Opportunity Title: Big data remote sensing of glaciers and ice sheets
Opportunity Reference Code: 0165-NPP-NOV23-JPL-EarthSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0165-NPP-NOV23-JPL-EarthSci

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

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 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 the future NASA/Indian Space Research Organization (ISRO) NISAR mission to be launched in 2021. 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 provides information on the ice motion vector and grounding line positions, stereo imagery informs about changes in surface height, and surface backscatter informs 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 for the remote sensing data, develop and implement tools for data extraction, analysis, and synthesis of our understanding of the evolution of glaciers and ice sheets. 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, synthetic aperture radar, programming, and an interest for glaciology applications and climate change. The candidate will work with our researchers at JPL and with researchers at UC Irvine (Earth System Science and Computer Science) under the leadership of Prof. Eric Rignot 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. 2016 X. Li, E. Rignot, J. Mouginot, B. Scheuchl, Ice flow dynamics and mass loss of Totten Glacier, East Antarctica from 1989 to 2015, Geophys. Res. Lett. 43(12) 6366-6373. 2015 X. Li, E. Rignot, J. Mouginot, B. Scheuchl, M.

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Morlighem, Grounding line retreat of Totten Glacier, East Antarctica: 1996 to 2013, Geophys. Res. Lett., 42(19), 8049-8056. 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 Zachariï¦ Isstrí¸m, northeast Green- land, Science, 350(6266), 1357-1361. 2014 E. Larour, E. Rignot, A. Khazendar, H. Seroussi, M. Morlighem, C.P. Borstad, Representa- tion 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 ground- ing line retreat of Pine Island, Thwaites, Smith and Kohler glaciers, West Antarctica from 1992 to 2011, Geophys. Res. Lett., 41(10) 3502-3509.

Location:
Jet Propulsion Laboratory
Pasadena, California

Field of Science: Earth Science

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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

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Eligibility Requirements

- **Degree:** Doctoral Degree.