

TEMPLE UNIVERSITY  
Department of Mathematics

# Applied Mathematics and Scientific Computing Seminar

Wednesday, 16 September 2015, 4:00 p.m.  
Room 617 Wachman Hall

(refreshments and social at 3:45 p.m)

## Reconfigurable Soft Metamaterial: Mechanics, Geometry, and Functionality

by Jie Yin

Department of Mechanical Engineering  
Temple University

**Abstract.** Metamaterials are artificially structured materials, which are not found in nature. When in response to external environmental stimuli, metamaterials can be reconfigured beyond their original design by reversibly changing the size, shape, and symmetry. Reconfigurable metamaterials are becoming the emerging frontier in scientific research and engineering innovation owing to their unprecedented properties in electronics, optics, acoustics, and mechanics, arising from the geometrical arrangements of their unit cells. In this talk, we will discuss our groups recent research in this area. The talk will be composed of two parts. Part I will be on harnessing surface wrinkling and structural buckling in soft materials under simple mechanical deformation for reconfigurable metamaterials. The mechanics governing the tunable geometry and their multi-functional applications in smart window, extremely stretchable electronics, and switchable electronics will be discussed. Part II will be on the generation of a new class of reconfigurable metamaterials by engineering simple cuts. The cut-based metamaterials are extremely soft, conformable, stretchable, and material properties tailorable. The mechanical behavior of such cut-based metamaterials and their application in tunable acoustics will be discussed in this talk.