IN THIS ISSUE

The Annual Belz Lecture of the Victorian Branch was given by the Society's current national President, Professor William Dunsmuir. The Maurice H. Belz Lecture is an annual lecture, established by the Statistical Society to honour the work of Professor Belz in establishing and advancing the science of statistics in Australia. Maurice Belz was the Foundation Professor of Statistics at The University of Melbourne (1955 – 1963).

William's talk was entitled: "Time series that count!". Again, it was refreshing to be immediately immersed in data: the talk began with a rich data set regarding the move from a 0.10 blood alcohol concentration (BAC) for drivers to 0.08 in the USA. A panel graph showed time series of road death rates by time for 19 states,

Belz Lecture

Professor William Dunsmuir, Statistical Society President.

identifying the time of the change in the BAC limit and, by the use of highlighted overall averages, the difference between the pre- and post-change death rates: an impressively informative and clear graph.

The next example was of an experiment looking at the effectiveness of training to managers of bars and liquor outlets in the USA. In the study, individuals aged over 21 but deemed to appear aged 17-20 approached these outlets and attempted to buy alcohol. The number of purchases achieved without challenge to their age status was the outcome variable. This variable was a small count, sometimes zero.

Both these examples were used to remind us that the use of standard regression models that ignore serial dependence leads to invalid inference, but William noted that detecting serial dependence can be difficult for count data, and that good models are needed.

For the error component of the model structure for Poisson data, two main types were described. The first treats the error as a linear combination of past normalized deviations of the counts from their mean; it is therefore described as "observation driven" and is singly stochastic. The second type regards the error component as an unobserved stationary time series ("parameter driven"). William regarded this second approach as superior, although it offers theoretical and practical challenges in implementation, and is not at a sufficiently mature stage of development to be used routinely by practitioners.

An example of polio count data was used to motivate models in which the error structure had a hidden process for the autocorrelation, in addition to the linear fixed effects of major interest (such as an overall trend). A tangible warning of the effect of ignoring the serial

dependence was an analysis with a standard error of 1.4 (for the main trend estimate) in the naïve model, and 4.1 if serial correlation was properly accounted for: a difference that cannot be dismissed as analytic pedantry.

After demonstrating a similar effect for binomial data, William went on to address possible solutions for dealing with serial dependence in count data. Some simple and practical reassurance was provided by the observation that we may be able to conclude that there is no serious serial dependence in some data, and therefore use the standard generalized linear models to estimate regression effects.
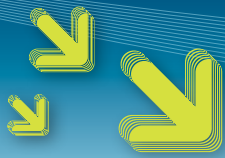
But what about the other cases, when serial dependence is evident? Asthma admissions from three Sydney hospitals were used to show the application of a multivariate "generalized linear autoregressive moving average (GLARMA)". Here there are weather and other temporal phenomena that lead to serial dependence; this model accounted for this and hence permitted inference about the differences between the hospitals.

William concluded by suggesting that the development of models for time series count data needed more work. Clearly, he has made several important contributions to this field and will continue to do so.

The 2008 Belz Lecture was very well attended and warmly appreciated by the audience; a number of insightful questions were asked. Stimulating discussion ensued, which continued to the dinner at a nearby restaurant afterwards, enjoyed by all.

The Victorian Branch was particularly grateful to William for delivering the Lecture, given the onerous and stressful load he has been carrying in his role as President.

Ian Gordon

Editorial

The New Year has seen a couple of items floating around the internet that place our profession in a very good light. In early January, the Wall Street Journal published an article entitled "Doing the math to find the good jobs". It reported that mathematicians, actuaries and statisticians occupy the top three spots in a new ranking of best and worst occupations in the United States. The full article is at http://online.wsj.com/article/SB123119236117055127.html.

Then in early February, Murray Cameron alerted ANZSTAT list members to two fantastic items. Firstly, the Chief Economist at Google, Hugh Varian, describes statistics as the "dream job of the next decade". The video is less than 2 minutes long, and can be found at http://www.youtube.com/watch?v=D4FQsYTbLoI. Varian was also interviewed by the New York Times (http://freakonomics.blogs.nytimes.com/2008/02/25/hal-varian-answers-your-questions/#more-2345) where he says:

Q: Your job sounds extremely interesting. What jobs would you recommend to a young person with an interest, and maybe a bachelors degree, in economics?

