ANDREA VU

Email: andyvu@cmu.edu | **Phone:** (678) 736-9839 | **Website:** and-vu.github.io | **Location:** Pittsburgh, PA | **U.S. Citizen** | **Security Clearance Eligible**

EDUCATION

Carnegie Mellon University, Pittsburgh, PA
Master of Science in Mechanical Engineering (Research Track) | Expected May 2026
Advisor: Dr. Howie Choset
Research Focus: Robot Locomotion, Controls, Gait Design, Motion Planning

Georgia Institute of Technology, Atlanta, GA
Bachelor of Science in Mechanical Engineering | December 2022
Highest Honors

TECHNICAL SKILLS

Programming: Python, MATLAB, Embedded C/C++, Julia, ROS 1
Simulation & Control: PyBullet, COMSOL, Pinocchio, System Identification, Nonlinear Dynamics
CAD & Design: SolidWorks, Fusion 360, KiCad, Altium
Prototyping & Fabrication: 3D Printing (FDM/Resin), CNC Machining, CAM Programming, Laser Cutting, Composites, PCB Design
Hardware Integration: Sensor Selection, Power Electronics, Motor/Gearbox Selection, Mechanical Assembly

PROFESSIONAL EXPERIENCE

Graduate Research Assistant | *Carnegie Mellon University Biorobotics Lab* | Aug 2024 – Present
Advisor: Dr. Howie Choset
- Designed force-controlled anchoring gait for snake robots enabling stable manipulation in constrained 3D environments and microgravity conditions
- Developed motion-planning algorithms with obstacle avoidance for coordinated multi-link robot systems
- Implemented real-time control systems for hybrid mobility-manipulation behaviors using Python and ROS
- Conducted hardware-in-the-loop testing validating kinematic models and constraint-based optimization strategies

Research Engineer | *Earthly Dynamics, LLC* | Feb 2022 – Aug 2024
- Led experimental flight-testing program for powered-paraglider deployment system with U.S. Army DEVCOM Soldier Center, advancing proof-of-concept → functional prototype
- Designed and validated novel aerial deployment mechanisms through iterative prototyping, reducing asymmetric-inflation failures by 40% via data-driven design improvements
- Conducted aerodynamic testing on small-scale parafoils achieving 40°/s turn rates and 58% glide-slope control through optimized bleed-air-vent placement, resulting in **3 peer-reviewed publications**

Mechanical Engineer | *Earthly Dynamics, LLC* | May 2021 – Aug 2024
- Engineered IP67-rated environmental logger (Dropmate v2.0) with hermetic O-ring sealing and breathable venting, passing saltwater immersion and humidity tests
- Built remote-controlled paramotor platform for repeatable flight testing, enabling system identification and control-algorithm validation
- Performed motor, gearbox, and sensor selection through torque-speed and load-case analysis to optimize performance, efficiency, and reliability for airdrop systems

RESEARCH & PUBLICATIONS

Peer-Reviewed 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

Research Areas: Robot locomotion and control, autonomous systems, unconventional actuation, hardware-software co-design, experimental validation

PROJECTS

Autonomous F1-10th Racing with Model Predictive Control | *CMU Optimal Controls and Reinforcement Learning* | Spring 2025
- Developed nonlinear vehicle dynamics simulation with Pacejka tire model for high-performance autonomous racing
- Implemented MPC framework in Julia optimizing trajectory tracking, velocity control, and steering smoothness
- Derived linearized models for drift equilibrium enabling mode transitions between grip and drift states

Hasselhoff Underwater Robot | *CMU Advanced Mechatronics* | Fall 2024
- Designed electrical schematic and PCB layout for teleoperated underwater robot remote control with 5 LEDs, dual joysticks, depth display, and state-machine architecture
- Programmed STM32 microcontroller in C configuring timers, ADCs, DMAs, and GPIO for robust underwater communication
- Integrated four waterproof motors and IR beam receiver enabling autonomous depth control and navigation