



Science of Signatures Advanced Studies Scholars Program 2014



Speaker: Eric Flynn

Title: Wave Number Signatures for Non-destructive Inspection

Abstract: I'll present an approach to visualize damage through rapid, full-field measurements of a plate-like structure's steady-state response to a single-tone ultrasonic excitation. In the setup, a piezoelectric transducer provides the excitation while a 2D scanning laser Doppler vibrometer (LDV) makes the full-field response measurement. Taking measurements of a structure's relatively high amplitude single-tone steady-state response enables significantly faster scans through avoidance of many of the signal-to-noise ratio issues typically associated with LDV ultrasonic measurements. Damage is visualized by making automated estimates, on a pixel-by-pixel basis, of the wavenumber of the excited response through wavenumber-domain processing. As I'll show, wavenumber turns out to be signature that both sensitive to local changes in material properties and/or geometry and relatively easy to measure, making it ideal for rapid scanning applications.

Bio: **Eric Flynn** joined LANL in 2011 as a director's funded postdoctoral fellow and is now a staff member in the LANL Engineering Institute. In 2010, he completed his Ph.D. in Structural Engineering at the University of California, San Diego following his masters and bachelors studies in Engineering at Caltech and Harvey Mudd College. Prior to joining Los Alamos, Eric served for a year as the lead algorithm and software engineer at Metis Design, a technology leader in the development of aerospace structural monitoring systems. His current research interests include ultrasonic non-destructive inspection and structural health monitoring as well as design optimization of surveillance and monitoring systems.