

John D. Aduroja

📞 (615) 999-5711 | ✉️ johnadurojakeys@gmail.com
🌐 [john-aduroja-ab238a286](https://www.linkedin.com/in/john-aduroja-ab238a286) | 🎧 [johnadurojakeys-blip](https://www.youtube.com/channel/UCjohndurojakeys-blip)

RESEARCH OBJECTIVE

Rising senior in Mechatronics Engineering seeking doctoral study in autonomous robotic systems, at the intersection of reinforcement learning, agentic AI architectures, and embedded control. Long-term aim: robots that perceive, reason, and adapt under uncertainty in unstructured, safety-critical environments, together with the control and ethical frameworks such autonomy demands.

RESEARCH INTERESTS

Autonomous Robotics, Reinforcement Learning, Agentic AI and Multi-Agent Systems, Robot Safety and Ethics

EDUCATION

Expected Spring 2027 **Middle Tennessee State University**, Murfreesboro, TN
Bachelor of Science in Mechatronics Engineering (GPA: 3.78/4.0)
Minors: University Honors, Mathematics

Relevant Courses Engineering Fundamentals, Materials Science, Circuits, Instrumentation & Design, Programmable Logic Controllers & Networks, Mechatronic System Design, Engineering Economy

AWARDS & HONORS

- Five-Time MTSU Dean's List Recipient (through Spring 2026)
- Ultimate Battle Royale Award for Combat Robot (Spring 2025)
- MTSU Honors Buchanan Fellow (Summer 2024)
- Precision Metal Forming Association (PMA) TN District Scholarship Recipient (Spring 2024)
- Best Graduating Engineering Student, Nigerian High School (2022)

RESEARCH & WORK EXPERIENCE

Research Assistant Summer 2026
Intelligent & Autonomous Systems Computing Lab, MTSU Engineering Technology

- Developed autonomous robotic systems leveraging agentic AI architectures and the Robot Operating System 2 (ROS2) framework to enable fully independent operation.
- Applied reinforcement learning algorithms to optimize real-time robotic decision-making, path planning, and multi-agent coordination across diverse mission profiles.
- Contributed to applied projects including disaster-response robotics, where robots autonomously survey, map, and navigate affected environments with minimal human intervention.
- Integrated onboard sensors (LiDAR, IMU, cameras) with ROS2 nodes to build robust perception and navigation pipelines for real-world deployment.

Research Intern

Summer 2026

Evva Robotics

- Designed, modelled, and built a humanoid robot for a startup.
- Integrated hardware components — servos, cameras, LiDAR, and LEDs — into a functioning software system.

Student Coordinator

Summer 2026

National Summer Transportation Institute (TDOT-sponsored)

- Introduced and instructed high school students on robotic applications in transportation.
- Guided students through hands-on experience with unmanned aerial (UAV) and ground (UGV) vehicles.
- Organized field trips to companies integrating AI and robotics into transportation systems.

Honors Thesis Research

Fall 2025 – Spring 2026

MTSU Honors College

- Designed, built, and programmed autonomous and non-autonomous Melty-Brain combat robots (3lb Beetle weight class) for the National Robotics Challenge.
- Successfully defended Honors thesis, “The Machinations and Ethics of Autonomous and Non-Autonomous Melty-Brain Combat Robots,” examining embedded AI, control systems, ethical frameworks, and safety protocols.

Robotics Research Intern

Summer 2025 – Present

MTSU Engineering Technology

- Assist an NSF-funded research project applying robotics to strawberry farming.
- Fabricate components of the robotic arm used to transport harvested strawberries.

Student Teaching Assistant & Tutor

Spring 2024 – Present

MTSU Engineering Technology

- Prepare, teach, and assist students in comprehending core engineering concepts.
- Operate and maintain lab machinery and equipment, including the Boss Laser Machine.
- Support the Engineering Technology chairman and lab technicians/operators on various projects.

