"Science and Engineering of Co-evolving Networks: Population Dynamics and Epidemics"

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Complex Networks are pervasive in our society. The size and heterogeneity of these networks, their co-evolving nature and the technical difficulties in applying dimension reduction techniques commonly used to analyze physical systems makes the problem of reasoning, prediction and control of these networks challenging.

Recent quantitative changes in high performance and pervasive computing including faster machines, distributed sensors and service-oriented software have created new opportunities for collecting, integrating, analyzing and accessing information related to such large complex networks. The advances in network and information science that build on this new capability provide entirely new ways for reasoning and controlling these networks. Together, they enhance our ability to formulate, analyze and realize novel public policies pertaining to these complex networks.

The talk will describe the development of high performance computing based crises management system called Comprehensive National Incident Management System (CNIMS). As an illustrative case study we will describe how CNIMS can be used for developing a scalable computer assisted decision support system for pandemic planning and response. In addition to the fact that they serve as excellent "model organisms" for developing a computational theory of co-evolving socio-technical networks. I will conclude by discussing directions for future research.