

Michael C. Anoruo

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EDUCATION

Carnegie Mellon University

Doctor of Philosophy in Robotics

Advisor: Wennie Tabib, Resilient Intelligent Systems Lab (RISLab)

Pittsburgh, PA

Anticipated May 2029

University of Maryland, Baltimore County

Bachelor of Science in Computer Science — AI/ML Track

GPA: 3.93/4.0, Summa Cum Laude

Baltimore, MD

Dec 2023

GRADUATE COURSES

Learning for 3D Vision

Optimal Control & Reinforcement Learning

Mobile Robots

Math Fundamentals for Robotics

Data Science

Deep Reinforcement Learning

Robot Learning

Computer Vision

Natural Language Processing

SKILLS

Languages: Python, Lua, C++, C

Robotics & Hardware: ROS, ROS 2, Vicon, Crazyflie, KiCad

Deep Learning & RL: PyTorch, TensorFlow, Gymnasium

Computer Vision: OpenCV, Open3D, PyTorch3D

Build Tools & Automation: CMake, Colcon

PHD RESEARCH

Carnegie Mellon University — Resilient Intelligent Systems Lab (RISLab)

Ph.D. Student

Pittsburgh, PA

Aug 2024 – Present

- Developed a differentiable, GPU-accelerated quadrotor simulator in PyTorch capable of simulating 100k+ drones in parallel.
- Built a Gymnasium environment to train RL quadrotor control policies for dynamic target interception, achieving over 95% success against targets moving up to 10 m/s.
- Equipped Crazyflie drones with onboard vision by soldering third-party monocular cameras and integrating a receiver to stream live image feeds to desktop.
- Modernized the lab's Crazyflie flight stack by setting up and configuring the drones to interface with the lab's Vicon motion-capture system, enabling swarming capability that wasn't previously possible.
- Deployed an MLflow experiment-tracking server (PostgreSQL-backed, hosted as an Apache service) to centralize training runs and provide on-demand access to results for a 5-person research team.

Skills: *PyTorch, Differentiable Simulation, Gymnasium, RL, Crazyflie, Vicon, MLflow, PostgreSQL*

RESEARCH EXPERIENCE

Johns Hopkins University APL — Asymmetric Operations Sector

Software Engineer Intern

Baltimore, MD

May 2024 – Aug 2024

- Enhanced a GUI module and contributed to an integration layer in Java/JavaFX for a secure communication system, interfacing with encryption APIs to transmit data as part of a large engineering team.
- Led a team of 7 interns on a drone swarming project for search-and-rescue, researching and testing A*-based search algorithms in PyBullet simulation.
- Trained a variational autoencoder on network packet data to support anomaly-based network intrusion detection.
- Built an internal logging service (PostgreSQL, Flask REST API, web interface) for network monitoring, saving the company hundreds of thousands of dollars in Splunk licensing fees.

Skills: *Java, JavaFX, PyBullet, A* Search, Machine Learning, PostgreSQL, Flask*

Massachusetts Institute of Technology — Space Enabled Media Lab

Zero Robotics Research Intern

Cambridge, MA

Jun 2022 – Aug 2022

- Optimized PID controller parameters for the MIT Astrobee robot simulator.
- Developed Python scripts to automate data collection and analysis for the Zero Robotics project.

- Collaborated with a team of six, alongside NASA astronauts, to host the Zero Robotics 2022 technical competition.

Skills: *PID Control, Astrobees Simulator, Python*

University of Pennsylvania — Scalable Autonomous Robots Lab
Robotics Research Intern

Philadelphia, PA
Jun 2021 – Aug 2021

- Collaborated with a PhD student to bring the lab's Clearpath Heron USV back online, testing the bathymetric sensor and validating autonomy behavior by collecting and replaying ROS bagfiles from field experiments.
- Repaired the lab's miniature autonomous boats, wiring motors, integrating OptiTrack motion capture for localization, and flashing onboard Arduino controllers to test collaborative object-pushing behaviors.
- Designed a waypoint algorithm to generate a strategic path for the lab's Autonomous Surface Vehicle (ASV) to survey the Schuylkill River.
- Developed a Python simulation framework to model ASV experiments.
- Created a PCB with KiCad to translate RS232 to USB for data transmission.

Skills: *ROS, OptiTrack, Arduino, Path Planning, KiCad, PCB Design, Python*

PROFESSIONAL EXPERIENCE

Apple Inc. — Apple Service Engineering
Data Engineer Intern

Seattle, WA
May 2023 – Aug 2023

- Replaced manual video segmentation with an automated CV pipeline, enabling accurate per-segment viewership reporting to sponsors.
- Developed code utilizing computer vision and machine learning techniques to automate analysis of large volumes of video content, cutting analysis time from over 3 hours to under 10 minutes.

Skills: *Computer Vision, Machine Learning, Video Processing*

PUBLICATIONS

Dang, Q., Kucukosmanoglu, M., **Anoruo, M.**, Kargosha, G., Conklin, S., & Brooks, J. "Automatic Detection of Cognitive Events Using Machine Learning and Understanding Models' Interpretations of Human Cognition." *Scientific Reports* 15, no. 1 (2025): 30506.

Piplai, A., **Anoruo, M.**, Fasaye, K., Joshi, A., Finin, T., & Ridley, A. "Knowledge Guided Two-Player Reinforcement Learning for Cyber Attacks and Defenses." *2022 21st IEEE International Conference on Machine Learning and Applications (ICMLA)* (2022): 1342–1349.

CONFERENCES / PRESENTATIONS

NVIDIA Day Robotics Research Talk, Carnegie Mellon University

Pittsburgh, PA, May 2026

Apple Service Engineering Intern Spotlight, Apple Inc.

Seattle, WA, Aug 2023

MSRP Summer Research Symposium, Massachusetts Institute of Technology

Cambridge, MA, Aug 2022

On-Ramp Mission Research Symposium, National Security Agency

Baltimore, MD, Mar 2022

SUNFEST Symposium, University of Pennsylvania

Philadelphia, PA, Aug 2021

TEACHING ASSISTANT EXPERIENCE

Carnegie Mellon University

Pittsburgh, PA

Teaching Assistant — 16-761 Mobile Robots

Spring 2026

Teaching Assistant — 16-362 Mobile Robot Algorithms Laboratory

Fall 2025

LEADERSHIP

Project Lead, AI Scholars Program, CMU

Summer 2026

Site Lead, Creative Coders, UMBC

Spring 2023

Peer Advisor, Meyerhoff Scholars Program, UMBC

Fall 2022 – Spring 2023

Executive Board, National Society of Black Engineers, UMBC

Fall 2021 – Spring 2023

AWARDS and HONORS

GEM Fellow

Fall 2024

Google CSRMP Scholar

Spring 2022

Meyerhoff Scholar

Fall 2020

National Football Foundation Scholar Athlete

Spring 2020