

TALK ANNOUNCEMENT

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

Speaker: Mark Newman, Department of Physics and Center for the Study of Complex Systems University of Michigan, Ann Arbor.

Title: Modularity and Community Structure in Networks

Abstract: Please see below.

Date & Time: Monday, April 10, 2006. 3:30-4:30 PM

Location: Virginia Tech Corporate Research Center, Building XV, Conference room 2018

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

Abstract:

Many systems of scientific or technological interest can be represented as networks, such as the worldwide web, citation networks, and social and biological networks. These networks are often found to divide naturally into communities or modules, whose detection and characterization has been the subject of a considerable volume of recent research. The ability to detect modules in the web network, for instance, could allow us to find collections of related web pages, while modules in metabolic networks might correspond to functional units. This talk will describe some recent advances in methods for community detection, focusing particularly on the idea of modularity optimization and on spectral methods based on matrix properties of networks. Throughout the talk a wide selection of examples will be presented of community structure in real-world networks.

Speaker background:

Mark Newman is a professor of Physics and Complex Systems at the University of Michigan and is also a member of the external faculty of the Santa Fe Institute. His research is on the structure and function of networks with an emphasis on social and biological networks. Some of his recent work includes

- The structure of scientific collaboration networks, M. E. J. Newman, Proc. Natl. Acad. Sci. USA 98, 404-409 (2001).
- Random graphs with arbitrary degree distributions and their applications, M. E. J. Newman, S. H. Strogatz, and D. J. Watts, Phys. Rev. E 64, 026118 (2001).
- The structure and function of complex networks, M. E. J. Newman, SIAM Review 45, 167-256 (2003).

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.