William Ward

willward20.github.io/ | Austin, TX

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, 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, Raspberry Pi, Arduino, camera

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 IscaacSim 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

1. 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).
2. Active Inverse Learning in Stackelberg Trajectory Games. Ward, et al. (2025). American Control Conference. (Link).
3. Fine-Tuning Language Models Using Formal Methods Feedback: A Use Case in Autonomous Systems. Yang, et al. (2024). Conference on MLSys. (Link).
4. 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

Dr. Ufuk Topcu, Professor and Director of Center for Autonomy   Email: utopcu@utexas.edu
The University of Texas at Austin

Dr. Husni Idris, Research Aerospace Engineer   Email: husni.r.idris@nasa.gov
NASA Ames Research Center

Dr. William Slaton, Professor and Director of Physics Engineering   Email: wvslaton@uca.edu
University of Central Arkansas