A: If you are looking for a career where your services will be in high demand, you should find something where you provide a scarce, complementary service to something that is getting ubiquitous and cheap. So what's getting ubiquitous and cheap? Data. And what is complementary to data? Analysis. So my recommendation is to take lots of courses about how to manipulate and analyze data: databases, machine learning, econometrics, statistics, visualization, and so on.

The Editors hope you can take these ideas and quotes forward into your area of work and use them to advance statistics and the Statistical Society of Australia. We also hope that you like the fresh new look for the newsletter in its first fully online issue. The move to an online newsletter was first raised 12 months ago, and has now come to fruition. If you have any comments about the new look, please feel free to contact the Editors: this is your newsletter and we want it to reflect your views.

Alice Richardson

Alice Richardson
Editor

CONFERENCES

IMST 2009-FIM XVII – International Conference on Mathematical and Statistical Techniques
23-26 May 2009, University of West Bohemia, Plzen, Czech Republic
http://home.zcu.cz/~pgirg/IMST2009/

ISBIS-2010, International Symposium for Business & Industrial Statistics
5-9 July 2009, Croatia
http://www.action-m.com/isbis2010

18th IMACS World Congress, MODSIM 09 International Congress on Modelling and Simulation with Mathematical and Computational Sciences
13-17 July 2009, Cairns, QLD
http://www.mssanz.org.au/modsim09/downloads/MODSIM09.pdf

IMST 2009-FIM XVIII: International Conference on Mathematical and Statistical Techniques
2-4 August 2009, Waknaghat/ Shimla, India
http://www.juit.ac.in/IMSTFIM2009/imst_fim_2009.htm

Young Statisticians' Conference 2009
25-26 September 2009, Sydney
http://www.statsoc.org.au/young-statisticians-conference.htm

Australasian Region of the International Biometric Society conference
29 November – 3 December 2009, Taupo, New Zealand
http://www.biometrics.org.au/conferences.html

Tenth Biennial Islamic Countries Conference on Statistical Sciences (ICCS-X)
20-23 December 2009, The American University in Cairo (AUC), New Cairo, Egypt
http://www.isoss.com.pk/conference/info_conf.php

International Biometrics Conference
5 – 10 December 2010, Florianopolis, Brazil
http://www.tibs.org/Interior.aspx

Australian Statistical Conference 2010
6 – 10 December 2010, Perth, WA
http://www.promaco.com.au/2010/asc/index.htm

President's Message

Dear Members

My apologies for not writing a President's column in the previous newsletter. As no doubt you can appreciate the Executive Committee has been largely occupied with attempting to resolve the financial difficulties arising from ASC2008. I hope you all received my email notices to members (one in mid December and a follow up in February this year). I am currently waiting on responses from various parties. As important information comes in I will continue to send emails to members with updates on the situation and with requests for your views on strategies for meeting the financial challenges faced.

I would like to thank all of the members who have written to me about the financial issues and for their generally positive and helpful suggestions. I would also like to thank Marie-Louise Rankin and members of the Executive Committee for their efforts and for their continued optimism and positive approach to solving the unprecedented problems that we have been presented with.

Now to more positive matters!

Planning for ASC2010 to be held in December 2010 in Perth is proceeding in an orderly way and is well on track with critical aspects of program and facilities. The conference organizing firm selected by the ASC2010 Organizing Committee has been briefed on the issues connected with the running of ASC2008 and have agreed to fully cooperate with the SSAI to ensure that ASC2010 is scientifically and financially successful. Various additional financial safeguards have been discussed and will be put in place in order to ensure that the issues arising with ASC2008 are not repeated. The ASC2010 Organizing Committee considered the possibility of moving the planned dates for the event to avoid the unfortunate clash with IBC2010. ASC2010 had set its dates well in advance of the IBC meeting dates being announced and had advised other societies nationally and internationally of these plans. It was decided that planning was too far advanced for the ASC2010 to be scheduled at a different time. Hopefully this clash will not inconvenience too many of our members.

The ASC2010 will be looking to hold a number of research and professional development workshops or course in conjunction with the conference. These would be aimed to meet the needs of members and a small survey is currently being planned for sending to you to seek your views. Of course, if you have suggestions for presenters and topics for such courses or research workshops please send these to the ASC2010 Organizing Committee as soon as possible.

