PHYSICAL MATHEMATICS SEMINAR

INTERFACIAL PHENOMENA IN BACTERIA

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ABSTRACT:

I will present two experimental studies that deal with interfacial processes in bacteria. The adhesion of individual bacterial cells to a surface is a complex process, which involves the cell membrane, but is also mediated by surface appendages such as pili and flagella. We have used a microfluidic approach to study the adhesion of *Pseudomonas aeruginosa* to abiotic surfaces as a function of shear stress. An interesting discovery is the enhanced bacterial adhesion in response to increasing shear rate. In order to identify the origin of this phenomenon, we have performed experiments with several mutant strains. Our results show that shear-enhanced adhesion seems not to be regulated by primary surface organelles, and that this process is not specific to a certain type of surface.

In the second part of the talk, I will discuss how dynamic processes within a bacterium and the associated membrane remodeling can influence protein localization. I will present evidence that the membrane protein SpoVM recognizes a geometric cue during spore formation in *Bacillus subtilis*. *In vitro* experiments with giant lipid vesicles support the hypothesis that this localization is driven by geometry rather than biochemical recognition. Our results, when interpreted using existing protein adsorption models, suggest a cooperative adsorption mechanism for high membrane curvature, which involves the formation of small clusters of proteins.

TUESDAY, DECEMBER 8, 2009
2:30 PM
Building 2, Room 105

Refreshments at 3:30 PM in Building 2, Room 290
(Math Department - Common Room)

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