Opportunity Title: Earth Science Research with Recent NASA Imaging Spectroscopy Measurements
Opportunity Reference Code: 0151-NPP-NOV23-JPL-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 The Earth is arguably the most complex object in the solar system, both in terms of the diversity of materials and compounds as well as the diversity of processes occurring in the Earth system. New measurements are required to investigate, understand and model this complex system that includes processes within and between the biosphere, lithosphere, hydrosphere, cryosphere, and atmosphere. Key constituents and processes of the Earth system can be measured and monitored with imaging spectroscopy in the Visible to Shortwave Infrared (VSWIR) region of the electromagnetic spectrum from 380 to 2510 nm with ‰¤10 nm.

The capability of VSWIR imaging spectroscopy to provide unique and essential measurements of constituents and processes of the Earth system has been demonstrated in site-specific studies with airborne instruments and first generation space based sampling missions. The success of this full spectrum measurement approach is demonstrated by the numerous peer reviewed journal articles spanning the disciplines of terrestrial ecology, coastal ocean, inland waters, the cryosphere, geology, soils, coral reefs, hazards, urban environments, agriculture, the atmosphere, etc. From these projects a range of critical and unique science products and results have been demonstrated.

NASA has recently collected extensive VSWIR imaging spectroscopy measurements with the JPL Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) in the many regions of the United States, as well as Greenland and India.

This NPP opportunity will support research that utilizes portions these diverse data sets. The research under this NPP is expected to be focused on new science enabled by these unique measurements. In 2016, a diverse set of science targets that utilize VSWIR imaging spectroscopy were provided to the current Earth Decadal Survey. Potential areas of research may be aligned with these recent inputs to the Earth Decadal Survey shown in Table 1.

Table 1. Inputs to the Earth Decadal Survey utilizing VSWIR imaging spectroscopy measurements.

- Biodiversity
- Global Observations of Coastal and Inland Aquatic Habitats
- Global Terrestrial Ecosystem Functioning and Biogeochemical Processes
- Earth Surface Geochemistry and Mineralogy: Processes, Hazards, Soils, and Resources
- Coral Reefs: Living on the Edge
- Understanding the controls on cryospheric albedo, energy balance, and melting in a changing world

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- Predicting Changes in the Behavior of Erupting Volcanoes, and Reducing the Uncertainties Associated with Their Impact on Society and the Environment
- The role of fire in the Earth System
- Measuring the Earth''s Surface Mineral Dust Source Composition for Radiative Forcing and Related Earth System Impacts
- Inland Waters
- Understanding anthropogenic methane and carbon dioxide point source emissions
- High Spatial, Temporal, and Spectral Resolution Instrument for Modeling/Monitoring Land Cover, Biophysical, and Societal Changes in Urban Environments
- Global Measurement of Non-Photosynthetic Vegetation
- From the Mountains to the Sea: Interdisciplinary Science and Applications Driven by the Flow of Water, Sediment, and Carbon
- A Thermodynamic Paradigm For Using Satellite Based Geophysical Measurements For Public Health Applications
- Monitoring Coastal and Wetland Biodiversity from Space
- Science and Application Targets Addressed with the 2007 Decadal Survey HyspIRI Mission Current Baseline

Location:
Jet Propulsion Laboratory
Pasadena, California

Field of Science: Earth Science

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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.