Dr. Lucas Liuzzo, Ph.D.

Space Sciences Laboratory
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Positions Held

University of California, Berkeley — *Berkeley, CA*

Assistant Research Scientist, Space Sciences Laboratory — *June 2022 – Present*

- Applying a combination of hybrid plasma modeling and test-particle simulations to study the interaction between outer-planet moons and their local plasma environments.
- Using data analysis techniques to understand particle signatures observed during near-moon encounters from missions including THEMIS-ARTEMIS, Juno, Cassini, Galileo, and Voyager 2.
- Modeling the plasma environments of various solar system objects to forecast conditions during future spacecraft missions to moons throughout the solar system.
- Advising the future generation of planetary and space scientists in modeling and data analysis techniques.

Postdoctoral Scholar, Space Sciences Laboratory — *August 2019 – June 2022*

- Applied various modeling techniques to constrain the electromagnetic environments near the Galilean moons of Jupiter.
- Constrained the high- and low-energy particle environments of select Galilean moons as well as Earth's Moon, based on measurements from multiple spacecraft missions.
- Advised undergraduate and graduate students in applying numerical models to understand moon-plasma interactions.

Georgia Institute of Technology — *Atlanta, GA*

Postdoctoral Scholar, School of Earth and Atmospheric Sciences — *January 2019 – July 2019*

- Applied numerical modeling and data analysis techniques to investigate energetic particle dynamics near Callisto and compared results to magnetic field and energetic particle data from the Galileo mission.
- Used a combination of a hybrid model and test-particle simulation framework to study the influence of plume activity at Europa on energetic particle dynamics near the moon.
- Advised undergraduate and graduate students in studying Europa's interaction with Jupiter's magnetospheric plasma.

Graduate Research Assistant, School of Earth and Atmospheric Sciences — *August 2014 – December 2018*

- Modeled and investigated the plasma interaction of Jupiter's moon Callisto through the use of the established *Adaptive Ion-Kinetic Electron-Fluid* hybrid simulation model and data analysis techniques. Results were compared to data from the Galileo mission, and applied to the future JUICE mission to Jupiter.

University of Michigan — *Ann Arbor, MI*

Undergraduate Research Assistant, Department of Atmospheric, Oceanic and Space Sciences — *January 2013 – August 2014*

- Modeled and analyzed ionospheric disturbances at Earth, studied their effects on atmospheric conditions using the established *Global Ionosphere-Thermosphere Model*, and compared model output with multiple observational data sets of the high-latitude ionosphere.

Education

Georgia Institute of Technology — *Atlanta, GA*

Doctor of Philosophy (Ph.D.), Planetary and Space Physics — *December 2018*

School of Earth and Atmospheric Sciences
Dissertation: *Callisto: Signatures of plasma interaction, induction, and energetic particle dynamics at the Galilean moon*
Advisor: Sven Simon

University of Michigan — *Ann Arbor, MI*

Bachelor of Science in Engineering (B.S.E.), Earth System Science and Engineering, *magna cum laude* — *May 2014*

Department of Atmospheric, Oceanic and Space Sciences
Area of Concentration: Space Weather
Academic Minors: Mathematics, Physics

Peer-reviewed Publications

13 first-authored, peer-reviewed publications (36 in total) | 413 citations | h-index 13

Symbols indicate advised [§] postdoctoral scholars, [†] graduate students, and [‡] undergraduate students

Emission of energetic neutral atoms from the magnetosphere-atmosphere interactions at Callisto and Europa

Charles Haynes[†], Tyler Tippens, Peter Addison[†], **Lucas Liuzzo**, Andrew Poppe, and Sven Simon, *Journal of Geophysical Research (Space Physics), 128*, e2023JA031931, doi:10.1029/2023JA031931.

