FESTSCHRIFT CONFERENCE IN HONOUR OF
LYN THOMAS
IN THE YEAR OF HIS 70TH BIRTHDAY

Date: Friday 22nd April 2016
Time: 10:30-17:30
Location: Hilton Southampton, Bracken Pl, Chilworth, Southampton SO16 3RB
Organising committee: Dr Christophe Mues, Prof Jake Ansell, Prof Tom Archibald, Dr Mee Chi So, Dr Katarzyna Bijak

Event Details:

This one-day conference is convened to mark Professor Lyn Thomas's research career in the fields of credit scoring and operations research, and will feature a series of invited speakers on topics linked to his unique contributions in both fields. We are looking forward to welcome attendants with an interest in these topic areas, as well as former colleagues, collaborators and friends, to join Professor Lyn Thomas and his colleagues at the Southampton Business School for this special occasion.

Schedule

Time	Details
	Session 1: Credit Scoring /Credit Risk **Chair: Professor Jake Ansell**
10:30-10:35	Professor Nigel Hitchin University of Oxford Video: Oxford is an Island
10:35-11:00	Dr Christophe Mues University of Southampton Presentation: Modelling LGD and EAD
11:00-11:05	Professor Ron Weaver University of Oxford Video: The bathroom packing
11:05-11:30	Dr Dirk Tasche Bank of England Presentation: Does quantification without adjustments work?
11:30-11:35	Professor Robert Oliver University of California, Berkeley Video
11:35-12:00	Dr Mee Chi So University of Southampton Presentation: Modelling the lending decision with limited capital
12:00-12:25	Professor Jonathan Crook University of Edinburgh Presentation: Themes from Conferences and Books
12:25-12:30	Professor Ken McKinnon University of Edinburgh Reminiscences: Running international conference Scottish style
12:30-13:15	Buffet Lunch

Session 2: Credit Scoring /Credit Risk Chair: Professor Thomas Archibald	
13:15-13:45	Professor Bart Baesens KU Leuven/University of Southampton Presentation: GOTCHA! Improving Fraud Detection Techniques using Social Network Analytics
13:45-14:15	Dr Joseph L. Breeden Prescient Models Presentation: Instabilities in Cox Ph when applied to credit risk modelling
14:15-14:20	Dr Ross McDonald Standard Chartered Video: Coventry Project
14:15-14:45	Dr Cristian Bravo University of Southampton Presentation: COCLAR: Constrained Clustering Using Langrangian Relaxation
14:45-15:10	Professor David Hand Imperial College London Presentation: What's not there: some selection bias scenarios, impact, and solutions in credit scoring
15:10-15:15	Dr Bob Phelps Video: What problem not to give your first Ph.D. student?
15:15-15:30	Tea/Coffee And Professor David Allen Visiting Professor, School of Mathematics and Statistics University of Sydney and Adjunct Professor, University of South Australia Video: Australian connections

	Session 3: Other Applications Chair: Dr Christophe Mues
15:30-15:35	Professor Donald Gaver and Professor Patricia Jacobs Naval Postgraduate School Video: Using inspection to avoid catastrophe but then driving 10 million kilometres around the US without checking the oil
15:35-16:00	Professor Thomas Archibald University of Edinburgh Presentation: Managing the risk-return trade-off in a start-up firm
16:00-16:05	Professor Edgar Possani Instituto Tecnológico Autónomo de México (ITAM) Video
16:05-16:30	Dr Tri-Dung Nguyen University of Southampton Presentation: Finding the Nucleoli of Large Cooperative Games
16:30-16:35	Professor Alan Washburn Naval Postgraduate School Video
16:35-17:00	Professor Jake Ansell University of Edinburgh Presentation: Asset Management
17:00-17:05	Professor Simon French University of Warwick Reminiscences
17:05-17:30	Dr Katarzyna Bijak and Dr Matthew Thomas University of Southampton and University Hospitals Bristol Presentation: Improving scoring in critical illness
17:30-17:35	Professor Martin Board Head of Southampton Business School Closing

Further Details

Speaker: Dr Christophe Mues
Affiliation: University of Southampton

Title: Modelling LGD and EAD

Speaker: Dr Dirk Tasche
Affiliation: Bank of England

Title: Does quantification without adjustments work?

