RAMAN MUKUNDAN

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U.S. Citizen

(720) 270-8182

INTERESTS

I am a physicist with the mind of an engineer, or sometimes the other way around. I am interested in technologies that assure the safety of instrumentation and human life in space and on other worlds.

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 Keesee

Developing space weather forecasting models to predict geomagnetically induced currents (GICs). Implemented neural networks and other machine learning algorithms for high-cadence timeseries analysis.

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.

PEER-REVIEWED PUBLICATIONS

- Coughlan, M., *et al.* 2023). Probabilistic forecasting of ground magnetic perturbation spikes at mid-latitude stations. Space Weather, 21, e2023SW003446. https://doi.org/10.1029/2023SW003446
- Pinto, V.A., *et al.* (2022) "Revisiting the Ground Magnetic Field Perturbations Challenge: A Machine Learning Perspective." *Frontiers in Astronomy and Space Sciences*, 9:869740. doi: 10.3389/fspas.2022.869740

PROJECTS

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*.

SKILLS

Computer Languages	Python, C/C++, Java
Human Languages	English, French
ML Tools	scikit-learn, TensorFlow, Keras, PyTorch, PyTorch Lightning, JAX
Data Analysis	Spacecraft data, predictive analytics
Other	Third degree black belt in karate