

## TALK ANNOUNCEMENT

**Seminar Series:** The Science of Complex Networks (description below)

**Speaker:** Stephen Eubank, NDSSL (VBI) and Dept. of Physics, Virginia Tech.

**Title:** Simulating Epidemics on a Social Network

**Abstract:** Please see below.

**Date & Time:** Wednesday, October 5, 2005. 4:00-5:00 PM

**Location:** CRC, Building XV, Conference room 1113

**Web:** <http://ndssl.vbi.vt.edu/seminars>

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### Abstract

Determining optimal responses for preventing the spread of diseases like pandemic flu require a detailed understanding of the vulnerability and criticality of people viewed as nodes in a social network. This talk will address issues in simulating epidemics that are specific to social network based approaches. I will briefly review some continuum models based on coupled rate equations to provide the context for these issues. The talk will focus on developing a model for disease propagation similar to a self-avoiding random walk, indicating the limitations of standard treatments of that problem, and finally introducing a Sequential Dynamical System (SDS) that captures the full dynamics. I will contrast the SDS dynamics with those of the continuum models and suggest definitions of time-dependent measures of vulnerability and robustness for vertices in the network.

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### Seminar Series: "The Science of Complex Networks"

A new seminar series titled "The Science of Complex Networks" is being started. It is organized by the group NDSSL at VBI, on the web at <http://ndssl.vbi.vt.edu>. The theme of the seminar is mathematical and computational aspects of dynamics over large graphs. Examples include the dynamics on networks in communication, urban traffic systems, and networks arising in biological systems such as the molecular networks in the genome and the immune system.

The systems and network models that come from these various areas describe very different phenomena and dynamics and may seem to have little in common. Contrary to this intuition, there are large classes of models with fundamental similarities in both structure and dynamics. This common and generic structure has already motivated research, and is an extremely active area of current research.

The seminars will have a formal flavor, and at least proof ideas and outlines will be encouraged. Presentations of experimental data and findings displaying interesting phenomena that point to possible general results are also welcome.