Abstract:
Classification is the task of predicting the class labels of objects based on the observation of their features. In contrast, quantification has been defined as the task of determining the prevalence of the positive class labels in a target dataset. The simplest approach to quantification is Classify & Count where a classifier is optimised for classification on a training set and applied to the target dataset for the prediction of positive class labels. The number of predicted positive labels is then used as an estimate of the positive class prevalence in the target dataset. Since the performance of Classify & Count for quantification is known to be inferior its results typically are subject to adjustments. However, some researchers recently have suggested that Classify & Count might actually work without adjustments if it is based on a classifier that was specifically trained for quantification. We discuss the theoretical foundation for this claim and explore its potential and limitations with a numerical example based on the binormal model with equal variances.

Bio:
Dirk Tasche is a technical specialist at the Bank of England – Prudential Regulation Authority (PRA). Before joining the PRA's predecessor, the FSA, he worked for Lloyds Banking Group, Fitch Ratings and the Deutsche Bundesbank. Dirk holds a doctorate in probability theory from Berlin University of Technology. He has published a number of papers on quantitative risk management.

Speaker: Dr Mee Chi So
Affiliation: University of Southampton

Title: Modelling the lending decision with limited capital

Abstract:
In order to stimulate or subdue the economy, financial regulators in several countries have sought to rein in or alternatively encourage lending to borrowers by putting caps or floors on the amount a bank can lend over a given time period. This study develops a set of dynamic programming models which address the lending problem with constraints on the total capital lent. From these, it is possible to investigate the optimal lending policies and how they differ in which borrowers are being accepted and the lender's total profitability compared with the optimal policy when there is no restriction on capital.

Bio:
Dr Mee Chi (Meko) So is a Lecturer in Marketing at the Southampton Management School. She has developed expertise in data mining, credit scoring and marketing analytics. She has publications in different academic journals and has presented in various conferences. She has participated in a number of consultancy projects to collaborate with a wide range of organisations such as Financial Conduct Authority, Global Radio, United Health, etc.

Speaker: Professor Jonathan Crook
Affiliation: University of Edinburgh

Title: Themes from Conferences and Books
Abstract:

This presentation will describe the history of the Credit Scoring and Credit Control conferences held biennially at the University of Edinburgh since 1989. It will draw out some themes from the conferences and discuss how approaches to credit risk have changed over time as reflected in the conferences. It will describe how themes from the conferences have influenced the literature through the special issues of journals that have come from the conferences. It will also describe the genesis of a textbook on Credit Scoring, including the forthcoming edition, and books of selected papers that have also come from the conferences.

Bio:
Jonathan Crook is Director of the Credit Research Centre at the University of Edinburgh (http://www.business-school.ed.ac.uk/crc) Professor of Business Economics and Director of Research in the University of Edinburgh Business School. He is the joint Editor in Chief of the Journal of the Operational Research Society and the joint author/editor of five books, including: Readings in Credit Scoring, OUP 2004, and Credit Scoring and its Applications, SIAM 2002. He has published a large number papers relating to credit risk published in many different journals including the Journal of the Operational Research Society, European Journal of Operational Research, Journal of the Royal Statistical Society (Series A), Expert Systems with Applications, the IMA Journal of Management Mathematics and the Journal of Banking and Finance. A new edition of his book with Lyn Thomas and Davide Edelman Credit Scoring and its Applications is due out in 2016.

He is a past joint winner of the Goodeve Medal for the best paper in any Operational Research Society journal. He is a Fellow of the Wharton Financial Institutions Center, Wharton School, University of Pennsylvania and of the Centre for Finance and Credit Markets at the University of Nottingham. He has been a postdoctoral Fulbright Scholar at the University of Virginia and a Visiting Fellow at the European University Institute.

His research interests are in the areas of survival analysis, intensity modelling, statistical classification methodologies, credit risk including the incorporation of economic factors into credit scoring models, credit constraints and the demand for credit.

