

# DYLAN K. LEONG

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## EDUCATION

### Carnegie Mellon University

*Master of Science in Mechanical Engineering – Research*

GPA: 4.0/4.0

Relevant Coursework: 10703 Deep RL and Control, 11785 Introduction to Deep Learning, 16833 Robot Localization and Mapping

Pittsburgh, PA

May 2026

### University of Florida

*Bachelor of Science in Mechanical Engineering*

GPA: 3.7/4.0, Magna Cum Laude, University of Florida Honors Program

Relevant Coursework: EML4930 Sensor Based Robot Planning, EML4313C Dynamics and Control System Design Lab

Gainesville, FL

May 2024

## RESEARCH PROJECTS

### Whole-body Reinforcement Learning on a Wheeled Quadrupedal Manipulator

Carnegie Mellon University

Pittsburgh, PA

May 2025 – Present

- Working toward a whole-body **PPO** policy, coordinating locomotion and manipulation in unstructured outdoor environments
- Developed a wheeled quadrupedal manipulator in **Isaac Sim**, including terrain and contact modeling, to train baseline policies
- Installed and configured a 4-DoF HEBI arm on a **Unitree Go2-W** handling mechanical mounting, wiring, and actuator integration

### LiDAR-based Dynamic Object Detection with a Hybrid Geometric-Learning Approach

Carnegie Mellon University

Pittsburgh, PA

September 2024 – Present

- Employed a novel geometric-based approach to cluster and learning-based classifier to identify dynamic objects in **<100 ms**
- Formulated a **PyTorch** semantic labeling classifier utilizing feature aggregation and prototype modeling to deploy on **Spot**
- Achieved **7% accuracy improvement** over current state of the art under noisy trajectory estimates and sensor tilt variations

### Autonomous Navigation and Gas Detection on a Wheeled Robot

Carnegie Mellon University (Sponsored by Chevron)

Pittsburgh, PA

May 2025 – December 2025

- Developed **ROS waypoint navigation** with rule-based **obstacle avoidance** for an autonomous demo delivered to the sponsor
- Integrated FLIR gas sensor, dual-antenna RTK GNSS, RealSense depth camera, and Intel NUC onto an **AgileX Scout Mini** rover
- Instrumented a GUI for real-time visualization of RTK GNSS position, gas sensor telemetry, and overlaid satellite imagery

### Aspiration-assisted End-cut Coaxial Needle Biopsy Device

University of Florida

Gainesville, FL

January 2023 – May 2024

- Tested a **novel biopsy device** performance on gelatin and chicken breast to explore their viability as prostate cancer phantoms
- Collected phantom samples that were **102% heavier** using our prototype biopsy needle compared to two commercial devices
- Established correlation between force and stiffness, achieving  $R^2=0.96$  with encoder data and  $R^2=0.94$  with strain-gauge readings

## ACADEMIC PROJECTS

### Sim-to-Real Adaptation for Hybrid Wheeled-Quadrupedal Locomotion on Low-Friction Terrains

Carnegie Mellon University

Pittsburgh, PA

October 2025 – December 2025

- Evaluated a model-free baseline **PPO** reinforcement learning policy trained with **PyTorch** in Isaac Sim, MuJoCo, and real hardware
- Investigated varying terrain friction coefficients in Isaac Sim to measure policy robustness and determine limits under low friction
- Utilized domain randomization, curriculum learning, and reward shaping to improve slip recovery and contact stability of the policy

### TinyPointNeXt: Reducing Model Parameters for Human Detection in Point Clouds

Carnegie Mellon University

Pittsburgh, PA

February 2025 – April 2025

- Redesigned a point cloud human classification network by modifying MLP widths and set abstraction layers over 48 ablation trials
- Reduced model parameters by 81%, decreased computation time by 17%, and improved human detection accuracy by 2%
- Achieved the **3<sup>rd</sup> highest** score among 52 project submissions for designing and applying an innovative neural network architecture

### Individual Demo Program Competition

Carnegie Mellon University

Pittsburgh, PA

October 2024 – November 2024

- Programmed in **C++** to develop a 2D animated demo with sound effects using custom **OpenGL** libraries during a 1-month project
- Awarded **1<sup>st</sup> place** in a competition that evaluated all student-created demo programs and ranked them based on skill and creativity

## LEADERSHIP

### Pi Tau Sigma (Mechanical Engineering Honors Society)

President

Gainesville, FL

August 2022 – May 2024

- Formed strong relationships with honors society members and department faculty through **social and community service events**
- Provided undergraduate freshmen with **tours of mechanical engineering labs** to help support the department

## SKILLS

**Programming Languages:** C++, Python

**Software:** SOLIDWORKS, ROS, Docker, Isaac Sim, MuJoCo, Gazebo, RViz, CloudCompare, MATLAB, Linux, Conda, Github

**Hardware:** Boston Dynamics Spot, Unitree Go2-W, AgileX Scout Mini, Rover Robotics, Ouster OS1, HEBI 4-DoF R-Series Arm

**Frameworks & Libraries:** PyTorch, TorchVision, PCL, ONNX Runtime, OpenAI API, pandas, NumPy, scikit-learn

**Domains:** Autonomous navigation (SLAM), Planning, Point cloud processing, Image segmentation, Reinforcement learning, HPC