



SAID BUSINESS SCHOOL, University of Oxford

SEMINAR SERIES / TRINITY 2011

Convenors: Felix Reed-Tsochas, Institute for Science, Innovation and Society,
Saïd Business School
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Seminar webpage:
www.cabdyn.ox.ac.uk/complexity_seminars.asp

Sandwiches and drinks will be provided

Please note: although the seminar programme detailed was correct at time of printing, seminar arrangements are subject to change - for the latest information, please check the seminar webpage.

Tuesday 24th May

(12.30 - 2.00pm) James Martin Seminar Room

Ben Fulcher

Oxford Complex Systems Group, Department of Physics, University of Oxford

'Comparative Time-Series Analysis'

ABSTRACT

Measuring and interpreting structure in signals obtained from real-world systems is a challenging task performed in many scientific disciplines, including forecasting meteorological systems and financial markets, diagnosing pathologies from medical recordings, and analyzing digital audio signals. As such, a diversity of methods and models that quantify informative properties of time-series data have been developed. In this work, we unify them by constructing an extensive interdisciplinary database of over 30 000 time series and over 9 000 time-series analysis algorithms. Our database contains medical, climatological, financial, acoustic, astrophysical, and synthetically-generated time series (among others), as well as time-series analysis methods measuring such properties as correlation, distribution, entropy, scaling, nonlinear structure, and fits to a variety of time-series models. Statistical learning techniques are used to understand the structure in this vast resource, for example, we construct of a reduced set of methods for time-series analysis that efficiently encapsulates informative dynamical structure in empirical time series. The utility of our comparative approach to time-series analysis is demonstrated on a variety of case studies, including classifying electroencephalograms, diagnosing heart-beat interval series, discriminating Parkinsonian speech, classifying seismic recordings, and predicting the scaling exponent of self-affine time series.

