### **Eric Anthony Comstock**

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EDUCATION Georgia Institute of Technology, Atlanta, GA

PhD student, Aerospace Engineering

GPA: 3.88/4.0 (current)

Georgia Institute of Technology, Atlanta, GA

Master of Science, Aerospace Engineering expected Fall, 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