

**Opportunity Title:** Solar System Exploration: Optical Scattering Investigations of Environments around Airless Bodies

**Opportunity Reference Code:** 0192-NPP-NOV23-GSFC-PlanetSci

**Organization** National Aeronautics and Space Administration (NASA)

**Reference Code** 0192-NPP-NOV23-GSFC-PlanetSci

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

**Description** Observations and analysis of faint light scattering by dust, aerosols and gas near airless bodies provides insight into ejection and transport processes common to these objects. This includes the Moon, the moons of Mars, the giant planet satellites and active (mass shedding) asteroids. An explanation for the putative "horizon glow" above the Moon detected during the Apollo era remains elusive, but could perhaps have been sunlight scattered by ejecta from meteoroid impacts. Evidence for the lunar ejecta cloud measured by LDEX may be present in the data sets of optical instruments on the Lunar Reconnaissance Orbiter (LRO), especially the LAMP FUV spectrograph, but no systematic search has been carried out. Analysis of multi-color limb imaging data from the upcoming OSIRIS-REx encounter with asteroid Bennu could reveal the composition and scale of dust plumes from natural impacts, as well as the artificial plume created during the touch-and-go (TAG) sampling event.

To accomplish these research objectives, the candidate applies existing radiative transfer codes, and simulates the optical scattering of sunlight by dust and aerosols, as well as neutral gas line emission from UV to infrared wavelengths. Dust modeling tasks will incorporate the scattering behavior of spherical and non-spherical grains with varying size and shape, as well as the spectral absorption of ice aerosols. A library of grain scattering properties presently exists at GSFC, but this will need to be expanded to larger grain sizes and greater diversity of mineralogies. Some understanding of the optical design of cameras and spectrometers, as well as principles of radiometry and photometry, will be necessary for interpreting existing data sets and making predictions about upcoming observations.

**Location:**

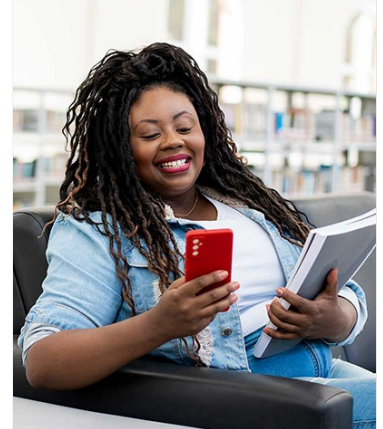
Goddard Space Flight Center  
Greenbelt, Maryland

**Field of Science:** Planetary Science

**Advisors:**

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301-286-1524

**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>.



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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.