Opportunity Title: Laboratory Astrophysics: experimental, theoretical, modeling, and/or database research
Opportunity Reference Code: 0121-NPP-MAR26-ARC-Astrophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0121-NPP-MAR26-ARC-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:

Context: Laboratory Astrophysics is a core capability at NASA Ames Research Center. Laboratory experiments and quantum-chemical computations simulating astrophysical conditions generate data that are used to interpret observations returned by NASA missions. The Laboratory Astrophysics Directed Work Package supports two broad science themes: 1) The PAH Universe, and 2) From Nano-grains to Carbonaceous Dust Grains by generating laboratory experimental and quantum computational data, and developing associated tools.

These will be provided to the scientific community via three complementary databases: the Polycyclic Aromatic Hydrocarbon Infrared Spectroscopic Database (**PAHdb**; www.astrochemistry.org/pahdb), the Optical Constants Database (**OCdb**; ocdb.smce.nasa.gov), and the (Nano)grain Spectral and Morphological Database (**Nanograindb**; in development).

These three databases will enable the study and interpretation of spectral signatures from carbon in the interstellar medium—including molecular clouds, planetary nebulae, protoplanetary disks—but also from exoplanets and galaxies. The data and tools will enable interpreting observational data from NASA missions, notably, JWST, which is now spectrally and spatially resolving PAH emission, stochastically heated nano-grains, and the continuum emission from thermally heated (nano-)grains in a wide variety

of environments.

Candidates are highly encouraged to contact their potential advisor to discuss their proposal.

Opportunity: We are looking to expand our team with a postdoctoral researcher to support any of the following tasks:

- Production of gas-phase analogs of cosmic molecules and ions, and solid-phase analogs of cosmic grains, exoplanetary atmospheric aerosols, and protoplanetary disk materials from gas chemistry at low temperature using a plasma expansion. Experience with plasma physics and vacuum techniques is required.
- Spectral characterization of low temperature molecules and ions for comparison with observations. The project involves the use of cavity ring down spectroscopy and reflectron time-of-flight mass spectrometry. Experience with laser spectroscopy in the UV-Visible-NIR and in the MIR ranges, jet expansions and molecular beams, plasma physics, and vacuum instrumentation is required for this project.
- Spectral and morphological characterization of laboratory-generated solid materials using scanning electron microscopy, UV-FIR spectroscopy and other techniques. Experience with ex-situ diagnostics for the characterization of solid materials is required for this task.
- Optical constant determination of organic refractory materials and ices from the visible to the far infrared. Development of new techniques from variable angle transmission and reflectance measurements and participation in projects to extend the characterized wavelength range. Work closely with observers and modelers to use the optical constants in the analysis of observational data from, e.g., Hubble, Spitzer, JWST. Candidates are expected to be proficient doing data reduction and analysis using Python and comfortable with IDL.
- Development of the infrastructure of the Nanograindb database by taking into account the needs of the astronomical community and by using PAHdb as a blueprint. Create libraries of computed and experimental spectra and morphological data. Develop software tools for modeling the emission spectra of nanograins using the spectral and morphological data and for comparing with observations. Make these tools available through Nanograindb.
- Involvement in planning and executing JWST observations, which are paramount for furthering our understanding of interstellar PAHs, increasing their effectiveness as astrophysical probes. Utilize PAHdb in astrophysical studies to affirm data-quality, tool performance, and foresee and respond to potential needs from the astronomical community. Mature and extend the software analysis tools in PAHdb for use with JWST data. Candidates are expected to be proficient using Python. Experience with JWST data reduction and analysis is a plus.

For all tasks, candidates will be expected to publish in peer-reviewed journals and present at conferences.

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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.

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.