SPoRT Seminar Series Presents:

# *WRF-ARW model research towards an Army Weather Running Estimate-Nowcast capability*

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Location: SPoRT VCL (NSSTC 3027)

Abstract:

The primary goal of the Weather-Running Estimate-Nowcast (WRE-N) effort at ARL is to develop a configuration of the Advanced Research version of the Weather Research and Forecast (WRF-ARW) model that can be used tactically as a forward-deployable deterministic nowcasting tool for supporting Army mission execution operations, resolving meteorological scales of about 300 m to 3 km grid spacing. The Distributed Common Ground System and the Artillery Profiler Virtual Model are two Army systems that will benefit from this research. In terms of time, hourly (or even sub-hourly) model temporal output and model update frequencies of about 30-60 minutes are desired for forecasting out 0-6 h. The research explores and tests WRF-ARW model performance, deficiencies, and uncertainties from the mesoscale to well into the numerical weather prediction "terra incognita", and participates in studies aimed towards better understanding of the physics of surface and boundary layer phenomena at such scales. The project also examines methods to assimilate regional & local observation sources (radar/lidar/UAS/radiosonde/surface/satellite) for improving initialization and nowcasting of cloud-to-storm-scale phenomena. However, computational constraints are also a strong consideration towards employing a particular methodology. Part of the data assimilation research will consider WRE-N nowcast sensitivity to observation input, and this work may involve exploration of ensemble Kalman filter approaches. Finally, the WRE-N concept also serves as a research tool to explore new modeling capabilities such as forecasting dust aerosols, employing storm-scale ensembles to examine uncertainty and its impact on Army weather decision support tools, providing first-guess inputs to ARL microscale models under development, and adapting and developing new approaches for verification of fine-scale models (such as object and feature-based verification).