Research Seminar

Parsimonious Data-Driven Models for Decision Making

Patrick McSharry | University of Oxford and Carnegie Mellon-Rwanda

Wed., April 15, 2015 | 4:00-5:00 p.m. | Porter Hall B34

EIS Seminar Series

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Please contact Claire at cbauerle@ece.cmu.edu to meet with Professor McSharry, Tues-Thurs, April 14-16, 2015.

Seminar abstract

Quantitative models are increasingly used for understanding and forecasting various dynamical systems, ranging from the economy to social behaviour. Organizations already rely heavily on data to plan, strategize and automate routine decision-making. Big data offers many opportunities to construct data-driven models for socio-economic systems. A deeper understanding of human behaviour obtained from big data could form the basis of more efficient services for the social good. Success will hinge on selecting the appropriate models for forecasting and communicating the associated uncertainty. Real-world systems are generally complicated due to nonlinearity and regime switching behaviour. It is a substantial challenge to both describe the complexity of these systems and also avoid over-fitting the data in order to ensure that the model is of practical utility. The principle of Occam's Razor provides philosophical support for seeking parsimonious models. Recommendations are outlined for combining knowledge and data when seeking such parsimonious models. Successful applications to economic activity and energy consumption are provided for demonstration.

Speaker bio

Patrick McSharry is a Senior Research Fellow at the Smith School of Enterprise and the Environment, Faculty Member of the Oxford Man Institute of Quantitative Finance at Oxford University and Visiting Professor at the Department of Electrical and Computer Engineering, Carnegie Mellon University. He is a Fellow of the Royal Statistical Society, Senior Member of the IEEE and Senior Academic Member of the Willis Research Network. He takes a multidisciplinary approach to developing quantitative techniques for data science, decision-making and risk management. His research focuses on big data, forecasting, predictive analytics, machine learning and the analysis of human behavior. He has published over 90 peer-reviewed papers, participated in knowledge exchange programs and consults for national and international government agencies and the insurance, finance, energy, telecoms, environment and healthcare sectors. Patrick received a first class honours BA in Theoretical Physics and an MSc in Engineering from Trinity College Dublin and a DPhil in Mathematics from Oxford University.