

Center for Biocomplexity/Center for Applied
Mathematics/Department of Mathematics
Colloquium

Bjorn Birnir

Department of Mathematics

Director of Center for Complex and Nonlinear Science

University of California – Santa Barbara

***“A Dynamical Systems Simulation of Myxobacteria, Driven
by Bio-energy”***

Wednesday October 1, 2008

4:00pm

117 Hayes-Healy Center

Tea at 3:30pm

We simulate myxobacteria in a petri dish as an interacting particle system. This simulation of the motion of the bacteria on a plane is not tied to a lattice and the different states of the life-cycle of the bacteria can be simulated including swarming, fruiting-body formation and sporulation. We incorporate Dynamic Energy Budget (DEB) into our model, successfully linking the internal dynamics of the individual cell with the dynamics of the population. Our simulation shows that the DEB simulation, with an additional equation modeling the level of C-signalling molecule on the surface of each cell, automates the transition from the swarming to the fruiting body stages and also the transition between the states of the fruiting body formation, concluding with sporulation.