

Sebastijan Mrak

Space Weather Technology, Research and Education Center
University of Colorado Boulder
Email: sebastijan.mrak@colorado.edu
Work: (303) 735 - 8685

Appointments

- 09/2021 – Research Associate, SWx TREC, University of Colorado Boulder
2020 – 2021 Postdoctoral Research Associate, Center for Space Physics, Boston University
2016 Research Assistant, Radiation and Optics Laboratory, University of Ljubljana

Education

- 2016–2020 Ph.D., Electrical and Computer Engineering, Boston University
2013–2016 M.Sc., Electrical Engineering, University of Ljubljana
2009–2013 B.Sc., Electrical Engineering, University of Ljubljana

Publications

1. Nishimura, Y., **Mrak, S.**, et al. (2021). Evolution of mid-latitude density irregularities and scintillation in North America during the 7–8 September 2017 storm, *Journal of Geophysical Research: Space Physics*, DOI: 10.1029/2021JA029192.
2. (Best Presentation Award) **Mrak, S.**, Semeter, J., Nishimura, Y., Coster, A. J., & Groves, K. (2021). Space Weather at Mid-latitudes: Leveraging Geodetic GPS Receivers for Ionospheric Scintillation Science, *Proceedings of ION GNSS+ 2021*, September 21–24, St. Louis.
3. **Mrak, S.**, Semeter, J., Nishimura, Y., & Coster, A. J., (2021). Extreme low-latitude TEC enhancement and GPS scintillation at dawn. *Space Weather*, Doi:10.1029/2021SW002740.
4. **Mrak, S.**, Semeter, J., Nishimura, Y., Rodrigues, F. S., Coster, A. J., & Groves, K. (2020). Leveraging geodetic GPS receivers for ionospheric scintillation science. *Radio Science*, 55, e2020RS007131. <https://doi.org/10.1029/2020RS007131>.
5. Yang, Z., **Mrak, S.**, Morton, Y, (2020). Geomagnetic Storm Induced Mid-latitude Ionospheric Plasma Irregularities and Their Implications for GPS Positioning over North America: A Case Study. *IEEE/ION Position, Location and Navigation Symposium (PLANS)*, 234–238. Doi:10.1109/PLANS46316.2020.9110132.
6. Sivadas, N., Semeter, J., Nishimura, Y. T., & **Mrak, S.** (2019). Optical signatures of the outer radiation belt boundary. *Geophysical Research Letters*, 46, 8588–8596. Doi:10.1029/2019GL083908.
7. Aryal, S., Geddes, G., Finn, S. C., **Mrak, S.**, Galkin, I., Cnossen, I., et al. (2019). Multispectral and multi-instrument observation of TIDs following the total solar eclipse of 21 August 21, 2017. *Journal of Geophysical Research: Space Physics*, 124, 3761–3774. Doi: 10.1029/2018JA026333.
8. **Mrak, S.**, Semeter, J. L., Nishimura, Y., Hirsch, & M., Sivadas, N. (2018). Coincidental TID Production by Tropospheric Weather during the August 2017 Total Solar Eclipse. *Geophysical Research Letters*, 45, 10,903–10,9011. Doi:10.1029/2018GL080239.
9. **Mrak S.**, Semeter, J. L., Drob, D., and Huba, J. D. (2018). Direct EUV/X-ray modulation of the ionosphere during the August 2017 total solar eclipse. *Geophysical Research Letters*, 45, 3820–3828. doi:10.1029/2017GL076771.

10. Hairston, M. R., **Mrak, S.**, Coley, W. R., Burrell, A., Holt, B., Perdue, M., et al. (2018). Topside ionospheric electron temperature observations of the 21 August 2017 eclipse by DMSP spacecraft. *Geophysical Research Letters*, 45, 7242–7247. doi:10.1029/2018GL077381
11. **Mrak S**, Hrovat A, Vidmar M, Vilhar A. (2018), A Discrete-components Millimeter-Wave Satellite Beacon Receiver for Q-band Propagation Experiment. *Int J Satell Commun Network*. 36:372–382. doi:10.1002/sat.1240
12. **Mrak S.**, et al., (2018), Field-aligned GPS Scintillation: Multi-Sensor Data Fusion, *J. Geophys. Res.*, 123, doi:10.1002/2017JA024557.
13. Semeter, J., **Mrak, S.**, Hirsch, M., Swoboda, J., Akbari, H., Starr, G., et al. (2017). GPS signal corruption by the discrete Aurora: Precise measurements from the Mahali experiment. *Geophysical Research Letters*, 44, 9539-9546. <https://doi.org/10.1002/2017GL073570>
14. **Mrak S.**, Vilhar A., Kuhar U. (2015), Low-Cost System Design for Tracking Satellites in Geosynchronous Orbit, *European Conference on Antennas and Propagation*, Lisbon, Portugal.

Funded Research Projects

- **Principal-Investigator**, NASA ISE21: The Impacts of Abrupt Changes in Photoionization on High-latitude Electrodynamics, 2021-2022, \$168k.
- **Co-Investigator**, NASA LWS 2021: Identifying driving mechanisms of GPS scintillation in the high-latitude ionosphere, 2021-2024, \$864k.

Professional Activities

- Team member, International Space Science Institute 2021, Multi-Scale Magnetosphere-Ionosphere-Thermosphere Interaction. Led by Toshi Nishimura.
- 2019-2020 Team member, NASA Living With a Star Institute: Space weather effects on GNSS at mid-latitudes. Led by Keith Groves.
- Chair: 2021 CEDAR Workshop Session space Weather at Mid-latitudes
- External grant reviewer for Czech Science Foundation: 2020
- Journal Reviewer: **Geophysical Research Letters** (2018, 2019, 2020); **Radio Science** (2018, 2019, 2021); **Advances in Space Research** (2018, 2019, 2020, 2021); **Journal of Geophysical Research Space Physics** (2019, 2020, 2021), **Journal of Space Weather and Space Climate** (2020); **NAVIGATION** (2020), **Sensors** (2021), **Pure and Applied Geophysics** (2021), **Remote Sensing** (2021).

Professional Memberships

- Member of Institute of Electrical and Electronics Engineers (IEEE) since 2014.
- Member of American Geophysical Union (AGU) since 2017.
- Member of Institute of Navigation (ION) since 2019.
- Senior Member of International Union of Radio Science (URSI) since 2019.