RESEARCH PROJECTS

Geometry-Based Overtaking & Traction-Aware Speed Control

Fall 2026 – Present

Team research project, MTSU · Faculty mentor: Dr. Vishwas N. Bedekar

- Lead trajectory planning and traction control on a two-student team building an interpretable, training-free alternative to learning-based overtaking in multi-agent F1TENTH racing.
- Implement Frenet-frame track utilities (arc length s , lateral offset d) and curvature-limited passing trajectories (diverge, peak offset, merge back) built from arcs and splines.
- Fuse IMU and wheel-encoder data into slip proxies (e.g., planned vs. measured lateral acceleration) to scale target speed to inferred traction limits through high-curvature corners and overtakes.
- Lead metrics, logging, and analysis, benchmarking against Pure Pursuit, hybrid Follow-the-Gap/Pure Pursuit, and fixed-side overtaking baselines on lap time, overtake success, and slip events.

- Built a hybrid ROS2 racing stack that couples Pure Pursuit raceline tracking with reactive Follow-the-Gap obstacle avoidance, arbitrated by a switcher node that hands control between the two on LiDAR obstacle detection.
- Tuned speed-scaled lookahead and PD steering gains for stable tracking of a pre-computed optimal raceline on the Spielberg circuit in the F1TENTH Gym simulator (ROS2 Foxy, Docker).
- Implemented LiDAR preprocessing and gap selection — safety bubble around the nearest obstacle, largest-gap steering, and speed scaled to steering angle — for collision-free overtaking at speed.

PUBLICATIONS

- Aduroja, John (2026). “The Machinations and Ethics of Autonomous and Non-autonomous Melty-Brain Combat Robots”. Honors thesis. University Honors College, Middle Tennessee State University. URL: <https://jewlscholar.mtsu.edu/handle/mtsu/8699>.
- Aduroja, John, Yeahia Sarker, and Mohammad Arif Hossain (2026). “Self Evolving Agent for Autonomous Drone Navigation”. Submitted to *Machine Learning* (Springer).

PRESENTATIONS

Speaker, International Conference of Undergraduate Research (ICUR)

- Presenting the paper “Melty-Brain Combat Robot via ROS2 and RL.”

Speaker, Southern Regional Honors Conference (SHRC)

- Presented the research “The Machinations and Ethics of Autonomous and Non-Autonomous Melty-Brain Combat Robots.”
- Networked and answered questions about the project.

Mech Tech, MTSU Engineering Technology

- Presented research on carbon fibre for a class project (Materials Science).

LEADERSHIP & EXTRACURRICULAR ACTIVITIES

Captain

Fall 2023 – Present

Society of Manufacturing Engineers (SME) Robotics Club

- Serve as the electrical fabricator for three-pound combat robots.
- Compete in events testing the robots’ durability, creativity, and strength.

President

Fall 2023 – Present

MTSU Debate and Literary Club

- Prepare and present arguments at state, regional, and national tournaments on various resolutions without prior knowledge.
- Previously served as Vice-President, working with members to fine-tune speeches and arguments.

Vice-President

Fall 2024 – Present

National Society of Black Engineers (NSBE)

- Assist in coordinating chapter activities, mentorship programs, and events that advance the academic and professional development of Black engineering students.

Student Member

Fall 2024 – Present

Institute of Electrical and Electronics Engineers (IEEE)

- Engage with professional development resources, technical publications, and networking events in electrical and electronics engineering.

Ambassador

Fall 2024 – Spring 2026

MTSU Honors College

- Coordinated and organized events for the Honors College.
- Served as a representative and leader for fellow students in the Honors College.

TECHNICAL SKILLS

- **Robotics & Autonomy:** ROS2, Agentic AI Systems, Autonomous Robotic Systems, Embedded Systems, Arduino IDE, Jetson Orin Nano
- **Programming:** C/C++, Python, MATLAB, Reinforcement Learning
- **Design & Simulation:** SolidWorks (CSWA Certified), NI Multisim, 3D Printing (FDM/TPU/PLA)
- **Productivity:** Microsoft Office Suite (Word, Excel, PowerPoint), Git/GitHub

REFERENCES

Dr. Vishwas N. Bedekar, Ph.D.

Professor, Engineering Technology
Middle Tennessee State University
Applied Engineering Bldg., Room 330
MTSU Box 0019, Murfreesboro, TN 37132
vishwas.bedekar@mtsu.edu
(615) 898-5697

Dr. Lei Miao, Ph.D.

Professor; Coordinator, Mechatronics Eng.
Middle Tennessee State University
Applied Engineering Bldg., Room 213
MTSU Box 0019, Murfreesboro, TN 37132
lei.miao@mtsu.edu
(615) 898-2256