

The Oliver Club

www.math.cornell.edu/~oliver/

Steven Strogatz, Cornell University

The Mathematics of Collective Synchronization

Every night along the tidal rivers of Malaysia, thousands of male fireflies congregate in the mangrove trees and flash on and off in silent, hypnotic unison. This display extends for miles along the river and occurs spontaneously; it does not require any leader or cue from the environment. Similar feats of synchronization occur throughout the natural world, whenever large groups of self-sustained oscillators interact.



This lecture will provide an introduction to the Kuramoto model, the simplest mathematical model of collective synchronization. Its analysis has fascinated theorists for the past 35 years, and involves a beautiful interplay of ideas from nonlinear dynamics, statistical physics, and fluid mechanics. Classic results, recent breakthroughs, and open problems will be discussed, and a video of synchronous fireflies will be shown.



Thursday, February 26, 2009
at 4:25 PM in 251 Malott Hall

Refreshments will be served at 3:55 PM in the Mathematics Department lounge (532 Malott Hall).

