

Opportunity Title: Microbial Alteration of Astromaterials
Opportunity Reference Code: 0014-NPP-NOV23-JSC-AstroBio

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0014-NPP-NOV23-JSC-AstroBio

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

Description KACE Systems Management Appliance Administrator Console

Bacteria, Archaea, and Fungi are capable of altering terrestrial materials as a way to acquire organic carbon and or trace nutrients. This alteration includes mineral dissolution and precipitation reactions, stable isotope fractionation and the production and consumption of a variety of organic compounds. Similar alteration of extra-terrestrial materials has been observed in meteorites. This opportunity is to understand the physical, chemical and microbiological signatures associated with microbial action on astromaterials. The goal is to characterize the metabolic pathways employed to alter astromaterials under anaerobic conditions like those encountered in the Astromaterials Curation labs. An alternate goal is to quantify the extent of alteration that has occurred to NASA meteorites. These goals could be accomplished with DNA and RNA sequencing as well as identification and quantification of biosignatures. The geomicrobiology group has access to a fully functional BSL-2 (Biosafety Level) laboratory for aerobic and anaerobic culturing experiments as well as a molecular biology lab containing: an Illumina MiSeq, an Applied Biosystems 3500 Sanger sequencer, and Oxford Nanopore Minlon sequencers. The ARES (Astromaterials Research and Exploration Science) division also has scanning electron microscopes, a transmission electron microscope, a Raman microscope, an isotope ratio mass spectrometer, and several different types of gas and liquid chromatography that could be used to characterize biosignatures produced during astromaterial alteration.

Location:

Johnson Space Center
Houston, Texas

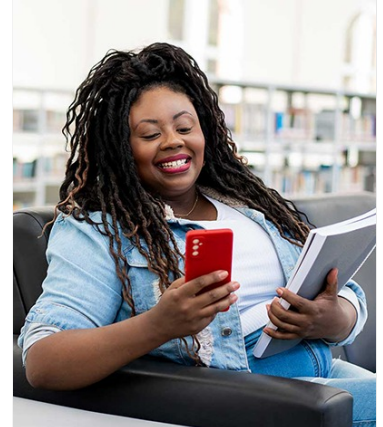
Field of Science:Astrobiology

Advisors:

Aaron Benjamin Regberg
aaron.b.regberg@nasa.gov
281-483-7243

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



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Eligibility Requirements • **Degree:** Doctoral Degree.