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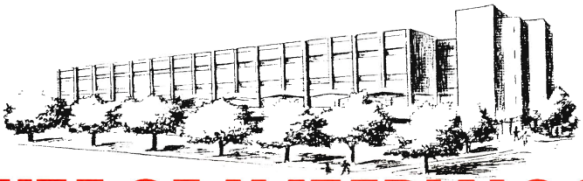

INSTITUTE OF MATERIALS SCIENCE

POLYMER PROGRAM SEMINAR

"Electromechanics of Biomimetic Bilayer Membranes"

Prof. Petia Vlahovska
Brown University

Friday, Apr. 18, 2014
1:30 PM, IMS Room 20

Living cells maintain electric potential difference across their plasma membrane. Changes in the transmembrane electric field are biologically important signals in physiological processes such as electric-field-directed cell migration in development and regeneration. Pulsed electric fields are used to open pores in the membrane, which enable the delivery of material inside the cell, e.g. for gene transfection.

In this talk, I will discuss our recent theoretical and experimental work on the dynamics of biomimetic membranes (bilayers assembled from lipids or polymers) in electric fields. We developed a zero-thickness model of the membrane, in which the bilayer finite thickness is effectively accounted for by membrane electro-mechanical properties such as bending modulus, capacitance, and conductance. A linear stability analysis for a planar membrane shows that membrane conductance and asymmetry in the embedding electrolyte solutions destabilize the interface. However, the capacitive charging acts to stabilize the system under conditions where an ordinary fluid-fluid interface is unstable. I will also discuss how the capacitive membrane dynamics affects electrodeformation of vesicles (closed membranes).

**For further information, please contact YH Chudy at ychudy@ims.uconn.edu*

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