Applied Mathematics Seminar
INSCC 110, 3:30pm Monday
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Membrane electromechanics and protein interactions

by

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Abstract

Organelle and cell membranes must mediate waste disposal, nutrient uptake, and structural rearrangements. I will present models of two of many related mechanisms that can control biomembrane structural rearrangements: (i) electrostatic coupling between membrane charge and ionic solution, and (ii) protein aggregation mediated membrane bending. Electrostatic effects depend on the membrane surface charge and ionic strength of the solution and alone can account for the 100nm tubules commonly observed emananting from Golgi/ER stacks. Local integral membrane protein concentrations also couple to local mean membrane curvatures. This effect has been exploited experimentally to spatially separate membrane components within intact cells. A simple statistical mechanical model incorporating protein concentration and membrane bending energies will be presented where local bending mediates protein-protein interactions.