Marcos Alexander Martinez

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EDUCATION

Cornell University, Ithaca NY **Expected Graduation: May 2028**

- **Major:** Bachelor of Science - Mechanical Engineering
- **Relevant Courses**: Multivariable Calculus, Physics I: Mechanics and Heat, Differential Equations, Statics and Mechanics of Solids, Thermodynamics.

ENGINEERING EXPERIENCE

Engineering Summer Math Institute (ESMI) - *Undergraduate Researcher* **Jun 2025 - Aug 2025**

- Applied queuing theory and Markov chain modeling using MATLAB to simulate ecological behavioral transitions.
- Integrated empirical foraging data to quantify state probabilities and mortality risks, finding that the annual death rate for North Atlantic Right Whales increased by 3.1% between 1970 and 2025, driven by anthropogenic causes.
- Presented Markov chain model with five transient behavioral states and an absorbing death state, illustrating North Atlantic Right Whale foraging dynamics and mortality risks, at Cornell's ESMI Research Symposium.

Cornell University Autonomous Drone (CUAD) - *Mechanical Subteam* **Nov 2024 - Present**

- Designed and optimized drone subsystems, applying principles of aerodynamics and structural mechanics to ensure stability and durability across varying flight conditions.
- Contributed to the design of a high-performance quadcopter with the goal of reaching record-level speeds.

Space Domain Awareness Laboratory - *Undergraduate Researcher* **Sep 2025 - Present**

- Collaborating with Mechanical, Electrical, and Software Integrated Product Teams (IPTs) to develop a full-scale satellite testbed that replicates spacecraft dynamics for real world mission applications.
- The platform enables testing of sensing, actuation, and autonomy technologies for space domain awareness.
- Testing and implementing a 12-nozzle cold-gas propulsion system, with each nozzle delivering 2 N thrust with 20 ms pulse capability for precise attitude control.

PROJECTS

First-Person View (FPV) Drone **Jan 2025 - Feb 2025**

- Designed, CAD-modeled, and iteratively prototyped an FPV drone optimized for filming high speed flight tests.
- First 3D-printed the frame to identify and correct major design flaws, then machined the final version in carbon fiber.
- Designed custom mount to stabilize and support HD FPV camera; fully assembled and flight-tested drone, achieving an extremely durable, high-speed platform with an optimal flight time of 30 minutes.

Mars Rover Scouting Drone **Sep 2025 - Present**

- Designing and CAD-modeling a custom quadcopter in collaboration with Cornell's Mars Rover project team, including the frame structure, battery mounts, motor mounts, and a landing mechanism to withstand harsh weather conditions.
- Developing the drone as a scout platform, capable of receiving user-input coordinates and autonomously following designated paths to support the team's rover during their annual competition.

LEADERSHIP EXPERIENCE

Society of Hispanic Professional Engineers (SHPE) - *Executive Board* **Oct 2024 –Present**

- Engaged first-year students to promote SHPE opportunities and events, supporting their integration into the organization and academic community (Freshman Representative).
- Organizing membership events to recruit new members and promote SHPE's professional, academic, and community benefits through collaborations with other campus organizations (Events Chair).

Selander Center for Engineering Leadership - *Student Leadership Facilitator* **Jul 2025 - Present**

- Facilitating leadership and communication workshops covering core values and active listening for 30+ students.
- Promoted collaboration and efficient group dynamics by guiding students through interactive activities and discussions.

RELEVANT SKILLS

Technical: OnShape, Fusion 360, 3D Printing, CNC Machining, MATLAB, Python, and Mechanical Design.
Professional: Leadership, Collaboration, Active Listening, and Public Speaking.