Callisto's atmosphere: The oxygen enigma

Shane Carberry Mogan[§], **Lucas Liuzzo**, Andrew R. Poppe, Sven Simon, Jamey R. Szalay, Orenthal J. Tucker, and Robert E. Johnson, *Journal of Geophysical Research (Planets), 128*, e2023JE007894, doi:10.1029/e2023JE007894.

Surface-plasma interactions at Europa in draped magnetospheric fields: The contribution of energetic electrons to energy deposition and sputtering

Peter Addison[†], **Lucas Liuzzo**, and Sven Simon. *Journal of Geophysical Research (Space Physics), 128*, e2023JA031734, doi:10.1029/2023JA031734.

Unrestricted solar energetic particle access to the Moon while within the terrestrial magnetotail

Lucas Liuzzo, Andrew R. Poppe, Christina O. Lee, Shaosui Xu, and Vassilis Angelopoulos. *Geophysical Research Letters*, e2023GL103990, doi:10.1029/2023GL103990.

Energetic magnetospheric particle fluxes onto Callisto's atmosphere

Lucas Liuzzo, Andrew R. Poppe, Peter Addison[†], Sven Simon, Quentin Nénon, and Christopher Paranicas (2022), *Journal of Geophysical Research (Space Physics)*, e2022JA030915, doi:10.1029/2022JA030915.

Influence of Titan's variable electromagnetic environment on the global distribution of energetic neutral atoms

Tyler Tippens, **Lucas Liuzzo**, and Sven Simon (2022), *Journal of Geophysical Research (Space Physics), 127*, e2022JA030722, doi:10.1029/2022JA030722.

Pitch angle distribution of MeV electrons in the magnetosphere of Jupiter

Quentin Nénon, Lucas Miller, Peter Kollmann, **Lucas Liuzzo**, Marco Pinto, and Olivier Witasse (2022), *Journal of Geophysical Research (Space Physics), 127*, e2022JA030627, doi:10.1029/2022JA030627.

Energetic charged particle fluxes relevant to Ganymede's polar region

Christopher Paranicas, Barry H. Mauk, Peter Kollmann, George Clark, …, **Lucas Liuzzo**, …, and Scott Bolton (2022), *Geophysical Research Letters*, e2022GL098077, doi:10.1029/2022GL098077.

Callisto's atmosphere and its space environment: Prospects for the Particle Environment Package on board JUICE

Andre Galli, Audrey Vorburger, Shane R. Carberry Mogan[§], Elias Roussos, …, and **Lucas Liuzzo** (2022), *Earth and Space Science, 9*, e2021EA002172, doi:10.1029/2021EA002172.

A statistical study of the Moon's magnetotail plasma environment

Lucas Liuzzo, Andrew R. Poppe, and Jasper S. Halekas (2022), *Journal of Geophysical Research (Space Physics), 127*, e2022JA030260, doi:10.1029/2022JA030260.

Effect of the magnetospheric plasma interaction and solar illumination on ion sputtering of Europa's surface ice

Peter Addison[†], **Lucas Liuzzo**, and Sven Simon (2022), *Journal of Geophysical Research (Space Physics), 127*, e2021JA030136, doi:10.1029/2021JA030136.

Single- and multi-pass magnetometric subsurface ocean detection and characterization in icy worlds using principal component analysis (PCA): Application to Triton

Corey Cochrane, Russell Persigner, Steven Vance, Everett Midkiff, …, **Lucas Liuzzo**, Carol Paty, Karl Mitchell, and Louise Prockter (2022), *Earth and Space Science, 9*, e2021EA002034, doi:10.1029/2021EA002034. *Published as an Editor's Highlight*.

Formation of a displaced plasma wake at Neptune's moon Triton

Sven Simon, Peter Addison[†], and **Lucas Liuzzo** (2022), *Journal of Geophysical Research (Space Physics), 127*, e2021JA029958, doi:10.1029/2021JA029958.

3D Monte-Carlo simulation of Ganymede's water exosphere

Audrey Vorburger, Shahab Fatemi, André Galli, **Lucas Liuzzo**, Andrew R. Poppe, and Peter Wurz (2021), *Icarus*, 114810, doi:10.1016/j.icarus.2021.114810.

