

**Opportunity Title:** Understanding Abiotic Organic Chemistry in Ocean World

Environments

**Opportunity Reference Code:** 0209-NPP-MAR24-JPL-Astrobio

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

**Reference Code** 0209-NPP-MAR24-JPL-Astrobio

**Application Deadline** 3/1/2024 6:00:59 PM Eastern Time Zone

**Description** Environments that may have hosted water-rock interaction are of significant interest for finding life in the solar system; including ocean worlds and Mars. These worlds have hosted a past or present liquid water ocean, and likely geochemical disequilibria that may be able to support life and/or organic chemistry through hydrothermal processes. However, organic detection - even detection of organics that are commonly found in Earth biology - does not necessarily mean life, because there are many processes that produce organics abiotically in geological systems. In order to understand whether future organic detections on Mars or ocean worlds could represent a past or present biosphere, we must be able to distinguish biotic from abiotic organic signatures, and thus we need to fully understand the range of abiotic / prebiotic organic chemistries that are plausible and favorable in these environments. In this project, we are particularly interested in exploring the chemical landscape of organosulfur molecules and organic polymers that might be synthesized hydrothermally and/or via reactions with redox-active minerals. This project would experimentally explore the geochemical synthesis of organic molecules and identify their formation and reaction mechanisms in the presence of planetary analog minerals and fluids, particularly focusing on simulating the gradients and disequilibrium that could occur in hydrothermal systems on ocean worlds or Mars.

**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:** Astrobiology

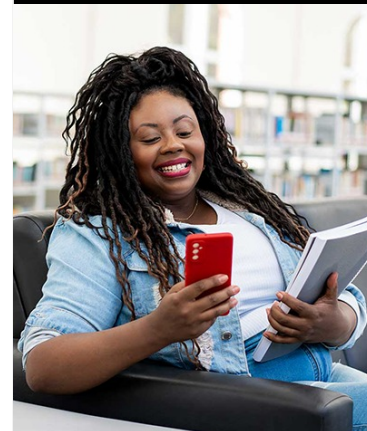
**Advisors:**

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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);



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- 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.