

Aidan Martin

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EDUCATION

Middle Tennessee State University

Aug. 2024 – May 2027

Bachelor of Applied Science, Mechatronics Engineering, GPA: 4.00/4.00

Murfreesboro, TN

- **Minors:** Computer Science, Mathematics
- **Graduate Coursework:** Reinforcement Learning, Advanced Control, Optimization, AI in Robotics
- **Activities & Awards:** President SME Robotics Club, IEEE Branch Founder/President, Quantum Computing Club, Department of Engineering & Technology Scholarship(2024-2027), Engineering Student Ambassador

TECHNICAL SKILLS

- **Research/Interests:** Optimal & Robust Control, Optimization, Computer Vision, Computational Mathematics
- **Certifications:** SOLIDWORKS CAD Design Associate (CSWA) - Mechanical Design
- **Languages:** MATLAB, C/C++, Python, Javascript (Node.js, Next.js), SQL, Verilog/VHDL
- **AI & Robotics:** Machine Learning, Computer Vision, ROS 2, Sensor Fusion, Control Systems (PID), SLAM, Gazebo Simulation, OpenCV, PyTorch, TensorFlow, Scikit-learn, YOLO, Forward/Inverse Kinematics
- **Hardware & Software:** NVIDIA Jetson Nano, Raspberry Pi, ArduinoIDE, KiCad, Git/GitHub, Linux, CMake

EXPERIENCE

Vanderbilt University MAPLE Lab

Sep. 2025 – Present

Research Assistant, Dr. Jie Ying Wu

- Utilized deep learning models and multimodal fusion with PyTorch, TensorFlow, and CUDA to automate surgeon skill prediction on the da Vinci Research Kit (dVRK).
- Processed complex kinematics and force data using Python to extract predictive features, and specialized in visualizations in MATLAB to validate model accuracy.

Vanderbilt Institute of Surgery & Engineering (VISE) Summer Fellow

May 2026 - Aug. 2026

Research Assistant, Dr. Jie Ying Wu

- Investigating 3D Kidney Reconstruction and applying optimal control methodologies to advance physical autonomy in robotic surgery

MTSU Optics & Mobile Robotics Lab

Jan. 2025 – Aug. 2025

Research Assistant, Dr. Hongbo Zhang

- Led embedded systems development for two autonomous robots, managing comprehensive electrical wiring and microcontroller programming using Arduino.
- Engineered a robust wireless communication system using ESP-NOW and MQTT, and developed control interfaces and data pipelines utilizing Python and HTML/CSS.

PROJECTS

Automated Computer Vision Sorting System (ACVSS)

Nov. 2025

- Shape-based conveyor belt sorting system. Developed a computer vision pipeline with OpenCV (cv2) on an NVIDIA Jetson Orin Nano, managed the electrical wiring and Arduino integration for precise motor control.

Micromouse Maze-Solving Robot

Jan. 2026

- Led programming in C++ implementing Dijkstra's, DFS, BFS, and FloodFill search algorithms for optimal pathfinding, and designed the custom electrical wiring and hardware architecture for the autonomous system.

BalanceCV

Apr. 2026

- 3-DOF Ball Balancing robot. Developed computer vision pipeline on NVIDIA Jetson Orin Nano, closed-loop control system processing 60 fps feedback to execute real time inverse kinematics and discrete PID control.

Project LUMEN

Apr. 2026

- Trained a YOLO computer-vision model powering a real-time projection-mapping system that dynamically tracks coffee cups across three sizes, locking customized projector displays onto each cup and cutting the projection when no cup is present. Presented at Vanderbilt VALIANT AI Pitch/Demo.