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From network dynamics to human activity and mobility patterns

ALBERT-LÁSZLÓ BARABÁSI, Center for Complex Network Research and Dept. of Physics, Northeastern University; Center for Cancer Systems Biology, Dana Farber Cancer Institute.

The next challenge of network research is to go beyond the structure and quantify the dynamics of interconnected systems. A particular difficult facet of this research requires us to understand the temporal and spatial driving forces that govern social, technological and biological networks. In this talk I will focus on the dynamical mechanism that drive the activity of social networks. While none of us thinks of our daily activity pattern as random, most modeling efforts approximate human activity with fundamentally random spacial and temporal patterns. My purpose is to offer evidence of a series of significant deviations from this random expectation. I will talk about the bursty temporal character of human activity patterns and the travel patterns of individuals. I will show that both human activity and travel patterns are far more regular than the standard Poisson and diffusion models would predict, with implications on agent based models, epidemic modeling as well as the nature of time and space experienced by humans. The work was done in collaboration with Marta Gonzales, Cesar Hidalgo, Kwang-il Goh, Joao Oliveria, and Alexei Vazquez.