Triton's variable interaction with Neptune's magnetospheric plasma

Lucas Liuzzo, Carol Paty, Corey Cochrane, Tom Nordheim, Adrienn Luspay-Kuti, Julie Castillo-Rogez, Kathleen Mandt, Karl L. Mitchell, Mats Holmström, Peter Addison[†], Sven Simon, Andrew R. Poppe, Steven D. Vance, and Louise Prockter (2021), *Journal of Geophysical Research (Space Physics), 126*, e2021JA029740, doi:10.1029/2021JA029740.

ARTEMIS observations of lunar nightside surface potentials in the magnetotail lobes: Evidence for micrometeoroid impact charging

Andrew R. Poppe, Shaosui Xu, **Lucas Liuzzo**, Jasper S. Halekas, and Yuki Harada (2021), *Geophysical Research Letters, 48*, e2021GL094585, doi:10.1029/2021GL094585.

Role of the ionospheric conductance profile in sub-Alfvénic moon-magnetosphere interactions: An analytical model

Sven Simon, **Lucas Liuzzo**, and Peter Addison[†] (2021), *Journal of Geophysical Research (Space Physics), 126*, e2021JA029191, doi:10.1029/2021JA029191.

Investigating the Moon's interaction with the terrestrial magnetotail lobe plasma

Lucas Liuzzo, Andrew R. Poppe, Jasper S. Halekas, Sven Simon, and Xin Cao (2021), *Geophysical Research Letters, 48*, e2021GL093566, doi:10.1029/2021GL093566.

Influence of Europa's time-varying electromagnetic environment on magnetospheric ion precipitation and surface weathering

Peter Addison[†], **Lucas Liuzzo**, Hannes Arnold[†], and Sven Simon (2021), *Journal of Geophysical Research (Space Physics), 126*, e2020JA029087, doi:10.1029/2020JA029087.

Modeling transmission windows in Titan's lower troposphere: Implications for infrared spectrometers aboard future aerial and surface missions

Paul Corlies, George McDonald, Alexander Hayes, James Wray, …, **Lucas Liuzzo**, Jacob Buffo, Ralph Lorenz, and Elizabeth Turtle (2021), *Icarus, 357*, 114228, doi:10.1016/j.icarus.2020.114228.

Applying ion energy spectrograms to search for plumes at Europa

Hannes Arnold[†], Sven Simon, and **Lucas Liuzzo** (2020), *Journal of Geophysical Research (Space Physics), 125*, e2020JA028376, doi:10.1029/2020JA028376.

Variability in the energetic electron bombardment of Ganymede

Lucas Liuzzo, Andrew R. Poppe, Christopher Paranicas, Quentin Nénon, Shahab Fatemi, and Sven Simon (2020), *Journal of Geophysical Research (Space Physics), 125*, e2020JA028347, doi:10.1029/2020JA028347.

Magnetospheric interactions of Saturn's moon Dione (2005–2015)

Norbert Krupp, Anna Kotova, Elias Roussos, Sven Simon, **Lucas Liuzzo**, Chris Paranicas, Krishan Khurana, and Geraint H. Jones (2020), *Journal of Geophysical Research (Space Physics), 125*, e2019JA027688, doi:10.1029/2019JA027688.

Plasma interaction signatures of plumes at Europa

Hannes Arnold[†], **Lucas Liuzzo**, and Sven Simon (2020), *Journal of Geophysical Research (Space Physics), 125*, e2019JA027346, doi:10.1029/2019JA027346.

Energetic electron dynamics near Callisto

Lucas Liuzzo, Sven Simon, and Leonardo Regoli (2019), *Planetary and Space Science, 179*, 104726, doi:10.1016/j.pss.2019.104726.

