Thirty-Ninth Gregynog Statistical Conference Programme

The talks on Friday and Sunday will take place in the Music Room (ground floor, same end as the dining room). Saturday's talks will be in Seminar Room 1 (2nd Floor, far end).

Friday
4 April

16.00	*Tea*
17.00	Dr Peter Craig University of Durham
	Simulator-Assisted Forecasting and Calibration
19.00	*Dinner*
20.15	Martin Ridout University of Kent
	Models for yeast prions.

Saturday
5 April

08.00	*Breakfast*
09.30	Professor Andy Wood University of Nottingham
	Saddlepoint approximations with applications.
11.00	*Coffee*
11.30	Professor Ian Russell University of Wales, Bangor
	What is Health Technology? What does it have to contribute to the care of back pain?
13.00	*Lunch*

Afternoon free

16.00	*Tea*
17.30	Professor Rodney Wolff University of Queensland, (visiting Oxford)
	Harry Potter and the Quest for Non-linearity.
19.00	*Dinner*
20.15	Professor Anatoly Zhigljavsky Cardiff University
	Approximating the harmonic mean and negative moments of Poisson random variables

Sunday
6 April

08.00	*Breakfast*
09.30	Dr John Marriott Nottingham-Trent University
	Investigating trends in economic time series: a Bayesian graphical approach.
11.00	*Coffee*
11.30	Dr Alexander Baranovski University of Dresden, (visiting Birmingham)
	Chaotic point and impulse processes and their applications.
13.00	*Lunch*
14.00	Dr Granville Tunnicliffe-Wilson Lancaster University
	Supercharged autoregressions
15.30	*Tea and finish.*

Speakers

Professor Alexander Baranovski	University of Dresden, visiting Birmingham
Dr Peter Craig	University of Durham
Dr John Marriott	Nottingham-Trent University
Martin Ridout	University of Kent
Professor Ian Russell	University of Wales, Bangor
Dr Granville Tunnicliffe-Wilson	Lancaster University
Professor Rodney Wolff	University of Queensland, visiting Oxford
Professor Andy Wood	University of Nottingham
Professor Anatoly Zhigljavsky	Cardiff University

Staff   Students

Aberystwyth
Dr John Basterfield   Alan Jones
Dr John Lane   Sylvia Lutkins
Prof Dennis Lindley

Bangor
Chris Whitaker   Rhiannon Whitaker
Daphne Russell

Birmingham
Prof Malcolm Faddy   Jia Yao
Prof Tony Lawrance
Alan Girling

Cardiff
Dr Antanas Zilinkas   Vippal Savani   Anna Leonenko

Keele
Prof Peter Jones   Dr John Preater

Swansea
Prof Alan Hawkes   Dr Mark Kelbert   Owen Bodger   Adam Shore
Dr Alan Mayer   Dr Alan Sykes
Dr Alan Watkins

University of Wales College of Medicine
Prof Frank Dunstan

Warwick
Prof John Copas   Grace Kwong   Dan Jackson
Dr Jen Marsh   Beatriz Penaloza   Simon Bond
Dr Jane Hutton   Judith Cabrera
Claudia Lozada-Can

Abstracts

Simulator-Assisted Forecasting and Calibration

Dr Peter Craig   *University of Durham*

In many disciplines, mathematical/physical models are used to make inferences about reality. Often such a model requires numerical computation, for example because it may involve systems of partial differential equations. Such software is often known as a "simulator".
A number of statistical issues arise. First, simulator and reality must be connected at both input and output levels, which requires an appropriate statistical model. Secondly, data relating to inputs and/or outputs must be taken into account. Thirdly, simulators are often slow to run so that the simulator itself is an unknown; this leads to the construction of emulators. Finally, inference for such situations is computationally demanding.
The talk will describe some applications, including hydrocarbon reservoirs and pollutant transport on contaminated land, state some standard problems and outline the variety of formal and informal statistical methods which are available for such situations.

Saddlepoint approximations with applications

Professor Andy Wood   *University of Nottingham*

I plan to give an introduction to saddlepoint approximations without assuming any prior knowledge, and then discuss three or four recent applications of saddlepoint methods in current or recent research I have been involved in (approximation of power functions in classical multivariate analysis; landmark-based shape analysis in 3D; block Bayesian wavelet shrinkage; and ion channel modelling).

Harry Potter a'r Ymchwil am Aflinoledd

Rodney Wolff   Coleg yr Iesu, Rhydychen,   Prifysgol Queensland, Brisbane

Mae'r byd yn aflinol. Mae popeth - o olwg y ddaear pan welir o'r gwagle i grymedd twyllodrus Oxford Street - yn tystiolaethu i'r ffaith. Ar hyd y 25 mlynedd diwethaf, mae ymchwil wedi cynnyrch llawer o dechnegau amrywiol i fodelu'r ffenomenau aflinol sydd i'w harsyllu trwy amser. Yn y sgwrs hon disgrifir tri phennod ymchwil. Mae'r cyntaf yn ehangu methodau sbectrol i roi prawf ar bresenoldeb a math yr aflinoledd. Mae'r ail yn addasu'r methodau a ddefnyddir yn arferol yngl^yn â dilyniadau amser aflinol er mwyn mesur cydgyfeiriant yr algorithmau MCMC. Ac yn olaf ceisiaf ddefnyddio methodau a ddefnyddir yn arferol mewn systemau dynamegol anhrefnus i ddiffinio'r gallu codio mewn dilyniadau DNA.

Mae Rodney Wolff yn Uwch-Ddarlithydd mewn Ystadegaeth yn Mhrifysgol Queensland yn Brisbane, Awstralioa. Ar hyn o bryd mae'n Gymrodor Ymchwil Gwadd yng Ngholeg yr Iesu, Rhydychen.

HYD AT ORFFENAF 18   **CYFEIRIAD PARHAOL**
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Harry Potter and the Quest for Non-linearity

Rodney Wolff   Jesus College, Oxford; and The University of Queensland, Brisbane

The world is non-linear: everything, from the view of the globe from space to the gentle and deceptive bend of Oxford Street, bears witness to this fact. Research over the past 25 years or so has rendered many and varied techniques for modelling non-linear phenomena observed through time. In this talk, three episodes of research carried out Hogwarts (or similar places) will be described. The first is an extension of spectral methods to test for the presence and kind of non-linearity. The second is an adaptation of some methods from non-linear time series to assess the convergence of MCMC algorithms. And the last is a speculative attempt to employ methods from chaotic dynamical systems to determine the coding ability of DNA sequences.

Rodney Wolff is a Senior Lecturer in Statistics at The University of Queensland in Brisbane, Australia. He currently holds a Visiting Senior Research Fellowship at Jesus College, Oxford.

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Supercharged autoregressions

Dr Granville Tunnicliffe-Wilson   *University of Lancaster*

You can get more power out of autoregressive modelling by adding on a one-parameter modification. You keep all the old attractiveness of autoregressions - linear estimation in particular, and tuning the new parameter is not a problem. The idea goes back to Wiener and was developed by Hannan in one of his last publications, for discrete time models, and has also been developed for continuous time models in recent years.
The case for the model will be supported by applications to prediction and spectrum estimation.