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Opportunity Title: Measuring Present-day Dune Formation on Mars
Opportunity Reference Code: 0284-NPP-MAR25-JPL-PlanetSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0284-NPP-MAR25-JPL-PlanetSci

How to Apply All applications must be submitted in Zintellect

Please visit the NASA Postdoctoral Program website for application instructions and requirements: How to Apply | NASA Postdoctoral Program (orau.org)

A complete application to the NASA Postdoctoral Program includes:

1. Research proposal
2. Three letters of recommendation
3. Official doctoral transcript documents

Application Deadline 3/1/2025 6:00:59 PM Eastern Time Zone

Description **About the NASA Postdoctoral Program**

The NASA Postdoctoral Program (NPP) offers unique research opportunities to highly-talented scientists to engage in ongoing NASA research projects at a NASA Center, NASA Headquarters, or at a NASA-affiliated research institute. These one- to three-year fellowships are competitive and are designed to advance NASA's missions in space science, Earth science, aeronautics, space operations, exploration systems, and astrobiology.

Description:

This research opportunity is an investigation, via aeolian/geomorphological modeling, of the present-day formation of protodunes (i.e., the sand patches that become dunes; Baddock et al., 2018) on Mars. Studies of protodunes can improve our interpretation of dune distribution and activity, feeding into our understanding of Mars's current near-surface wind environment and sediment budget. Additionally, rapid changes in the shape, size, and ripple patterns over these small-scale features can be used to constrain sand flux estimates over seasonal timescales (vs. measurable changes in dunes which usually reflect net sand transport over multiple Mars years). Estimations of sand flux rates are important for improved interpretation of all dunes and wind patterns around Mars, but also are used to constrain aeolian erosion rates that are used in to estimate exposure times (e.g., for sample selection and habitability studies) and particle transport distances (e.g., relevant for contamination studies away from landing sites). Past work has identified martian protodunes, some with distinctive ripple beds and some with observed changes. This research opportunity aims to quantitatively tie these identified features and activity to wind and sand flux models so that broader interpretations for wind patterns, dune formation on Mars, and aeolian transport and erosion rates can be derived from martian protodunes.

References: Baddock, M.C., Nield, J.M. and Wiggs, G.F., 2018. Early-stage aeolian protodunes: Bedform development and sand transport dynamics.

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Earth Surface Processes and Landforms, 43(1), 339-346, https://doi.org/10.1002/esp.4242.

Field of Science:

- Planetary Science

Advisors:

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Applications from 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

Questions about this opportunity? Please email npp@orau.org

Qualifications

(1) Experience with bedform evolution and/or sand flux models over ripples and/or dunes

(2) Familiarity with aeolian process/wind model(s) application in Mars/planetary studies

(3) Familiarity with relevant martian observation datasets

Eligibility Requirements

- **Degree:** Doctoral Degree.