Nathan L. Butler

Graduate Research Assistant

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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 information parsing model to provide communication-efficient behavioral coordination to multi-robot team to achieve distributed coordination without explicit communication
- Collaborating on multi-university grant to develop coordination algorithms for teams of underwater robots
- Designing modular hardware package to provide autonomy to a variety of autonomous surface vehicle platforms

Undergraduate Research Assistant, ABE Automation and Robotics Lab, Iowa State Univ. **Jan. 2022 - Jul. 2023**

- Integrated robotic arm into field robot system to support dexterous crop data sampling techniques
- Updated design of mobile data collection robot by introducing modular, removable base 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 as Simulink blocks and added components to NASA's Electrical Modeling and Thermal Analysis Toolbox for use in realistic digital twins of electric aircraft propulsion systems
- Developed multiple example Simulink 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
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