

Opportunity Title: Big data remote sensing of glaciers and ice sheets

Opportunity Reference Code: 0315-NPP-NOV26-JPL-EarthSci

Organization National Aeronautics and Space Administration (NASA)

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A complete application to the NASA Postdoctoral Program includes:

1. Research proposal
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3. Official doctoral transcript documents

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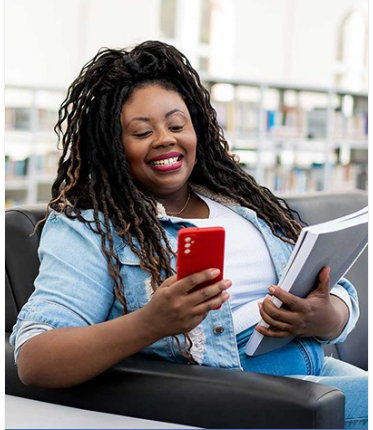
Description About the [NASA Postdoctoral Program](#)

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Description:

In this research, we will employ a suite of satellite data, spanning from satellite radar interferometry (InSAR) platforms to satellite optical platforms, to build time series of observations of ice sheet dynamics and study their linkage with climate forcing. The SAR instruments will include the Agenzia Spaziale Italiana (ASI) Cosmo-SkyMed constellation, the European Space Agency (ESA) Sentinel-1ab/ series, the Canadian Space Agency (CSA) RADARSAT-2, the German Aerospace Center (DLR) Tandem-X SAR, and - most important - the NASA/Indian Space Research Organization (ISRO) NISAR mission to be launched in April 2025. Optical sensors include the USGS Landsat-8, World View, ESA's Sentinel-2, and NASA's MODIS. These sensors span different repeat cycles (1 day, 3 days, 6 days, 16 days, 12 days, 24 days, etc.), spatial resolution, noise characteristics, spectral characteristics, and collect a vast amount of data, daily, that surpasses anything done in the past. Hence the concept of remote sensing big data.

Tracking of features or speckle will provide information on the ice motion vector and grounding line positions, stereo imagery informs about changes in surface height, and surface backscatter about ice cracking, fracturing and calving processes. The focus of this work will be on the Amundsen Sea sector of West Antarctica, where rapid glacier changes are taking place and contributing to sea level rise. The work will develop and implement a structural organization of the vast array of remote sensing data, develop



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and implement tools for data extraction, analysis, Machine Learning, and synthesis of our understanding of the evolution of glaciers and ice sheets in a changing climate. The results will benefit conceptual and numerical modeling of ice sheet evolution in response to climate forcing.

Candidates should have a PhD degree in Electrical Engineering, Computer Science, Earth Science, or Physics, a strong background in remote sensing, Machine Learning, synthetic aperture radar, programming, and an interest for glaciology applications and climate change. The candidate will work with our researchers at JPL under the leadership of Prof. Eric Rignot and Dr. Eric Larour to develop advanced ways of analyzing these satellite data and learn more about the physical processes controlling ice sheet evolution and subsequent impact on sea level rise.

References:

2017 J. Mouginot, E. Rignot, B. Scheuchl, R. Millan, Comprehensive Annual Ice Sheet Velocity Mapping Using Landsat-8, Sentinel-1, and RADARSAT-2 Data, Remote Sensing 9 (4), 364.

2016 B. Scheuchl, J. Mouginot, E. Rignot, M. Morlighem, A. Khazendar, Grounding line retreat of Pope, Smith, and Kohler Glaciers, West Antarctica, measured with Sentinel-1a radar interferometry data, Geophys. Res. Lett., 43 (16), 8572-8579.

2015 J. Mouginot, E. Rignot, A. Buzzi, I. Fenty, A. Khazendar, M. Morlighem, B. Scheuchl, H. Seroussi, M. van den Broeke, J. Paden, Fast retreat of Zachariæ Isstrøm, northeast Greenland, Science, 350(6266), 1357-1361.

2014 E. Larour, E. Rignot, A. Khazendar, H. Seroussi, M. Morlighem, C.P. Borstad, Representation of sharp rifts and faults mechanics in modeling ice-shelf flow dynamics: application to Brunt Stancomb-Wills Ice Shelf, Antarctica. J. Geophys. Res., 119(9), 1918- 1935.

2014 E. Rignot, J. Mouginot, M. Morlighem, H. Seroussi, B. Scheuchl, Widespread, rapid grounding line retreat of Pine Island, Thwaites, Smith and Kohler glaciers, West Antarctica from 1992 to 2011, Geophys. Res. Lett., 41(10) 3502-3509.

Field of Science: Earth Science

Advisors:

Eric Rignot
erignot@uci.edu
(818) 653-2531

Eric Larour
Eric.Larour@jpl.nasa.gov
(818) 393-2435

Applications with citizens from Designated Countries will not be

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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 Candidates should have a PhD degree in Electrical Engineering, Computer Science, Earth Science, or Physics, a strong background in remote sensing, synthetic aperture radar, programming, Machine Learning, and an interest for glaciology applications, physics, and climate change.

Point of Contact [Mikeala](#)

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