Opportunity Title: Investigating Mars' CO2 Cycle and Seasonal Polar Caps Dynamics Using Radar Sounding
Opportunity Reference Code: 0312-NPP-MAR26-JPL-PlanetSci

Organization National Aeronautics and Space Administration (NASA)

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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 3/1/2026 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:

Understanding the climate of Mars is essential for unraveling the planet's geological and atmospheric evolution, shedding light on its transformation from a warmer, wetter past to the cold, arid world observed today. This project focuses on characterizing the seasonal and long-term dynamics of Mars' CO2 cycle and polar caps using radar sounding data, providing a critical perspective on processes governing the exchange of volatiles between surface and atmospheric reservoirs. The CO2 cycle, a fundamental driver of Martian climate, influences atmospheric density, water stability, and dust activity, while the seasonal polar caps represent a key component of this exchange system. Utilizing radar data from instruments such as SHARAD aboard the Mars Reconnaissance Orbiter, this study will quantify the seasonal deposition and sublimation of CO2 ice, revealing thickness and volume changes over time. These data will provide direct insights into the magnitude and variability of mass exchange between the surface and atmosphere, addressing critical knowledge gaps about the Martian volatile cycle. The analysis will extend to interannual and long-term variations, enabling the detection of potential secular trends in polar cap structure. By inferring radar-derived observables, this project will validate and refine measurements of CO2 condensation and sublimation processes. By focusing on radar-sounding data, this project leverages a uniquely powerful but currently not fully exploited tool to investigate subsurface and

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surface interactions, advancing our knowledge of Martian climate dynamics and volatile processes in unprecedented detail.

Field of Science: Planetary Science

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/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 Previous expertise working with radar sounding data

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.