PHYSICAL MATHEMATICS SEMINAR

Predicting Network Structure and Dynamics using in Silico Evolution

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ABSTRACT:

I will describe an evolutionary procedure in silico that evolves small gene networks and selects for a desired dynamical behaviour. I will illustrate this approach on several examples related to developmental biology: vertebrae formation and hox gene patterning. Despite the intrinsic stochasticity in evolution itself, for the same function, selection often converges towards similar network dynamics, which can be characterized by its bifurcation diagram. Evolved models are coarse-grained, unexpectedly evolve dynamical properties analogous to actual biological networks and suggest new experiments. I propose a kinetic view of evolution, which can be related to the evolutionary phenomenon of parallel/convergent evolution.

TUESDAY, NOVEMBER 8, 2011
2:30 PM
Building 2, Room 105

Reception at 3:30 PM in Building 2, Room 290
(Math Dept. Common Room)

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