Energetic ion dynamics in the perturbed electromagnetic fields near Europa

Benjamin Breer[‡], **Lucas Liuzzo**, Hannes Arnold[†], Peter Andersson[‡], and Sven Simon (2019), *Journal of Geophysical Research (Space Physics), 124*, 7592–7613, doi:10.1029/2019JA027147.

Magnetic signatures of a plume at Europa during the Galileo E26 Flyby

Hannes Arnold[†], **Lucas Liuzzo**, and Sven Simon (2019), *Geophysical Research Letters, 46*, 1149–1157, doi:10.1029/2018GL081544. *Published as a Featured Article*.

Energetic ion dynamics near Callisto

Lucas Liuzzo, Sven Simon, and Leonardo Regoli (2019), *Planetary and Space Science, 166*, 23–53, doi:10.1016/j.pss.2018.07.014.

Observability of Callisto's inductive signature during the JUpiter ICy moons Explorer mission

Lucas Liuzzo, Sven Simon, and Moritz Feyerabend (2018), *Journal of Geophysical Research (Space Physics), 123*, 9045–9054, doi:10.1029/2018JA025951.

Coronal mass ejection hits Mercury: A.I.K.E.F. hybrid-code results compared to MESSENGER data

Willi Exner, Daniel Heyner, **Lucas Liuzzo**, Uwe Motschmann, Daikou Shiota, Kanya Kusano, and Takyua Shibayama (2018), *Planetary and Space Sciences, 153*, 89–99, doi:10.1016/j.pss.2017.12.016.

A three-dimensional model of Pluto's interaction with the solar wind during the New Horizons encounter

Moritz Feyerabend, **Lucas Liuzzo**, Sven Simon, and Uwe Motschmann (2017), *Journal of Geophysical Research (Space Physics), 122*, 10,356–10,368, doi:10.1002/2017JA024456.

Magnetic signatures of plasma interaction and induction at Callisto: The Galileo C21, C22, C23, and C30 flybys

Lucas Liuzzo, Sven Simon, Moritz Feyerabend, and Uwe Motschmann (2017), *Journal of Geophysical Research (Space Physics), 122*, 7364–7386, doi:10.1002/2017JA024303.

Disentangling plasma interaction and induction at Callisto: The Galileo C10 flyby

Lucas Liuzzo, Sven Simon, Moritz Feyerabend, and Uwe Motschmann (2016), *Journal of Geophysical Research (Space Physics), 121*, 8677–8694, doi:10.1002/2016JA023236.

The impact of Callisto's atmosphere on its plasma interaction with the Jovian magnetosphere

Lucas Liuzzo, Moritz Feyerabend, Sven Simon, and Uwe Motschmann (2015), *Journal of Geophysical Research (Space Physics), 120*, 9401–9427, doi:10.1002/2015JA021792.

Filamented ion tail structures at Titan: A hybrid simulation study

Moritz Feyerabend, Sven Simon, Uwe Motschmann, and **Lucas Liuzzo** (2015), *Planetary and Space Science, 117*, 362–376, doi:10.1016/j.pss.2015.07.008.

High-latitude ionospheric drivers and their effects on wind patterns in the thermosphere

Lucas Liuzzo, Aaron Ridley, Nicholas Perlongo, Elizabeth Mitchell, Mark Conde, Donald Hampton, William Bristow, and Michael Nicolls (2015), *Journal of Geophysical Research (Space Physics), 120*, 715–735, doi:10.1002/2014JA020553.

Submitted Publications

A model of Ganymede's magnetic and plasma environment during the Juno PJ34 flyby

Aaron Stahl, Peter Addison†, Sven Simon, and **Lucas Liuzzo**, *Journal of Geophysical Research (Space Physics)*.

A novel backtracing model to study the emission of energetic neutral atoms at Titan

Tyler Tippens, Elias Roussos, Sven Simon, and **Lucas Liuzzo**, *Journal of Geophysical Research (Space Physics)*.

