

# Lower back pain: What's the disc got to do with it?

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## ABSTRACT

Lower back pain, caused by disc degeneration or injury, has a major effect on the United States economy, resulting in large medical costs – 2.5% of US health care expenditures (~50 billion dollars) annually. A herniation is a common injury to the intervertebral disc that is characterized as the migration of the inner nucleus pulposus through the layers of the outer annulus fibrosus. There have been many studies quantifying the mechanical characteristics of the annulus fibrosus and modeling the response, both mathematically and computationally. There has been some work investigating the failure mechanisms of the annulus in a degenerative, micromechanical model, however the work for a larger injury model is lacking. Experimental work shows that repetitive, compressive and bending loads of the disc, causing the annulus to fail in tension, will result in catastrophic disc herniation. Currently, research is focused on two main objectives: (1) characterization of failure properties of annular lamellae using micro-mechanical testing protocols with the long-term goal of developing a failure criterion for the annulus fibrosus and (2) development of clinical interventions to restore stability to the intervertebral disc, including injectable hydrogels and biocomposite patches.

## BIOGRAPHY

Dr. Isaacs grew up outside of Philadelphia and received a B.S. degree in Mechanical Engineering from Widener University in 2006 as well as M.S. and Ph.D. degrees in Mechanical Engineering and Mechanics in the Laboratory for Biomaterials and Biosurfaces in Tissue Engineering at Drexel University in 2009 and 2012, respectively. Her current research interests include overall spine biomechanics, including annular repair biomaterials, fracture of annular fibrosus leading to disc herniation, and injectable nucleus pulposus replacement. She received Widener University's Service and Leadership Award (2006) and the United States Department of Education's GAANN Fellowship (2007-2011). Also, she is the recipient of a Fulbright Fellowship to complete her post-doctoral work at Tel Aviv University in the School of Mechanical Engineering. Dr. Isaacs has been a Visiting Assistant Professor at Widener University since 2013.



## EVENT DETAILS

### DATE:

Friday, January 16, 2015

### TIME:

1:00 PM

### LOCATION:

Carnegie 315  
Stevens Institute of Technology

### ATTENDANCE:

This event is open to Stevens' Faculty, Students, Staff and Invited Guests