TEXAS TECH UNIVERSITY
National Wind Institute™

Wednesday, November 1, 2017
3:30 p.m.
Experimental Sciences Building, Rm. 120
Reception to follow.

The McDonald-Mehta Lecture Series Presents:

Advances in Weather Forecasting for Wind Energy

Dr. James Wilczak, Research Meteorologist
NOAA/Earth Systems Research Laboratory/Physical Science Division

ABSTRACT:

Recent studies of forecasting wind energy generation using numerical weather prediction models have shown that significant improvements are possible. Results from two research projects that used field campaign measurements to evaluate and improve NWP model forecasts will be discussed. The 2012 DOE/NOAA Wind Forecast Improvement Project (WFIP) assessed the impact of assimilating new atmospheric observations, including ground-based remote sensing measurements, as well as large numbers of tall tower and turbine nacelle anemometer measurements provided by wind plant operators, on operational numerical weather prediction models used for wind energy forecasting. Statistically significant improvements from assimilation of both the remote sensing and from the in-situ observations were found for short-term (1-6 h) forecasts. The 2016 Second Wind Forecast Improvement Project (WFIP2) deployed networks of wind profiling radars, sodars, lidars, and microwave radiometers to study meteorological processes affecting wind energy generation in the complex terrain region of the Pacific Northwest. Those observations are being used to improve physical parameterizations used in several of NOAA's operational weather forecast models. For both projects, the skill of models at forecasting wind ramp events is evaluated, and the meteorological processes associated with large forecast error events are investigated.

BIOGRAPHY:

Dr. Wilczak leads a wind energy research group in the Physical Sciences Division at NOAA's Earth System Research Laboratory. His area of specialty is the turbulent atmospheric boundary layer, with expertise in remote sensing instrumentation, flow in complex terrain, turbulence processes, and wind energy and air quality forecasting. He was the Project Technical Manager for the 2012 DOE/NOAA Wind Forecast Improvement Project (WFIP) which investigated impacts of data assimilation on wind energy forecasts in the upper U.S. Great Plains and in West Texas. He was also the observation lead for the 2016 DOE/NOAA/Vaisala Second Wind Forecast Improvement Project (WFIP2), which investigated meteorological processes affecting wind energy generation in the complex terrain region of the Pacific Northwest. In addition, Dr. Wilczak's instrumentation-related research includes the development of techniques for estimating PBL depths using radar wind profiler observations, the calculation of turbulence dissipation rates from wind profiler data, wind profiling radar quality control to identify and remove contamination from intermittent interference sources, and turbulent pressure measurements. Dr. Wilczak holds a B.S. degree in Physics from Kalamazoo College, and M.S. and Ph. D. degrees in the Atmospheric Sciences from the University of Washington.