Opportunity Title: Enhancing Earth Observation and Numerical Weather Prediction through a Next-Generation OSSE Framework and Km-Scale GEOS Nature Runs
Opportunity Reference Code: 0319-NPP-NOV26-GSFC-EarthSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0319-NPP-NOV26-GSFC-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:

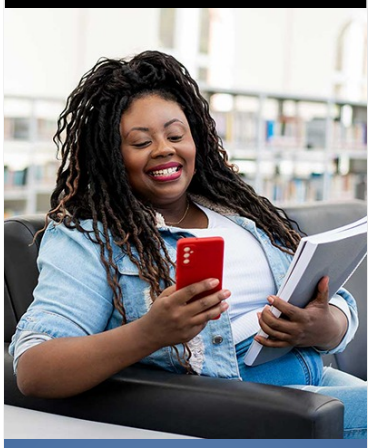
This opportunity is closed to applicants who are Senior Fellows (5-years or more past PhD).

Observing System Simulation Experiments (OSSEs) have their roots in Numerical Weather Prediction (NWP) dating back to the 1980's. The classic NWP OSSE was limited in scope where conventional and remotely sensed weather data were simulated and assimilated into weather prediction models to assess their impact on forecast skill. Since then, the concept of OSSEs has evolved to include the simulation of a vast observing system serving various disciplines, including active and passive sensors targeting atmospheric constituents, clouds and precipitation, for example.

To date, OSSEs are still a vital framework for assessing the potential impact of current and future suborbital and spaceborne observing systems on numerical weather prediction. By leveraging Nature Run simulations and synthetic observations from proposed instruments, OSSEs provide a rigorous and systematic approach to optimize mission design and guide strategic investments in Earth observation systems.

This project aims to integrate NASA's next generation of km-scale GEOS Nature Runs into the emerging OSSE framework based on the Joint Effort

NPP NASA Postdoctoral Program
ORAU Pathfinder



Whether you are just starting your career or already at a senior level, ORAU offers internships, fellowships, research opportunities, and contract positions that can provide you with invaluable experience. Download the ORAU Pathfinder mobile app and find the right opportunity to propel you along your career path!

Visit ORAU Pathfinder
GET IT ON Google Play
Download on the App Store

Opportunity Title: Enhancing Earth Observation and Numerical Weather Prediction through a Next-Generation OSSE Framework and Km-Scale GEOS Nature Runs
Opportunity Reference Code: 0319-NPP-NOV26-GSFC-EarthSci

for Data Assimilation Integration (JEDI). The primary objective is to improve the realism of simulated satellite observations, particularly those sensitive to the lower atmosphere and surface conditions, addressing critical gaps in existing OSSE approaches. In addition, the convection-allowing, kilometer-scale Nature Run provides a more realistic simulation of all-sky radiances and serves as an environment for developing algorithms to assimilate active remote sensing data, such as that from radars and lidars, which will become available with NASA's Earth System Observatory (ESO).

Proposed Activities (suggested but not limited to) include the following:

- Simulated Observations: Develop synthetic observations for existing and proposed microwave and low Earth orbit and geostationary orbit infrared sounders using JEDI-based Unified Forward Operator (UFO) tools, such as the Radiative Transfer for TOVs (RTTOV) model. The focus will be on improving the realism of simulated observations sensitive to surface conditions and the lower troposphere, and the representation of clouds and precipitation.
- Observation Error Estimation: Develop methodologies to estimate observation errors, transforming idealized observations into realistic datasets. This ensures that simulated data from both operational and proposed instruments accurately represent real-world measurement conditions.
- OSSE Experiments: Conduct OSSE experiments to evaluate the impact of these observations on data assimilation and numerical weather prediction. We will also ssess the impact of the improved circulation and thermodynamics on several aspects of atmospheric composition, including transport, physical and chemical processes.

Expected Outcomes:

- A comprehensive dataset of simulated observations for both current and future satellite missions.
- Advanced methodologies for observation error estimation, enhancing the realism of OSSE simulations.
- Quantitative insights into the value of improved observations for weather prediction accuracy, supporting the development of PBL targeted observing systems.
- Publication of findings in peer-reviewed journal papers to share results with the broader scientific community.

Field of Science: Earth Science

Advisors:

Min-Jeong Kim
min-jeong.kim@nasa.gov
(301) 284-6867

Opportunity Title: Enhancing Earth Observation and Numerical Weather Prediction through a Next-Generation OSSE Framework and Km-Scale GEOS Nature Runs
Opportunity Reference Code: 0319-NPP-NOV26-GSFC-EarthSci

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

Point of Contact Mikeala

Eligibility Requirements

- **Degree:** Doctoral Degree.