

**Opportunity Title:** CO2 Modeling and Retrieval with Mid-infrared IPDA Lidars

**Opportunity Reference Code:** 0021-NPP-NOV23-LRC-EarthSci

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

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**Application Deadline:** 11/1/2023 6:00:59 PM Eastern Time Zone

**Description:** Research groups in the Engineering Directorate and Science Directorate at NASA Langley Research Center focus on lidar developments that are relevant to NASA's Earth Science priorities. Currently, the groups are developing, testing, and actively flying integrated path differential absorption (IPDA) lidar technologies that provide capabilities that meet atmospheric CO<sub>2</sub> active remote sensing requirements called out by the recent Earth Science Decadal Survey. Researchers at Langley Research Center are pioneers in pulsed 2- $\hat{1}$ /<sub>4</sub>m active remote sensing (funded under ROSES-2013, Instrument Incubator Program, Earth Science Technology Office). Langley also plays a leadership role in the Atmospheric Carbon and Transport - America (ACT-America), an investigation funded under SMD ESSP Earth Venture Sub-Orbital 2 -2015 Program to address uncertainties affecting CO<sub>2</sub> inverse flux estimates. A postdoctoral researcher with focused expertise in CO<sub>2</sub> transport and modeling and skills in carbon-cycle is required to participate in multiple research tasks. For the CO<sub>2</sub> and H<sub>2</sub>O 2- $\hat{1}$ /<sub>4</sub>m triple-pulse IPDA lidar under development, the postdoctoral researcher will assist in data processing for deriving CO<sub>2</sub> mixing ratio from the instrument data. The researcher will also contribute to the instrument testing and validation. The candidate will utilize meteorological and in-situ data to develop atmospheric models, and provides input to IPDA instrument models for performance evaluation and error assessment. The postdoctoral researcher will make full use of the observed CO<sub>2</sub> concentrations and modeled meteorological data obtained during ACT-America. These will include data from the ensemble of simulations created with the Weather Research and Forecasting (WRF) model using different physical parameterizations (e.g., planetary boundary layer (PBL) schemes and land surface models (LSMs), cumulus parameterizations and microphysics parameterizations). A thorough understanding of how uncertainties in the CO<sub>2</sub> concentrations may affect the inverse flux estimates is crucial for defining the requirements and validating the performance of the instrument.

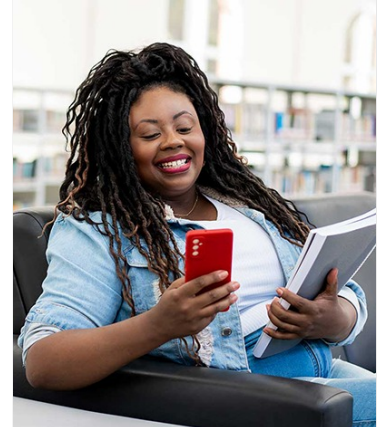
**Location:**

Langley Research Center  
Hampton, Virginia

**Field of Science:**Earth Science

**Advisors:**

Tamer F. Refaat  
Tamer.F.Refaat@nasa.gov  
757-864-1540



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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

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