

**Opportunity Title:** Quantum Machine Learning and Quantum Graph Neural Networks for Enhanced Wildfire and Air Quality Management  
**Opportunity Reference Code:** 0316-NPP-JUL25-JPL-EarthSci

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

**Reference Code** 0316-NPP-JUL25-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** 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 U.S. and non-U.S. 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 aims to address the growing challenges of wildfire monitoring and air quality management by leveraging NASA's satellite observations and cutting-edge quantum computing techniques. By integrating Quantum Graph Neural Networks (QGNNs) and quantum-assisted neural networks with classical methods like Knowledge Graphs and Geometric Deep Learning (GDL), the study seeks to enhance the detection of wildfire smoke plumes, evaluate quantum computing's accuracy and speed advantages, and compare results with classical approaches. Utilizing advanced quantum hardware, the research explores the scalability and precision of quantum methods to process complex, high-dimensional datasets. Expected outcomes include improved detection accuracy, predictive modeling, and computational efficiency. Deliverables include open-source code, comparative analyses, and peer-reviewed publications, contributing to NASA's Earth science objectives and establishing the potential of quantum computing for actionable insights in wildfire and air quality management.

**Field of Science:** Earth Science

**Advisors:**

Olga Kalashnikova  
[Olga.Kalashnikova@jpl.nasa.gov](mailto:Olga.Kalashnikova@jpl.nasa.gov)



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**Questions about this opportunity?** Please email [npp@orau.org](mailto:npp@orau.org)

**Qualifications** We are seeking a highly motivated and talented postdoctoral researcher to join our project focused on leveraging quantum computing and machine learning for wildfire monitoring and air quality management using NASA's satellite observations. The ideal candidate will possess a strong background in quantum computing, machine learning, and environmental data analysis, with a demonstrated ability to tackle complex problems in interdisciplinary research.

#### **Qualifications**

**Education:** Ph.D. in Computer Science, Physics, Environmental Science, Atmospheric Science, or a related field, with a focus on quantum computing, machine learning, or spatiotemporal data analysis.

#### **Technical Expertise:**

Proficiency in quantum computing frameworks such as IBM Qiskit or similar platforms.

Strong knowledge of machine learning techniques, including Graph Neural Networks (GNNs) and Geometric Deep Learning (GDL).

Experience with handling large-scale spatiotemporal datasets and satellite data.

Familiarity with Knowledge Graphs and multi-variable optimization methods.

**Programming Skills:** Expertise in Python and other relevant programming languages. Experience in cloud-based or high-performance computing environments is a plus.

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

<b>Eligibility</b>	• <b>Citizenship:</b> LPR or U.S. Citizen
<b>Requirements</b>	• <b>Degree:</b> Doctoral Degree.