CITIES AND COMPLEXITY — MICHAEL BATTY — CASA, UCL, Gower Street, London WC1E 6BT

Cities, like many human systems, evolve as the product of a multitude of individual decisions concerning location and movement, generating order that emerges from the bottom up. In the last decade, they have been used as exemplars par excellence of many features that now define the complexity sciences: interacting dynamic systems, far-from-equilibrium, with strong path dependence, and surprising and novel behaviours. Cities are thus the crucibles of innovation in the economy and society and have become ever more central to the way we articulate our understanding of human systems. In parallel to these concerns, cities appear to becoming even more complex. New forms of behaviour are being generated largely through the development of new information technologies which enable individuals to communicate in countless novel ways. For example, in the development of social media, while new forms of city-wide data are emerging as ICT is being fashioned into new systems underpinning the wired city. Transport of all kinds is being revolutionized by the import of ICT and in the near future, it is likely that the development of new forms of urban econophysics dealing with urban markets for land, housing as well as specific markets involving the production and consumption of goods at the spatial level will become the subject of the city focus. In this talk, I will summarise three of these developments: cities and the complexity sciences the rise of big data and the city, and smart cities.

EXPERIMENTAL COMPUTATIONAL FINANCE & BIG DATA ENVIRONMENT — PHILIP TRELEAVEN — University College London, UK

High-frequency algorithmic trading is growing rapidly accounting for 70% of US equity volumes in 2010 (according to Reuters and Bloomberg), but is also of major concern due to potential catastrophic "Flash Crashes". Likewise, the behavior and risk of individual trading algorithms is poorly understood.

For the past seven years UCL has worked with the major investment banks and funds developing algorithmic trading systems, and more recently with the regulators investigating high-frequency trading risk and systemic risk. To support this work we have developed our Algorithmic Trading & Risk Analytics Development Environment (ATRADE) platform which can be used both for virtual and real trading and has access to terabytes of "big" data. It has been designed to: a) speed the development of trading algorithms, b) evaluate algorithm risk, and c) assess algo programmers. As an evaluation of the performance of ATRADE, in 2011 it was used to support a global algorithmic trading competition which attracted over 300 traders in 100 teams scattered across Europe, North America and Australia. Moving forward, UCL is now extending ATRADE with a comprehensive social media engine that supports scraping and analyzing of a wide range of social media data (called Social media Streaming, Repository and Analytics Manager (SocialSTREAM) platform). This presentation will present ATRADE and SocialSTREAM.