

Opportunity Title: Development of organic analysis and life-detection instrumentation and methods for in-situ planetary applications

Opportunity Reference Code: 0193-NPP-NOV23-JPL-Astrobio

Organization National Aeronautics and Space Administration (NASA)

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

Description One of the main goals of NASA space exploration missions involves the search for organics and biomarkers in situ. Sample processing remains a key challenge to facilitate chemical detection and characterization. Our team seeks to develop and miniaturize a new instrumentation and methodology for non-targeted chemical analysis of organic biomarkers at parts-per-billion or parts-per-trillion concentration levels. We have previously demonstrated in our lab that analysis (extraction, preconcentration and separation) can be performed without using any organic solvents, additives or reagents using only supercritical CO₂ and water at either ambient or superheated conditions. This technology can be combined with multiple detection techniques, can accept a variety of sample types (aqueous, solid, mixed) and has applicability to all solar system targets where organic analysis is of high scientific priority. This work relates directly to multiple NASA objectives. To facilitate the building of the first-ever portable supercritical fluid extraction and chromatography, combined with superheated water extraction and chromatography and hyphenated with mass spectrometry, we seek NPP candidates with interest and expertise in analytical chemistry, non-targeted analysis, sample preparation, separation techniques, mass spectrometry, instrument design and method validation. Applicants from other disciplines with first-hand experience in field sample collection and handling followed by chemical analysis are also encouraged to apply. Their expertise would help in performing field test or validation in the laboratory for non-targeted analysis of organic biomarkers from various astrobiologically-interesting samples, potentially from Mono Lake, the Siberian permafrost, Death Valley, White Sands, Antarctic dry valleys and the Atacama Desert.

Location:

Jet Propulsion Laboratory
Pasadena, California

Field of Science: Astrobiology

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/oijr/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

This opportunity may require the following: 1- Mandatory drug testing; 2-Random drug testing; 3- Testing prior to initiation of fellowship appointment.

Eligibility Requirements

- **Degree:** Doctoral Degree.