BOSTON UNIVERSITY

Boston University College of Arts & Sciences
Center for Space Physics

2023—2024 SPACE PHYSICS SEMINAR SERIES

Transformation of monitoring data to information by Machine Learning techniques

Thanks to the advances in electronics and computers in the last decades, the automated continuous monitoring of space phenomena has become a natural task. An extensive amount of data is generated each day by space-based and ground-based sensors and automatically stored in the databases. The challenging task nowadays is how to continue in this pipeline 'space phenomena -> data -> information -> action' without human interaction and transform the acquired data into new scientific knowledge or actionable steps. The employment of Machine Learning (ML) techniques might play an important role in this effort as they have the capability to outperform traditional rule-based algorithms and conduct repetitive human tasks much more effectively.

In this talk, several examples of the application of ML techniques for the transformation of space monitoring data to information will be presented. Specifically, segmentation of solar corona structures from EUV images, data-driven nowcasting and forecasting of ionospheric phase scintillations from GNSS receivers data, and detection of transient events in the upper atmosphere. All these activities lead to the ultimate goal to understand variations and disturbances in the interface region between space and Earth's atmosphere. The actual challenge, to automatically extract ionosphere-thermosphere variations from BU airglow allsky imagers, will be also outlined and discussed.

Thursday, March 21st

4:00-5:00 p.m.

725 Commonwealth Ave | Room 502

Simon Mackovjak

Boston University