AE Curriculum Vitae: Elena R. Martinez

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SUMMARY

Aerospace Engineering graduate student specializing in hypersonic aerodynamics, propulsion systems, and computational fluid dynamics. Experienced in experimental testing, numerical modeling, and interdisciplinary research focused on next-generation flight vehicles and space systems.

EDUCATION

North Carolina State University

Master of Science in Aerospace Engineering – *Expected May 2026*

Relevant Coursework: Hypersonic Aerodynamics, Advanced Propulsion, Computational Fluid Dynamics, Aerospace Structures

University of California, San Diego

Bachelor of Science in Aerospace Engineering – *May 2024*

Capstone: Design and performance modeling of a reusable hypersonic glide vehicle

RESEARCH EXPERIENCE

Graduate Research Assistant, High-Speed Flow Physics Laboratory 2024 – *Present*

North Carolina State University

- Modeled shock-wave boundary layer interactions for hypersonic inlets using high-fidelity CFD simulations.
- Conducted wind-tunnel experiments to analyze thermal loading on ceramic matrix composites.
- Developed Python-based post-processing tools to evaluate flow instability and pressure oscillations.

PUBLICATIONS

Martinez, E.R., Zhao, L., & Feldman, R. (2026). Thermal Protection Performance of Ultra-High-Temperature Ceramic Composites in Hypersonic Flight. *Journal of Spacecraft and Rockets*.

Zhao, L., **Martinez, E.R.**, & Kovacs, M. (2025). Numerical Study of Shock-Induced Flow Separation in Scramjet Intakes. *Aerospace Science and Technology*.

Patel, N., **Martinez, E.R.**, & Huang, Y. (2025). CFD Analysis of Variable-Geometry Hypersonic Inlets. *AIAA Journal*.

Feldman, R., **Martinez, E.R.**, & Cho, S. (2024). Experimental Measurement of Heat Flux in High-Mach-Number Wind Tunnel Tests. *Experimental Thermal and Fluid Science*.

Martinez, E.R., Singh, P., & Kovacs, M. (2024). Optimization of Fuel Injection in Dual-Mode

Scramjet Combustors. *Combustion Science and Technology*.

Singh, P., **Martinez, E.R.**, & Brooks, T. (2023). Aeroelastic Stability of Slender Hypersonic Wings. *Journal of Aircraft*.

TECHNICAL SKILLS

- MATLAB, Python, OpenFOAM, ANSYS Fluent, Abaqus
- SolidWorks, CATIA, Simulink
- LaTeX, Fortran, CFD Post-Processing, Data Visualization

PRESENTATIONS

- "Shock-Induced Flow Separation in Hypersonic Intakes," AIAA Aviation Forum, June 2025
- "Thermal Loads on Hypersonic Vehicles," ASME Fluids Engineering Conference, October 2024

AWARDS & HONORS

- AIAA Aerospace Graduate Fellowship, 2025
- Best Student Paper, AIAA Southeast Region Conference, 2024

PROFESSIONAL MEMBERSHIPS

- American Institute of Aeronautics and Astronautics (AIAA)
- American Society of Mechanical Engineers (ASME)