Opportunity Title: Astrobiology of Returned Samples
Opportunity Reference Code: 0227-NPP-NOV23-GSFC-Astrobio

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0227-NPP-NOV23-GSFC-Astrobio

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

Description Returned samples are critical to gaining knowledge of the formation and distribution of complex organic molecules in space. Understanding this prebiotic chemistry enables us to understand the underlying planetary processes that are responsible for the fidelity, resilience or detectability of biosignatures. As future scientists study the organic chemistry of returned samples, they will need to understand how the compounds they detect relate to the prebiotic chemistry of the parent object and its precursors.

Despite the importance of understanding the astrobiology and prebiotic chemistry relevant to returned samples, this work is generally beyond the scope of analyses by the mission science teams. Furthermore, individual ROSES awards are typically too narrow to simultaneously incorporate the necessary planetary and astrophysical background as well as to cross-compare lessons from different bodies and missions. The work here will investigate the *chemical*, *isotopic*, *chiral*, and *spatial* distribution of sample-return organics to ask our core question:

What do returned samples teach us about abiotic organic chemical evolution to guide the search for biosignatures?

We will conduct investigations outside the scope of current missions to maximize the value of returned samples. We will use a combination of laboratory experiments, observations, and models relevant to objects and locations of current and planned sample return missions and these include:

- The **Artemis** project will return material from potentially volatile-rich polar regions of the Moon.
- Samples from organic rich-asteroids returned from C-type asteroid Ryugu by the JAXA **Hayabusa2** mission and B-type asteroid Bennu by **OSIRIS-REx**.
- Samples from the martian moon Phobos will be returned by the JAXA **MMX** mission in 2029.
- Samples from Mars will be collected by the Perseverance rover from the Jezero region and returned to Earth by the **Mars Sample Return** campaign.

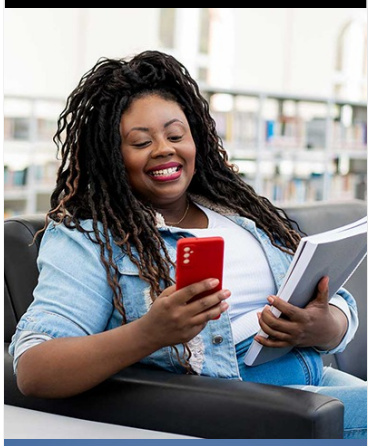
Location:
Goddard Space Flight Center
Greenbelt, Maryland

Field of Science: Astrobiology

Advisors:

NPP NASA Postdoctoral Program

ORAU Pathfinder



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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

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.