

# Raymond (Mingguang) Yang

Philadelphia, PA | Open to relocate

P: +1(445)208-3603 | [minggyan@seas.upenn.edu](mailto:minggyan@seas.upenn.edu) | Portfolio: [@mingg10](#)

## EDUCATION BACKGROUND

*University of Pennsylvania*, Philadelphia, PA *Aug 2024 – May 2026 (Expected)*  
M.S.E. in **Mechanical Engineering** (Mechatronics and Robotics stream), **GPA:3.95/4.00**

*University of Toronto*, Toronto, Canada *Sep 2019 – June 2024*  
B.A.Sc. with Honor in **Mechanical Engineering** (Mechatronics and Manufacturing stream), **GPA:3.77/4.00**

## SKILLS & QUALIFICATIONS

**Programming & Control:** ROS1/2, Python, C++, MATLAB, Linux, Git, control algorithms (PID, LQR, MPC), sensor fusion (EKF/IMU–Vision), robotic kinematics & dynamics

**Perception & Simulation:** OpenCV, computer vision, visual–inertial odometry (VIO), SLAM, Gazebo, RViz,

**Design & Prototyping:** SolidWorks, 3D printing, machining, hardware integration (Raspberry Pi, Jetson, microcontrollers), hardware communication (I<sup>2</sup>C, UART, CAN), PCB design basics

## ROBOTICS PROJECTS

*Multi-Platform Lunar Rover System (NASA LASSIE)*, UPenn, Philadelphia, PA *Jan 2025 – Feb 2026 (Expected)*

- Designed and prototyped aluminum docking interfaces using **SolidWorks**, capable of handling up to **60 kg** combined load, enabling multiple robots to physically attach and detach for **cooperative push–pull operations**.
- Implemented low-level control firmware on **Raspberry Pi 4** for differential-drive motors and sensor feedback, achieving **<2% velocity tracking error** during field tests.
- Programmed an **AprilTag-based** self-docking system in **ROS2**, integrating camera feedback and **dual-axis motor control** for real-time yaw–pitch alignment to achieve **>95% success** in fully automated docking and undocking.
- Integrated **GPS + IMU sensor fusion (Extended Kalman Filter)** to maintain localization drift below 0.3 m over 50 m trajectory, improving global positioning accuracy by **40%**.

*Autonomous VIO-based Quadcopter*, UPenn, Philadelphia, PA *Jan 2025 – May 2025*

- Built a **ROS2-based simulation of drone dynamics** with integrated IMU and stereo camera sensors for state estimation and control testing in Gazebo.
- Implemented and tuned **visual–inertial odometry (VIO)** achieving **<1% drift over 100 m trajectory**.
- Developed **trajectory planning and control nodes** for autonomous waypoint tracking, maintaining **±2 cm positional accuracy** in simulated flight tests.

*Franka Panda Block Stacking Competition*, UPenn, Philadelphia, PA *Aug 2024 – Dec 2024*

- Implemented **inverse kinematics and Hybrid potential field-based trajectory control** in ROS/Python for real-time motion planning of the 7-DOF Franka Emika Panda arm.
- Integrated **camera-based object detection and pose calibration** using OpenCV, achieving **<2 mm stacking precision** and earning **2nd place among 10 teams** in the competition.

*Autonomous Maze-Solving Robot*, UofT, Toronto, Canada *Aug 2024 - Dec 2024*

- Developed a **real-time sensing and planning system** on Arduino using Python, integrating **5 ultrasonic sensors, dual encoders, and IR trackers** for dynamic obstacle avoidance and localization with **<2 cm error at 10 Hz update rate**.
- Implemented **A\* path-planning** algorithm, enabling full maze traversal and block transport with **±2 cm waypoint accuracy**.

## WORK EXPERIENCES

*Process Engineer*, Bittelle Electronics Inc., Toronto, Canada *May 2022 - Sep 2023*

- Applied **DFM and IPC-610 standards** to **optimize PCB assembly workflow**, improving manufacturing consistency and reliability for automation and embedded hardware applications based on **ISO 9001**.

*Mechanical Engineer*, Jiangnan Mould & Plastic Technology Co., Ltd, Shanghai, China *May 2021 – Aug 2021*

- Designed and optimized **plastic injection molds and automotive bumper components** in **SolidWorks**, applying **DFM and GD&T principles** to improve part precision and manufacturability for automated production lines.