

**Opportunity Title:** Characterization of ionospheric dynamics through application of machine learning techniques to GPS measurements

**Opportunity Reference Code:** 0202-NPP-NOV23-JPL-HelioSci

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

**Reference Code** 0202-NPP-NOV23-JPL-HelioSci

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

**Description** The Earth's upper atmosphere and ionosphere respond dynamically to geomagnetic storms and driving from the Sun. Ionosphere demonstrates local response to a geomagnetic storm superimposed on daily, seasonal and solar cycle dependent variabilities. These different phenomena make characterization of regional ionospheric dynamics a complex problem. New observational capabilities and sophisticated data analysis tools provide an opportunity to improve our understanding of ionosphere dynamics during storms as compared to quiet times. Specifically, the Total Electron Content (TEC) of the ionosphere is readily available from GPS measurements. Analysis of TEC dynamics over ground-based GPS sites using network analysis is of major interest. Characterizing network topology, connections between TEC measurements at different locations, directionality of the network can lead to better understanding of ionospheric dynamics and advances in space weather forecasting. We seek highly motivated candidates to participate in research on ionospheric dynamics and data analysis. We are particularly interested in candidates who will analyze satellite and ground-based observations to improve our understanding of space weather. Knowledge of basic signal processing techniques and system science approaches are encouraged.

**References:**

1. Verkhoglyadova, O. P., Komjathy, A., Mannucci, A. J., Mlynczak, M., Hunt, L. & Paxton, L.J. (2017). Revisiting Ionosphere-Thermosphere Responses to Solar Wind Driving in Superstorms of November 2003 and 2004. *J. Geophys. Res.*, 122. <https://doi.org/10.1002/2017JA024542>.
2. McGranaghan, R. M., A. J. Mannucci, O. Verkhoglyadova, and N. Malik (2017), Finding multiscale connectivity in our geospace observational system: Network analysis of total electron content, *J. Geophys. Res.*, 122, doi:10.1002/2017JA024202.
3. J. Dods, S. C. Chapman, and J. W. Gjerloev, Network Analysis of Geomagnetic Substorms Using the SuperMAG Database of Ground Based Magnetometer Stations, *JGR*, 120, doi:10.1002/2015JA021456 (2015)

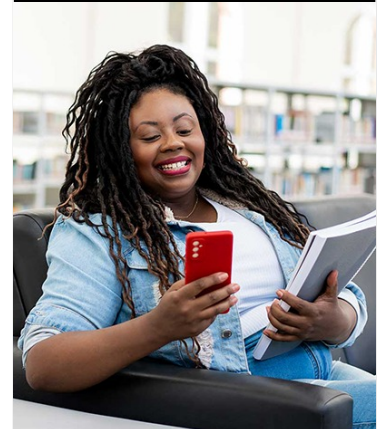
**Location:**

Jet Propulsion Laboratory  
Pasadena, California

**Field of Science:**Heliophysics Science

**Advisors:**

Olga Verkhoglyadova



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 [↗](#)



**Opportunity Title:** Characterization of ionospheric dynamics through application of machine learning techniques to GPS measurements

**Opportunity Reference Code:** 0202-NPP-NOV23-JPL-HelioSci

Olga.Verkhoglyadova@jpl.nasa.gov  
818-354-3860

- Eligibility** • **Citizenship:** LPR or U.S. Citizen  
**Requirements** • **Degree:** Doctoral Degree.