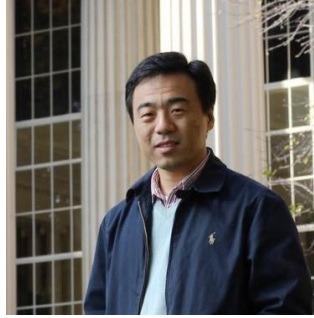


The Department of Mechanical Engineering/College of Engineering and Applied  
Sciences

Stony Brook University

## **Mechanical Engineering Seminar**

### **Faculty Candidate**



**Dr. Lifeng Wang, Ph.D.**

**Department of Civil & Environmental Engineering, Clarkson University**

### **Lecture Title: 3D Periodic Polymer Composites: Mechanics and Multifunctional Applications**

Friday May 3, 2013 at 2:30PM, Room 173 Light Engineering Building

#### **Abstract**

New design concepts for energy absorption materials, especially for personal protection applications, have attracted great interest in material science. The extraordinary mechanical performances of polymer structures and composites enable them as constituents in hierarchically structured protective systems for achieving superior mechanical performance. In this talk, I will present the design, analysis, and fabrication of two types of high-performance 3D periodically ordered structures and composites at difference length scales - co-continuous polymer composites and bicontinuous nanoframes. These structures and composites are shown to have a unique combination of stiffness, strength, toughness, energy absorption, and damage tolerance. The results provide guidelines for engineering and tailoring the nonlinear mechanical behavior and energy absorption of 3D periodic polymer composites for a wide range of applications and further creating multifunctional materials. For example, polymer co-continuous composites provide the potential of 3D shape memory behavior to be activated at multiple temperatures. The periodic and multi-phase nature of the structures and composites also enables design of mechanically tunable phononic band gap materials, tunable sensors, and elastic/acoustic filters.

#### **Biography**

Dr. Lifeng Wang is currently an assistant professor in the Department of Civil & Environmental Engineering at Clarkson University. Before joining Clarkson, Dr. Wang was a postdoctoral associate in the Department of Mechanical Engineering at Massachusetts Institute of Technology, where he worked on the mechanics of polymers, polymeric-based micro- and nano-composite materials, and biological materials. He received his B.E. (2001) and Ph.D. (2006) both from Tsinghua University, majoring in Solid Mechanics. Dr. Wang received National Excellent Doctoral Dissertation Award of P.R. China (2008) and Natural Science Award from Ministry of Education of China (2009).

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