Eric Anthony Comstock

eric.comstock@gatech.edu   cell: (832) 718-1150   ericanthonycomstock.com

Master of Science in Aerospace Engineering
Aerospace Engineering PhD student, Georgia Institute of Technology

SUMMARY OF QUALIFICATIONS:

- 38 months of broad and deep aerospace research experience in multiple domains: high enthalpy/high fidelity hypersonic computational fluid dynamics, light-particle interactions, simulations and numerical algorithm development, optical diagnostics, magnetohydrodynamics, ferrohydrodynamics, and plasma physics
- Substantial programming experience, including an internship at The Aerospace Corporation, creating numerical simulations using Python, C++ and MATLAB
- Graduate courses include Spacecraft Engineering (in progress), Space Plasma Physics, Electric Propulsion, Air Breathing Propulsion, Aerothermochemistry, Numerical Methods for Partial Differential Equations, Computational Fluid Dynamics, Turbulent Flow, Viscous Fluid Flow, Orbital Mechanics, and Optimization for Design of Engineered Systems
- **3.89/4.0 Undergraduate GPA**, Bachelor of Science in Aerospace Engineering, *magna cum laude*, with Engineering Honors, Minors in chemistry and mathematics, Texas A&M University – College Station, December, 2022, completed at 17 years of age
- **3.9/4.0 Graduate GPA** (current), Aerospace Engineering PhD program, Georgia Institute of Technology
- **Master of Science in Aerospace Engineering, December, 2024, Georgia Institute of Technology**

TECHNICAL SKILLS:

Languages: Python, JSON, HTML, C++, R

Software: COMSOL Multiphysics, MATLAB, Wolfram Mathematica, Solidworks 3D Modeling, LaTeX, VeusZ, General Mission Analysis Tool (GMAT), NEQAIR, Pointwise, US3D, OpenMDAO, SIMION 2020

Applied Math: Finite Difference Method and Finite Element Analysis for hyperbolic and parabolic PDEs in arbitrary-dimensional spaces, Rigid Body Dynamics, Runge-Kutta 4, Least Squares Method, Control Systems Analysis (Laplace transfer functions and state-space systems)

RESEARCH / PROFESSIONAL EXPERIENCE:

NSF GRFP Federally Funded Graduate Student – Georgia Institute of Technology   Aug, 2024 – present
Low Gravity Science and Technology Lab

- Further development of a magnetohydrodynamic propulsion system from this past spring
- Creation of a Vlasov simulator using Python to improve simulation accuracy and further verify the models

Modeling and Simulation Graduate Summer Intern   May, 2024 – Aug, 2024
The Aerospace Corporation

- Debugging, refactoring, and integrating communications, plotting, and data processing software for an Aerospace internal space object catalog
- Abstraction of an event-based logistics modeling simulation system from use in a specific application to more general use for arbitrary vehicles and cargo elements
- Invented a group of software engineering initiatives, scalable to any database application, to make code easier to use, easier for onboard training, easier for debugging, and easier for the project to be expanded to more contributors

Graduate Research Assistant – Georgia Institute of Technology   Jan, 2023 – May, 2024
Low Gravity Science and Technology Lab

- Simulation of magnetohydrodynamic propulsion systems where induced electric currents and magnetic fields accelerate ambient plasma in orthogonal directions, thus providing thrust
- Optimization of a spherical mirror surface generated by an electromagnetically modified ferrofluid-based liquid mirror in both terrestrial and lunar gravity environments

Undergraduate Research Assistant – Texas A&M University – College Station   Sept, 2022 – Dec, 2022
National Aerothermochemistry and Hypersonics Lab

- CFD simulation of spectra of chemically reacting hypersonic flows in a Mach stem

Undergraduate Research Assistant – Texas A&M University – College Station   Jan, 2022 – Aug, 2022
Laser Diagnostics and Plasma Devices Lab

- Computational modeling of a laser refracted through a particle beam, incorporating low-density effects and the modeling of quantum absorption and refraction spectra

