

# Nathan L. Butler

## Graduate Research Assistant

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### ABOUT ME

Motivated roboticist with a background in AI and mechanical design, seeking to develop scalable, generalizable autonomy solutions for real-world environments. Experienced in reinforcement learning, multi-robot systems, and rapid prototyping for field-deployable platforms.

### EDUCATION

**Oregon State University** Sep. 2023 - Present  
M.S. in Robotics; minor in Artificial Intelligence

**Iowa State University** Aug. 2018 - May 2023  
B.S. in Mechanical Engineering; minors in Computer Science and Cyber-Physical Systems  
GPA: 3.94/4.00

### RELEVANT COURSEWORK

Deep Learning; Sequential Decision Making; Multiagent Systems; Learning-Based Control; Intelligent Agents and Decision Making; Kinematics, Dynamics, and Controls; Machine Learning for Cyber-Physical Systems; Principles of Artificial Intelligence

### EXPERIENCE

**Graduate Research Assistant, [Robotic Decision Making Lab](#), Oregon State Univ.** Sep. 2023 – Present

- Developed hybrid decentralized planning algorithm that enables multi-robot team to integrate local and global information; published at ICRA 2025
- Implemented and trained transformer-based model to provide flexible behavioral coordination to multi-robot teams in communication-constrained environments via weighted role specializations
- Collaborating on multi-university grant to develop coordination algorithms for teams of underwater robots
- Designing modular hardware package to provide onboard autonomy to autonomous surface vehicle platform

**Undergraduate Research Assistant, [ABE Automation and Robotics Lab](#), Iowa State Univ.** Jan. 2022 - Jul. 2023

- Completed mechanical, electrical, and software integration of robotic arm into mobile field robot system to support dexterous crop data sampling techniques
- Decoupled manipulator from mobile base of data collection robot in new modular design to reduce recharging downtime
- Developed mechanical components for heat dispersion and weatherproofing for custom stereo camera with LED array, integrated 12 units into field robots

**Intern, Intelligent Control & Autonomy Group, [NASA Glenn Research Center](#)** Jan. 2021 - May 2021

- Modeled physical responses of electrical hardware components in Simulink for NASA's [Electrical Modeling and Thermal Analysis Toolbox](#) for use in physics-based digital twins of electric aircraft propulsion systems
- Developed multiple example control models with accompanying tutorial documentation to reduce learning curve for new toolbox users

### ADDITIONAL PROJECTS

**[MERL for Constrained Coordination](#)**: Multiagent Evolutionary RL for training agents in tightly coupled tasks with sparse rewards

**[Bravo MPC](#)**: Model Predictive Control for Reach Bravo robotic arm

**Multiagent Routing as COP**: Constraint Optimization Problem formulation with solver for multiagent orienteering

**Robot Moisture Sensor**: ROS-based hardware implementation of plant-probing robot

**[DQN for Task Scheduling](#)**: Deep Q-Network for multi-robot task scheduling

**[Crop Row Robot Steering](#)**: AE+CNN approach for robot steering commands from visual data within crop rows

### SKILLS & TOOLS

**Software**: Python (PyTorch, TorchRL), ROS/ROS2, Linux, SolidWorks, MATLAB/Simulink, GitHub, Docker

**Mechanical**: Rapid Prototyping, 3D Printing, Metal Fabrication, Wood Fabrication, Electronics Assembly

**Algorithms & Control**: Learning-Based Control (DL, RL, EA), Multiagent Systems, Path Planning, MPC, PID, IK

**Soft Skills**: Research & Analysis, Robotic Frameworks, Systems Engineering, Project Management, Technical Communication