

CNDE Webinar Presentation

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

Process Compensated Resonance Testing (PCRT) for Aerospace and AM material NDT Applications

Presented by:

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Abstract:

Process Compensated Resonance Testing (PCRT) is an NDE method that uses the resonance frequencies of a component to assess its structural integrity and material state. Building off the fundamentals of Resonant Ultrasound Spectroscopy (RUS), whole body resonance frequencies for parts are identified scored through various pattern recognition algorithms. PCRT inspections have been deployed across the aerospace, automotive, and power generation industries to rapidly detect defective or damaged parts, provide processes monitoring, and can be used as a bases for model validation and model-based inversion of material properties. Standard procedures for formal certification and qualification of additively manufactured (AM) parts involve extensive empirical testing incurring significant time and monetary costs. AM qualification would benefit from rapid component and model validation, accurate non-destructive evaluation (NDE), and process monitoring capabilities. Volumetric inspection methods, such as PCRT can inspect the full range of geometric complexity in parts made by AM while also detecting variation in partial state produced by AM process variation. During this webinar, a background in PCRT methodology will be presented along with several case study examples showing PCRT use in AM applications including areas of powered evaluation, material property extraction, machine to machine variance, and dimensional design intent.

Speaker(s):

Julianne Heffernan is a PCRT Certification III and is the program lead of PCRT testing for aerospace landing systems at Vibrant. Before her career in NDT, Julie has also worked as a chemical laser process engineer for Boeing and Leidos. She received her MS and BS in Materials and Chemical Engineering, respectively, at the New Mexico Institute of Mining and Technology.

Jim Colovos is a lead modeling and simulation engineering at Vibrant and holds a PCRT Certification II. He studied Mechanical Engineering and Applied Mathematics at the University of New Mexico and received his MS in Mechanics and Computation at Stanford. Jim has a strong background in finite element methods, structural mechanics, and laser Doppler vibrometry.

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