Bodee Davis

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EDUCATION

University of Michigan, College of Engineering | *Ann Arbor, MI* **Aug. 2021 - April 2026**

- Senior Pursuing: Major in Robotics, Minor in Electrical Engineering, International Minor for Engineers
- GPA: 3.52 / 4.0
- Awards: University Honors - Winter 2022, Fall 2022, Winter 2023, Fall 2023, Winter 2025

Meiji Gakuin University, 明治学院大学 | *Yokohama, Japan* **Aug. 2023 - Aug. 2024**

SKILLS

Computer Science: C++, Python, Matlab, Reinforcement Learning, gymnasium, Mujoco, Git, ROS2, Isaac Lab, Pytorch
Robotics & Controls: SLAM, A*, PID, Dynamical Feedback Control, Feedback Linearization, CAD, Plant Modeling
Electrical Engineering: Circuit Design, Signal and System Analysis, Filtering, KiCad

EXPERIENCE

RoboCup Humanoid Robot Soccer – WolverBot Kickers, Control Lead | *Ann Arbor, MI* **July 2025 - Current**

- Lead the multidisciplinary development of a humanoid robot control system, integrating both feedback control and reinforcement learning approaches.
- Develop control policies for complex 18-dof bipedal robots, focusing on effectively standing up, walking, and playing soccer.
- Develop a 3 and 5-link feedback linearization-based walking robot simulation in Matlab to find necessary joint torques, test feedback methods, and generate foot placement data for training RL models.

Instructional Aide – Simultaneous Localization and Mapping | *Ann Arbor, MI* **Aug. 2025 - Dec. 2025**

- Lead weekly lab sessions for 40+ students, guiding the practical implementation of robotic localization and mapping techniques.
- Collaborate with faculty to develop teaching methods designed to enhance student comprehension of complex SLAM concepts.
- Design and implement supplemental materials to support students in developing skills beyond the standard class curriculum.

NHK Japan Broadcasting Corporation – Political Researcher | *Tokyo, Japan* **June 2024 - August 2024**

- Serve as a bilingual (English/Japanese) researcher for an NHK documentary focused on the U.S. presidential election.
- Act as a cultural liaison, providing key insights into American customs and political beliefs to the Japanese production team.
- Research and schedule interviews with American citizens from diverse cultural and political backgrounds.

PROJECTS

Fabric-Embedded Resistive Soft Sensor for Therapeutic Robot **Fall 2025**

- Engineer a low-cost ($1.14 per 100 cm²) soft sensor by sewing conductive Faraday fabric strips in an orthogonal grid onto a muslin backing, separated by a polyester mesh spacer to define discrete sensing locations.
- Develop a matrix scanning algorithm on an Arduino Nano that sequentially sends a LOW signal through digital output pins and detects contact on analog input pins, enabling multi-touch detection.
- Characterize sensor performance, achieving gentle activation forces (0.82 N mean), fast response times (81 ms mean), and good intra-cell repeatability (25.6% CV).

Game Console PCB **Summer 2025**

- Design a complex, multi-layer PCB in KiCad for a dual-screen portable console, applying critical layout principles like functional grouping and ground planes to ensure system stability and signal integrity.
- Engineer a complete power management subsystem featuring a dedicated Li-Po charging IC to manage the CC/CV charge profile, a battery protection IC for over-voltage and over-current safety, and high-efficiency buck/boost converters to create stable 3.3V and 5V rails from the battery.
- Integrate all core circuitry for the Raspberry Pi CM4, ensuring reliable high-speed communication by routing USB data lines as impedance-controlled differential pairs to reject noise.

LiDAR-Based Simultaneous Localization and Mapping **Fall 2024**

- Derive motion models for a differential drive robot and implement wheel odometry to serve as the foundation for navigation.
- Process raw LiDAR sensor data to build occupancy grid maps and implement a particle filter for robust robot localization.
- Develop a full autonomous navigation stack by integrating the localization and mapping pipeline (SLAM) with an A* path planner to move to a goal.