

Lee Milburn

+1-401-787-4443

www.leemilburn.com

lmilburn@seas.upenn.edu

Education

University of Pennsylvania

MSE, Robotics

Northeastern University

BS, Computer Engineering and Computer Science

Fall 2023 – expected May 2025

Philadelphia, PA

Fall 2018 – May 2023

Boston, MA

Research Experience

The General Robotics Automation Sensing and Perception Laboratory Oct, 2023 – Present

Research Assistant

Philadelphia, PA

- Implemented a physics-informed parameter estimation model to fit real-world data to a dynamic bicycle model of an autonomous car.
- Engineered a new F1-Fifth autonomous vehicle research platform, integrating hardware and software.
- Implemented a physics-informed Koopman Operator to estimate non-linear systems.
- Applied a Non-Linear Model Predictive Control (NMPC) based on Koopman system's estimation.

The Robotics and Intelligent Vehicles Research Laboratory

Sept, 2020 – Aug, 2023

Undergraduate Researcher

Boston, MA

- Developed Autonomous UAV - UGV system to identify and pick up trash.
- Wrote networking and collected data for system which uses RGB-D and Hyperspectral data to classify terrain types in real-time for VAST project.
- Designed and constructed autonomous PPE material tests according to industry standards for ACE PPE project. Wrote the system's networking, decision making, and GUI.

The Dynamic Legged Systems Laboratory

July, 2022 – Dec, 2022

Guest Researcher

Genova, Italy

- Developed higher level control for autonomous navigation stack on Vinum-EU precision agriculture project.
- Algorithms for accurately generating navigation waypoints from RGB-D sensors during runtime, while navigating down the vineyard row.
- Trained and implemented a Mask-RCNN to do semantic segmentation of grapevine trunks for autonomous navigation. Hand annotated data-set of 500+ images.

Publications

Conference Papers

- 1 **L. Milburn**, J. Chiaramonte, J. Fenton and T. Padir, "*TRASH: Tandem Rover and Aerial Scrap Harvester*," 2023 Robotics Automation and Artificial Intelligence (RAAI), Singapore, Singapore, 2023, pp. 259-265, doi: 10.1109/RAAI59955.2023.10601262.
- 2 **L. Milburn**, J. Gamba, M. Fernandes and C. Semini, "*Computer-Vision Based Real Time Waypoint Generation for Autonomous Vineyard Navigation with Quadruped Robots*," 2023 IEEE International Conference on Autonomous Robot Systems and Competitions (ICARSC), Tomar, Portugal, 2023, pp. 239-244, doi: 10.1109/ICARSC58346.2023.10129563.
- 3 M. H. Shaham, M. Skopin, H. Hochsztein, K. Mabulu, **L. Milburn**, J. Tukupah, A. Tunik, J. Winn, M. Zolotas, D. Erdogmus, and T. Padir, "*Human-Supervised Automation Test Cell to Accelerate Personal Protective Equipment Manufacturing During the COVID-19 Pandemic*," in 2022 IEEE International Symposium on Technologies for Homeland Security (HST), Boston, MA, USA, 2022, pp. 1-8, doi: 10.1109/HST56032.2022.10025429.

Extended Abstracts

- 1 R. Tumu, A. Amine, **L. Milburn**, L. Jia, K. Liu, U. Kono, and R. Mangharam "*Physics-Constrained and Vision-Informed Friction Coefficient Estimation*" in 40th Anniversary of the IEEE International Conference on Robotics and Automation, November 23-26, 2024.
- 2 **L. Milburn**, J. Chiaramonte, J. Fenton, "*Towards an Error Tolerant Multi-Robot System for Roadside Trash Collection.*" in 2022 International Symposium on Distributed Autonomous Robotic Systems, November 25-28, 2022.
- 3 **L. Milburn**, J. Gamba, and C. Semini, "*Towards Computer-Vision Based Vineyard Navigation for Quadruped Robots*" in 2022 Institute for Robotics and Intelligent Machines, October 7-9, 2022.
<https://doi.org/10.5281/zenodo.7531328>

Awards & Honors

1st Place in ECE Capstone Competition 2022 Award	
<i>Northeastern ECE Department</i>	2022
Project-Based Exploration for the Advancement of Knowledge (PEAK): Summit Award	
<i>Northeastern Undergraduate Research and Fellowships</i>	2022
Fung Leadership Award	
<i>Fung Scholars and Fellows</i>	2022
PEAK: Shout it out Award	
<i>Northeastern Undergraduate Research and Fellowships</i>	2022
Presidential Global Scholarship	
<i>Northeastern Global Experience Office</i>	2022
Graduate School Application Fund Award	
<i>Northeastern Undergraduate Research and Fellowships</i>	2022
Northeastern Achievement Award	
<i>Northeastern University</i>	2019-2022

Teaching Experience

FIRST Robotics Mentor	September, 2023 – Present
<i>Robotics Mentor</i>	Online
<ul style="list-style-type: none">• Mentor on Highschool Robotics FIRST team which reached the 2024 World Championships.• Worked through computer vision principles and helped debug team's technical issues.	
CS 2510 Fundamentals of Computer Science 2	January, 2023 – May, 2023
<i>Teacher's Assistant</i>	Online
<ul style="list-style-type: none">• Held Office Hours nine hours each week.• Graded student submissions and tested homework pre-release.	

Employment

Scientific Systems Inc. Co.	July, 2021 – July, 2022
<i>Autonomous Systems Coop</i>	Woburn, MA
<ul style="list-style-type: none">• Created and prototyped an algorithm for UAVs to do multi-target pursuit tracking in an unstructured environment. This work was turned into the basis for a government contract.• Researched modeling the large neighborhood search and tabu search algorithms for optimizing the Multi- Robot Task Allocation scheduling towards a given time horizon using Optaplanner.	

United Electronics Industries

July, 2020 – December, 2020

*Sales Engineer Coop**Waltham, MA*

- Benchmark tested UEI's hardware to determine the max throughput.

BrainQ Technologies

June, 2019 – August, 2019

*Product Intern**Jerusalem, Israel*

- Improved EMG physical therapy product through testing and creating designs. Researched the start-up market to provide information for initiating Series B funding.

Robotics Projects

TRASH: Tandem Rover and Aerial Scrap Harvester*Capstone Project*

2022

Visual and Spectral Terrain Classification in Unstructured Multi-Class Environments*Contributor to IROS 2022 paper*

2022

Northeastern's NASA RASC-AL Challenge Club*Mobile Robotics Team Lead*

2021-2022

Hack the Normal Hackathon*SOAR*

2021

Extracurricular Activities

Jewish Student Union Club*Member*

2020-Present

Disability Resource Center*Notetaker for EE 2412 Fundamentals of Electronics*

2020-2021

Dialogue of Civilizations in Israel*Multiple Narratives and Cultural Complexities*

2019

Other Interests

Running*2023 Philadelphia Marathon, 2022 Pisa Marathon, 2020 Malden Half-Marathon*

2020-Present

Six month backpacking trip in Southeast Asia*Thailand, Cambodia, Vietnam, Malaysia*

2018