

**Opportunity Title:** Earth Rotation, Gravity, Shape, and Reference Frames:  
Measurements and Models

**Opportunity Reference Code:** 0056-NPP-NOV23-JPL-EarthSci

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

**Reference Code** 0056-NPP-NOV23-JPL-EarthSci

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

**Description** The rearrangement of mass within the surficial fluid layers of the Earth, including the atmosphere, oceans, and water, snow and ice stored on land, causes the Earth's gravity to change, causes the Earth's rotation to change by changing the Earth's inertia tensor, and causes the Earth's shape to change by changing the load acting on the solid, but not rigid, Earth. In fact, on time scales of a few days to a few years, the interaction of the surface geophysical fluids with the solid Earth dominates non-secular variations in each of these three fundamental areas of geodesy (rotation, gravity, and shape). This allows geodetic measurements to be used to study the flux of mass within and between different surface geophysical fluids including, for example, tracking water in its various phases as it moves between the atmosphere, oceans, and land. But the deformation of the Earth's surface caused by the changing surface mass load complicates our ability to determine an accurate and stable terrestrial reference frame from measurements taken by geodetic stations located on the Earth's surface. Opportunities exist in all aspects of using geodetic measurements and surface geophysical fluid models to improve the terrestrial reference frame and to gain greater understanding of the mass flux in the climate system.

Gross, R. S., Earth rotation variations “” long period, in Physical Geodesy, 2nd ed., edited by T. A. Herring, pp. 215-261, Treatise on Geophysics vol. 3, Elsevier, Oxford, 2015.

**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:**Earth Science

**Advisors:**

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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,



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- 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.