

CNDE Webinar Presentation October 6, 2022 - 1:00 p.m. CST

This webinar will be recorded and made available on the CNDE website



Applications of Synthetic Aperture Radar Polarimetry for Nondestructive Evaluation (NDE)

**Presented by: Dr. Matthew Dvorsky
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Abstract:

Microwave and millimeter-wave synthetic aperture radar (SAR) imaging is well-suited for a wide variety of nondestructive evaluation (NDE) applications, especially due to its noncontact nature and ability to inspect dielectric or composite structures. SAR polarimetry is an extension of SAR imaging that makes use of wave polarization, by measuring the polarization of the wave scattered by a target or flaw relative to the illumination wave polarization. This polarization can be used to ascertain critical properties and features of a target or a defect. For example, SAR polarimetry has been used in the past to characterize the orientation and size of the surface-breaking cracks in metals (i.e., length, width, and depth). This presentation illustrates the utility of SAR polarimetry for several NDE applications, including characterization of waviness in carbon- and glass-fiber-reinforced composites and characterization of surface curvature. The SAR polarimetry technique will be introduced, including a recently developed 3D polarimetry technique, after which results from polarimetric microwave and millimeter wave imaging NDE experiments will be presented.

Speaker:

Matthew Dvorsky received his B.S. degree in Electrical Engineering in 2017 from Missouri University of Science and Technology, and his Ph.D. in Electrical Engineering in 2022 from Iowa State University (ISU). He is currently a postdoctoral research associate at the Center for Nondestructive Evaluation (CNDE). His research interests are in the areas of microwave and millimeter-wave polarimetry, 3D synthetic aperture radar imaging, and nondestructive testing. He was a recipient of the ISU Research Excellence Award, the CNDE Trapp Fellowship, the IEEE Transactions on Instrumentation and Measurement (TIM) 2021 Outstanding Reviewer Award, the 2019 IEEE International Instrumentation and Measurement Technology Conference Best Student Paper (2nd place), and was a finalist in the 2017 IEEE (International) AP-S Student Design Contest. He was the 2021 and 2022 Graduate Student Representative for the AdCom of the IEEE Instrumentation and Measurement Society.

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