Opportunity Title: Machine Learning Assisted Aerosol Retrieval from Space Lidar Measurements in Planetary Boundary Layer
Opportunity Reference Code: 0142-NPP-MAR26-ARC-EarthSci

Organization National Aeronautics and Space Administration (NASA)

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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 4/2/2026 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:

The Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) mission, launched in April 2006 and operational until 2023, provided 17 years of valuable data. Its primary payload, the Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP), was an elastic backscatter lidar transmitting polarized laser light at 532 and 1064 nm. CALIOP measured range-resolved backscatter intensities, enabling the detection of clouds, aerosols, and surface features. Building on CALIPSO's legacy, the Earth Clouds, Aerosols and Radiation Explorer (EarthCARE) mission and the planned Cloud-Aerosol Lidar for Global Observations of the Ocean-Land-Atmosphere (CALIGOLA) mission represent the next generation of lidar-based atmospheric research. EarthCARE, led by ESA and JAXA, features the Atmospheric Lidar (ATLID) operating at 355 nm. Meanwhile, CALIGOLA will deploy a three-wavelength system (355, 532, and 1064 nm) with rotational Raman channels to enhance measurement capabilities.

Traditionally, the data processing for space lidar measurements has relied on physics-based approaches. However, machine learning (ML) is increasingly being utilized in Earth science applications due to its advanced architectures, computational efficiency, and the availability of high-

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performance resources. ML has become invaluable for processing and analyzing large volumes of Earth observation datasets.

This opportunity focuses on developing ML-assisted retrievals of aerosols in the planetary boundary layer, emphasizing aerosol and cloud detection and classification using multi┐channel measurements at the highest spatial resolution. The extensive 17-year CALIOP archive provides an ideal training dataset for ML algorithms, enabling their adaptation to EarthCARE's ATLID and the future CALIGOLA mission. This research aims to generate a multi-year dataset of boundary layer aerosol properties, enhancing our understanding of aerosol-cloud interactions and their impact on climate processes.

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 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 Applicants with a strong background in mathematics, computational methods, and machine learning, who are eager to apply their expertise to real-world challenges in Earth and atmospheric sciences, are encouraged to apply.

Point of Contact Mikeala

Eligibility

- **Degree:** Doctoral Degree.

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Requirements