Andrea Vu

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Education

Carnegie Mellon University **Aug 2024 – May 2026 (*Expected*)**
Mechanical Engineering, Master's of Science, Research Track

Georgia Institute of Technology **Aug 2020 – Dec 2022**
Mechanical Engineering, Bachelor's of Science

Experience

Graduate Research Assistant **Aug 2024– Present**
CMU Biorobotics Lab *Pittsburgh, PA*

- Developed an adaptive, closed-loop control policy using **Pinocchio** that allows a serial kinematic chain robot to temporarily transition from a floating-base to a fixed-base robot manipulator in 3D structures in **pyBullet**
- Deployed the control policy on hardware using **ROS1 and Python** bindings on a custom 3D test bed
- Simulated an adaptive, closed loop height-control policy on a custom hexapod robot in **CoppeliaSim**

Research Engineer **Jan 2023– Aug 2024**
Earthly Dynamics, LLC *Roswell, GA*

- Simulated novel bleed-air vents in small-scale parafoils using **CFD** to determine optimal vent placement
- Validated simulation results through experimental flight tests to determine the influence of the bleed-air vents on **control authority**
- Led an experimental flight-testing program for a novel powered-paraglider deployment systems

Mechanical Engineer **May 2021– Dec 2022**
Earthly Dynamics, LLC *Atlanta, GA*

- Selected and performed **system identification** on motors, gearboxes, and sensors through torque-speed and load-case analysis in **Matlab** to optimize performance and reliability for airdrop systems
- Built a remote-controlled paramotor platform using **rapid prototyping** techniques, enabling **control-algorithm validation**

Projects

Non-Linear MPC (NMPC) for RoboRacer **Jan 2025– May 2025**
Optimal Controls and RL

- Developed a real-time trajectory tracking using the full non-linear dynamic model and constraints with **Casadi** to support maneuvers like drfiting
- Integrated full-state and control sensors into prediction to accurately represent non-linearities for robust tracking in a **pyBullet simulation**

Teleoperated Underwater Submarine **Aug 2024– Dec 2024**
Advanced Mechatronic Design

- Wrote custom libraries in **Embedded C** for **STM32 Microcontroller** to support **real-time operation** of an underwater submarine from the remote control
- Designed electrical circuitry in **KiCad** to add peripherals to the STM32 Microcontroller to develop a remote control for the submarine

Publications

- Ward, D.J., **Vu, A.L.**, Costello, M., "Control Authority of a Single-Surface Parafoil with Bleed-Air Spoilers," Journal of Aircraft, Vol. 61, No. 6, 2024
- Ward, D.J., **Vu, A.L.**, Costello, M., "Bleed Air Actuation for a Single Surface Parafoil," AIAA Aviation Forum, AIAA 2024-4519, July 2024
- Ward, D.J., **Vu, A.L.**, Ward, M., Costello, M., "Bleed-Air Control of a Single Surface Parafoil Canopy," AIAA SciTech Forum, AIAA 2022- 2716, 2022