

The Department of Mechanical Engineering/College of Engineering and Applied  
Sciences  
Stony Brook University  
**Mechanical Engineering Seminar**

**Jinying Zhu, Ph.D**

Assistant Professor

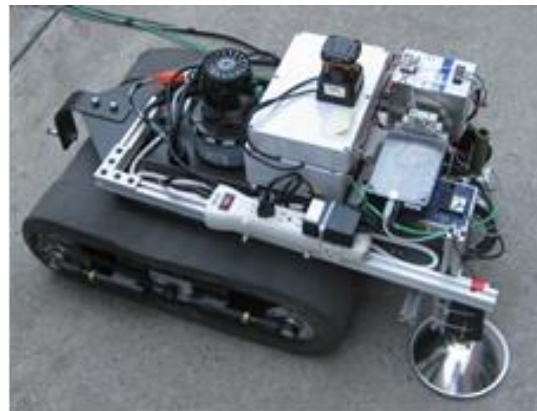
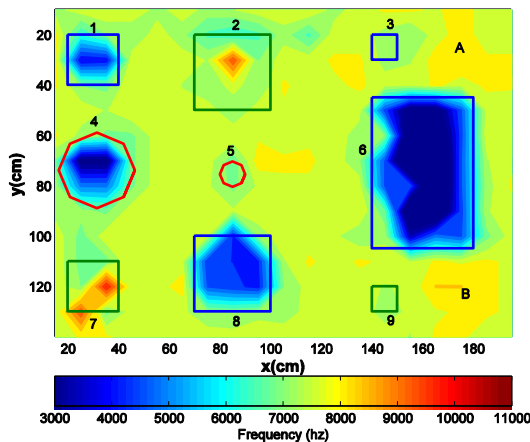
Department of Civil, Architectural and Environmental Engineering  
The University of Texas at Austin

**Lecture Title: Non-Contact Air-Coupled Sensing for NDT of Concrete  
Infrastructure**

Wednesday, January 29, 2014 at 11am, Room 173 Light Engineering Building

**Abstract**

With aging of our nation's infrastructure, development of rapid and reliable sensing techniques becomes more important than ever to reduce assessment related cost and to improve safety and resilience of critical structures. Air-coupled ultrasonic non-destructive testing (NDT) provides a solution for rapid scanning of large concrete structures. In this presentation, I will review the development of air-coupled sensing technology for civil engineering applications and present most recent progress in realizing a fully non-contact air-coupled sensing system. The presentation will show four stages of the research: 1) feasibility study of air-coupled sensing through theoretical analysis; 2) experimental validation of air-coupled surface wave and impact-echo tests; 3) improvement of signal-to-noise ratio by using a parabolic reflector; and 4) most recent progress in development of a non-contact, spark acoustic source focused by an ellipsoidal reflector. A demonstration of air-coupled testing using a robot climber will be presented.



(a) Delaminations detected by air-coupled impact-echo test. (b) A climbing robot equipped with air-coupled IE and laser positioning system.

**Biography**

Jinying Zhu is an assistant professor in Department of Civil, Architecture and Environmental Engineering at the University of Texas at Austin. She received her Ph.D. degree in Civil Engineering from the University of Illinois at Urbana-Champaign in 2006. Her research expertise and interests include NDT for concrete, wave propagation, cement material characterization using innovative sensing techniques. Dr. Zhu is the pioneering researcher in air-coupled sensing for concrete. Dr. Zhu is a recipient of the ASNT Fellowship Award in 2012, and three time winner of ACI-James Instrument Award.

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