

Opportunity Title: Observational Studies of Exoplanet Habitability

Opportunity Reference Code: 0235-NPP-NOV23-JPL-Astrophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0235-NPP-NOV23-JPL-Astrophys

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

Description JWST will provide revolutionary capabilities to characterize small exoplanets and open up pathways toward the observational studies of exoplanet habitability. Particularly, the temperate planets with radii between 1.7 and 3.5 times the radius of Earth (i.e., temperate sub-Neptunes) will be among the planets first observed for atmospheric signatures. Some of the temperate sub-Neptunes may support liquid-water oceans if they do not have massive H₂ atmospheres and are thus not too hot at the bottom of the atmospheres (Hu et al. 2021). Approved JWST programs will obtain transmission spectra of K2-18 b and LHS 1140 b and provide the opportunity to study their atmospheric chemistry in depth and assess their potential habitability. In the meantime, JWST will survey a handful of hotter, and likely rocky planets in the thermal infrared to determine their surface or atmospheric composition. This dataset may thus test the models of atmospheric evolution and retention, and eventually, inform the conditions to form Earth-like habitable planets. The successful applicant will have the opportunity to work at the forefront of exoplanet observations and is expected to extract high-level science results from multiple upcoming JWST observations. The fellow is encouraged to leverage the team's expertise in exoplanetary models to develop new ideas for future JWST cycles. This synergy between modeling and observations will result in a high potential for groundbreaking discoveries. The fellow will have the support to interact with planetary scientists and astrophysicists at both JPL and Caltech, and will fully benefit from the intellectual environment in both institutions.

Renyu Hu, Mario Damiano, Markus Scheucher, Edwin Kite, Sara Seager, and Heike Rauer (2021), Unveiling shrouded oceans on temperate sub-Neptunes via transit signatures of solubility equilibria vs. gas thermochemistry, ApJ Letters, 921, L8

Location:

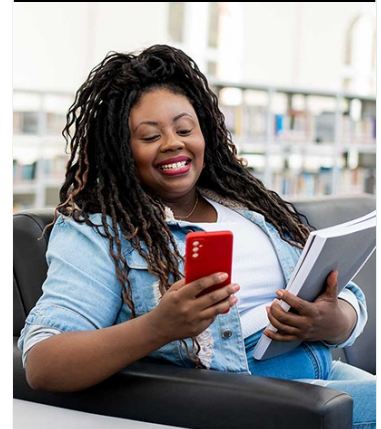
Jet Propulsion Laboratory
Pasadena, California

Field of Science: Astrophysics

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



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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.