3D Monte-Carlo simulation of Ganymede's atmosphere

Audrey Vorburger, Shahab Fatemi, Shane R. Carberry Mogan, André Galli, **Lucas Liuzzo**, Andrew R. Poppe, Lorenz Roth, and Peter Wurz, *Icarus*.

Science Return of Probing Magnetospheric Systems of Ice Giants

Xin Cao, Xiangning Chu, Sean Hsu, Hao Cao, Weijie Sun, **Lucas Liuzzo**, …, and Ferdinand Plaschke. *Frontiers in Astronomy and Space Sciences*.

Funded Proposals

Characterizing the Solar Energetic Particle Environment near the Moon

PI: Lucas Liuzzo (SSL)

Principal Investigator

2022 NASA Lunar DAP

Budgeted for 14 months over 3 years from the total of $478,104.

Paving the Road to Jupiter's Icy Moons

PIs: A. Poppe and Q. Nénon

Junior Scientist

2023 France-Berkeley Fund

Provides travel funds for active collaborations between Berkeley scientists and their French colleagues.

Emission of Energetic Neutral Atoms at Callisto and Europa

PI: S. Simon (Georgia Tech)

Co-Investigator

2020 NASA Solar System Workings

Budgeted for 12 months over 3 years from the total of $499,674.

Anisotropy of the radiation belts of Jupiter in the Europa-Ganymede region — *Science PI: Q. Nénon (SSL)*

Funded Science Team Member — *2020 NASA New Frontiers DAP*

Budgeted for 4 months over 3 years from the total of $352,055.

Energetic Particle Bombardment of Callisto — *Science PI: Lucas Liuzzo (SSL)*

Science Principal Investigator — *2019 NASA Solar System Workings*

Budgeted for 24 months over 3 years from the total of $349,981.

Energetic Ion Dynamics at Europa — *PI: S. Simon (Georgia Tech)*

Funded Science Team Member — *2018 NASA Solar System Workings*

Budgeted for 3 months over 3 years from the total of $328,469.

First-Authored Presentations

Invited Talks

On the Moon's interaction with the terrestrial magnetosphere. Taiwan Space Union, Mini-Moon-Seminar Series, 01/2022.

Triton's variable interaction with Neptune's magnetosphere. Trident/Neptune-Odyssey Workshop, 07/2021.

Studying the plasma interactions of the icy outer planet moons. NASA Jet Propulsion Laboratory, 01/2021.

Modeling the plasma environments of Jupiter's icy moons: A gateway to understanding their atmospheres, surfaces, and interiors. Illinois State University, Department of Physics, 02/2020.

Callisto: Signatures of plasma interaction, induction, and energetic particle dynamics. University of California, Berkeley, Space Sciences Laboratory, 03/2019.

Callisto: Signatures of plasma interaction, induction, and energetic particle dynamics. Johns Hopkins University, Applied Physics Laboratory, 01/2019.

A comprehensive picture of Callisto's magnetic and cold plasma environment during the Galileo era: Implications for JUICE. American Geophysical Union Fall Meeting, New Orleans, LA, USA, 12/2017.

Callisto's magnetic environment during the Galileo era. University of Braunschweig Institute for Theoretical Physics, Braunschweig, Germany, 06/2017.

Callisto's interaction with Jupiter's magnetospheric plasma. German Aerospace Center, Berlin, Germany, 05/2016.

Modeling Callisto's interaction with the Jovian magnetosphere (workshop). University of Braunschweig, Institute of Geophysics and Extraterrestrial Physics, Braunschweig, Germany, 04/2016.

The interaction of Callisto's atmosphere with the Jovian magnetosphere. International School/Symposium for Space Simulations, Prague, Czech Republic, 07/2015.

Contributed Presentations

^{T} indicates a contributed talk | ^{P} indicates a contributed poster

The importance of plasma measurements for ice giant moon science.^{P} Uranus Flagship Workshop, Pasadena, CA, USA, 07/2023.

