David Schvartzman (Senior Member, IEEE) was born in Piracicaba, SP, Brazil, on March 17, 1988. He received the M.S. and Ph.D. degrees in electrical and computer engineering from the University of Oklahoma, Norman, OK, USA, in 2015 and 2020, respectively, with a focus on polarimetric phased array radar. Dr. Schvartzman has held research positions supporting the NOAA National Severe Storms Laboratory (NSSL) and the Advanced Radar Research Center (ARRC) at the University of Oklahoma. At NSSL, he gained key insights into observational needs for improving weather warnings and forecasts and developed signal processing algorithms to enhance meteorological products for the operational US Weather Surveillance Radar (WSR-88D). He is currently an Assistant Professor with a joint appointment in the School of Meteorology and the School of Electrical and Computer Engineering at the University of Oklahoma, affiliated with the ARRC. His work spans signal and array processing, radar calibration, and the development of advanced radar techniques for weather observation and severe weather detection.

Dr. Schvartzman serves as a Topical Associate Editor for the IEEE Transactions on Geoscience and Remote Sensing (TGRS). He has received awards including the 2024 Research Excellence Award from the College of Atmospheric and Geographic Sciences at the University of Oklahoma, the 2023 IEEE Region 5 Outstanding Young Professional Award, and the 2019 American Meteorological Society Spiros G. Geotis Prize. He is a Senior Member of IEEE and an active member of the American Meteorological Society (AMS), where he contributes to its Scientific and Technological Activities Commission (STAC) on Radar Meteorology.

Enabling Next-Generation Weather Observations with the Fully Digital Horus Radar

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Next-generation weather surveillance requires high-temporal-resolution, flexible scanning systems capable of capturing the rapid evolution of severe convective storms and other high-impact weather phenomena. Developed by the University of Oklahoma's Advanced Radar Research Center, Horus is a fully digital, dual-polarization S-band phased array radar (PAR) built to meet this challenge. With 1600 independently controlled channels across a 2 m × 2 m aperture (3° beamwidth), Horus enables per-channel waveform agility, advanced digital beamforming, and dynamic scan reconfiguration. Key capabilities for advanced weather surveillance include: the ability to almost instantly steer the radar beam to an arbitrary direction within the scan sector, the flexibility to dynamically redefine the sampling parameters for each beam position in the scan, and the ability to digitally form multiple simultaneous beams in different directions.

This talk provides an overview of the Horus system architecture and highlights results from recent field deployments, including observations of severe convective storms. Advanced radar modes include intentional transmit beam broadening (i.e., spoiling) coupled with digital beamforming for rapid volumetric coverage, and simultaneous transmission of multiple beams in different directions. These modes support sub-10-second volume scans and enable high-fidelity polarimetric weather measurements. The lecture will cover the engineering principles behind Horus's architecture, including digital beamforming techniques, calibration strategies, and scanning strategy trade-offs. These capabilities illustrate how fully digital PAR technology can accelerate innovation in radar meteorology and inform future operational radar systems.