

## SUMMARY

Robotics engineer with hands-on experience in real-time control, dynamics modeling, and autonomous navigation across both simulation and physical platforms. Skilled in developing AI-driven control algorithms and adaptable robotics systems. Seeking industry roles in robotics, autonomy, or embedded systems where research translates into deployed technologies.

## EDUCATION

**MS in Aerospace Engineering.** The University of Texas at Austin (Austin, TX) May 2025  
**Thesis:** Terrain Adaptation for Autonomous Navigation and Model Predictive Control

**BS in Engineering Physics.** University of Central Arkansas (Conway, AR) May 2023  
**Thesis:** Investigating MEMS Accelerometer Calibration Techniques

## SKILLS

- **Programming:** C++, Python, MATLAB, Julia
- **Software Tools:** PyTorch, ROS, Gazebo, Unity, Conda, Git, Docker, VS Code, Linux
- **Robotics & Control:** MPC, PID, path planning, dynamics modeling, embedded systems, sensor integration
- **Simulation/Hardware:** Unity, IsaacSim, Habitat, Gazebo, URDF/XML, IMU, vision-based control

## EXPERIENCE

**Oden Institute for Computational Engineering and Sciences,** The University of Texas at Austin (Austin, TX)

**Research Engineer / Scientist Associate** May 2025 - present

- Designing real-time terrain adaptation algorithms for hardware robots using ROS, MPC, and machine learning.
- Developing transferable reinforcement learning control policies for quadruped robots in IsaacSim and Habitat.

**Graduate Research Assistant** Sep 2024 - May 2025

- Developed terrain adaptation algorithms for high-speed off-road driving using PyTorch and MPC, enabling robots to traverse unknown environments with increased stability and speed in a Unity simulation.
- Contributed to reinforcement learning pipelines in IsaacSim and Habitat, enabling transferable locomotion policies for quadrupeds in simulation.

**Graduate Research Assistant** Sep 2023 - May 2024

- Developed a multi-agent simulation framework for competitive pursuit-evasion tasks, enabling robotic agents to infer human intent through observed behavior.
- Built a visual navigation pipeline for mobile ground robots using real-time computer vision and control feedback, improving safe driving in suburban scenarios.

**Aeronautics Research Intern.** NASA Ames Research Center (Mountain View, CA) June - Aug 2024

- Designed high-efficiency aircraft trajectories using A\* and Dijkstra's algorithms for global path planning.
- Integrated multi-objective optimization into the planner to balance fuel efficiency, time, and mission constraints.

**Robotics Engineering Intern.** NASA Langley Research Center (Hampton, VA) June - Aug 2022

- Simulated and analyzed the dynamic behavior of a soft, "C"-shaped robotic gripper for autonomous in-space assembly.
- Achieved millimeter accuracy in motion prediction under variable torques using physics models in ROS/Gazebo.

**Research Assistant.** University of Central Arkansas, Dept. of Physics & Astronomy (Conway, AR) Oct 2021 - May 2022

- Designed trajectory and attitude control algorithms for a fixed-wing UAV using PID and IMU data.
- Programmed embedded software for real-time sensor logging, servo motor control, and radio communication.
- Led flight tests to validate control performance under environmental disturbances.

**Research Intern.** Purdue University, Dept. of Physics & Astronomy (West Lafayette, IN) June - Aug 2021

- Designed and built a vacuum chamber for conducting cold-atom quantum physics experiments.
- Created detailed CAD models and custom electronic circuits for chamber instrumentation and control.

ACADEMIC PROJECTS

- Quadrotor Path Planning Competition. (UT Austin)

Jan - May 2024

  - Designed full-stack GNC algorithms including state estimation, motion planning, and feedback control for autonomous quadrotor flight.
  - Simulated high-fidelity flight dynamics to ensure safe trajectory generation through complex obstacle fields using C++ and MATLAB.
- Vision-Based Autonomous Driving via Supervised Learning. (UCA)

Aug 2022 - May 2023

  - Built a ground robot that autonomously navigates an obstacle course using computer vision and machine learning.
  - Trained supervised models to map camera inputs to steering commands using PyTorch.
  - Achieved 1st place in the Autonomous Vehicle Challenge (2023 Arkansas Space Grant Consortium Symposium).

PUBLICATIONS

- Online Adaptation of Terrain-Aware Dynamics for Planning in Unstructured Environments. Ward, et al. (2025). RSS 2025 Workshop on Resilient Off-Road Autonomous Robotics. [Link](#).
- Active Inverse Learning in Stackelberg Trajectory Games. Ward, et al. (2025). American Control Conference. [Link](#).
- Fine-Tuning Language Models Using Formal Methods Feedback: A Use Case in Autonomous Systems. Yang, et al. (2024). Conference on MLSys. [Link](#).
- A Hybrid Soft Material Robotic End-Effector for Reversible In-Space Assembly of Strut Components. Hammond, et al. (2023). *Frontiers in Robotics and AI*. [Link](#).

HONORS

Cockrell School of Engineering Graduate Fellowship (UT Austin)	2023, 2024
Arkansas Space Grant Consortium Workforce Development Award (UCA)	June 2022
UCA Distinguished Scholarship	2019 - 2023
Arkansas Governor's Distinguished Scholarship (UCA)	2019 - 2023

REFERENCES

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