

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



**Jianguo Zhao**  
PhD candidate in Electrical and Computer Engineering at Michigan State  
University

**Lecture Title: Design and Control of Biologically Inspired Meso-scale Jumping  
Robots**

Wednesday, April 09, 2014 at 2PM, Room 173 Light Engineering Building

**Abstract**

Robots will transform our daily lives in the near future by moving from controlled industrial lines to unstructured environments such as home, offices, or outdoors with various applications from healthcare, service, to defense. Nevertheless, two fundamental problems remain unsolved for robots to work in such environments. On one hand, how to equip robots, especially meso-scale ones with sizes of a few centimeters, with versatile locomotion abilities to deal with the uncertain environment is still a daunting task. On the other hand, how to control such robots to dynamically interact with the environment for agile and robust locomotion also requires tremendous efforts. In this talk, I will present my research efforts to tackle these two problems in the framework of biologically inspired robotics. First, I will show how to use biologically principles found in nature to build efficient meso-scale robots with various locomotion abilities such as jumping, rolling, and aerial maneuvering. Second, I will present a novel non-vector space control method for control with limited information feedback by incorporating compressive sensing. This method is ideal for the control of meso-scale robots with limited sensing and computation ability. The research in these two thrusts will pave the way for next generation bio-inspired, low cost, and agile robots.

**Biography**

Jianguo Zhao is a PhD candidate in Electrical and Computer Engineering at Michigan State University. He received the B.E. Degree (2005) in Mechanical Engineering from Harbin Institute of Technology, P. R. China, and the M.E. Degree (2007) in Mechatronic Engineering from Shenzhen Graduate School of Harbin Institute of Technology, P. R. China. He has more than ten years of experience in designing and building robots for various applications. His research interests include biologically inspired robotics, mechanism design, dynamic systems, mechatronics, 3D printing, vision based control, and motion control for nano-systems. His research on meso-scale jumping robots has received many media reports. He has won the outstanding research award from Michigan State University (2011) and the second place in ASME mechanism & robot design competition (2012). He is a student member of American Society of Mechanical Engineers, the IEEE Robotics & Automation Society, and the IEEE Control Systems Society.

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