Eric Anthony Comstock

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

EDUCATION

Georgia Institute of Technology, Atlanta, GA
PhD student, Aerospace Engineering
GPA: 3.9/4.0 (current)

Georgia Institute of Technology, Atlanta, GA
Master of Science, Aerospace Engineering
GPA: 3.9/4.0 December, 2024

Texas A&M University, College Station, TX
B.S. Aerospace Engineering,
Engineering Honors Program
Magna Cum Laude
Minors: Chemistry and Mathematics
GPA: 3.885/4.0 December, 2022

RESEARCH INTERESTS

Advanced Propulsion, Alternative Propulsion, Plasma Physics, Plasma Devices, Laser Diagnostics, Magnetohydrodynamics, Electromagnetism, Computational Fluid and Plasma Dynamics, Simulation Development, High Performance Computing

CURRENT FUNDING

2024 National Science Foundation Graduate Research Fellowship
Goizueta Foundation Fellowship

PROFESSIONAL SOCIETIES

American Institute of Aeronautics and Astronautics (AIAA)
American Physical Society (APS)
Space Generation Advisory Council Commercial Space Project Group

EXPERIENCE

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

- 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
The Aerospace Corporation, Chantilly, VA May, 2024 – August, 2024

- 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, Atlanta, Georgia
Low-Gravity Science and Technology Lab January, 2023 – May, 2024

- Analysis and 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, Texas
National Aerothermochemistry and Hypersonics Lab September, 2022 – December, 2022

- Computational modeling and optical spectrum analysis of hypersonic flows

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

- In the context of beamed propulsion, 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, Texas
Aerospace Engineering Department January, 2021 – May, 2021

- Graded papers for a senior level class in Finite Difference and Finite Element Analysis (AERO 430)

Undergraduate Research Assistant
Texas A&M University, College Station, Texas January, 2021 – May, 2021

- Created a simulation program in Python simulating rotational-vibrational spectra for use in hypersonic flow spectroscopy

JOURNAL ARTICLES

- E. Comstock, H. Chen, T. Hu, Á. Romero-Calvo, "On the Feasibility of Spherical Magnetic Liquid Mirror Telescopes," Astronomy & Astrophysics, *under review*
- Eric A. Comstock, A. Romero-Calvo, "Propellantless Magnetohydrodynamic Deorbiting Systems, " *in preparation*

CONFERENCE PAPERS AND PRESENTATIONS

- Eric A. Comstock, A. Romero-Calvo, "External Plasma-Breathing Magnetohydrodynamic Spacecraft Propulsion," Paper and Oral Conference Presentation at the AIAA SciTech Forum, Orlando, Florida, US, January 6 - 10, 2025
- Neil Rowlands, Alvaro Romero-Calvo, David Stafford, Rebecca Kamire, Amanda Childers, Stephen F. Yates, Emir Rahislic, Sheng-Hai Zheng, Peter Cameron, Gabriel Cano-Gómez**,** Hugh Chen**,** Eric Comstock**,** Miguel Herrada**,** Tianyang Hu, "Development of a self-assembling ferrofluidic ionic liquid mirror", In SPIE Astronomical Telescopes + Instrumentation, Yokohama, Japan, June 16–21, 2024

- Eric A. Comstock, A. Romero-Calvo, "External Plasma-Breathing Magnetohydrodynamic Spacecraft Propulsion," Oral Conference Presentation at the 65th Annual Meeting of the APS Division of Plasma Physics, Denver, Colorado, US, October 30 – November 3, 2023

- Eric A. Comstock, Christopher Limbach, "Methods of Low-Density Gas Simulation in the Context of Beamed Propulsion Techniques," Poster at the Texas A&M University – College Station College of Engineering Undergraduate Summer Research Grant (USRG) Program, August 3, 2022

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

- Davidson Young Scholar, 2010

SKILLS COMSOL Multiphysics, MATLAB, Wolfram Mathematica, Maple, Python, JSON, HTML, C++, R, MS Office, Solidworks, General Mission Analysis Tool (GMAT), CFD, NEQAIR, Pointwise, US3D, OpenMDAO, SIMION 2020, Leadership experience, 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)

RELEVANT COMPLETED COURSEWORK as of May, 2024

Space Plasma Physics, Electric Propulsion, Aerothermochemistry, Numerical Methods of Partial Differential Equations, Computational Fluid Dynamics, Turbulent Flows, Viscous Fluid Flows, Orbital Mechanics, Optimization for Design of Engineered Systems, Space System Design, Air Breathing Propulsion, Chemical Equilibria, Nuclear Chemistry, Physical Chemistry