The University *of* Western Ontario

Faculty of Science

Department of Applied Mathematics

APPLIED MATHEMATICS COLLOQUIUM

Date: Tuesday, June 17, 2008

Time: 2:30 pm

Location: Middlesex College Room 204

From Curvature Driven Pore Growth to Studying Vesicle-cell Fusion Pores

Jens Kröger

Physics Department and Center for the Physics of Materials

McGill University

Abstract:

In the first part of my talk, I will discuss a model of curvature driven growth of pores in electrically charged membranes which correctly reproduces charge-pulse experiments. Our model, consisting of a Langevin equation for the time dependence of the pore radius coupled to an ordinary differential equation for the number of pores, captures the statistics of the pore population and their effect on the membrane conductance. The calculated pore radius is a linear, and not an exponential, function of time as observed experimentally (Wilhelm et al. 1993. Biophys. J. 64. 121-128). Two other important features of charge-pulse experiments are recovered: pores re-seal for low and high voltages but grow irreversibly for intermediate values of the voltage.

In the second part of my talk I will briefly discuss how confocal microscopy and spatiotemporal image correlation spectroscopy can be used to track the dynamics of vesicle flow and eventually study vesicle-cell fusion.