Opportunity Title: Advancing Multimodal Earth Observation Foundation Models for Wildfire Risk and Vegetation Recovery Assessments
Opportunity Reference Code: 0346-NPP-NOV26-JPL-EarthSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0346-NPP-NOV26-JPL-EarthSci

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 11/1/2026 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:

Under the guidance of a mentor, the participant will engage in a NASA-aligned research project advancing data-driven approaches to characterize wildfire risk and post-fire vegetation recovery across the western United States. Initially focused on California's ecosystems, this research investigates how structural vegetation interacts with climatic stressors, such as drought and prolonged dry conditions. The overarching objective of the project is to develop an extensible, scalable framework that integrates structural, radar, spectral, and temporal information to continually update estimates of vegetation vulnerability and fire response.

During the appointment, the participant will have the opportunity to collaborate on developing structural vegetation representations from LiDAR observations, including GEDI-derived canopy height, vertical structure, and aboveground biomass products. Through this research, the participant will learn to establish metrics for vegetation condition, pre-fire fuel environments, wildfire-related structural change, and post-fire recovery.

The participant will also research multimodal data fusion, collecting and analyzing data to explore how LiDAR-based observations can inform representations and encoder adaptations. This activity will provide hands-on experience in making three-dimensional vegetation structure accessible

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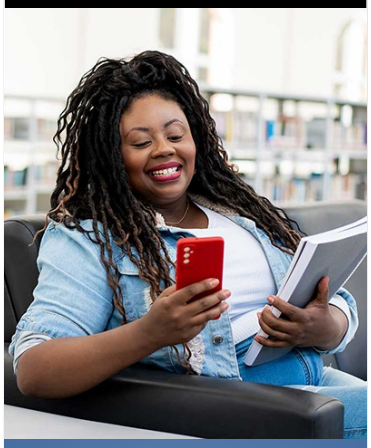

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within data-driven geospatial modeling processes.

Additionally, the participant will participate in evaluating L-band SAR, particularly emerging observations from the NASA-ISRO Synthetic Aperture Radar (NISAR) mission, as a scalable source of information for vegetation structure, biomass, disturbance, and recovery. By modeling the relationships between LiDAR-derived metrics and NISAR observations, the participant will investigate whether SAR can accurately extrapolate LiDAR-constrained structural data across broader spatial and temporal scales.

The participant will collaborate with researchers to evaluate encoder adaptations that incorporate both synthetic aperture radar and LiDAR-derived vegetation characterizations into multimodal geospatial learning pipelines. These capabilities will be applied to Earth observation foundation models. The participant will analyze models such as NASA's Prithvi, alongside other relevant foundation-model architectures and fine-tuning strategies.

For initial model development and fine-tuning, the participant will learn to utilize existing multimodal biomass testbeds containing LiDAR-derived aboveground biomass reference measurements paired with Sentinel-1 SAR and Sentinel-2 multispectral time series. Subsequently, the participant will explore adapting these models for application in California using GEDI products, NISAR L-band SAR, optical Earth observations, climatic indicators, and fire-severity datasets.

Through these activities, the participant will gain valuable experience in illuminating the critical relationships among pre-fire vegetation structure, climatic stress, and observed burn severity, while using post-fire observations to quantify structural loss and recovery. By participating in the integration of LiDAR-constrained structural data, spatially extensive NISAR observations, and advanced representations learned by Earth observation foundation models, the participant will enhance their educational background in large-scale vegetation and wildfire modeling while gaining knowledge directly related to the agency's mission.

Field of Science: Earth 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

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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

Candidates should hold or be pursuing a doctoral degree in Geography, Earth Science, Remote Sensing, Computer Science, Forestry, Ecology, or a related discipline, with a strong foundation in geospatial analysis or computational modeling.

Favorable candidates will possess academic research experience with remote sensing data, specifically LiDAR (e.g., GEDI), Synthetic Aperture Radar (SAR), and multispectral optical time-series. Experience exploring machine learning and deep learning techniques for geospatial applications is highly desirable to effectively engage with Earth observation foundation models.

Technical proficiency in scientific programming (Python or R) and deep learning frameworks (PyTorch or TensorFlow) is recommended, alongside experience processing large spatial datasets using cloud or high-performance computing environments.

Additionally, a foundational understanding of fire ecology, forest dynamics, or aboveground biomass estimation, coupled with strong scientific communication skills, will greatly benefit the participant's research and collaboration efforts.

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.