Elderson Mercado Rivera, EIT

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OBJECTIVE

Contribute skills in aerospace engineering, manufacturing, materials, and structures toward the advancement of engineering projects.

EDUCATION

University of Puerto Rico – Mayagüez, Puerto Rico Graduation Date: **June 2024**

Bachelor of Science in Mechanical Engineering; Minor in Project Management General GPA: **4.00/4.00** Major GPA: **4.00/4.00**

PROFESSIONAL & RESEARCH EXPERIENCE

Medtronic P.R. Operation Company *– Capstone Intern at Villalba, PR* **Aug '23 – Dec '23**

- **Developed** a Design of Experiments (DOE) model using Minitab to examine critical response variables of a silicone rubber adhesive (MED-1137) (thickness, relative humidity, and temperature), and **conducted** Finite Element Analysis (FEA) to optimize its design.
- **Identified** and **mitigated** production bottlenecks by implementing a Full Factorial Design methodology, determining optimal curing conditions through mechanical testing (hardness and pull tests) and, consequently, reducing curing times of adhesives by 10%.
- **Improved** production line quality assurance by performing root cause analysis and pacemaker assembly inspections to address nonconformance issues and implement corrective actions, resulting in increased operational and manufacturing reliability.

Boeing Satellite Systems Internship (EAHI Program) *– Mechanisms Engineering Intern at El Segundo, CA* **May '23 – Aug '23**

- **Designed** and **optimized** spacecraft pointing mechanisms, including gimbals and actuators, in SolidWorks, applying GD&T (ASME Y14.5) to control positional and runout tolerances while improving interface fit-up for satellite assembly and integration.
- **Developed** a MATLAB signal-processing tool to analyze actuator torque datasets, implementing FFT filtering and windowing to suppress spectral leakage and reduce noise during qualification testing, improving interpretation of periodic response trends.
- **Refined** CAD models and material selection of test instrumentation and preload fixtures for satellite actuator spring preload testing, increasing fixture stiffness and reducing load variability by 8% to improve test repeatability and identify structural damage trends.
- **Supported** PDR and CDR deliverables and contributed to MRB assessments by analyzing failure signatures from historical data.

MIT Summer Research Program (MSRP) 2022 *– Assistant Researcher at Cambridge, MA* **June '22 – Dec '22**

- **Designed** and **fabricated**, through 3D printing and prototyping, a mechanical thermal cycling test rig to simulate space-relevant thermal gradients in reusable rocket engine turbopumps, integrating servo motor actuation, RPM tuning, and fatigue test design.
- **Prepared** metal-glass-ceramic composite Environmental Barrier Coatings (EBCs) and **characterized** delamination and interface crack propagation through SEM imaging after surface treatment, supporting stress and failure analysis under thermal loading.
- **Originated** a preferential etching method to analyze metallic percolation in EBC systems submitted to high heat-flux environments.

NASA Ames Research Center (ARC) Internship *– Aeromechanics Intern at Mountain View, CA* **Jan '22 – May '22**

- **Designed** ultra-thin low Reynolds number airfoils for the ROAMX and Mars Science Helicopter vehicles, performing CFD and FEA structural analysis to enhance rotor blade lift generation and airframe integrity under Martian atmospheric constraints.
- **Assembled** and **instrumented** the RAPTOR wind tunnel to support structural and aerodynamic testing, including hardware installation, fixture configuration, and checkout, supporting qualification-style testing of flight-relevant components.
- **Led** RFQ-based cost estimation and manufacturing planning for rotorcraft airfoil fabrication, identifying materials, manufacturing processes (metal 3D printing, CNC, MIM), and suppliers to assess production feasibility and supply chain readiness of components.

Stanford University REU (SURF 2021) *– Assistant Researcher at Stanford, CA* **June '21 – Aug '21**

- **Integrated** machine learning classification models into a binary Python-based predictive algorithm to detect early indicators of turbofan engine degradation up to 25 operating cycles ahead, performing data reduction and propulsion reliability assessments.

EXTRACURRICULAR ACTIVITIES

SAE Aero Design UPRM Collegiate's Chapter RUM-Air Team – *Advanced Class Team Member* **May '19 – June '20**

- **Designed**, **manufactured**, and **tested** CDA (Colonist Delivery Aircraft) prototypes for deployment from a remote-controlled plane.
- **Managed** sponsor relations, inventory, and testing budgets to support procurement documentation and team's testing expenses.

NASA RASC-AL UPRM Team – *Team Member and Researcher* **Sep '18 – June '19**

- **Designed** the landing gear and robotic arm of *Lunar Exploration and Access to Polar Regions (LEAPR)* project's lunar vehicle.

AWARDS / HONORS

- NASA Group Achievement Award – Recognized for outstanding contributions to planetary flight research at NASA ARC **[2025]**
- Great Minds in STEM (GMiS) Scholarship **[2022]** & Dominion Energy's Hispanic Higher Education Initiative Scholarship **[2023]**
- The Boeing Company Scholarship ("Boeing Excellence Award") **[2021, 2023]**
- Hispanic Scholarship Fund (HSF) Scholar & Evertec Scholarship **[2021-2024]**
- First Place in the Advanced Class category at the SAE Aero Design West Competition **[2020]**
- Lockheed Martin Scholarship & First Place (Overall) at the NASA RASC-AL Contest **[2019]**

SKILLS / IMPORTANT COURSES

- Thermal Science Lab, Heat Transfer, System Dynamics & Controls, Mechanics of Materials, Design of Machine Elements.
- Fluent in English and Spanish; Certifications: Engineer in Training, Lean Six Sigma Yellow Belt, and Google Project Management.
- Microsoft Office [Excel, Word, PowerPoint, MS Project] (Advanced), SolidWorks (Advanced), Python (Proficient), Siemens NX /NASTRAN (Proficient), CATIA (Proficient), MATLAB (Proficient), AutoCAD (Proficient), Creo Pro/E (Basic), ANSYS (Basic)
- Leadership; teamwork; ability to multitask; excellent technical writing, communication, and organizational skills.
- **Eligible and willing to obtain a U.S. Government Security Clearance. Willing to relocate and cover relocation costs if needed.**