BRIANNA N. ISOLA

brianna.isola@unh.edu
linkedin.com/in/briannaisola/
0000-0001-9563-9920

Education

University of New Hampshire, *Durham, NH* — Aug. 2020–May 2026 (expected)
Ph.D. Physics

University of New Hampshire, *Durham, NH* — Sept. 2024
M.S. Physics

Stony Brook University, *Stony Brook, NY* — May 2020
B.S. Physics, B.S. Astronomy

Highlighted Coursework: *High-Performance Computing, MHD of the Heliosphere, Data Mining & Predictive Analytics, Plasma Physics*

Experience

University of New Hampshire, **Graduate Research Assistant**, *Durham, NH* — May. 2021–Present

- Developed the first neural network (NN) driven model of the inner magnetospheric electric field trained with NASA MMS mission time series data.
- Responsibilities include experimenting with different model types (ANNs, CNNs, KANs, LSTMs), model optimization, and model applications to study magnetospheric phenomena such as subauroral polarization streams.
- Characterizing particle dynamics by implementing particle tracing into global electric and magnetic field models for select geomagnetically quiet and active periods.

Frontier Development Lab, **Researcher**, *Mountain View, CA* — Jun. 2024–Aug. 2024

- Hosted by NASA and Trillium Technologies; Prestigious and intensive summer program on assembled team of space, AI and ML experts.
- Project focused on developing an updated density and temperature model of the 3D solar atmosphere using neural radiance fields (NeRFs) to study irradiance on Mars and aid future NASA martian missions.
- Milestones include collaboration with top-tier AI and physics partners (Google Cloud, NVIDIA), a technical showcase, and advancement of space weather prediction models.

Los Alamos National Laboratory, **Summer Research Fellow**, *Los Alamos, NM* — Jun. 2023–Aug. 2023

- Responsibilities include applying system science techniques to magnetohydrodynamic simulation: Canonical correlation analysis used to compare GAMERA MHD model with OMNI solar wind data.
- Active collaboration between LANL, Johns Hopkins APL, and the Space Science Institute.

Northwest Research Associates, **Research Intern**, *Boulder, CO* — Aug. 2020–Dec. 2020

- Continuation of REU Research: Modeled the coronal magnetic field to quantify released energy during solar reconnection event.

Boulder Solar Alliance REU, **Research Intern**, *Boulder, CO* May 2019–Aug. 2019

- Modeled the coronal magnetic field using the CFITS non-linear force-free extrapolation code and identified individual current systems by looking at photospheric concentrations of current within the extrapolation volume to determine energy that might be released in a single reconnection event.
- Methodology included use of IDL and Fortran.

Flatiron Center for Computational Astrophysics, **Summer Intern**, *New York, NY* Jun. 2018–Aug. 2018

- Responsibilities include estimating the probability of detection of two coalescing supermassive black holes in eccentric orbit using Python.
- Attended weekly journal club at the American Museum of Natural History.

Honors, Awards & Fellowships

- **Future Investigators in NASA Earth and Space Science and Technology (FINESST)** (2024-2026), *NASA.*
  Competitive and selective research grant award for doctoral students that provides support for up to three years at $50K per year.
- **Dorothy Kittredge Memorial Scholarship** (2024), *University of New Hampshire.*
  Scholarship awarded to one UNH College of Engineering and Physical Sciences graduate student per year with strong academic merit and enthusiasm for volunteering and community impact.
- **Vela Fellowship** (2023), *Los Alamos National Laboratory.*
  Awarded to selected students of the Space Weather Summer School.
- **603 Challenge Travel Grant Award** (2023), *University of New Hampshire.*
  Awarded to attend the SIGGRAPH 2023 conference.
- **NASA Space Grant Fellowship** (2021–2022), *NASA, New Hampshire Space Grant Consortium.*
  Selective fellowship awarded for research-based graduate study in NASA-related disciplines.
- **AGU Fall Meeting Student Travel Grant** (2019), *American Geophysical Union, Sponsor: Lockheed Martin.*
  Awarded to attend the AGU 2019 fall meeting for students with strong scientific merit demonstrated in submitted abstract and grant application.
- **WISE (Women in Science and Engineering) Honor Society Scholarship** (2016–2020), *Stony Brook University.*
  Very selective award given to academically accomplished and well-rounded students with demonstrated aptitude and interest in STEM subjects.
- **Presidential Scholarship** (2016–2020), *Stony Brook University.*
  Awarded to seniors in high school who have achieved a meritorious unweighted high school average.

