# RAFAEL S. MEZA

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**United States Citizen** - English: Fluent; Spanish: Fluent                  www.linkedin.com/in/**rafameza**/

## WORK EXPERIENCE:

**NASA's Jet Propulsion Laboratory – Extreme Environment Robotics (347C) – EELS Team**
Robotic Hardware Engineering Intern – Pasadena, CA – Cryogenic Dynamometer Station          May 2023 – December 2023
- Final dynamometer testbed is able to characterize actuators at a minimum temperature of -184°C while applying a maximum cross moment of 388 Nm on the output shaft. The design succeeded within 3% of project requirements.
- Conducted structural and thermal analysis on over 20 features designed to withstand high torque load in a cryogenic environment. Focused on reducing component backlash in rotating assemblies and delivering precise shaft alignment.
- Prioritized systems integration in a sectioned design plan following the V-diagram strategy. Improved material knowledge of stainless steels with low CTE and preloaded bolted joints at extreme temperatures.
- Prepared 24 parts for fabrication with strict GD&T through CNC milling or water jet operations, for a system where shaft alignment and cross moment preload determined success down to 1 thousandth of an inch (0.0254mm).

**Carrier Corporation – HVAC Division**
Quality Assurance Engineering Intern / Production Supervisor Intern – Collierville, TN          May 2022 – August 2022
- Processed over 700 units as part of the Rework Burndown Project with the goal of eliminating 5,500 units on hold.
- Implemented cloud-based spreadsheets for tracking Rework Burndown units, this change accelerated unit processing by 38% resulting in 900 units shipped, averaging 29.5 units per day, while actively tracking repairs and units on hold.
- Created operation diagrams and workflow charts identifying primary failure modes to mitigate procedural slowdown.

## EDUCATION:

**University of Maryland, A. James Clark School of Engineering**                                  College Park, MD
Masters of Science in Mechanical Engineering                                          December, 2025
  Graduate Teaching Assistant – ENES 221 Dynamics

**Sensors and Actuators Lab – Active Structural State Evaluation Technology**
Graduate Research Assistant – College Park, MD – Sensor Technology, Vibrations, and FSI          Jan. 2024 – Dec. 2025
- Researching the application of Fiber Bragg Grating (FBG) sensors to measure temperature, strain, and vibrational effects on a compliant panel surface in hypersonic conditions at NASA Langley, Mach 6, blowdown tunnel facilities.
- Designed an analysis system to extract eigenfrequencies from vibration data using fast Fourier transform, a hamming function, and searching with a custom peak finding method with selective Gaussian smoothing of peak readings.
- Implemented TCP/IP-based Ethernet communication with the Hyperion SI-155 sensing instrument over a LAN using a static IP address and subnet mask configuration for real-time data acquisition. Using the python API to create a high frequency (5kHz) sampling system collecting 23MB per minute and writing to a HDF5 file database.

**Florida State University, FAMU-FSU College of Engineering**          GPA: 3.75          Tallahassee, FL
Bachelor of Science, Mechanical Engineering minoring in Mathematics                     December 15, 2023
  Senior Capstone Project – NASA Heavy Lunar Surface Transport Vehicle - MSFC
  Teacher Assistant/ Undergraduate Grader – Design and Analysis of Control Systems, Statics, Thermodynamics

## PROJECTS:

**Temperature Controller – mechatronics and PID control design – C++ (Arduino)**
- Designed the electrical hardware and packaging to operate a handheld temperature controller powered by a 25-volt power supply using a N-channel MOSFET circuit to heat a stainless-steel structure with a flexible heater. Developed a custom PID controller in C++. Communicating with a thermocouple and two OLED displays with I2C protocol.

**Quadcopter Control Design and Simulation – stabilization with state-space modeling - MATLAB**
- Modeled quadcopter dynamics with a state-space model for the purpose of stabilizing a drone after encountering an initial disturbance. The pole placement method brings the drone to equilibrium within 5 seconds of encountering a disturbance all while minimizing the flight trajectory from an arbitrary start point to the desired endpoint.

## SKILLS / COURSEWORK:

**Graduate (M.S.) Coursework**
- Dynamics, Measurement/Instrumentation and Analysis, Fluid Structure Interactions, Numerical Methods, Semiconductor Devices and Technology, Applied Machine Learning for Engineering and Design

**Design, Programming and Software**
- SolidWorks (CAD/FEA), Python, GitHub, C++, MATLAB, LabVIEW, Microsoft Office, ANSYS Modal

**Technical Engineering Skills - with applied experience**
- FDM Rapid Prototyping, Finite Element Analysis, GD&T, Root Cause Analysis, Design of Control Systems, Six Sigma, Design for Assembly, Systems Integration, Thermal Analysis, Structural Analysis, Modal Analysis