In early February two meetings concerned with the mathematical sciences were held in Canberra. The first was concerned with educational issues and Michael Martin, co-chair of the SSAI Statistical Education Section attended on our behalf. Helen McGillivray, who was running a highly successful workshop on the same day in Brisbane also managed to find time to provide substantial input prior to and after the meeting. I would like to thank them both for representing us in this important area. On the following day the Australian Council of the Heads of Mathematical Sciences met to discuss a variety of issues. This group (ACHMS) is composed of Heads of Departments of mathematics and statistics from around Australia as well as Presidents of the major mathematical science societies and CSIRO and ABS. I attended to represent the SSAI and found this to be a very valuable meeting for building links and discussing vital issues impacting all of the mathematical sciences in Australia. The new Chief Scientist attended and was very interested in the background and recommendations of the " National Strategy for Mathematical Sciences in Australia", prepared in consultation with the ACHMS by Professor Hyam Rubinstein who is Chair of the National Commitee for the Mathematical Sciences. A key recommendation that I hope members in the University sector will be pleased to hear about are calls for all universities to establish a mechanism to support 'intellectual infrastructure', specifically internal statistical consulting services. The full strategy has been posted through the Anzstat email list and is available under Resources then Links on the SSAI web site (see http://www.statsoc.org.au/Links).

As President of the SSAI I have also been asked to join the reference committee for a Go8 Universities sponsored review of Education in Mathematics, Data Science and Quantitative Disciplines to be led by Professor Gavin Brown, previously VC of Sydney University. Other statisticians on the reference committee include Peter Hall and Dennis Trewin. This should provide another excellent opportunity for the SSAI to work with colleagues across the mathematical sciences in improving the education in mathematics and statistics.

William Dunsmuir

Young Statisticians Conference 2009 – We're Young and Significant!

The Statistical Society of Australia Inc. (SSAI) is hosting the YSC 2009 on Friday 25th September, and Saturday 26th September 2009, at the University of Technology, Sydney (UTS). Registration and abstract submission are now open.

All are welcome to attend the conference and support the future leaders of our profession. In addition, young and early career statisticians are also encouraged to submit abstracts for talks or posters. That is, you are encouraged to present if you are a student, or are within five (5) years of graduation. Abstract submission closes on 30th June 2009, and we ask you to submit using the template, which is available at http://www.statsoc.org. au/objectlibrary/315?filename=YSC%20 Abstract.dot.

Sessions will cover the major areas of statistics. Special sessions are also planned, including some with a careers focus.

Registration fees are as follows and include access to the conference sessions, morning & afternoon teas, lunches and a conference dinner on the Friday evening:

You may register online at: http://www. statsoc.org.au/young-statisticians-conference.htm. You need to log-in first to qualify for member's discount. If you have any questions, please don't hesitate to email Marie-Louise Rankin (eo@statsoc. org.au).

If you are a member of NZSA, you are eligible to register as a member.

However, you will need to use the registration form and send it back.

Best Regards,

Kevin Wang, Fiona Beer, Steve Bush and Richard Hutchinson — YSC 2009 Organising Committee.

Early Bird (by 30 June 2009)	$
Student Member (SSAI or NZ)	150.00
Student Non-Member	200.00
Member (SSAI or NZSA)	250.00
Non Member	400.00
Non Early Bird	**$**
Student Member (SSAI or NZSA)	200.00
Student Non-Member	250.00
Member (SSAI or NZSA)	300.00
Non Member	500.00

AMSI/SSAI ASC2008 Satellite R Workshop, June 27–29 2008

Report
John Maindonald
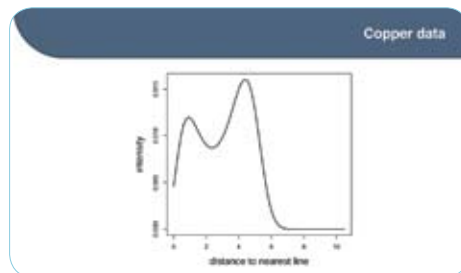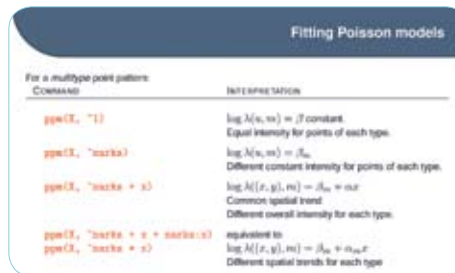
Spatial Statistics overhead samples from the workshop.