Teaching Assistant – Texas A&M University – College Station   Jan, 2021 – May, 2021
- Graded papers for senior level class in Finite Difference and Finite Element Analysis (AERO 430)

Undergraduate Research Assistant – Texas A&M University – College Station   Jan, 2021 – May, 2021
- Research involved creating a Raman spectroscopy simulation program in Python simulating rotational-vibrational spectra for use in hypersonic flow spectroscopy

SYSTEMS ENGINEERING EXPERIENCE:
Graduate:
Individual School Project: Electric Racecar Optimization
- Research and analysis of component performance characteristics using industry standards
- Analysis of performance constraints of a multidisciplinary and time-dependent problem
- Error analysis and determination of optimal system improvements

Undergraduate:
Individual School Project: Reverse-engineering of the design process of the New Horizons space probe
- Analysis of the ideation and validation stages of the development lifecycle, including CONOPS generation
- Mission-level systemic and technical requirements identification
- Systems validation against requirements

Team School Project: Senior capstone design project – design of a cis-lunar navigational satellite constellation designed to provide high quality navigational data to objects in cis-lunar space, and allow for communication between these objects and Earth
- Lifetime budgetary validation for launch, operations, and component costs
- Verification and validation of navigational system accuracy, the deorbiting procedure, and component and system lifetime
- Pareto analysis and tradespace optimization, written in Python, of the designs generated
- Analysis of simulation limitations used for performance validation and design generation

Team School Project: Space system design project – design of a next generation lunar lander to supplement or replace Starship for missions after Artemis III, Propulsion sub-team
- Significant contributions to system requirements document and trade study plan for propulsion sub-team
- Responsible for trade studies and choice of propellant, nozzle shape, number, placement, and CAD modeling for main and reaction control propulsion engines
- Maintained high breadth and depth of knowledge for propulsion sub-system, serving as the subject matter expert
- Significant contributions to system reference documents at PDR and CDR

HONORS AND AWARDS:
- April, 2024 – National Science Foundation Graduate Research Fellowship Program (NSF GRFP)
- August, 2023 – APS Division of Plasma Physics Travel Grant – This is a selective grant awarded to students presenting their research at the October, 2023 APS DPP meeting. Preference is given to first authors.
- Fall, 2023 – Goizueta Foundation Fellowship at Georgia Tech – This is a renewable fellowship for up to 4 years. Fellowship recipients bring exemplary levels of scholarship and innovation to the academic departments that host their study and research.
- Graduated at 17 years of age from Texas A&M University – College Station, *magna cum laude* (3.89/4.0 GPA), Bachelor of Science in Aerospace Engineering with Engineering Honors, and minors in chemistry and mathematics, December 2022
- Summer, 2022 – Undergraduate Summer Research Grant (USRG) at Texas A&M - College Station – This is a highly selective grant, open to STEM students from all over the country who plan to attend graduate school, funded by the Texas A&M – College Station College of Engineering.
- Dean's Honor Award, Fall, 2022, Spring, 2022, Fall, 2021, Fall 2020, Texas A&M – College Station College of Engineering
- Engineering Honors Program, Texas A&M – College Station Aerospace Engineering Department
- Tau Beta Pi, National Engineering Honor Society, November, 2020
- National Chemistry Olympiad, Honors designation in 2018 and in 2019 (top 150 students nationwide)
- President, Chemistry Club, Lone Star College – Montgomery, 2017

EDUCATION:
- Georgia Institute of Technology, PhD student in Aerospace Engineering, **GPA: 3.9/4.0 (current)**
- Georgia Institute of Technology, **MS in Aerospace Engineering**, December, 2024, **GPA: 3.9/4.0**
- Texas A&M University – College Station, **BS in Aerospace Engineering**, *magna cum laude*, with Engineering Honors, December, 2022, Minors: chemistry and mathematics, **GPA: 3.89/4.0**