

Opportunity Title: Earth Science: Application of Machine Learning Methods for Analysis and Interpretation of Hyper-Spectral Spaceborne Measurements

Opportunity Reference Code: 0237-NPP-NOV23-GSFC-EarthSci

Organization National Aeronautics and Space Administration (NASA)

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

Description A new generation of hyper-spectral sensors, like the Ozone Monitoring Instrument (OMI) on Aura satellite or Ozone Mapping and Profiler Suite (OMPS) on Suomi NPP and NOAA-20 satellites, allows to acquire measurements across a wide range of wavelengths in UV and VIS bands. These hyper-spectral measurements enable retrievals of atmospheric trace gasses like ozone, sulfur dioxide, nitrogen oxide, formaldehyde, and aerosols. Suomi NPP OMPS, launched in 2011, comprises of three complementary sensors - Limb Profiler (LP), Nadir Profiler (NP) and Nadir Mapper (NM) - that scan the same region of the atmosphere from Earth's surface to the mesosphere within minutes enabling retrievals of total columns and vertical ozone profiles. NOAA-20 (formally JPSS-1) OMPS, launched in 2017, includes only the two nadir sensors, but future JPSS missions 2, 3, and 4 will include all three sensors, including the Limb Profiler. Observations with a series of OMPS instruments will be extended to mid-century.

Large amounts of acquired data from hyper-spectral sensors like OMPS require new approaches for data analysis, calibrations, and inverse modelling. This opportunity is for candidates interested in applying the Machine Learning framework to analyze and interpretate OMPS spectral measurements, which can lead to improvements in the instrument calibration and ozone retrieval algorithm. If successful, this technique can be later applied to exploit the synergy of the OMPS sensors to effectively combine measurements from limb and nadir sensors for developing new retrieval algorithms.

A successful candidate should have a degree in one of the following STEM fields Computer Science, Mathematics, Physics, or Meteorology, and have advanced programming skills working with big data (e.g. Python).

Location:

Goddard Space Flight Center
Greenbelt, Maryland

Field of Science: Earth Science

Advisors:

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Eligibility Requirements

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Doctoral Degree.



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