

Michaelmas Term 2007

**CABDyN SEMINAR SERIES**  
**Saïd Business School, University of Oxford**



**Convenors:**

Felix Reed-Tsochas, *James Martin Institute, Saïd Business School*

Jukka-Pekka Onnela, *Physics Department & 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 (<http://sbs-xnet.sbs.ox.ac.uk/complexity/>).

**Tuesday 27<sup>th</sup> November, 12.30 – 2.00 pm**

**Seminar Room A, Saïd Business School**

**Please note different venue**

**Alex Ng**

**Department of Engineering, University of Oxford**

**Improving Network Robustness by Structural Evolution:  
from MST to Robust Network**

**ABSTRACT**

A network structural evolution scheme is developed to construct a network configuration for any level of robustness, constrained by one or more other network properties. The scheme operates by first constructing a Minimum Spanning Tree to connect all nodes, then adding additional links, subject to a halting condition that tests both the achievement of the desired level of robustness, and the rate of approach to the desired level. The resulting algorithm has complexity of order  $O(n^2)$ , which compares well with previous work in this field,  $O(n!)$ . Three evolution strategies for identifying links to be added to the tree are tested and compared against a number of different performance criteria. Applications of this work in telephone and distribution networks are considered.

**Sandwiches and drinks will be provided**

For further information contact [info.cabdyn@sbs.ox.ac.uk](mailto:info.cabdyn@sbs.ox.ac.uk)

Seminar webpage: [http://sbs-xnet.sbs.ox.ac.uk/complexity/complexity\\_seminars.asp](http://sbs-xnet.sbs.ox.ac.uk/complexity/complexity_seminars.asp)