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Opportunity Title: A Next-Generation Wildfire Risk Assessment System: Integrating Satellite Data, Deep Learning, and Advanced Statistical Analytics
Opportunity Reference Code: 0326-NPP-MAR26-JPL-EarthSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0326-NPP-MAR26-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 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:

Wildfires represent a critical and growing threat to national security, economic stability, public health, and ecosystem integrity. The increasing frequency and intensity of these events, exacerbated by climate change and evolving land-use patterns, demand a paradigm shift in risk assessment. Current operational tools, such as the National Fire Danger Rating System (NFDRS), often rely on limited data inputs and linear models. Consequently, they struggle to capture the complex, non-linear interactions between fuel conditions, topography, weather dynamics, and anthropogenic activity that collectively drive wildfire ignition and spread. This limitation results in predictive models with insufficient spatial resolution and temporal accuracy, hindering the ability of fire managers and public safety officials to make proactive, data-driven decisions.

This project directly addresses this capability gap by developing a sophisticated, next-generation wildfire risk assessment system. Our approach is founded on the principle that by integrating high-resolution Earth observation (EO) data from NASA with state-of-the-art machine learning, we can produce a more accurate, dynamic, and actionable measure of wildfire risk.

Project Goals and Objectives

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The primary goal of this project is to design, develop, and validate a unified wildfire risk index that provides a comprehensive and dynamic assessment of wildfire potential across diverse landscapes. To achieve this, we will first create a comprehensive, multi-modal data repository by integrating diverse streams of satellite, meteorological, and geospatial data, which involves processing and harmonizing high-resolution NASA EO data. Subsequently, we will architect and train an ensemble of deep learning and statistical models capable of identifying key wildfire drivers and accurately predicting risk, leveraging a framework of ensemble neural networks, CatBoost, and generative adversarial networks (GANs). The system's predictive accuracy will then be rigorously validated against extensive historical wildfire records and benchmarked against established conventional indices to ensure superior predictive skill. Finally, we will translate the validated risk index into actionable intelligence by creating intuitive, high-resolution fire risk maps and an interactive web-based dashboard for stakeholders.

Field of Science: Earth Science

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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

- Ph.D. in a quantitative field such as Earth Science, Data Science, Computer Science, Remote Sensing, Environmental Science, Statistics, or a related discipline.

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Technical Skills:

- **Machine Learning & Deep Learning:** Demonstrated experience with advanced machine learning models. Specific expertise in ensemble methods, gradient boosting frameworks (like CatBoost or XGBoost), and neural networks is highly sought. Experience with Generative Adversarial Networks (GANs) is a significant plus.
- **Geospatial & Satellite Data Analysis:** Strong proficiency in processing and analyzing satellite and geospatial datasets, particularly from NASA Earth Observation missions (e.g., MODIS, VIIRS, SMAP). Expertise with libraries and tools like GDAL, Rasterio, GeoPandas, and QGIS/ArcGIS is essential.
- **Programming Proficiency:** Advanced skills in Python and its core data science libraries (e.g., TensorFlow, PyTorch, Scikit-learn, Pandas, NumPy).
- **Data Engineering:** Experience in building and managing large, multi-modal data pipelines and repositories.

Domain Knowledge:

- A solid understanding of Earth science, climatology, and the environmental factors that drive wildfire behavior

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.