

CURRICULUM VITAE

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Education & Degrees:

August 2021 – Ph.D. in Physics and Applied Physics
August 2025 The University of Texas at Arlington
Arlington, TX, USA
September 2017 – B.A. in Physics, Minor in Geology
May 2021 Gustavus Adolphus College
St. Peter, MN, USA

Employment & Teaching Experience:

August 2025 – Visiting Assistant Professor, Department of Physics, Gustavus
Present Adolphus College, St. Peter, MN
August 2021 – Graduate Teaching Assistant, Department of Physics, The University of
August 2025 Texas at Arlington, Arlington, TX
September 2022 – Graduate Research Assistant, Department of Physics, The University of
June 2024 Texas at Arlington, Arlington, TX
February 2019 – Laboratory Teaching Assistant, Department of Physics, Gustavus
May 2021 Adolphus College, St. Peter, MN

Publication List:

1. **Fredrick, E.**, Hong, Y., Lopez, R., and Deng, Y. (2025) The Impact of OMNI Data Accuracy on Thermospheric Neutral Density Simulations at Grid Cell Resolutions. *Space Weather*. <https://doi.org/10.1029/2025SW004374>
2. **Fredrick, E.** and Lopez, R. (2025) Propagation Reliability of Geomagnetic Storm Drivers in the OMNI Data: Coronal Mass Ejections and High-Speed Streams. *Space Weather (in review)*
3. **Fredrick, E.** (2025) Uncertainty in Solar Wind Propagation: An Analysis of L1 to Earth Variability and the Implications for Geospace Modeling in Space Weather Operations. [Doctoral dissertation, The University of Texas Arlington]

Selected Research Experience & Interests:

1. Investigations in the Reliability of Solar Wind Propagated to Earth's Bow Shock
September 2022 – Present
This study characterizes the ability of OMNI to project upstream solar wind measurements to Earth's bow shock by correlating in-situ measurements of solar wind by

THEMIS in Earth's orbit along the Earth-Sun line. Further work to describe the impact of solar wind parameters in propagation uncertainty is currently ongoing.

2. CUSIA - Center for the Unified Study of Interhemispheric Asymmetries
January 2022 - August 2022
Conducted research in conjunction with collaborators at a NASA Phase 1 DRIVE center on asymmetric ring currents.
3. CHAOS VII – Improving Strong-Line Abundance Calibrations
The Ohio State University, June 2020 - January 2021
Undergraduate REU program. Analyzed various spiral galaxy strong-line metal abundance calibration methods to reduce discrepancy between calculated abundances those found with direct-method techniques.

Conference Presentations & Abstracts:

1. Omni Data Accuracy and the Implications for Space Weather Simulation. 2025 Asian Oceania Geosciences Society Annual Meeting. *Poster Presentation*. Ramon Lopez, **Espen Fredrick**, Yue Deng, Yu Hong. July 27-August 1, Singapore.
2. Analysis of OMNI High-Speed Stream and Coronal Mass Ejection Propagation Reliability to Earth's Bow Shock. 2025 Space Weather Workshop. *Lightning Talk and Poster Presentation*. **Espen Fredrick**, Ramon Lopez, Yu Hong, Yue Deng. April 17-24, Boulder, CO.
3. Examining the Effects of Variability in Global Model Inputs on Model Outputs at Large and Small Scales. 2024 GEM Workshop. *Poster Presentation*. **Espen Fredrick**, Ramon Lopez. June 23-28, Fort Collins, CO.
4. Space Weather: An Overview (Student Tutorial Day 2024). 2024 GEM Workshop. *Invited Talk*. June 23-28, Fort Collins, CO.
5. Examining the Accuracy of The OMNI Data in Representing ICME Observations Near Earth and the Effect on Global Modeling. 2024 Space Weather Workshop. *Lightning Talk and Poster Presentation*. April 15-19, Boulder, CO.
6. The Variable Reliability of Solar Wind Data from OMNI. 2023 African Geophysical Society Workshop. *Oral Presentation*. September 26-October 4, Lusaka, Zambia.
7. Determining the reliability of OMNI data to predict solar wind conditions at Earth. 2023 GEM Workshop. *Poster Presentation*. June 11-16, San Diego, CA.

Other Awards & Professional Service:

1. UTA graduate school dissertation fellowship – *May 2025*
2. Truman D. Black endowed scholarship in physics – *May 2025*
3. NASA review panel executive secretary – *February 2025*
4. Sigma Pi Sigma National Physics Honor Society Member
5. Gustavus First-Year Research Experience Grant – *May 2018*
6. Gustavus Fuller Scholarship Recipient – *May 2020*
7. NASA Night Sky Network Recognition of Exceptional Outreach – *November 2018*
8. American Geophysical Union member

Relevant Education:

1. Boulder Space Weather Summer School. July 18-29, 2022. Boulder, CO.
2. Iberian Space Science Summer School. June 6-10, 2022. Alcalá de Henares, Spain.

3. Space Physics II (*professor: Dr. Victoria Wilder*). Spring 2023.
4. Space Physics I (*professor: Dr. Ramon Lopez*). Fall 2022.
5. Mathematical Methods III (*professor: Dr. Amir Shahmoradi*). Spring 2023.