Urban systems science: From theory to applications

Prof. Brian Deal
Dept. of Urban and Regional Planing
University of Illinois
USA

http://www.urban.illinois.edu/people/faculty-directory/core-faculty/2-brian-deal

Abstract

Cities are complex and evolving systems. Understanding these systems and their dynamics is becoming critical as our urban areas shift from a relatively static and dependent determinism, toward a more entropic 'edge of chaos' (Langton 1986). Planning on the edge, the evolutionary point between stasis (characterized by a lack of responsiveness to change), and chaos (where actions become "lost in the static of irregular activity", Marion (1999)), requires a deeper understanding of what we refer to as *urban systems science*.

We define urban systems science as a systems approach to the study of the structure and behavior of the urban world through observation, simulation, and experiment. A systems approach acknowledges that complex behaviors cannot be understood or reliably improved by studying the behavior of its parts in isolation. In order to meet the growing challenges of urban areas more effectively, the system must be viewed as a dynamic interactive whole. We contend that this approach is critical for addressing the challenges inherent in urban sustainability, resilience and climate change.

In this presentation I consider urban science using the Land use Evolution and impact Assessment Model from three perspectives: i) a systems understanding, needed to confront complex systems dynamics and the deep uncertainty associated with climate variability and urban disorder, ii) a comparative framework that enables urban systems integration, testing, and peer to peer learning, and iii) and a communicative approaches that can affect policy and on the ground action through the production of useful information. I do this using some recent work on water systems modeling in both Chicago and Stockholm, Sweden.