Sergio A. Esteban

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EDUCATION

California Institute of Technology **Sept. 2021—Present**

Ph.D., Mechanical Engineering, Robotics – Controls & Dynamics

- Advisor: Dr. Aaron Ames
- Control for Robot Locomotion

California State Polytechnic University, Pomona **Sept. 2016 – Dec. 2020**

B.S., Mechanical Engineering

- Major GPA: 3.95 / 4.00 | Overall GPA: 3.94 / 4.00
- *Summa Cum Laude*

EXPERIENCE

MIT Lincoln Laboratory, Lexington MA, Research Intern **Jun. 2021 – Aug. 2021**

- Designed and built a low Earth orbit precision 2-DOF gimbal system, including custom design and mechanical fabrication, sensor integration, and full hardware assembly.
- Developed embedded software and a state-space controller for this gimbal achieving micro-radian-level pointing accuracy.

Raytheon Intelligence & Space, El Segundo CA, Mechanical Engineer **Jan. 2021 – May 2021**

- Designed test and support hardware for space systems, producing detailed engineering drawings for both test fixtures and flight components.
- Automated hardware testing with custom software and supported environmental qualification efforts, including cleanroom test campaigns.

Stanford University Multi-Robot Systems Lab, Stanford CA, Research Intern **Jun. 2019 – Aug. 2019**

- Developed and validated UAV swarm path-planning algorithms in Stanford's MSL Lab, integrating ROS, OptiTrack motion capture, and quadcopter testing for reliable waypoint following in ecological survey missions.
- Conducted UAV swarm survey field experiments and presented results at the Stanford SURF Symposium, earning 2nd place out of 40 for research excellence.

NASA Jet Propulsion Laboratory, Pasadena CA, Mechanical and Robotics Engineer Intern **Jan. 2019 – Jun. 2019**

- Supported Mars Perseverance Rover mobility system integration, co-led development of a variable–center-of-gravity handling fixture, and led stress testing and subsystem validation with mobility engineers and flight technicians in cleanroom and analog environments.
- Designed a fork-style wheel assembly for the RoboSimian robot to eliminate terrain-snagging issues and enhance its multi-modal locomotion performance.

California Institute of Technology Amber Lab, Pasadena CA, Research Intern **Jun. 2018 – Aug. 2018**

- Developed a two-axis UAV-mounted gimbal system, building custom sensor/control PCBs and implementing real-time PD control to stabilize pitch and roll of altimetry sensors during flight.

Search for Extraterrestrial Intelligence Institute, Mountain View CA, Research Intern **Jun. 2017 – Aug. 2017**

- Assessed the feasibility of atmospheric water extraction on Mars as an on-site resource strategy to support future human exploration on Mars.

TECHNICAL SKILLS

- **Programming:** C++, Python, MATLAB, Simulink, LabView
- **Version Control:** Git, CPDM, EPDM, Siemens Teamcenter
- **Software and Packages:** Robot Operating System (ROS), Mujoco, Drake, Isaac Lab, Brax, JAX, PyTorch
- **CAD:** Solidworks, Creo, Siemens NX, Femap Nastran
- **Operating Systems:** Linux (Ubuntu), Windows, macOS
- **Machine Prototyping:** CNC Machining, Vertical Mill, Lathe, Water Jet, Soldering, Welding, Laser Cutting, and 3D Printing
- **Languages:** English and Spanish: Native (Written/Spoken/Interpretation)

LEADERSHIP AND OUTREACH

Caltech Robotics Outreach, Pasadena CA, Outreach Volunteer **Jun. 2022 – Present**

- Led more than two dozen robotics-focused lab tours for middle and high school students, collaborating with Caltech's Center for Teaching, Learning, and Outreach (CTLO), Pasadena-area schools, and programs such as DaVinci Camp, "Noche de Ciencias", and FIRST Robotics to inspire interest in engineering and STEM careers.

FIRST Robotics Competitions (FRC), Pasadena CA, Team 2404 Mentor **Aug. 2022 – Mar. 2024**

- Mentored middle and high school students in designing and building a competition robot for FRC, teaching fabrication, machining, electronics, programming, and engineering design principles, while also providing guidance on preparing for a career in engineering.