Interdisciplinary Physics
Science at the Edge Seminar

Dynamics of Large Biological Systems

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Room 1400BPS, 11:30 a.m. Friday October 28th, 2016

Biological systems are large: to understand the development of *D. melanogaster*, we need to account for a gene-regulation network with more than 15,000 nodes; the spread of influenza in Chicago is mediated by a contact network composed of several million nodes; ecosystems can harbor thousands of different species interacting with each other in different ways.

Modeling this staggering diversity is difficult using traditional methods, and a possible alternative is represented by the application of random matrix theory to biological dynamics. I present a series of studies on the stability of large ecological systems which use and extend the theory of random matrices, to gain insight on the principal quantities determining the response to perturbations. I show how these methods can be applied to a diversity of problems in biology, and conclude with a list of challenges that need to be overcome to make this theory more applicable and complete.

Refreshments in 1400BPS prior to talk