The Credit Research Centre organises the popular Credit Scoring and Credit Control conference every two years, the next being in August 2017.

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Speaker: Professor Bart Baesens
Affiliation: KU Leuven/University of Southampton

Title: GOTCHA! Improving Fraud Detection Techniques using Social Network Analytics
Abstract:
Data mining algorithms are focused on finding frequently occurring patterns in historical data. These techniques are useful in many domains, but for fraud detection it is exactly the opposite. Rather than being a pattern repeatedly popping up in a data set, fraud is an uncommon, well-considered, imperceptibly concealed, time-evolving and often carefully organized crime which appears in many types and forms. As traditional techniques often fail to identify fraudulent behavior, social network analysis offers new insights in the propagation of fraud through a network. Indeed, fraud is not something an individual would commit by himself, but is often organized by groups of people loosely connected to each other. The use of networked data in fraud detection becomes increasingly important to uncover fraudulent patterns and to detect in real-time when certain processes show some characteristics of irregular activities. Although analyses focus in the first place on fraud detection, the emphasis should shift towards fraud prevention, i.e. detecting fraud before it is even committed. As fraud is a time-evolving phenomenon, social network algorithms succeed to keep ahead of new types of fraud and to adapt to changing environment and surrounding effects.

Bio:
Professor Bart Baesens is a professor at KU Leuven (Belgium), and a lecturer at the University of Southampton (United Kingdom). He has done extensive research on big data & analytics, customer relationship management, web analytics, fraud detection, and credit risk management. His findings have been published in well-known international journals (e.g. Machine Learning, Management Science, IEEE Transactions on Neural Networks, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Evolutionary Computation, Journal of Machine Learning Research, …) and presented at international top conferences. He is also author of the books Credit Risk Management: Basic Concepts (http://goo.gl/T6FNOn), published by Oxford University Press in 2008; and Analytics in a Big Data World (goo.gl/k3kBrB), published by Wiley in 2014. His research is summarized at www.dataminingapps.com. He also regularly tutors, advises and provides consulting support to international firms with respect to their analytics and credit risk management strategy.

Speaker: Dr Joseph L. Breeden
Affiliation: CEO, Prescient Models LLC

Title: Instabilities in Cox Ph when applied to credit risk modelling
Abstract:
Through analytical and numerical calculations, we demonstrate challenges in applying Cox Ph to credit risk modeling. We find two types of problems: ambiguities when modeling data with dynamics in age, vintage, and time; and multicollinearity problems when including behavioral factors such as recent delinquency in PD models.

Bio:
Dr. Breeden has been designing and deploying risk management systems for loan portfolios since 1996. He founded Prescient Models in 2011, which focuses on portfolio and loan-level forecasting solutions for pricing, account management, CCAR, and CECL. He co-founded Strategic Analytics in 1999, where he led the design of advanced analytic solutions including the invention of Dual-time Dynamics.

Dr. Breeden has created models through the 1995 Mexican Peso Crisis, the 1997 Asian Economic Crisis, the 2001 Global Recession, the 2003 Hong Kong SARS Recession, and the 2007-2009 US Mortgage Crisis and Global Financial Crisis. These crises have provided Dr. Breeden with a rare perspective on crisis management and the analytics needs of executives for strategic decision-making.

He has published over 40 academic articles, 6 patents, and the second edition of his book "Reinventing Retail Lending Analytics: Forecasting, Stress Testing, Capital, and Scoring for a World of Crises" was published by Riskbooks in 2014.

Dr. Breeden received separate BS degrees in mathematics and physics in 1987 from Indiana University. He earned a Ph.D. in physics in 1991 from the University of Illinois studying real-world applications of chaos theory and genetic algorithms.

