

Opportunity Title: Laboratory Research in Astrobiology and Planetary Science

Cryogenic Ice Chemistry

Opportunity Reference Code: 0186-NPP-NOV23-JPL-Astrobio

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0186-NPP-NOV23-JPL-Astrobio

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

Description This opportunity is for research on the preservation of biosignatures, or evidence of organic chemical evolution, in cryogenic ices in support of Astrobiological exploration of Ocean Worlds and fundamental Solar System evolution. The research focuses on the preservation potential of different cryogenic ice mixtures found on Ocean or Icy Worlds under relevant radiation environments. An example of this work is the determination of the viability of bacterial spores and their biomarker, dipicolinic acid, at temperatures and UV radiation doses relevant to the surface on Europa [1,2]. The preservation of molecular biosignatures derived from cells under these relevant environmental conditions is also being studied. The development of novel instrumentation and laboratory apparatus for the pursuit of understanding these goals is active. Therefore, qualified candidates will have strong laboratory and/or instrumentation skills with experience in some or all of the following: cryogenic vacuum systems, analytical chemistry and biochemistry instrumentation, radiation chemistry, and cryogenic ices.

References:

[1] Noell, A.C., et al., Spectroscopy and Viability of Bacillus Subtilis Spores after Ultraviolet Irradiation: Implications for the Detection of Potential Bacterial Life on Europa. *Astrobiology*, 2015. 15(1): p. 20-31. [2] Fayolle, E.C., et al., Viability of Bacillus subtilis Spores Exposed to Ultraviolet Light at Ocean World Surface Temperatures. *Astrobiology*, 2020. 20(7): p. 889-896. 10.1089/ast.2019.2214

Location:

Jet Propulsion Laboratory
Pasadena, California

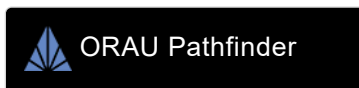
Field of Science: Astrobiology

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/oiiir/export-control>.

Eligibility is currently open to:



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- 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

Eligibility Requirements

- **Degree:** Doctoral Degree.