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“ Exploring spreading processes in social networks and hospital-hospital transfer networks”

Understanding how and how far information, behaviors, or pathogens spread in social networks is an important problem, having implications for both predicting the size of epidemics, as well as for planning effective interventions. I will talk about the structure of a social network based on the cell phone communication patterns of millions of individuals, and what implications it has for diffusion processes on social networks. Given two nodes A and B in a network, I will discuss the relationship between (1) the shortest path between A and B in a fully observed network, (2) the shortest path between A and B in a partially observed network, and (3) a typical simulated (stochastic) spreading path between A and B in fully and partially observed networks. I'll also discuss our ongoing work on patient transfers across US hospitals, highlighting some of the structural and geographical properties of the hospital-hospital transfer network and the temporal dynamics of patient transfers. Finally, I'll talk about some of our early results on simulated epidemics on hospital-hospital transfer networks.