

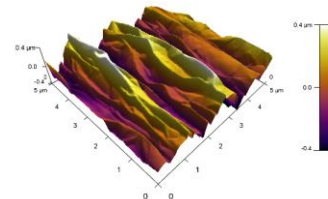
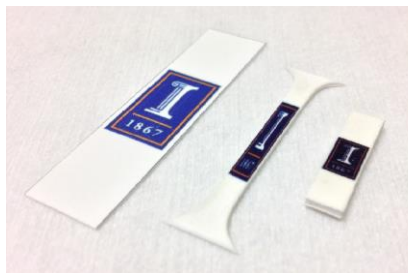
# NANO HOUR

Wednesday, April 16, 2014 3:00 pm  
Beckman Institute - Room 3269

## Textured Graphene-Graphite Nanostructures for 3-Dimensional Nano-electromechanical Devices

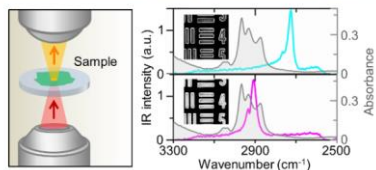
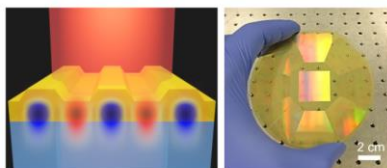
**Cai Mike Wang, Mechanical Science and Engineering**  
Graduate student with Professor SungWoo Nam

Superb electromechanical properties of graphene, where large mechanical deformation is achievable, provide substantial promise as a candidate material for advanced nano-electromechanical devices. We demonstrate a simple, scalable, and selective method of crumpling graphene and graphite into 3-dimensional (3D) textured graphene-graphite hierarchical nanostructures by using thermal transformation of shape-memory polymers. Quantitative analysis shows that both the periodicity and feature size of textured graphene/graphite are on the order of micrometers for mechanical strains of up to 80%. The resultant 3D morphology (i.e. induced wavelength and height) can be modulated via simple processing parameters, such as temperature and duration of thermal treatment. Selective and tunable formation of localized areas of large strain concentrations may enable studies into characteristic Raman bands' shifts, work function and band-gap modulation, and wavelength-sensitive photo-response.



## Engineering Narrowband Guided Fano Resonances Inherent in the Large-Area Mid-Infrared Photonic Crystal Microresonators for Spectroscopic Imaging

**Jui-Nung Liu, Electrical and Computer Engineering**  
Graduate student with Professor Brian T. Cunningham



In this talk, I will illustrate an array of large-area, one-layer, narrow-bandwidth mid-infrared photonic crystal microresonators. This device is designed and co-fabricated upon a single substrate as a bank of discrete-wavelength reflectance filters. With this device, we demonstrate how high-performance Fano resonances can enable wavelength-selectable incoherent mid-IR radiation for high-quality discrete frequency infrared (DF-IR) microspectroscopic imaging of condensed matter and biological specimens.

**Coffee and cookies will be served**  
<http://nanohour.beckman.illinois.edu>