

# PHYSICAL MATHEMATICS SEMINAR

## Cross-Disciplinary and Multi-scale Aspects of Shell Deformation

**ASHKAN VAZIRI**

Northeastern University

### ABSTRACT:

Emergence of new technological applications, in addition to the constantly growing interest in biological materials has accentuated the importance of studying the mechanics of highly deformed shells. The key challenge is the intricate interplay of physics and geometry, which leads to a mechanical response much different from the response of solid objects. The quest to understand the underlying phenomena has spawned theoretical and experimental studies, which have helped in understanding the underlying mechanisms of deformation and response of shells. In this talk, I will discuss the mechanics of elastic shells in a number of inorganic and biological systems, involving time and size scales that span over several decades. I will also use several classical problems: indentation of elastic spherical caps by a flat rigid plate and a rigid sharp indenter and pure bending of a cylinder, to highlight some of the key aspects of the mechanics of strongly deformed elastic shells.

### Short Biography:

Ashkan Vaziri received his Ph.D. in 2004 from Northeastern University. After graduation, he joined the Division of Engineering and Applied Sciences at Harvard University, first as a Post-Doctoral Fellow and then a Research Associate under the mentorship of Professor John W. Hutchinson. He was also a Lecturer on Engineering at Harvard University and a Research Affiliate with the Biological Engineering Division at MIT. Dr. Vaziri is now an Assistant Professor and the Director of High-Performance Materials and Structures Laboratory at Northeastern University. He is also an Associate of Harvard School of Engineering and Applied Sciences and a Visiting Scholar at UC, Berkeley and the Associate Technical Editor of *Experimental Mechanics*.

**TUESDAY, MAY 4, 2010**

**2:30 PM**

**Building 2, Room 105**

*Refreshments at 3:30 PM in Building 2, Room 290  
(Math Department - Common Room)*

<http://math.mit.edu/pms/spring10/>



Massachusetts Institute of Technology

Department of Mathematics  
Cambridge, MA