Opportunity Title: Gravitational Physics in Space: Theory and Experiment
Opportunity Reference Code: 0016-NPP-MAR26-JPL-Astrophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0016-NPP-MAR26-JPL-Astrophys

How to Apply All applications must be submitted in Zintellect

Please visit the NASA Postdoctoral Program website for application instructions and requirements: How to Apply | NASA Postdoctoral Program (orau.org)

A complete application to the NASA Postdoctoral Program includes:

1. Research proposal
2. Three letters of recommendation
3. Official doctoral transcript documents

Application Deadline 3/1/2026 6:00:59 PM Eastern Time Zone

Description **About the NASA Postdoctoral Program**

The NASA Postdoctoral Program (NPP) offers unique research opportunities to highly-talented scientists to engage in ongoing NASA research projects at a NASA Center, NASA Headquarters, or at a NASA-affiliated research institute. These one- to three-year fellowships are competitive and are designed to advance NASA's missions in space science, Earth science, aeronautics, space operations, exploration systems, and astrobiology.

Description:

Our research program is dedicated to advancing the frontiers of gravitational physics, relativistic astrophysics, and precision navigation technologies, with a strategic emphasis on enabling transformative scientific discoveries and mission capabilities. Core research areas include:
1. Gravitational and Fundamental Physics: Developing theoretical and experimental frameworks to test general relativity, alternative theories of gravity, and fundamental physical laws through high-precision measurements and advanced modeling in relativistic celestial mechanics, astrophysics, and cosmology.
2. High-Precision Spacecraft Navigation: Advancing models of relativistic gravitational and non-gravitational forces, solar system dynamics, and state-of-the-art algorithms for spacecraft trajectory prediction, state reconstruction, and deep-space mission navigation.
3. Optical Astrometry and Laser Metrology: Pioneering high-precision astrometry techniques and laser-based metrology systems to achieve unprecedented accuracy in ranging, tracking, and observational platforms for both near-Earth and deep-space applications.
4. High-Power Laser Technologies: Developing coherent beam combination, high-power laser ranging, and power transmission systems to support advanced sensing, communication, and propulsion solutions for space missions.

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5. Detection and Characterization of Near-Earth and Interstellar Objects (NEOs and ISOs): Innovating optical sensor designs and synthetic tracking methodologies to identify, track, and characterize faint, fast-moving objects, enabling proactive planetary defense and interstellar science.
6. Solar Gravitational Lens (SGL) Exploration: Designing mission architectures and technological frameworks for direct, high-resolution imaging and spectroscopy of exoplanets using the solar gravitational lens, providing unprecedented observational capabilities for distant planetary systems.
7. Solar Sailing and High-Velocity Propulsion: Investigating advanced solar sailing concepts for achieving high-speed transit velocities, with applications for interplanetary and interstellar exploration, emphasizing scalable, low-mass propulsion solutions.
8. Gravitational Microlensing and Astrophysical Observations: Exploiting gravitational microlensing to study planetary and astrophysical systems, enhancing our understanding of the distribution and properties of distant celestial objects.
9. High-Precision Science with GNSS: Leveraging Global Navigation Satellite Systems (GNSS) for advanced scientific applications, including time transfer, Earth observation, and spacecraft tracking with sub-centimeter accuracy.
These efforts are designed to address critical challenges in space exploration, providing solutions that bridge fundamental science and mission technology. Our work supports the long-term vision of advancing humanity's reach into the cosmos, transforming our understanding of the universe, and enabling next-generation space missions.

Location:
Jet Propulsion Laboratory
Pasadena, California

Field of Science: Astrophysics

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.

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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

Questions about this opportunity? Please email npp@orau.org

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.