Speaker: Dr Cristian Bravo
Affiliation: University of Southampton

Title: COCLAR: Constrained Clustering Using Langrangian Relaxation
Abstract:
Constrained clustering is a semi-supervised technique that allows finding the best-formed clusters when there are constraints over how these clusters, or the instances therein, should be. This problem arises naturally in some business applications when there is background knowledge, or there is a particular business objective in mind. There are techniques that solve this problem when there are case-level instances, but for more general constraints this problem is still open. In this talk I will an iterative algorithm that, transforming these constraints into variables, simultaneously minimizes variances while satisfying the constraints. The conversion between constraints and variables is handled using Langrangian Relaxation. Results on both synthetic and corporate datasets show how the algorithm is efficient in obtaining solutions, and how it can become a powerful business tool.

Bio:
Dr. Cristián Bravo is Lecturer in Business Analytics at The University of Southampton Business School. Previously he served as Instructor Professor at the University of Talca, Chile; Research Fellow at KU Leuven, Belgium; Research Director at the Finance Centre, Universidad de Chile, and Head of Business Intelligence at one of the largest insurance companies in Chile. His research focuses on the development an application of predictive, descriptive and prospective analytics to the problem of credit risk in micro, small and medium enterprises; covering diverse topics and methodologies, such as semi-supervised techniques, social networks analytics, fraud analytics, reject inference, and multiple modelling methodologies. His work has been published in well-known international journals, he has edited two special issues in business analytics in reputed scientific journals, and he regularly teaches courses in Credit Risk and Analytics.

Speaker: Professor David Hand
Affiliation: Imperial College London

Title: What's not there: some selection bias scenarios, impact, and solutions in credit scoring
Abstract:
Problems of selection bias are pervasive, especially so in the realm of retail banking data. This is a consequence of the fact that such data are overwhelmingly observational rather than experimental. We explore three aspects: how to identify when selection bias has occurred, how to measure the impact on parameter estimates and future predictions, and what do to about it. The talk illustrates with three examples: the familiar one of reject inference when developing new scorecards, bias in estimates of performance of scorecards, and bias in evaluation of fraud detection systems.

Bio:
David Hand is Emeritus Professor of Mathematics at Imperial College, London. He has served as President of the Royal Statistical Society and of the International Federation of Classification Societies. He is a fellow of the British Academy, the Royal Statistical Society, the Institute of Mathematics and its Applications, and an Honorary Fellow of the Institute of Actuaries. He was awarded the Royal Statistical Society's Guy Medal in Silver in 2002, the Credit Collections and Risk Award for Contributions to the Credit Industry in 2012, and was made OBE for contributions to research and innovation in 2013. He is a non-executive director on the Board of the UK's Statistics Authority, chairs the Board of the UK's Administrative Data Research Network, and serves on the European Statistical Advisory Committee. David is the founding editor of Statistics and Computing, and previously edited JRSS-C: Applied Statistics. He has published 300 scientific papers and 28 books.

Speaker: Professor Thomas Archibald
Affiliation: University of Edinburgh

Title: Managing the risk-return trade-off in a start-up firm
Abstract: A series of models that consider the operating decisions of start-up firms will be discussed. Analysis of the models shows that although a start-up firm should generally be more cautious than a well-established firm when taking operational decisions, it should not be too cautious. The models might help explain the behaviour observed in practice in the case of a manufacturing start-up. Finally, the model is used to provide insight on negotiations in a "Dragon's Den" scenario.

Bio:
Thomas Archibald is Professor of Business Modelling at the University of Edinburgh Business School. After studying Mathematics (BSc) and Operational Research (PhD), Thomas held a series of research posts before joining the Department of Business Studies at the University of Edinburgh as a lecturer in 1995. His research interests lie in the area of stochastic modelling and have always had an applied focus, for example work on reservoir operations, inventory management and maintenance. Thomas is joint editor of the Journal of the Operational Research Society.

