Manufacturing (ISRMM) Laboratory

Toronto, ON

- Developing Unitree G1 whole-body control via Python SDK, using motor feedback and PID tuning for fluidity
- Building a multi-modal SLAM pipeline in ROS2 by fusing Livox MID-360 LiDAR (Fast-LIO2) with RGB-D depth data (RTAB-Map), enabling autonomous navigation and obstacle avoidance in unstructured environments via Nav2
- Training a 29-DoF humanoid locomotion policy in Isaac Lab with PPO and domain randomization, using GPU-accelerated parallel simulation to generalize across rough, stochastic terrain
- Built a Qt GUI for pose saving and configuration management, including a custom DDS bridge between ROS2 Joint States and the SDK's Low State topics, cutting manual joint entry and speeding up lab prototyping

Control Systems Software Lead

September 2024 — Present

MetRocketry Design Team

Toronto, ON

- Led 4 developers to build active fin stabilization on STM32/FreeRTOS achieving 459ms end-to-end control latency
- Engineered robust Linear and Extended Kalman Filter on an ARM Cortex-M4 microcontroller to optimize state estimation, achieving ultra-low latency of **513 μ s** altitude and velocity updates alongside **172 ms** attitude updates
- Wrote thread-safe C drivers for SPI/I2C sensors with interrupt-driven I/O, hitting a 7 ms acquisition rate while eliminating race conditions via mutexes and semaphores
- Integrated 4-bit SDIO with FatFS logging and syncs to guarantee data retention through power loss during flight
- Added a watchdog (IWDG)-based failsafe monitor to validate execution integrity of all critical flight tasks

Avionics Software Member

September 2025 — Present

Metropolitan Aerospace Combustion Hub (MACH) Design Team

Toronto, ON

- Developed a Python CAN 2.0A driver at 1 Mbps on the RP2040, enabling communication across a 5 PCB stack
- Optimized bus throughput by leveraging **10 MHz** SPI interrupts for low-latency hardware configuration, managing TX/RX buffer allocation and crystal oscillator bit-timing synchronization to reduce processing overhead
- Validated bus reliability by implementing CAN loopback self-tests and end-to-end node communication checks

Software Developer Intern

May 2025 — August 2025

First Insurance Funding of Canada

Toronto, ON

- Reduced security risk in a production C# .NET system by triaging and resolving **500+** static analysis findings
- Improved reliability by increasing error detection by **~8%** via automated Laravel/PHP HTTP monitoring service

PROJECTS

6-DoF Robotic Arm

GitHub

- Enabled robotic control by achieving **9 ms** update rates via C++ inverse-kinematics solver using hardware FPU
- Applied a first-order IIR low-pass filter to attenuate high-frequency sensor noise, improving control stability