Unrestricted solar energetic particle access to the Moon while within the terrestrial magnetotail.^{T} Dust, Atmosphere, and Plasma Environment of the Moon and Small Bodies Workshop, Boulder, CO, USA, 06/2023.

A statistical study of the Moon's magnetotail plasma environment.^{T} THEMIS/ARTEMIS SWT Meeting, Chicago, IL, USA, 12/2022.

A statistical study of the Moon's magnetotail plasma environment.^{P} American Geophysical Union Fall Meeting, Chicago, IL, USA, 12/2022.

A statistical study of the Moon's magnetotail plasma environment.^{P} Europlanet Science Congress, Granada, Spain, 09/2022.

Energetic particle fluxes onto Callisto's atmosphere.^{T} Europlanet Science Congress, Granada, Spain, 09/2022.

Energetic particle fluxes onto Callisto's atmosphere.^{T} Magnetospheres of the Outer Planets Meeting, Liège, Belgium, 07/2022.

Formation of a tilted plasma wake at Neptune's moon, Triton.^{P} Magnetospheres of the Outer Planets Meeting, Liège, Belgium, 07/2022.

Energetic particle deposition onto Callisto's atmosphere.^{P} American Geophysical Fall Meeting, Virtual, 12/2021.

Investigating the Moon's interaction with the terrestrial magnetotail lobe plasma.^{P} American Geophysical Fall Meeting, Virtual, 12/2021.

Triton's variable interaction with Neptune's magnetosphere.[P] American Geophysical Union Fall Meeting, Virtual, 12/2021.

Investigating the Moon's interaction with the terrestrial magnetotail lobe plasma.[P] NASA Exploration Science Forum, Virtual, 07/2021.

Triton's variable interaction with Neptune's magnetosphere.[P] Magnetospheres of the Outer Planets Meeting, Virtual, 07/2021.

Variability in the energetic electron bombardment of Ganymede.[P] American Geophysical Union Fall Meeting, Virtual, 12/2020.

Variability in the energetic electron bombardment of Ganymede.[P] Outer Planet Moon-Magnetosphere Interactions Workshop, Virtual, 11/2020.

Variability in the energetic electron bombardment of Ganymede.[P] Europlanet Science Congress, Virtual, 09/2020.

The dynamics of energetic ions and electrons while embedded in Callisto's perturbed electromagnetic environment.[T] American Geophysical Union Fall Meeting, San Francisco, CA, USA, 12/2019.

Energetic electron dynamics near Callisto.[P] American Geophysical Union Fall Meeting, San Francisco, CA, USA, 12/2019.

Energetic ion dynamics near Callisto.[P] American Geophysical Union Fall Meeting, Washington, D.C., USA, 12/2018.

Understanding Callisto's interaction with the Jovian magnetosphere: A case study of the Galileo C10 flyby.[T] Committee on Space Research Proceedings, Pasadena, CA, USA, 07/2018.

The impact of Callisto's atmosphere on its plasma interaction with the Jovian magnetosphere.[P] Committee on Space Research Proceedings, Pasadena, CA, USA, 07/2018.

A comprehensive picture of Callisto's magnetic environment during the Galileo era: Implications for JUICE.[P] Committee on Space Research Proceedings, Pasadena, CA, USA, 07/2018.

Energetic ion dynamics near Callisto.[P] Committee on Space Research Proceedings, Pasadena, CA, USA, 07/2018.

Energetic ion dynamics near Callisto.[T] Magnetospheres of the Outer Planets Meeting, Boulder, CO, USA, 07/2018.

Energetic ion dynamics near Callisto.[P] Magnetospheres of the Outer Planets Meeting, Boulder, CO, USA, 07/2018.

A comprehensive picture of Callisto's magnetic environment during the Galileo era: Implications for JUICE.[P] Magnetospheres of the Outer Planets Meeting, Boulder, CO, USA, 07/2018.

Energetic ion dynamics near Callisto.[T] Asia Oceania Geosciences Society Meeting, Honolulu, HI, USA, 06/2018.

