
AGSOE 7: Traffic Dynamics, Urban and Regional Systems I

Time: Tuesday 9:30–10:15

Location: BAR 205

Invited Talk AGSOE 7.1 Tue 9:30 BAR 205
Growth, Innovation, Scaling, and the Pace of Life in Cities
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Humanity has just crossed a major landmark in its history with the majority of people now living in cities. The inexorable trend towards urbanization worldwide presents an urgent challenge for developing a predictive, quantitative theory of urban organization and sustainable development. We present empirical evidence indicating that the processes relating urbanization to economic development and knowledge creation are very general, being shared by all cities belonging to the same urban system and sustained across different nations and times.

Many diverse properties of cities from patent production and personal income to electrical cable length are shown to be power-law functions of population size with scaling exponents greater than unity (increasing returns) for quantities reflecting socio-economic processes (wealth creation, innovation, crime). Quantities accounting for infrastructure on the other hand are characterized by exponents smaller than one (economies of scale).

We explore the consequences of these relations for the pace of urban life and for the long term growth dynamics of urban agglomerations. We also show how the statistical properties of residuals from scaling fits lead to a new ranking of cities within an urban system that is population size independent and to simpler, more fundamental, models of urban systems.