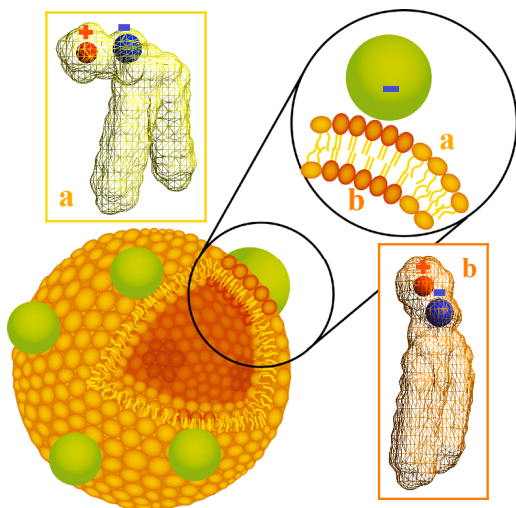


NANO HOUR

Wednesday, March 11, 2009
3:00 PM
Beckman Institute - Room 3269

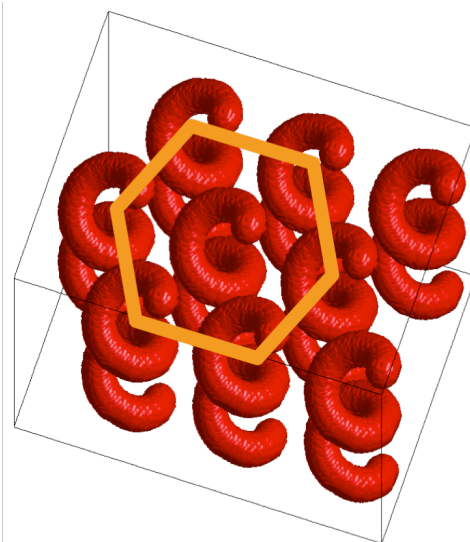
Nanoparticle-Induced Surface Reconstruction of Phospholipid Membranes Bo Wang—Graduate Student, Materials Science & Engineering



This research offers a new mechanism to generate patchy functional properties in phospholipid membranes. Phospholipid vesicles simple enough that they do not satisfy the traditional requirements to display patchiness are stimulated to display it in response to nanoparticle binding. Nanoparticles of negative charge induce local gelation in otherwise-fluid bilayers; nanoparticles of positive charge induce otherwise-gelled membranes to fluidize locally. Through this mechanism, the phase state deviates from the nominal phase transition temperature by tens of degrees. Moreover, the present systems are more strongly influenced by the fluctuation phospholipid membranes and thus present anomalous dynamics.

Design and Fabrication of Novel Structures through Proximity Field Nano-Patterning Sidhartha Gupta – Graduate Student, Materials Science & Engineering

Proximity Field Nano-Patterning is a technique used for fabricating period 3D microstructures.¹ This technique utilizes a grating molded into or in conformal contact with the surface of a photopolymer film. This photopolymer is then exposed to a single incident coherent optical field through the grating. Diffraction from the grating gives rise to more optical fields, creating an interference pattern that is recordable in the photopolymer. Given the grating design and the optical field used, established theories based on Maxwell's equations, such as rigorous coupled wave analysis (RCWA), can reliably predict the structures that would be recorded in the photopolymer. However, it's more complex to solve the inverse problem, i.e. choosing the grating design and the corresponding optical field for a desired structure. To solve this problem, we have developed and demonstrated the use of a genetic algorithm based approach.² The designs developed for a variety of structures, such as a hexagonal array of helices and face-centered cubic diamond, will be exhibited. The fabrication of these structures and the correspondence between experiment and theory will also be discussed.



Coffee and cookies will be served.

<http://nanohour.beckman.uiuc.edu>