



THE UNIVERSITY OF
CHICAGO

Department of Statistics

STATISTICS COLLOQUIUM

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Dynamics of Large Biological Systems: A Random Matrix Approach

MONDAY, February 29, 2016, at 4:00 PM

Eckhart 133, 5734 S. University Avenue

Refreshments following the seminar in Eckhart 110.

ABSTRACT

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.