Jonathan Lane

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Objective

To pursue research and discover new problems in control systems and robotics, with particular interests in nonlinear, geometric, and network control.

Education

Purdue University West Lafayette, IN
MS in Electrical Engineering, GPA: **4.0** *Jan 2024 - May 2025*
BS in Electrical Engineering, GPA: **3.96** *Aug 2020 - Dec 2023*

Relevant Coursework: Robotics, Nonlinear control, Linear control, Machine learning, Digital signal processing
Technical Skills: Python, Crazyflie, ROS 2, Unity, STM32, TensorFlow, PCB design, MATLAB, C

Awards

- 2x Midwest Collegiate Cycling Conference Champion *Apr 2024, Apr 2025*
- 3rd place overall at USA Cycling Collegiate Nationals *May 2024*
- Eli Shay Scholarship (ECE Great Work Award) *Aug 2023*
- Dave & Marsha Meyer Undergraduate Teaching Award *Apr 2023*

Publications

L. F. Wu, **J. Lane**, et al. "Airborne Underwater Vehicle Recovery System: Eagle-Inspired Trajectory Generation and Control for UAV-Assisted Recovery of AUVs" *IEEE Access 2025* Link *Aug 2025*

J. Lane, N. P. Hyun, "Graph-Based Dynamics and Network Control of a Single Articulated Robotic System" *American Control Conference 2025* Link *Jul 2025*

J. Lane, "New Perspectives on Network-Based Modeling and Control of Articulated Robots" *Purdue University Graduate School* (Master's thesis) Link *Apr 2025*

Research Experience

Researcher Purdue University
Hyun Lab, Prof. Nak-seung Patrick Hyun *Jan 2024 – Present*

- Developing a graph-based formulation to quantify network interactions within articulated robots
- Generating a network control theory for decentralized control of articulated robots
- Demonstrated the theory with a network of Crazyflie quadrotors

Digital Futures Research Intern Stockholm, Sweden
KTH Royal Institute of Technology, Prof. Ivan Stenius *Jun 2024 – Aug 2024*

- Recruited on the ALARS team, a project whose goal is to design a quadrotor system to retrieve an AUV from the sea
- Designed and implemented geometric tracking controllers in the Unity simulator to track the quadrotor's position before retrieval and position of the suspended load after retrieval

Projects Purdue University
Senior Design Project (Smart Bike Light) Team Lead *Aug 2023 – Dec 2023*

- Created a LiDAR-based vehicle recognition device mounted at the back of a bike with the goal of alerting the rider when a car approaches from behind
- Led the software implementation of the detection algorithm and integration of other subsystems via STM32CubeIDE

Reimplementation of CycleGAN ML Algorithm (ECE 50024) *Apr 2023 – May 2023*

- Implemented and trained a Generative Adversarial Network (GAN) to transform images to a different style
- Wrote a research paper in ICML format to summarize my methods and findings

Purdue Face Recognition Challenge (ECE 50024) *Apr 2023*

- Trained a machine learning model to recognize certain faces from a dataset containing 100 different celebrities
- Software model implemented computer vision and transfer learning techniques
- The model had a 73% success rate, scoring in the top 15% of the class

Teaching Experience

ECE Teaching Assistant Purdue University

Team Mentor for Embedded Senior Design (ECE 47700) *Jan 2024 - Present*

- Met with teams weekly to check up on progress
- Provided technical advice to teams to improve their projects

***Instructor** for Second Year EE Lab (ECE 20008)* *Jan 2023 - May 2024*

- Performed as the main instructor for a lab section
- Instructed the class in relevant lab material
- Provided feedback for students on assignments and accommodated classwork makeups

Undergraduate Teaching Assistant for ECE 20008 *Jan 2022 - Dec 2023*

- Guided students in a once-a-week lab period by answering questions during class
- Explained relevant circuit calculations, clarified lab instructions, and helped students debug their circuits
- ⋆ **Dave & Marsha Meyer Undergraduate Teaching Award**

Work Experience

Electrical Engineering Intern Brookfield, WI

Milwaukee Tool *Jun 2023 – Aug 2023*

- Designed a low-cost instrumentation amplifier for the pressure sensor on Milwaukee's hydraulic tools which saves the company $1.56 per tool
- Developed firmware to calibrate and configure a STM32G4 microcontroller's onboard Opamps

Electrical Engineering Intern Irvine, CA

Delphi Engineering Group *May 2022 - July 2022*

- Implemented VHDL code for an i2c protocol on an FPGA carrier board
- Created a web-based user interface to control DEG's CLKSYNC device

Professional Activities

- Reviewer for 5th IFAC Workshop on Cyber-Physical & Human-Systems (CPHS) *Aug 2024*

Activities

Purdue Cycling Club *Aug 2020 - Present*

Ride Safety Officer *Jun 2023 – May 2024*

- Managed a team of ride leaders and the group ride schedule
- Organized weekly race planning meetings during race season to discuss race safety and tactics