

EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

Tracing the Source of Large-Scale Outbreaks of Foodborne Contamination Across Complex Food Supply Networks

ABSTRACT - In today's globally interconnected food system, outbreaks of contamination can spread widely and cause considerable impact on public health and safety. Tracing the spread and identifying the source of emerging large-scale contamination events are crucial steps in mitigating their proliferation. However, tracing contamination origins is a challenging problem due to the complexity of the food supply system. In this talk I will describe a model-based approach to identify the source of emerging outbreaks of foodborne contamination which involves (i) modeling the aggregate network structure of the food supply system by combining logistics models with multi-scale sources of data, (ii) formulating a model of foodborne contamination diffusion on these networks, and (iii) developing network-theoretic approaches to identify the food item carrying the contamination and the location source in the supply network. The combined approach is evaluated in application to simulated outbreak scenarios and a retrospective analysis of a major historical outbreak, demonstrating real-world applicability. Extensions to other foodborne contamination identification settings will be discussed.



Dr. Abigail Horn

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SPEAKER BIO – Abigail Horn is a Research Assistant Professor of Industrial and Systems Engineering (ISE) and Research Lead in the Information Sciences Institute (ISI) at the University of Southern California, where she is a Co-Director of the AI4Health Center. She obtained her Ph.D. in Engineering Systems from the Institute for Data, Systems, and Society at Massachusetts Institute of Technology and an undergraduate degree in Physics from the College of Creative Studies at the University of California, Santa Barbara. Before coming to Viterbi, she completed a Research Associateship in Biostatistics and Health Behavior at the USC Keck School of Medicine. Before coming to USC she completed a joint postdoctoral fellowship in transport and logistics modeling at the Kuhne Logistics University (Hamburg) and in epidemiology and bioinformatics at the German Federal Institute for Risk Assessment. The general area of her research is the combination of approaches from computational social science, systems modeling, and AI with large-scale data sources to design solutions to pressing public health challenges related to food systems, from food safety to nutrition. Current research includes analyzing big mobility data from smartphones to understand visits to food outlets and impacts on nutritional health, using digital menu data to predict the nutritional quality of restaurant menus, and modeling food supply chain network structure for applications in foodborne disease to food security.

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3:30 PM – 4:50 PM

USC ANDRUS GERONTOLOGY CENTER (GER), Room 206