Raymond (Mingguang) Yang

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EDUCATION BACKGROUND

University of Pennsylvania **Philadelphia, PA**

M.S.E. in **Mechanical Engineering** (Mechatronics and Robotics stream), ***Aug 2024 – May 2026 (Expected)***

- GPA **3.95/4.00**

University of Toronto **Toronto, Canada**

B.A.Sc. with Honor in **Mechanical Engineering** (Mechatronics and Manufacturing stream), ***Sep 2019 – June 2024***

- GPA **3.77/4.00**. Dean's Honor List (all semesters)

PROFESSIONAL EXPERIENCES

Research Assistant, NASA LuSTR Project, **UPenn,** Philadelphia, PA ***Jan 2025 – Feb 2026 (Expected)***

- **Designed** a wheel-based rover and a turret docking mechanism with **±45° yaw/pitch actuation**, achieving **<3 cm** alignment tolerance and **>95%** docking success across **10+ outdoor trials**.
- **Integrated** actuators, sensors, and dual localization pipelines (**motion capture (MoCap) indoors, GPS/IMU outdoors**), reaching **±5 cm** positioning accuracy for cooperative locomotion.
- **Validated** multi-robot rescue in **2 NASA field tests**, with hybrid robots traversing **20° lunar sandy slopes** under closed-loop **ROS2** control.

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

- **Reviewed 300+ PCB** assemblies for **DFM** compliance, preventing design-production conflicts and reducing rework.
- **Conducted electrical testing** on **100+ PCB units** using oscilloscopes, thermal imaging, and custom fixtures to identify and diagnose high-risk failure modes.
- **Increased production reliability** from prototype-level **3σ to 6σ standards** in mass production by implementing **FMEA-driven** validation and corrective process adjustments.

RELEVANT PROJECTS

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

- **Implemented** an autonomous flight stack in simulation by combining **visual–inertial odometry (VIO)** state estimation with motion planning and SE(3) control in **ROS2/Python.**
- **Integrated** stereo feature tracking, IMU fusion, and graph-based trajectory search to achieve stable waypoint tracking in **6+ obstacle-filled environments**.
- **Validated** quadcopter autonomy with **20+ simulated environments**, maintaining **<10 cm position error** while navigating cluttered maps; extended performance through **local real-time replanning**.

Arena Battle Robot, **UPenn,** Philadelphia, PA ***Aug 2024 - Dec 2024***

- **Programmed C++** control algorithms with **real-time sensor feedback** for autonomous attacks and stable teleoperation.
- **Integrated** actuators, IMU sensors, and wireless communication modules with **ESP32 MCU**; designed **PCB-level circuits** for reliable signal and power distribution.
- **Placed 1st/25 teams** after 5+ competition matches, optimizing mobility and durability through iterative testing.

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

- **Developed** motion planning algorithms and integrated AprilTag-based **computer vision** for precision block detection and manipulation.
- **Deployed** autonomous control on the **Franka Emika Panda robot** to grasp, lift, and stack **7 blocks** in both **static and moving scenarios,** placing **2nd/15** teams with **> 90%** accuracy.

SKILLS & QUALIFICATIONS

Programming & Control: Python, C++, MATLAB, ROS, control algorithms, sensor fusion, robotics kinematics
Design & CAD: SolidWorks, CATIA, Eagle (PCB design), 3D printing, machining & prototyping
Manufacturing & Testing: Lean manufacturing, ISO/IPC standards, process optimization, quality control