

Opportunity Title: Geology and Habitability of Ancient Sedimentary Environments on Mars

Opportunity Reference Code: 0206-NPP-NOV23-JPL-PlanetSci

Organization National Aeronautics and Space Administration (NASA)

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

Description Discoveries by recent rover, lander, and orbiter missions to Mars have offered new insight into the diversity of the martian sedimentary rock record and the potential for the preservation of ancient habitable environments within this record. Orbiter images show sedimentary deposits to occur in diverse settings on Mars that represent eolian, fluvial, and possibly lacustrine depositional environments. In addition, high-resolution mapping by visible and near-infrared orbital spectrometers has revealed a diversity of hydrated minerals including clays, sulfates, carbonates, and chlorides on the surface of Mars, suggesting a complex history of diagenesis, aqueous alteration, and mineral precipitation in sedimentary environments. Ongoing investigations by Mars rovers have proven the importance of using high-resolution orbital image datasets together with rover observations to advance our understanding of the evolution of surface environments and Mars' ancient climate.

This research program focuses on developing novel insights into the geologic context, depositional origin, and habitability of ancient sedimentary deposits on Mars. We are soliciting proposals involving: (1) geologic and mineralogic mapping on Mars using orbiter visible image, topographic, and spectroscopic data, (2) analysis of ground-based image and geochemical data from current and past Mars rovers, and (3) field or laboratory analog work applicable to the ancient sedimentary rock record of Mars.

References:

Stack et al. (2019), ""Evidence for plunging river plume deposits in the Pahrump Hills member of the Murray formation, Gale crater, Mars,"" DOI: 10.1111/SED.12558

Stack et al. (2016), ""Comparing orbiter and rover image-based mapping of an ancient sedimentary environment, Aeolis Palus, Gale crater, Mars,"" DOI:10.1016/j.icarus.2016.02/024

Stack et al. (2015), ""Modeling near-infrared reflectance spectra of clay and sulfate mixtures and implications for Mars,"" DOI:10.1016/j.icarus.2014.12.009

Stack et al. (2012), ""Bed thickness distributions on Mars: An orbital perspective,"" DOI:10.1002/jgre.20092

Location:

Jet Propulsion Laboratory
Pasadena, California

Field of Science: Planetary Science



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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:

- 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.