

CNDE Webinar Presentation  
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### **Using Heat to See Into Structures: Thermography for Non-Destructive Evaluation**

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#### Abstract:

Non-destructive evaluation is needed to verify the structural integrity of safety-critical structures. Thermography is the use of thermal imaging cameras to measure surface temperature. Energy applied to the structure creates contrast that can be related to internal features. Flash thermography uses a pulse of light to find discontinuities in the structure. We discuss how modeling of the heat flows allows internal structure such as delaminations in composite materials to be identified. Vibro-thermography is a related method for nondestructive evaluation that uses vibration as the energy source. The vibration causes crack surfaces to rub, generating heat which is detected with a thermal camera. We discuss the vibration and crack heating mechanisms and how modeling leads to better understanding of what sorts of cracks or other damage can be found.

#### Bio:

Stephen D. Holland is an associate professor of Aerospace Engineering at Iowa State University and a fellow of the American Society of Nondestructive Testing. He founded the thermography research group at the Center for Nondestructive Evaluation, and specializes in thermographic nondestructive evaluation and digital twin data integration. Dr. Holland did his graduate work in Theoretical and Applied Mechanics at Cornell University, and has published numerous refereed journal articles, conference proceedings, and book chapters.

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