Ming Huang

Mechanical Engineer (M.S.) | Robotics R&D & Control

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EDUCATION

Cornell University, *Ithaca, NY* *Aug 2025 - Present*

- M.S. Mechanical Engineering (Robotics), *concentration in Dynamics and control*

Michigan State University, *East Lansing, MI* *Sep 2021- May 2025*

- B.S. Mechanical Engineering, *concentration in Biomedical Engineering*
- GPA: 3.72/4.00

SELECTED PROJECTS

Autonomous Car Navigation System (ROS, MuSHR, Python)

- Built an autonomous navigation stack for an Ackermann-steering robot using PRM+A* planning with Dubins kinematics.
- Implemented multi-waypoint mission sequencing under time and MPC trajectory tracking with particle-filter localization

A 6-DOF Robotic Arm Manipulation (ROS, Gazebo)

- Built an autonomous pick-and-place pipeline using inverse kinematics, joint-space PRM + A* planning, and collision-free motion execution.
- Integrated task-level sequencing and PID-based joint trajectory tracking, with object pickup gated by state-estimation thresholds

Multi-Robot Coordination under Communication Delay (Python)

- Implemented Hungarian-based task assignment and A* path planning for coordinated multi-robot navigation.
- Built a distributed execution layer with collision handling, deadlock resolution, and online replanning.

RESEARCH & ENGINEERING EXPERIENCE

Collective Embodied Intelligence Laboratory, Department of Electrical and computer Engineering, Cornell University

Robotics R&D – Advisor: Dr. Kirstin H. Petersen *Aug 2025 – Present*

- Leading and building a fully autonomous aquatic robot for invasive vegetation management.
- Currently integrating an underwater manipulator end-effector for autonomous detection, cutting, and collection of submerged vegetation.

Prism Controls (PMSI)

Mechanical Engineering Intern *May 2024 - Aug 2024*

- Independently developed BarnFlowDynamics, a large-scale CFD framework for airflow and heat transfer analysis in agricultural facilities using OpenFOAM.
- Built and executed >100M cell parallel simulations, configuring turbulence and thermal transport models on HPC systems.
- Led end-to-end simulation workflow design, including meshing, solver configuration, parallelization, and convergence optimization.

Neural Engineering Laboratory, Department of Mechanical Engineering , Michigan State University

Research Assistant – Advisor: Dr. Galit Pelled *Aug 2024 – Oct 2025*

- Conduct research on neural circuitry and motor control in octopus arms to understand decentralized learning and adaptation.
- Designed and executed stimulation experiments using high-density multi-electrode arrays.
- Developed analysis pipelines for signal processing, spike detection, and neural data visualization.

Computational Biomechanics Laboratory, Department of Mechanical Engineering, Michigan State University

Research Assistant – Advisor: Dr. Lik Chuan Lee *Aug 2024 – May 2025*

- Developed finite element models of swine hearts to study ventricular–aortic interactions and cardiac mechanics
- Built and refined 3D meshes from echo data, defined myocardial fiber architecture, and prepared datasets for electromechanics simulations.
- Performed waveform analysis and validation, aligning simulated pressure volume loops with experimental swine data.

Yueshen Farming and Animal Husbandry Co.Ltd

Engineering Intern *May 2023 - Aug 2023*

- Installed and aligned electrical systems for water pumps integrated with cooling cells, ensured smooth operations.
- Designed CAD models and electrical schematics that improved accuracy of panel and motor installations.
- Repaired critical mechanic equipment , reduced downtime in large-scale farming operations.

PUBLICATIONS AND MANUSCRIPTS

1. Ziaei-Rad, V., **Huang, M.**, Lee, L.-C. *Mechanisms of Reduced Global Longitudinal Strain in Heart Failure with Preserved Ejection Fraction: Insights from a Novel Swine Model and Computational Framework.* manuscript in preparation.
2. **Huang, M.**, Pelled, G. *Investigating Neural Plasticity in Octopus Arm Tissue via Electrical Stimulation.* Poster presentation.
3. **Huang, M.,** Wang, J., Yu, L., Feng, R., He, Y. (2021). *Using speech recognition to analyze the physical condition of the elderly and its application in telemedicine. International Core Journal of Engineering*, 7(12), 619–626. DOI:10.6919/ICJE.202112_7(12).0086

HONORS AND AWARDS

- Dean's List at MSU *2021 - 2025*
- 5th place in World First Robotics Competition in Midwest Region *2017-2018*

TECHNICAL SKILLS

- **Robotics & Control:**
  Motion planning, Robot control, State estimation, Multi-agent coordination
- **Hardware:**
  Embedded systems, actuator control, sensor integration, LabVIEW, Pspice
- **Software:**
  Python, C++, MATLAB, ROS, Gazebo, Linux, Git
- **CAD:**
  Fusion 360, SolidWorks, Siemens NX
- **Computational Modeling:**
  CFD, FEV, FEA