Opportunity Title: Geological Evolution of Major Shield Volcanoes on the Moon Using Contemporary Lunar Mission Datasets
Opportunity Reference Code: 0289-NPP-JUL25-JPL-PlanetSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0289-NPP-JUL25-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 7/1/2025 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:

Description and objective: Volcanism has played a significant role in the crustal and thermal evolution of the Moon. Major effusive volcanism created the mare basins ~3.8 to 3.4 Ga ago. The mare basalts are erupted through fissures as effusive flows along with minor explosive pyroclastic volcanism. In contrast to mare plains volcanism, Spudis et al., (2013) identified topographic rises in the lunar maria and proposed that these regions represented shield volcanoes on the Moon. These authors identified a total of eight shield volcanoes on the near side of the Moon based on topographic and structural features. Only a few of these volcanoes have detailed compositional, structural, and morphological analyses using recent higher resolution and hyperspectral datasets. As a part of this effort, the candidate will study these shield volcanoes and compare the geological differences among them, including Rümker, Gardner, Prinz, Aristarchus, Kepler, Hortensius, Marius Hills, and Cauchy features. Data sets: To understand the volcanic history, composition, and thermophysical properties of the material present in the shields, the candidate will use LRO Diviner Thermal data, and Chandrayaan-1 Moon Mineralogy mapper data. To study morphology and topography, the candidate will use the LROC Narrow Angle Camera, wide angle camera, and LOLA SLDEM data. The Diviner Lunar radiometer Experiment instrument is a nine band multispectral infrared radiometer onboard NASA's Lunar Reconnaissance

Opportunity Title: Geological Evolution of Major Shield Volcanoes on the Moon Using Contemporary Lunar Mission Datasets
Opportunity Reference Code: 0289-NPP-JUL25-JPL-PlanetSci

Orbiter. The Diviner radiometer maps lunar surface with seven channels and reflected solar radiation with two channels from 0.3 to 400 µm and 128m/pix (~250 m/pix at equator) resolution. The Moon Mineralogy Mapper operates in the VNIR region from 540 nm to 3000 nm with 85 contiguous bands with 140 m/pix and 200 m/pix spatial resolution. The candidate will use the M3 Level-2 data products from Chandrayaan-1 Optical period 2C (OP2C). These data products provide pixel located, thermally corrected, and photometrically corrected, reflectance data from 200 km orbital altitude and 140 m/pix resolution. Lunar Reconnaissance Orbiter (LRO) Lunar Orbiter Laser Altimeter (LOLA)- Kaguya/Selene combined digital elevation model (SLDEM) data with 60 m/pix resolution, and Lunar Reconnaissance Orbiter Camera (LROC) Narrow Angle Camera (NAC) with ~1 m/pix and Wide Angle Camera (WAC) data with 100m/pix resolution will be used to study the detailed topography and morphology with 3D model of the all shield volcanoes. Methodology: To investigate detailed compositional variability, the candidate will generate Integrated Band Depth (IBD) parameter map to identify different basaltic flow units within the shields. They will derive reflectance spectra from the identified units and will calculate their band parameters as per to derive detailed variation in the mineralogical abundances within the shield basalts. Based on previous laboratory analysis, the candidate will plot those value for final derivation of the mafic mineralogy present within the area. To understand topography, morphology and structure, the candidate will generate high resolution 3D topographic maps using NAC, WAC and LOLA data from LRO mission and map the structures within the area to understand tectonics and evolution combined with composition.

The candidate will be an independent researcher. As part of their stay at the Jet Propulsion Laboratory, they will learn about mission formulation and mission development, instrumentation, and be a part of a group studying lunar questions.

Field of Science:

- Planetary Science

Advisors:

Laura Kerber
Laura.A.Kerber@jpl.nasa.gov
(626) 429-6013

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:

Opportunity Title: Geological Evolution of Major Shield Volcanoes on the Moon Using Contemporary Lunar Mission Datasets
Opportunity Reference Code: 0289-NPP-JUL25-JPL-PlanetSci

- 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 The ideal applicant has experience working with lunar data sets, including LROC datasets, Clementine, and Moon Mineralogy Mapper.

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.