A comprehensive picture of Callisto's magnetic environment during the Galileo era.[P] Asia Oceania Geosciences Society Meeting, Honolulu, HI, USA, 06/2018.

Plasma interaction and energetic particle dynamics near Callisto.[P] American Geophysical Union Fall Meeting, New Orleans, LA, USA, 12/2017.

A comprehensive picture of Callisto's magnetic environment during the Galileo era: Implications for JUICE[T], JUpiter ICy moons Explorer Radio and Plasma Wave Instrument Team Meeting, Virtual, 09/2017.

A comprehensive picture of Callisto's magnetic environment during the Galileo era.[T] Magnetospheres of the Outer Planets Meeting, Uppsala, Sweden, 06/2017.

Plasma interaction and energetic particle dynamics near Callisto: A case study of the Galileo C10, C21, and C23 flybys.[P] Magnetospheres of the Outer Planets Meeting, Uppsala, Sweden, 06/2017.

Plasma interaction and induction at Callisto: Hybrid simulation study of the Galileo C10 flyby.[T] American Geophysical Union Fall Meeting, San Francisco, CA, USA, 12/2016.

Plasma interaction and induction at Callisto: Case studies of Galileo magnetic field data.[P] American Geophysical Union Fall Meeting, San Francisco, CA, USA, 12/2016.

Plasma interaction and induction signatures at Callisto: Preparations for JUICE.[T] European Geophysical Union General Assembly, Vienna, Austria, 04/2016.

Modeling Callisto's interaction with the Jovian magnetospheric environment.[P] American Geophysical Union Fall Meeting, San Francisco, CA, USA, 12/2015.

Studying the effect of atmospheric configuration on plasma interaction at Callisto.[P] International School/Symposium for Space Simulations, Prague, Czech Republic, 07/2015.

Studying moon-magnetosphere interactions at Callisto and Titan.[P] International School/Symposium for Space Simulations, Prague, Czech Republic, 07/2015.

Studying the effect of atmospheric configuration on plasma interaction at Callisto.[P] Magnetospheres of Outer Planets Meeting, Atlanta, GA, USA, 06/2015.

A statistical comparison of coupled thermosphere-ionosphere models. [T] American Geophysical Union Fall Meeting, San Francisco, CA, USA, 12/2014.

High-latitude ionospheric drivers and their effects on wind patterns in the thermosphere. [P] Coupling, Energetics and Dynamics of Atmospheric Regions Annual Conference, Seattle, WA, USA, 06/2014.

A statistical comparison of thermosphere-ionosphere models. [P] Coupling, Energetics and Dynamics of Atmospheric Regions Annual Conference, Seattle, WA, USA, 06/2014.

High-latitude ionospheric drivers and their effects on wind patterns in the thermosphere. [P] American Geophysical Union Fall Meeting, San Francisco, CA, USA, 12/2013.

High-latitude ionospheric drivers and their effects on wind patterns in the thermosphere. [T] Joint Geospace Environment Modeling and Coupling, Energetics, and Dynamics of Atmospheric Regions (GEM-CEDAR) Workshop, San Francisco, CA, USA, 12/2013.

Awards, Honors, and Recognition

Jun. 2018	**Asia Oceania Geosciences Society Annual Conference,** Best Poster Contest, 1st prize	*Honolulu, HI*
May. 2018	**Georgia Institute of Technology School of Earth and Atmospheric Sciences,** Best Paper Award	*Atlanta, GA*
May. 2017	**Georgia Institute of Technology School of Earth and Atmospheric Sciences,** Research Excellence Award	*Atlanta, GA*
Dec. 2015	**Georgia Institute of Technology School of Earth and Atmospheric Sciences,** Student of the Month	*Atlanta, GA*
Jul. 2015	**International School/Symposium for Space Simulations,** Best Poster Contest, 1st prize	*Prague, CZ*
Jun. 2014	**Community Coordinated Modeling Center,** Student Research Contest, 1st prize ionospheric category	*Seattle, WA*
2010–2014	**University of Michigan College of Engineering,** Paul B. and Ruth A. Hayes Scholarship Recipient	*Ann Arbor, MI*

