

Eric Anthony Comstock

eric.comstock@gatech.edu

cell: (832) 718-1150

ericanthonycomstock.com

Aerospace Engineering PhD student and Research Assistant Low-Gravity Science and Technology Lab Georgia Institute of Technology

SUMMARY OF QUALIFICATIONS:

- Broad and deep experience in aerospace research in multiple domains: high enthalpy/high fidelity hypersonic computational fluid dynamics modeling, light-particle interactions, simulations and numerical algorithm development, optical diagnostics, and currently, magnetohydrodynamics
- Systems Engineering school project experience
- Substantial programming experience creating numerical simulations using Python, C++ and MATLAB
- Graduate courses include Aerothermochemistry, Numerical Methods for Partial Differential Equations, Computational Fluid Dynamics, Turbulent Flows 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
- **3.7/4.0 Graduate GPA** (current), Aerospace Engineering PhD program, Georgia Institute of Technology

TECHNICAL SKILLS:

Languages: Python, C++

Software: Solidworks 3D Modeling, LaTeX, Maple, MATLAB, 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:

Graduate Research Assistant – Georgia Institute of Technology

Low Gravity Science and Technology Lab

Jan, 2023 – Present

- Simulation of propulsion systems which involve the use of induced electric currents and magnetic fields to accelerate ambient plasma in orthogonal directions, thus providing thrust.

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

- Characterization of the refraction and diffraction of monochromatic directed energy through media of changing particle densities, accomplished by superimposing a laser and a rubidium supersonic jet to create a hybrid beam
- Absorption spectroscopy was used in the analysis to determine the magnitudes and types of interactions involved
- Created a Python computational model of a supersonic flow of argon and rubidium through the initial parts of an apparatus designed to test potential laser/particle beam coupling behavior
- Added a model of a section of the apparatus containing collisionless flow, modeling the interactions of a laser with this flow, and comparing the model to the results obtained in the experiment

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

Optical Diagnostics Lab

- Research involved creating a Raman spectroscopy simulation program in Python simulating rotational-vibrational spectra for use in hypersonic flow spectroscopy.

Undergraduate Research Assistant – Texas A&M University – College Station

Jan, 2020 – May, 2020

Michaudel Lab

- Organic chemistry research that resulted in a departmental paper entitled “Bottom-Up synthesis of n-doped Polycyclic Aromatic Hydrocarbons”

SYSTEMS ENGINEERING EXPERIENCE:

Individual School Project: Electric Racecar Optimization – Spring, 2023

- 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

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 – Fall, 2022

- 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

Team School Project: Senior capstone design project – design of a cis-lunar navigational satellite constellation designed to provide high quality navigational data, and allow for communication between these objects and Earth – Spring, 2022

- 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

Individual School Project: Reverse-engineering of the design process of the New Horizons space probe – Fall, 2021

- Stakeholder identification and CONOPS generation
- Mission-level systemic and technical requirements identification
- Systems validation against requirements

HONORS AND AWARDS:

- 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

PROFESSIONAL SOCIETIES: American Physical Society, SGAC Commercial Space Project Group

EDUCATION:

Georgia Institute of Technology, PhD student in Aerospace Engineering (as of January, 2023), GPA: 3.7/4.0

Texas A&M University – College Station, Bachelor of Science in Aerospace Engineering, *magna cum laude*, with Engineering Honors, December, 2022, Minors: chemistry and mathematics, GPA: 3.89/4.0