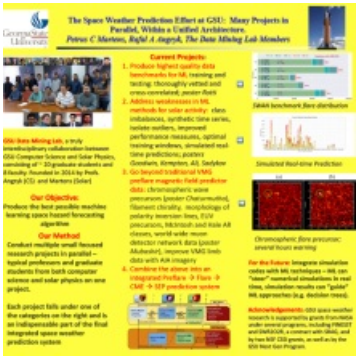
Petrus
Martens
Georgia State University
Rafal Angryk and the GSU Astro-informatics Cluster (Georgia State University)
Poster
The Georgia State University Astro-informatics Cluster is a strongly integrated interdisciplinary research group between the departments of Computer Science and Physics & Astronomy. Since its foundation in 2014 the cluster has been solely focused on space weather prediction.

Our current research program consists of over a dozen projects, each carried out in parallel by faculty and their graduate and undergraduate students. Each project forms a building block for a comprehensive and unique space weather data mining and forecasting using cutting edge machine learning and modeling approach. Several of these projects are presented at this meeting in more detail here in posters by our graduate students.

In my contribution I will present the overall design and architecture of our prediction system, the place of each individual effort within it, and describe future projects to complete the system.

A partial list of efforts underway or completed is:
- Thoroughly verified, complete, connected, and machine learning ready data bases of flares, CME's, and SEP's (benchmarks), made publicly available
- A Systematic search for flare precursors in magnetic and spectral data, including use of GSU's South Pole Observatory data, polarity inversion line morphology, and GONG H-alpha filament observations
- A computer science study of the machine learning method and data requirements for optimal space weather prediction
- Mitigation of solar limb limitation of the quality of magnetic field data for machine learning
- Integration of SoHO EIT and MDI data labels with those from HMI and AIA on SDO
- Flare prediction from time series data rather than static snapshots
- Constructing synthetic time series data for improving forecasting
- Simulated real-time predictions

This is merely a sample of projects going on. None of this work would be possible without the dedication and persistence of our standing army of students.



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