



TEXAS TECH UNIVERSITY  
Department of Mechanical Engineering

## Pointwise Characterizations of Mechanical Properties of Heterogeneous Tissues

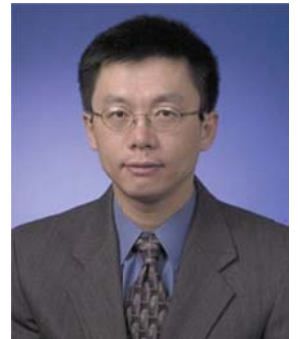
**Jia Lu, Ph.D., Professor**

Department of Mechanical and Industrial Engineering  
The University of Iowa, Iowa City, Iowa

**Abstract:** Advances in mechanobiology reveal that many cell types will try to offset complexities in geometry and applied loads with heterogeneous material properties in order to render a mechanobiologically favorable environment. To fully understand tissue's behavior, there is a pressing need for quantifying the heterogeneities, and preferably in tissue's natural state. In this talk, we will present a new method for characterizing the heterogeneous property of thin tissues. The corner stone of this method is an inverse approach of stress analysis. The method takes a deformed configuration as input to predict stress distributions by way of finding the reference configuration. For some applications, this inverse approach has a unique attribute, that it can predict the stress without accurate knowledge of the tissue property in question. In our work, the method is integrated with digital image correlation technique, enabling an independent acquisition of 3D stress and strain data. Several examples will be presented. We will also show the application in evaluating the rupture properties of aneurysmal tissues.

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**Bio:** Dr Jia Lu received a Ph.D. degree from the University of California, Berkeley in 1999. After a short tenure in industry, he joined the University of Iowa in 2001 and have stayed in UI since then. His research has been in tissue mechanics, computational mechanics, and inverse problems. He is a member of ASME and SES.



**Monday, October 26, 2015**  
**Livermore Center 101 | 2:00 – 3:00 pm**  
Coordinator: Dr. Beibei Ren ([beibei.ren@ttu.edu](mailto:beibei.ren@ttu.edu))