

**Opportunity Title:** Modeling of Planetary Thermospheres and Exospheres

**Opportunity Reference Code:** 0247-NPP-NOV23-GSFC-PlanetSci

#### Organization

National Aeronautics and Space Administration (NASA)

#### Reference Code

0247-NPP-NOV23-GSFC-PlanetSci

#### Application Deadline

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

#### Description

The thermal structure and atmospheric escape within the transition region of planetary thermospheres and exospheres are being modeled for bodies such as Titan, Callisto, Mars, Pluto and early Moon. Theoretical models that employ principles of rarefied gas dynamics using techniques such as the Direct Simulation Monte Carlo DSMC method are used to simulate the atmospheres to compare with data of the upper atmosphere from missions such as MAVEN, Cassini, Clipper and New Horizons. Analyses of current mission data will be used to provide a basis for examining the early atmospheres such as the Moon's early volcanic atmosphere. An existing DSMC model will be updated to carry out multi-dimensional studies and to include photochemistry in the rarefied region of atmospheres. The DSMC model will be coupled with hydrodynamic, diffusion or photochemical models to consistently model the effect of non-equilibrium conditions and escape occurring in the transition region of the broader atmosphere.

#### Location:

Goddard Space Flight Center  
Greenbelt, Maryland

**Field of Science:** Planetary Science

#### Advisors:

Orenthal James Tucker  
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(434) 249-6614

**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/oair/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.



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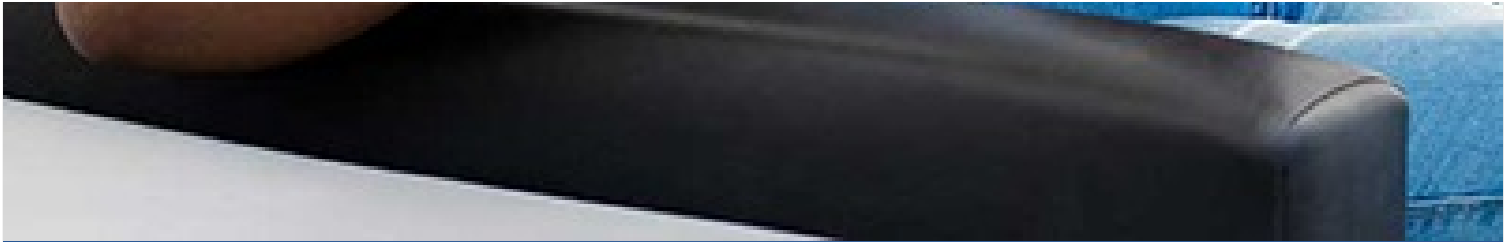
## NASA Postdoctoral Program

 ORAU Pathfinder



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