Texas Tech University

Dr. Brian Ancell uses convection-allowing ensembles to understand the relationships between severe convection (and its individual hazards) and the atmospheric state prior to severe events. In this way he aims to determine how different atmospheric features contribute to the predictability of severe convection, and explores how this information can be used within operational tools to improve high-impact forecasts.

Prof. Eric Bruning would be a willing mentor of postdoctoral scholars in the area of thunderstorm electricity, cloud microphysics, and their coupling to thunderstorm kinematics and dynamics. Projects might encompass observational (using radio frequency and space-based lightning mapping and polarimetric weather radars) or theoretical, and numerical modeling studies of processes, and utilization of field campaign data and a continuously operating regional lightning mapping network covering West Texas and Oklahoma. Research-to-operations and lightning dataset calibration/validation studies and further research and development related to the operational GLM imagery products (developed at TTU) would especially fit the themes and purpose of the CI.

Dr. Sandip Pal studies boundary layer processes and their impact on pre-convective environments. Possible projects may relate to PBL regime-specific model verification, particularly involving targeted field campaign measurements (e.g., vertical distributions of temperature, moisture, wind velocity, and aerosols) in the Texas Panhandle region and state-of-the-art numerical simulations (e.g., HRRR or RRFS) with a key focus on the detailed understanding of the pre-convective PBL thermodynamics during high-impact weather events in spring and summer.

Dr. Christopher Weiss uses both numerical models and observations to better understand severe thunderstorm dynamics, particularly processes influencing low-level vertical vorticity in supercell thunderstorms and quasi-linear convective systems. Of particular interest is how numerical simulations can be used to more effectively observe these storms (e.g., validation of specific features such as the streamwise vorticity current, using ensemble sensitivity analysis as a guide for targeted observation). Two high-frequency (TTUKa) mobile Doppler radars and 48 rapidly deployable in situ “StickNet” stations are readily available for these types of studies.