Ashrith Edukulla

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Education

University of Michigan, Ann Arbor — B.E. in Robotics | GPA 3.96/4.0 | Aug 2024 – Dec 2026
- **Honors/Awards:** Rank 3 in **WRO**, 4-time medalist in **IYRC**, 3x **AMC** qualifier, 2x **AIME** qualifier
- **Current (Fall 2025):** ROB 415 (Control of Robotic Systems) • ROB 320 (Planning & ROS Integration) • ROB 330 (Localization & Mapping) • EECS 281 (Data Structures & Algorithms), **Completed:** Circuit Design • Robot Optimization • Simultaneous Localization and Mapping • Linear Algebra • Robotic Differential Equations

Skills

- **Languages:** C++, Julia, MATLAB, Python(learning)
- **Robotics & Embedded:** ROS 2, Gazebo, RViz, Isaac Sim (learning), colcon build, Arduino, I^2C, PWM
- **Control & Dynamics:** State-space modeling, linearization, PID control, feedback linearization
- **Perception & Localization:** Mapping, odometry, SLAM, particle filters, sensor models, coordinate transforms
- **Software & Tools:** Linux, Git, CMake, VS Code Remote, sockets & IPC, SolidWorks
- **Math & Algorithms:** Linear algebra, ODEs, optimization, recursion, data structures (STL, heaps, sorting, queues)

Work Experience

Northrop Grumman   **Jan 2026 – April 2026**
Incoming Robotics Engineer
- Contributing to **robotics subsystem development** for modular spacecraft, integrating control, perception, and simulation elements within a model-based systems engineering (MBSE) framework.
- Designing and simulating **autonomous docking and alignment mechanisms** using ROS 2, Gazebo, and digital-twin models to evaluate precision alignment, fault tolerance, and multi-module interaction.
- Bridging **robotics and systems design disciplines** by translating functional spacecraft requirements into dynamic models, control logic, and validation pipelines for integrated system testing.

Synergic Adaptive Machinas (SAM) Lab @University of Michigan   **Aug 2025 – Dec 2025**
Undergraduate Researcher
- **Researching macro- and micro-scale robot swarms** under Prof. Steven Ceron to study collective motion and environmental interaction.
- **Designing** and **testing** decentralized swarm behaviors using physical reconfiguration and distributed control strategies.
- **Co-authoring** a research paper on emergent coordination and adaptive behavior in reconfigurable robotic collectives.

ROB 201: Robot Differential Equations @ University of Michigan   **Aug 2025 – Dec 2025**
Instructional Aide
- **Support** instruction in ODE modeling, linear systems, and feedback control for undergraduate robotics.
- **Lead** weekly office hours and problem-solving sessions using Julia notebooks, simulations, and visualization tools.
- **Assist** with labs and grading; clarified Laplace transforms, transfer functions, and stability concepts.

DSC Lab @ UM-SJTU   **June 2025 – July 2025**
Researcher Intern
- Reviewed literature on multi-port energy routing and wireless-charging methods for intelligent robotic systems.
- Develop on paper and simulate a robotic-leg testbed in Isaac Sim using a 6-DOF robotic arm.
- Explore experiments using motion–energy efficiency trade-offs and control strategies for dynamic charging.

Michigan Mars ROVER   **Nov 2024 – May 2025**
Embedded software engineer
- • Programmed **STM32 firmware** for **servos, LEDs, and accelerometers** supporting actuation and feedback.
- • Integrated **ROS nodes** for subsystem communication and embedded coordination.
- • Contributing to **navigation system design** with sensor-based localization and control tuning.

PROJECTS

Motion-Sensing Robotic Limb   **Dec 2024 – Mar 2025**
- Designed and implemented an accelerometer-based control system enabling precise finger actuation.
- Optimized sensor calibration and feedback processing to ensure smooth, stable, and responsive limb movements in dynamic conditions.
- Conducted validation tests to evaluate motion accuracy, latency, and repeatability under varied operating env.

FROST   **Aug 2024 – Dec 2024**
- Built an autonomous ice-detection robot with IR sensors, a thermal camera, and a salt dispenser.
- Developed MBot-based perception and actuation for autonomous navigation and ice removal.
- Modeled CAD assemblies to improve durability, weight balance, and environmental resilience.