

**Opportunity Title:** A Multimodal AI Framework for Dynamic Forest Structure and Carbon under Hydroclimatic Change and Natural Disturbance

**Opportunity Reference Code:** 0353-NPP-NOV26-JPL-EarthSci

**Organization** National Aeronautics and Space Administration (NASA)

**Reference Code** 0353-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:**

This project will develop a multimodal artificial intelligence framework to characterize and predict dynamic changes in forest structure, aboveground biomass, and carbon storage under hydroclimatic variability and natural disturbances. The research will integrate NASA Earth observations, spaceborne LiDAR measurements, hydroclimatic information, and Earth-observation foundation models to move beyond static forest mapping toward temporally resolved reconstruction and prediction of forest-state transitions.

The project will leverage Prithvi-EO to extract spectral, spatial, and temporal information from Landsat/Harmonized Landsat Sentinel-2 (HLS) time series and develop a self-supervised representation of three-dimensional forest structure from GEDI LiDAR observations, including canopy height, relative-height profiles, and biomass-related metrics. Prithvi-WxC will provide complementary representations of large-scale hydroclimatic conditions. Through masked-modality and cross-modal learning, the research will investigate how structural information from spatially and temporally sparse GEDI measurements can be transferred to continuous satellite and climate records. Ground-based observations from sources such as NSF NEON, the Forest Observation System, and Forest



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Inventory and Analysis (FIA) will provide additional constraints and independent evaluation.

The resulting framework will be applied to reconstruct multi-year trajectories of canopy structure, biomass, and carbon stocks across the conterminous United States and the Amazon rainforest. These trajectories will be used to identify patterns of forest growth, structural degradation, biomass accumulation or loss, and carbon-storage change and to assess where conventional vegetation greenness indicators agree or diverge from changes in physical forest structure and carbon.

A major component of the project will focus on forest resilience to natural disturbances, including wildfire, drought, flooding, and large-scale hydroclimatic anomalies. The research will track forest conditions from pre-disturbance states through recovery and quantify metrics such as resistance, disturbance magnitude, recovery rate, recovery time, and cumulative carbon loss. By relating these trajectories to pre-disturbance forest conditions, hydroclimatic variability, and disturbance severity, the project will investigate why some forests rapidly recover while others experience persistent structural degradation, long-term carbon loss, or transitions toward alternative ecosystem states.

Expected outcomes include a dynamic multimodal AI framework for forest monitoring and prediction; spatially continuous, temporally resolved datasets of forest structure, biomass, and carbon trajectories; and spatially explicit products describing forest resilience and recovery. The research will extend Prithvi-based Earth-observation foundation models toward dynamic characterization of terrestrial ecosystems and provide new capabilities for understanding long-term forest change, carbon-cycle responses, and ecosystem vulnerability to environmental change and natural disturbances.

**Field of Science:** Earth Science

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**Applications with citizens from Designated Countries will not be**

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**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](mailto:npp@orau.org)

**Point of Contact** [Mikeala](#)

**Eligibility Requirements**      • **Degree:** Doctoral Degree.