

Raymond (Mingguang) Yang

Philadelphia, PA | Open to relocate

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EDUCATION BACKGROUND

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

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| University of Toronto , Toronto, Canada | <i>Sep 2019 – June 2024</i> |
| 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 (I²C, UART, CAN), PCB design basics

ROBOTICS PROJECTS

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| Multi-Platform Lunar Rover System (NASA LASSIE) , UPenn, Philadelphia, PA | <i>Jan 2025 – Feb 2026 (Expected)</i> |
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- **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%**.

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| Autonomous VIO-based Quadcopter , UPenn, Philadelphia, PA | <i>Jan 2025 – May 2025</i> |
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- **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.

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| Franka Panda Block Stacking Competition , UPenn, Philadelphia, PA | <i>Aug 2024 – Dec 2024</i> |
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- **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.

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| Autonomous Maze-Solving Robot , UofT, Toronto, Canada | <i>Aug 2024 - Dec 2024</i> |
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- **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

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| Process Engineer , Bittele Electronics Inc., Toronto, Canada | <i>May 2022 - Sep 2023</i> |
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- **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.

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| Mechanical Engineer , Jiangnan Mould & Plastic Technology Co., Ltd, Shanghai, China | <i>May 2021 – Aug 2021</i> |
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- **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.