

RAMAN MUKUNDAN

raman.mukundan@unh.edu \diamond github.com/ramanm262

University of New Hampshire

Durham, New Hampshire, United States of America

EDUCATION

Doctor of Philosophy in Physics, University of New Hampshire 2020 - Present

Bachelor of Arts in Physics, University of Colorado Boulder 2016 - 2019

RESEARCH

Geomagnetic Disturbance Modeling Aug 2020 - Present

University of New Hampshire - Research advisor: Dr. Amy Keese

Developing space weather forecasting models to predict geomagnetically induced currents (GICs). Implemented neural networks and other machine learning algorithms for high-cadence timeseries analysis. Probing the drivers of localized geomagnetic disturbances with explainable models.

Frontier Development Lab Jun 2023 - Aug 2023

Trillium Technologies in partnership with NASA, Google Cloud, and NVIDIA

Elevated the DAGGER geomagnetic perturbation forecasting model to higher Technology Readiness Level. Used multiple cloud platforms to train and integrate machine learning components in operational pipeline.

CU Boulder Honors Thesis 2019

Research advisors: Dr. Daniel Baker and Dr. Thomas Berger

Independently studied theoretical ground-level enhancement precursor signals in neutron monitor data. Applied solar physics, time series analysis, and machine learning techniques. Wrote a final paper and defended a thesis before a committee. Awarded *summa cum laude*.

PEER-REVIEWED PUBLICATIONS

- **Mukundan, R.**, Keese, A., Marchezi, J. P., Pinto, V. A., Coughlan, M., and Hampton, D. (2025) Localized geomagnetic disturbances: a statistical analysis of spatial scale. *Frontiers in Astronomy and Space Sciences*. 12:1610276. <https://doi.org/10.3389/fspas.2025.1610276>
- Coughlan, M., Keese, A., Pinto, V., **Mukundan, R.**, Marchezi, J. P., Johnson, J., Connor, H., & Hampton, D. (2023). Probabilistic forecasting of ground magnetic perturbation spikes at mid-latitude stations. *Space Weather*. <https://doi.org/10.1029/2023sw003446>
- Pinto, V. A., Keese, A. M., Coughlan, M., **Mukundan, R.**, Johnson, J. W., Ngwira, C. M., & Connor, H. K. (2022). Revisiting the ground magnetic field perturbations challenge: A machine learning perspective. *Frontiers in Astronomy and Space Sciences*. <https://doi.org/10.3389/fspas.2022.869740>

SELECTED CONFERENCE PRESENTATIONS AND INVITED TALKS

- Multiscale Geoeffectiveness Forecasting: Upgrading the DAGGER Pipeline, AGU Fall Meeting, December 2023, San Francisco, CA (poster)
- Localized Geomagnetic Storm Forecasting from Sun to Mud, UNH EOS Space Science Seminar, October 2023, Durham, NH (**invited**)
- Forecasting Ground-Level Magnetic Perturbations Using a Spherical Elementary Current System Method, AGU Fall Meeting, December 2021, New Orleans, LA (**invited**)