Ben-Gurion University of the Negev

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CYBER SEMINAR SERIES

# JASON WANG, PH.D.

## "Machine Learning for Space Weather Analytics"

In this talk we introduce an emerging interdisciplinary field, space weather analytics, which aims to (i) understand the onset of solar eruptions and assess space weather effects on Earth through big solar and space data analysis, and (ii) perform near real-time long-term predictions of extreme space weather events including solar flares, coronal mass ejections, and solar energetic particles as well as the solar wind and geomagnetic storms by using advanced artificial intelligence (AI) and machine learning (ML) techniques. We present a suite of end-to-end deep learning AI models and tools for performing space weather analytics. These AI/ML tools have been used to (i) predict solar flares and coronal mass ejections, (ii) trace important structures such as magnetic flux elements and H-alpha fibrils in solar active regions, and (iii) perform Stokes inversion. Finally, we describe our efforts of incorporating some of these AI/ML tools into a community-coordinated cyberinfrastructure (CI) for the space weather sciences and point out some directions of future research for expanding our CI facility to serve the space weather community.

Dr. Jason Wang received his Ph.D. in computer science from the Courant Institute of Mathematical Sciences at New York University. He is a professor of computer science at the New Jersey Institute of Technology. He has over 30 years of experience developing data management, data mining, and machine learning algorithms, as well as applying these algorithms to problems in astronomy, astrophysics, heliophysics, space weather, biology, medicine, chemistry, environmental science, among others. He has published over 180 refereed journal and conference papers as well as 9 books in these areas. Dr. Wang's current research focus is on the design and implementation of a big data-enabled AI-powered community-coordinated cyberinfrastructure facility for the space weather sciences.

Thursday, October 28th, 2021 | 10:00 AM ET | 5:00 PM Israel

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