Skills

Programming	Python (Pandas, SunPy), C/C++ (Boost, OpenMP), IDL, FORTRAN
ML/AI	Deep Learning, NNs, NeRFs, PyTorch, Tensorflow, Scikit-learn
Technical	Cloud Computing (GCP), HPC/Parallel Computing
Software & Tools	ds9, IRAF, Adobe Suite (Photoshop, Illustrator, InDesign)

Academic Service & Development

Teaching
PHYS 407: General Physics I Lab – University of New Hampshire, Spring 2021
PHYS 407: General Physics I Lab – University of New Hampshire, Fall 2020

Workshops & Summer Schools
Python in Heliophysics Summer School (May 20th 2024–May 24th 2024), *Boulder, CO* (attended remotely).
Machine Learning Summer School (March 4th–March 15th 2024), *Okinawa, Japan.*
Los Alamos National Lab Space Weather Summer School (June–July 2023), *Los Alamos, New Mexico.*
Python in Heliophysics Summer School (May 30th 2022–June 3rd 2022), *Madrid, Spain* (attended remotely).

Professional
AGU SPA Student Advisory Committee, Co-Chair (2024–2025)
Geospace Environmental Modeling Workshop Student Advisory Committee (2024-2025)
University of New Hampshire CEPS Student Advisory Board (2024-2025)
Early Career Session Convener, AGU Fall Meeting (2024)
University of New Hampshire Graduate Council (2023–2024)
Selected Student Volunteer, SIGGRAPH Conference (2023)
Graduate Student Senate Executive Committee, Community Coordinator (2023–2024)

Reviewer: Journal of Geophysical Research

Outreach

Citizen Continental-America Telescopic Eclipse (CATE) Project Feb. 2024 – Apr. 2024
`https://eclipse.boulder.swri.edu/`
I am selected to lead one of 35 teams across the United States to take data during the April 2024 total eclipse under the path of totality. Observation teams will generate high-dynamic-range images to study the lower to middle corona. Provided equipment will be kept for future outreach events within my local community.

Presentations & Publications

[14] **Isola, Brianna**, Matthew R. Argall, and R. B. Torbert. *A Data-Driven Model of the Earth's Inner Magnetospheric Electric Field*. Poster. Machine Learning Summer School. Okinawa, Japan, Mar. 2024.

[13] **Isola, Brianna**, Matthew R. Argall, and R. B. Torbert. *Data-Driven Methods for Characterizing the Inner Magnetospheric Electric Field*. Poster. Geospace Environment Modeling Workshop. Fort Collins, CO, June 2024.

[12] **Isola, Brianna**, Matthew R. Argall, and R. B. Torbert. *Update to ML-IMEF: A Data-Driven Model of the Inner Magnetospheric Electric Field*. Oral Talk. MMS 10th Community Workshop. Los Angeles, CA, Sept. 2024.

[11] (★ *Invited*) **Isola, Brianna** et al. *Characterizing Particle Dynamics from a Data-Driven Model of the Inner Magnetospheric Electric Field*. Poster. American Geophysical Union Fall Meeting. San Francisco, CA., Dec. 2023.

[10] **Isola, Brianna** et al. *Particle dynamics derived from a data-driven model of the inner magnetospheric electric field*. Poster. Geospace Environment Modeling Workshop. San Diego, CA, June 2023.

[9] **Isola, Brianna** et al. *System Science Tools for MHD Simulations*. Oral Talk. American Geophysical Union Fall Meeting. San Francisco, CA., Dec. 2023.

[8] (★ *Invited*) **Isola, Brianna** et al. *System Science Tools for MHD Simulations*. Oral Talk. UNH EOS Space Science Seminar Series. Durham, NH., Oct. 2023.

[7] Izzak Boucher, Matthew R. Argall, and **Isola, Brianna**. *Global model of the electric potential using regularized linear regression and neural networks*. Oral presentation. Geospace Environment Modeling Workshop. Honolulu, HI, June 2022.

[6] **Isola, Brianna** et al. *A dynamic, 3D model of the inner magnetospheric electric field*. Poster. Geospace Environment Modeling Workshop. Honolulu, HI, June 2022.

[5] **Isola, Brianna** et al. *Characterizing particle dynamics from a data-driven model of the inner magnetospheric electric field*. Poster. American Geophysical Union Fall Meeting. Chicago, IL., Dec. 2022.

[4] Vincent E. Ledvina et al. "How open data and interdisciplinary collaboration improve our understanding of space weather: A risk and resiliency perspective". In: *Frontiers in Astronomy and Space Sciences* 9 (Dec. 2022). ISSN: 2296-987X.

[3] Izzak Boucher, Matthew R. Argall, and **Isola, Brianna**. *New Inner Magnetospheric Electric Field Model Maps Electric Potential using MMS data*. Oral presentation. MMS Community Workshop. Waterville Valley, NH, Oct. 2021.

[2] **Isola, Brianna** et al. *A neural network-driven approach to inner magnetospheric electric field modelling*. Poster. American Geophysical Union Fall Meeting. New Orleans. LA, Dec. 2021.

[1] **Isola, Brianna** et al. *The How and Why of Big Solar Flares*. Poster. American Geophysical Union Fall Meeting. San Francisco, CA., Dec. 2019.