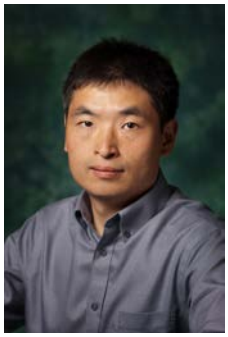
The Department of Mechanical Engineering / College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar



Dr. Xun Yu

Associate Professor and Chair
Department of Mechanical Engineering
New York Institute of Technology, Old Westbury

Research in the Integration of Nanotechnology, Sensors, Actuators and Controls

Friday, November 10, 2017 at 11:00AM, Room 173 Light Engineering Building

Abstract

This seminar will present our recent researches on the development of new systems that integrate nanomaterials with sensing, actuating and advanced control technologies for a variety of applications, including active noise control, self-sensing composites, and dynamic strain sensors:

- *Active sound transmission control for windows using CNT based transparent thin film actuators.* Carbon nanotube based transparent thin film actuators were developed in junction with an active control system for windows, aiming to significantly reduce noise transmission through windows. Such windows would be extremely useful for homes close to airports and noisy highways.
- *Active noise control for infant incubators in neonatal intensive care units (NICU).* In addition to using the CNT based transparent thin film speaker as the actuator for the control system, a specific hybrid control algorithm is also being developed for cancellation of non-stationary noise and impulse-like noise in a NICU.
- *Self-sensing CNT/cement composites.* Piezoresistive properties of CNT/cement composites are being investigated in our research. Results will be presented to demonstrate the electromechanical properties of CNT/cement composites, which will enable civil infrastructure *itself* (bridge, levee, or roadway) to work as an embedded distributed stress sensor. This technology could be used for structure health monitoring, traffic flow detection, and other civil applications.
- *Flexible strain sensor for high-rate dynamic strain measurement.* A new type of highly stretchable strain sensor was developed based on the piezoresistive response of carbon nanotube (CNT)/polydimethylsiloxane (PDMS) composite thin films. The piezoresistive response of CNT composite gives fast response in strain measurement, whereas the ultrasoft PDMS matrix provides high flexibility and ductility for large strain measurement. Results showed that the CNT/PDMS sensor is capable of measuring large strains (up to 26%) with an excellent linearity and ultrafast response (less than 30 μs).

Biography

Dr. Xun Yu currently is the Chair and Associate Professor of Mechanical Engineering at New York Institute of Technology (NYIT). He received his Ph.D. in mechanical engineering from the University of Minnesota-Twin Cities in 2006. He then joined the Department of Mechanical and Industrial Engineering at the University of Minnesota-Duluth, where he worked as an assistant professor from 2006-2010 and associate professor from 2010 -2011. He was an Associate Professor at the University of North Texas from 2011-2015 before joining NYIT. Dr. Yu's primary research areas include nanotechnology-based smart materials and smart structures, sensors, actuators and controls. Dr. Yu is a Fellow of the American Society of Mechanical Engineers (ASME).

Directions: Please refer to website: http://www.sunysb.edu or call 631-632-8310 for more information.
Check http://me.eng.sunysb.edu for any changes to location or time.

Stony Brook University