Tyler Tippens

Doctoral Candidate
Georgia Institute of Technology, Atlanta, GA
tylertippens.github.io

Education

Georgia Institute of Technology – Atlanta, GA
PhD in Computational Space Physics *Expected December 2024*
Minor in Scientific Machine Learning
Advisor - Dr. Sven Simon

Georgia Institute of Technology – Atlanta, GA
Bachelor of Science in Physics *May 2017*
Graduated with High Honors

Research

Georgia Institute of Technology School of Earth and Atmospheric Sciences *January 2020-Present*
Graduate Research Assistant – Dr. Sven Simon

- Develop novel parallelized particle tracing codes to model the production and detection of energetic neutral atoms in moon-magnetosphere interactions using Python/Cython and Julia
- Expanded an existing hybrid plasma simulation code to model the interaction of Titan with Saturn's magnetosphere; contributed to the C++ codebase, improving performance by an order of magnitude
- Extended portability of the plasma code to allow operation on both Georgia Tech and NASA computer clusters
- Established git versioning and wrote documentation on operation of the plasma code
- Presented research on computational methods at several specialized conferences

Georgia Institute of Technology School of Earth and Atmospheric Sciences *January 2016-May 2017*
Undergraduate Research Assistant – Dr. Sven Simon

- Wrote parallelized simulation software to study behavior and surface incidence of energetic ions at Callisto
- Created 3D visualization and impact mapping scripts in Python
- Received President's Undergraduate Research Award in summer 2016 to support this work

Georgia Institute of Technology School of Physics *January 2015-December 2015*
Undergraduate Research Assistant – Dr. Laura Cadonati

- Data analysis and detector characterization for the LIGO Scientific Collaboration (LSC)
- Configured and ran gravitational wave burst pipeline software on LSC computer clusters
- Wrote data visualization scripts in C++ using ROOT
- Identified, categorized, and cataloged glitches in LIGO data using spectrograms generated in Python
- Participated in first ever gravitational wave detection

Teaching

Laboratory Teaching Assistant – Habitable Planet, EAS 1601 (undergraduate course) *January 2023-May 2023*
Georgia Institute of Technology
Ran weekly lab section, produced pre-lab materials, graded lab reports

Teaching Assistant – Earth System Modeling, EAS 6130 (graduate course) *August 2022-December 2022*
Georgia Institute of Technology
Held office hours, graded weekly homework and two exams

Teaching Assistant – Computing for Engineers, CS 1371 (undergraduate course) *August 2014-July 2015*
Georgia Institute of Technology
Taught weekly recitation, held help desk hours, wrote and graded three exams

Peer-Reviewed Journal Publications

Tyler Tippens, Elias Roussos, Sven Simon, Lucas Liuzzo. (2024). **A Novel Backtracing Model to Study the Emission of Energetic Neutral Atoms at Titan**. *Journal of Geophysical Research: Space Physics*, 129, e2023JA032083. DOI:10.1029/2023JA032083

C. Michael Haynes, Tyler Tippens, Peter Addison, Lucas Liuzzo, Andrew R. Poppe, Sven Simon. (2023). **Emission of Energetic Neutral Atoms From the Magnetosphere-Atmosphere Interactions at Callisto and Europa**. *Journal of Geophysical Research: Space Physics*, 128, e2023JA031931. DOI:10.1029/2023JA031931
T.T. Contribution: Guided model development, collaborated on analysis and interpretation of results, and assisted with production of several figures.

Tyler Tippens, Lucas Liuzzo, and Sven Simon. (2022). **Influence of Titan's Variable Electromagnetic Environment on the Global Distribution of Energetic Neutral Atoms**. *Journal of Geophysical Research: Space Physics*, 127, e2022JA30722. DOI:10.1029/2022JA030722

Andre Galli, Audrey Vorbuger, Shane R. Carberry Mogan, Elias Roussos, …, Tyler Tippens, and Lucas Liuzzo. (2022). **Callisto's Atmosphere and its Space Environment: Prospects for the Particle Environment Package on Board JUICE**. *Earth and Space Science*. e2021EA002172. DOI:10.1029/2021EA002172
Contribution: T.T. performed the simulation, produced Figure 8, and assisted with writing the text of section 4.3.

International Conference Presentations

Tyler Tippens, Elias Roussos, Sven Simon, Lucas Liuzzo. **Influence of Titan's Variable Electromagnetic Environment on the Global Distribution of Energetic Neutral Atoms**. *American Geophysical Union Fall Meeting*, poster presentation, December 2023.

Tyler Tippens, Elias Roussos, Sven Simon, Lucas Liuzzo. **Influence of Titan's Variable Electromagnetic Environment on the Global Distribution of Energetic Neutral Atoms**. *Division for Planetary Sciences and Europlanet Science Congress Joint Meeting*, oral presentation, October 2023.

Tyler Tippens. **Modeling Emission of Energetic Neutral Atoms at Titan**. *International HPC Summer School 2023*, virtual poster presentation, July 2023.

Tyler Tippens, Jack Peters, and Sven Simon. **Influence of Titan's Variable Electromagnetic Environment on the Emission of Energetic Neutral Atoms**. *American Geophysical Union Fall Meeting*, virtual poster presentation, December 2020.

Additional Work Experience

Auxier & Associates, Inc. *July 2017-November 2019*
Health Physicist I

- Part of a team of consultants in radiological environmental and human health safety; risk assessment, surveying and remediation, and regulatory compliance
- Led survey and remediation work, including communicating with clients, organizing contractors and subcontractors, performing field measurements, providing remediation oversight, and writing technical reports
- Developed, documented, and supported in-house Android application for wirelessly receiving, displaying, and disseminating survey instrument and GPS readings to improve survey speed, coverage, and data integrity and to provide real-time information in the field
- Participated in writing, editing, and quality assurance of risk assessment and licensing documents for clients and regulatory bodies, including performing and supporting colleagues in calculations, modeling, and research
- Upgraded and maintained radiation survey equipment by installing and supporting wireless instrument communication via Bluetooth
- Developed scripts in C# and VBA for Microsoft Office in collaboration with coworkers to automate tasks and improve the team's workflow

Georgia Institute of Technology Office of Information Technology *January 2016-August 2016*
HPC Systems Support Assistant

- Supported high performance computing with the Partnership for an Advanced Computing Environment (PACE)
- Assisted with hardware break-fix support, inventory management, and HPC system maintenance
- Handled support ticket intake and assisted users

Leadership

Vice President – Society of Physics Students *May 2015-May 2016*

- Planned and organized club meetings, projects, events, fundraisers, and travel, alongside other officers

Coordinator for Spark, Spin, and Freeze – Society of Physics Students *May 2015-May 2016*

- Scheduled, organized, and oversaw community physics outreach program of 6-8 students

Professional Organizations

American Geophysical Union – Member *January 2020-Present*

Europlanet Society – Member *June 2023-Present*

Association for Computing Machinery – Member *October 2023-Present*