Teaching Experience

Advanced Space Plasma Physics (Co-Instructor) — *Georgia Institute of Technology*

Lectured students, held office hours, designed and graded weekly homework sets and two exams. — *Spring 2018*

Earth System Modeling (Teaching Assistant) — *Georgia Institute of Technology*

A course focused on solving ordinary and partial differential equations through numerical techniques. — *Fall 2018, Fall 2017, Spring 2017*

Advanced Space Plasma Physics (Teaching Assistant) — *Georgia Institute of Technology*

A course studying non-linear processes in plasma physics (e.g., waves, instabilities, shocks, and discontinuities). — *Fall 2016*

Introduction to Space Plasma Physics (Teaching Assistant) — *Georgia Institute of Technology*

A course focused on introducing students to concepts in space plasmas including particle dynamics in electromagnetic fields, planetary magnetospheres, and solar physics. — *Fall 2015*

Habitable Planets (Teaching Assistant) — *Georgia Institute of Technology*

A course introducing students to the concept of habitability in the solar system and beyond. — *Spring 2015*

Advising Experience

Shane Carberry Mogan — *Space Sciences Laboratory*

Postdoctoral Scholar (Co-Advised) — *Fall 2022 – Present*

Charles Michael Haynes — *Georgia Institute of Technology*

Ph.D. Student (Co-Advised) — *Fall 2022 – Present*

Peter Addison — *Georgia Institute of Technology*

Undergraduate Student; Ph.D. Candidate (Co-Advised) — *Spring 2019 – Present*

Hannes Arnold — *Georgia Institute of Technology*

Ph.D. Candidate (Co-Advised), Successfully defended in Fall 2020 — *Fall 2017 – Fall 2020*

Benjamin Breer — *Georgia Institute of Technology*

Undergraduate Student — *Fall 2018 – Spring 2020*

Peter Andersson — *Georgia Institute of Technology*

Undergraduate Student — *Fall 2018 – Spring 2020*

Professional and Community Involvement

HERMES Suite on NASA's Lunar Gateway

Working with the team at UC Berkeley to develop data products from the SPAN-I instrument — *2023 – Present*

NASA Panel and Proposal Reviewer

Helping review the next generation of proposals from students and researchers in Planetary and Space Sciences. — *2018 – Present*

Convener: Moon-Plasma Interactions Throughout the Solar System

Session at the annual Fall Meeting of the American Geophysical Union. — *2017 – Present*

Member: American Geophysical Union

2013 – Present

NASA's Trident Mission to Neptune's moon Triton

Provided modeling support as a Science Team Member to facilitate detection of Triton's subsurface ocean during Phase A. — *2020 – 2021*

Reviewer: President's Undergraduate Research Award Proposals

Georgia Institute of Technology. — *2018 – 2019*

Student Member: The Planetary Society

Georgia Institute of Technology Chapter. — *2014 – 2018*

Student Member: Geophysics Faculty Search Committee

School of Earth and Atmospheric Sciences, Georgia Institute of Technology. — *Spring 2017*

Graduates in Earth and Atmospheric Sciences (GEAS)

School of Earth and Atmospheric Sciences, Georgia Institute of Technology.

- Social Committee Chair (2016 – 2017)
- President (2015 – 2016)
- Treasurer (2014 – 2015)
- Planetary Science Representative (2014 – 2015)

Local Organizing Committee: Magnetospheres of the Outer Planets Meeting

Hosted in Atlanta, GA on the campus of the Georgia Institute of Technology. — *Jun. 2015*

Student Representative: Undergraduate Curriculum Committee

Department of Atmospheric, Oceanic and Space Sciences, University of Michigan. — *2013 – 2014*