

Opportunity Title: Machine Learning and Mathematical Methods in Heliophysics

Opportunity Reference Code: 0197-NPP-NOV23-GSFC-HelioSci

Organization National Aeronautics and Space Administration (NASA)

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Application Deadline 11/1/2023 6:00:59 PM Eastern Time Zone

Description Heliophysics has a vast wealth of data, sampling a wide range of domains, such as the solar interior, corona, heliosphere, magnetosphere, ionosphere, upper atmosphere. There are diverse data sets and models representing many properties (e.g. intensity, magnetic field, current, density, velocity, temperature). These data sets are used to study physical processes and relationships (such as turbulence, waves, shocks, magnetic reconnection) which vary over a wide range of temporal and spatial scales. Because of this, there are many associated challenges facing data science in heliophysics. Modern methods in data science have the potential to access new, exciting results that eluded classical analysis approaches. Machine learning has been shown to improve performance in several elements of space weather forecasting. However, a deep comprehension of machine learning techniques in the context of the heliophysics data environment will open new opportunities for cross-disciplinary sharing and cooperation. More deliberate approaches can help reveal the fundamental physical processes that govern heliophysical systems, and adaptation of methods to specifically target the underlying physics can help turn an improved correlation or forecast into deeper physical insight and understanding.

This opportunity emphasizes the use of machine learning, AI, and advanced mathematical methods to expand the discovery potential of heliophysics mission data, theoretical models, and simulations. Examples include deep learning, neural networks, data segmentation, high dimensionality, and advanced statistical/probabilistic methods.

Location:

Goddard Space Flight Center
Greenbelt, Maryland

Field of Science:Heliophysics Science

Advisors:

Jack Ireland
jack.ireland-1@nasa.gov
301-286-2503

Jeffrey Klenzing
jeffrey.klenzing@nasa.gov
310-286-6172

Barbara J Thompson
Barbara.J.Thompson@nasa.gov
301-286-3405

Alex Young



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c.a.young@nasa.gov
301-286-4441

John Dorelli
John.Dorelli@nasa.gov
301-286-9753

Shing F. Fung
Shing.F.Fung@nasa.gov
301-286-6301

Menelaos Sarantos
menelaos.sarantos-1@nasa.gov
301-286-2945

Mabilia Samara
mabilia.samara@nasa.gov
301-286-2813

Brian Anthony Thomas
brian.a.thomas@nasa.gov
202-641-4893

Christopher Bard
Christopher.Bard@nasa.gov
301-286-7368

Jaye Verniero
jaye.l.verniero@nasa.gov
301-286-5014

Hyunju Kim Connor
Hyunju.k.connor@nasa.gov
301.286.7417

Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found at: <https://www.nasa.gov/oiir/export-control>.

Eligibility is currently open to:

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

Eligibility Requirements • **Degree:** Doctoral Degree.