

Distinguished Lecture Series on Network Science and Research

In light of the growing interest and importance of network science and network research to the Penn State Research community, the Office of the Senior Vice President for Research is sponsoring this series. Prominent national experts are scheduled to present talks on campus throughout the academic year. The goal is to clarify the underlying principles in this intrinsically interdisciplinary research area and to bring the diverse community of Penn State researchers together around common themes to explore how their research might benefit from intellectual cross-fertilization.



“Dynamic Network Analysis: From Words to Spatio-Temporal Network Analytics”

Kathleen M. Carley, Carnegie Mellon University

Monday, December 15, 2008

11:15 a.m. – 12:30 p.m.

Cybertorium, 113 IST Building

Abstract:

Who we know, whom we interact with, impacts everything we do, everything we know, and everything we are. Over the past 60 years, the field of social networks has evolved to enable the assessment of individual, group and organizational behavior as a function of the position in and the overall structure of the social network. Nevertheless, repeatedly, scientists have discovered that just knowing the social network is insufficient to forecast change and to unequivocally predict performance. Considering the overall ecology of networks connecting who, what, when, where, how and why enables improved assessment and forecasting. This talk examines what technology is necessary to examine these meta-networks and the advantage of assessing groups from this meta-network perspective. Illustrative examples are drawn from a variety of domains including white collar crime, counter-terrorism and general information diffusion.

Interests:

Dr. Carley is the director of the center for Computational Analysis of Social and Organizational Systems (CASOS). She is the founding co-editor with Al. Wallace of the journal Computational Organization Theory and has co-edited several books in the computational organizations and dynamic network area. Dr. Carley's research combines cognitive science, social networks, and computer science to address complex social and organizational problems. Her specific research areas are dynamic network analysis, computational social and organization theory, adaptation and evolution, text mining, and the impact of telecommunication technologies and policy on communication, information diffusion, disease contagion, and response within and among groups particularly in disaster or crisis situations. She and her lab have developed infrastructure tools for analyzing large scale dynamic networks and various multi-agent simulation systems. The infrastructure tools include ORA, a statistical toolkit for analyzing and visualizing multi-dimensional networks. Another tool is AutoMap, a text-mining system for extracting semantic networks from texts and then cross-classifying them using an organizational ontology into the underlying social, knowledge, resource, and task networks. Her simulation models meld multi-agent technology with network dynamics and empirical data. Three of the large-scale multi-agent network models she and the CASOS group have developed in the counter-terrorism area are: BioWar a city-scale dynamic-network agent-based model for understanding the spread of disease and illness due to natural epidemics, chemical spills, and weaponized biological attacks; DyNet a model of the change in covert networks, naturally and in response to attacks, under varying levels of information uncertainty; and RTE a model for examining state failure and the escalation of conflict at the city, state, nation, and international as changes occur within and among red, blue, and green forces.

**Sponsored by the College of Information Sciences and Technology
and the Office of the Senior Vice President for Research**