Epidemic processes over time-varying networks

Abstract: The study of epidemic processes has been studied within a wide range of areas over many years, including in mathematical systems, biology, physics, computer science, social sciences and economics. Recently there has been renewed interest in the study of epidemic processes focused on the spread of viruses over networks, motivated not only by recent outbreaks of infectious diseases, but also by the rapid spread of opinions over social networks, and the security threats posed by computer viruses. Most of the models considered in these recent studies have been focused on network models with static network structures, however almost all systems being considered have inherently dynamic structures. In this talk, we will discuss the modeling of epidemic processes over time-varying networks, and present stability analysis results which elucidate the behavior of these systems. Ongoing efforts for multi-virus processes over multi-layer networks will also be introduced. Simulation results and potential control actions will be presented and discussed to conclude the talk.

Bio: Carolyn received her Ph.D. (Electrical Engineering) from California Institute of Technology in 1997, her M.S. (Electrical and Computer Engineering) from Carnegie Mellon University in 1985, and her B.S. (Electrical and Computer Engineering) from California State Polytechnic University in 1984. From 1985 through 1989 she was a Research and Development Engineer for Hewlett-Packard in Silicon Valley. She is currently a Professor at the University of Illinois at Urbana-Champaign in the Department of Industrial and Enterprise Systems Engineering, and has held visiting positions at KTH (Stockholm, Sweden), Stanford University and Lund University (Lund, Sweden). Carolyn has been the recipient of national research awards including the National Science Foundation CAREER Award, and the Office of Naval Research Young Investigator Award, and local teaching awards. Her research interests lie in the development of model approximation and control analysis theory, network inference and aggregation, and distributed optimization and control, with applications in bioengineering and energy networks.