Speaker: Dr Tri-Dung Nguyen
Affiliation: University of Southampton

Title: Finding the Nucleoli of Large Cooperative Games
Abstract: The nucleolus is one of the most important solution concepts in cooperative game theory as a result of its attractive properties - it always exists (if the imputation is non-empty), is unique, and is always in the core (if the core is non-empty). However, computing the nucleolus is very challenging because it involves the lexicographical minimization of an exponentially large number of excess values. We present a method for computing the nucleoli of large games, including some structured games with more than 50 players, using nested linear programs (LP). Although different variations of the nested LP formulation have been documented in the literature, they have not been used for large games because of the large size and number of LPs involved. In addition, subtle issues such as how to deal with multiple optimal solutions and with tight constraint sets need to be resolved in each LP in order to formulate and solve the subsequent ones. Unfortunately, this technical issue has been largely overlooked in the literature. We treat these issues rigorously and provide a new nested LP formulation that is smaller in terms of the number of large LPs and their sizes. We provide numerical tests for several games, including the general flow games, the coalitional skill games and the weighted voting games, with up to 100 players.

Bio: Dr Tri-Dung Nguyen is an associate professor in Operational Research and Management Science, jointly appointed under the LANCS Initiative at both Southampton Mathematical Sciences and Southampton Business School. Dr Nguyen received a PhD from MIT in 2009, was a visiting research assistant professor at UIUC between 2009-2010, and has been in Southampton since 2010. His research interests cover cooperative game theory, robust optimisation (with applications in portfolio optimisation and in games) and robust statistical analysis.

Speaker: Professor Jake Ansell
Affiliation: University of Edinburgh

Title: Asset Management
Abstract:
The work will describe approaches Asset Management developed jointly with Lyn Thomas and Tom Archibald. It will focus on a single asset but will evolve subsequently into multiple assets. The starting point will be data analysis using intensity models to estimate the underlying behaviour using kernel density estimation. From this it will look at options of refurbishment and replacement using stochastic dynamic programming. The proceed to remaining issues of asset management.

Speakers: Dr Katarzyna Bijak and Dr Matthew Thomas
Affiliation: University of Southampton and University Hospitals Bristol

Title: Improving scoring in critical illness
Abstract:
Scoring on intensive care is increasingly important. Scores are used to measure acuity and activity of patients within a unit and allow comparison between units. They can guide recruitment into research trials and could be used to decide which patients should receive critical care in an overwhelming crisis such as an influenza pandemic. Several scores are used in critical care, including Acute Physiology and Chronic Health Evaluation (APACHE), Simplified Acute Physiology Score (SAPS) and Mortality Probability Model (MPM).

The Sequential Organ Failure Assessment (SOFA) score is based on six components: respiratory, coagulation, liver, cardiovascular, central nervous system and renal. The SOFA score has the advantage over most other scores that it does not need to be calculated at admission or following the first 24 hours, but it can be computed daily. This allows for monitoring the patient's condition throughout their stay in the intensive care unit (ICU). Despite SOFA being an organ dysfunction score and not an outcome prediction score, SOFA-based scores and models can be effective in predicting mortality. In this research we focus on the predictive ability of SOFA-based scores. We also examine whether the total amount of organ failure in an ICU affects outcome for individual patients.

Bio of Dr Bijak:
Dr Katarzyna (Kasia) Bijak focuses on the applications of statistical methods (including Bayesian inference), data mining and econometrics in credit scoring. She is also interested in the use of scoring in other areas, especially in intensive care. Kasia published papers in both academic and practitioners' journals and presented at a number of conferences. Before joining academia, she worked in banking industry in Poland: first in a leading bank and then in a credit reference agency. Kasia then moved to the UK to pursue a PhD programme at the University of Southampton. In 2013 she was awarded her PhD for a thesis on selected modelling problems in credit scoring, and she took up the post of Lecturer in Management Science in the Southampton Business School.

Bio of Dr Thomas:
Dr Matthew Thomas is a Consultant in Intensive Care and Anaesthesia in Bristol. He has the UK Diploma in Intensive Care as well as the European Diploma in Intensive Care and is Co-Editor of the 'Key Clinical Topics in Critical Care' textbook. He has published over 20 peer reviewed papers and is on the management team for several trials in the management of cardiac arrest. Matt has extensive experience at running a variety of different teaching and training courses. He also has a sub-speciality interest in pre-hospital care and is Clinical Lead for the Great Western Air Ambulance Service.
He is also Lyn Thomas son and has an interest in seeing how operational research can benefit healthcare.