MICHAELMAS TERM 2009

Saïd Business School, University of Oxford

SEMINAR SERIES

Convenors: Felix Reed-Tsochas, Institute for Science, Innovation and Society, Saïd Business
Eduardo López, Saïd Business School

Our meetings intend to provide a forum for rigorous research (in a broad range of disciplines) focusing on complex adaptive systems, using methods and techniques such as agent-based modelling and complex network analysis. Since potential areas of application for such approaches can be located across the social, natural and engineering sciences, our aim is to involve participants from a wide range of departments in Oxford. We welcome talks which focus on particular areas of application and associated technical issues, but also encourage contributions which address more fundamental conceptual or mathematical problems. The CABDyN Seminar Series is one of the activities of the CABDyN Research Cluster.

Tuesday 13th October, 12:30-14:00

James Martin Seminar Room

Prof Erik Bollt

Department of Mathematics and Computer Science, Clarkson University

'Hierarchical Models of Multiscaled Dynamics on Networks and Evaluating the Model Quality of Such Multiscaled Systems.'

ABSTRACT

Dynamics on Networks has recently boomed as the nonlinear dynamics community has joined in on the growing scientific interest in complex network research as a whole. In its simplest form, many coupled oscillators, either discrete time maps or ordinary differential equations, have coupling between elements described by some graph structure. Such high dimensional dynamical systems arise naturally in settings across many scientific fields, including modeling disease propagation between many agents, opinion dissemination, and power grids to name a few. A homogeneity assumption has typically been the starting point in the past – this is in fact the simplest form of model reduction. Recently the dynamical systems community, armed with ever larger computer simulations, has more so begun to approach large scale models in their fine details. However, it remains possible that such systems may naturally offer model reductions into a coarse grained scale systems of systems, meaning lower dimensional models in which oscillator elements will represent the behavior of several elements. Besides presenting tools to find such possible reductions, to analytically perform such reductions, and to interpret the results, we will also discuss some theoretical underpinnings concerning how we should even define when a reduced model should be considered to be a good model of the original system. Further, we will mention a related research thread of ours, called mostly conjugacy and defect measure that is meant to offer a way to dynamically describe a model to be "pretty good" if not perfect.

Sandwiches and drinks will be provided