The idea for this workshop arose from discussions with Ross Darnell, Andrew Robinson and Neville Bartlett. The workshop was jointly organized by SSAI and AMSI (Australian Mathematical Sciences Institute), and held at the AMSI premises in Carlton.

It proved surprisingly easy to pull together a first-rate team of presenters. Four of the presenters — Graham Williams, Matt Wand, Adrian Baddeley and Rob Hyndman — have created their own very substantial R analysis packages. The workshop proved highly popular. There were 45 registrations for the Friday, 65 for the Saturday, and 71 for the Sunday. In all, there were 85 registrations, with 36 registered for all 3 days. In spite of the long days (8.30am to 5.15pm on the Saturday and Sunday), most participants attended all sessions on the days for which they had registered.

In order to meet the demand for places at Friday's tutorial introduction to R, there were parallel sessions. Andrew Robinson fronted one of these and John Maindonald the other. The audience divided itself nicely into two roughly equal groups — one wanting a step by step introduction to R, and the other wanting to build on existing R skills. Members of this second group (some of them at least) seemed most unwilling to leave at the end of the day, staying well beyond the allotted 5pm closing time. We had excellent support from student tutors — Frank Liu, Howard Chuang, and David Lazaridis. Additionally, Simon Blomberg turned up and was keen to help (he had somehow been enrolled as a participant!), which he did very expertly!

The Saturday sessions described particular R features. Graham Williams described difficulties, and strategy, in getting management to sanction use of open source software. He demonstrated his rattle GUI interface for "data mining" using R — regression, classification, and multivariate data exploration. Malcolm Hudson commented on experiences in moving from S-plus to R, then discussing medical applications. Other talks were more tutorial in character — lattice and other graphics in R (John Maindonald), generalized linear models (Peter Dunn), and multi-level models (Andrew Robinson).

The Sunday sessions kicked off with Peter Dunn's talk on the incorporation of R code and output into Open Office and LaTeX documents. Matt Wand used a tutorial on the use of the BRugs interface to Open Bugs to discuss Bayesian analysis using R. Adrian Baddeley surveyed spatial analysis in R, while Rob Hyndman gave a survey of the extensive range of time series abilities.

Neville Bartlett handled much of the local organization, with Andrew Robinson providing useful backup. Simi Henderson of AMSI gave sterling help with physical arrangements for the use of rooms, copying of notes, and so on. Thanks are due to all who helped make the workshop a success.

Financial support was provided to allow four students to attend: Frank Liu, Howard Chuang (both year 3, Finance and Applied Statistics, ANU), Andrea Walters (PhD, U of Tasmania) and Joanne Wang (PhD, U of Sydney).

A highly informal survey suggested that at most 20% or 25% of participants were willing to identify themselves as statisticians. There are a huge number of application area people out there who are using R and related tools for statistical analysis, for graphics, and for related purposes. Feedback was very favourable. with several comments along the lines of the following:

"Overall I found the workshop very enjoyable and worthwhile. The venue and facilities were excellent, lunch and morning and afternoon teas good, and the presenters and tutors were extremely knowledgeable, enthusiastic and approachable. All in all I found this to be a very useful and well organised day and would recommend it to others."

Notes and overheads from the workshop are available from the web address http://www.maths.anu.edu.au/~johnm/courseweb/notesANDohps-ASC2008.html

John Maindonald
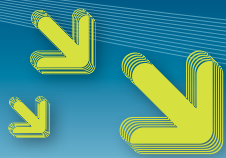
Dhaka Hosts International Statistics Conference

Some participants of the conference (from left) A K Md Ehsanes Saleh (Canada), M Obaidullah (Bangladesh), Shahjahan Khan (Australia), Munir Ahmad (Pakistan), Abdunanabi Ali (Libya), and Emad-Eldin Aly (Kuwait). Reported by Shahjahan Khan, Chair of International Scientific Committee, and President of ISOSS, Department of Mathematics & Computing, University of Southern Queensland, Toowoomba, Australia.

The North South University (NSU), Bangladesh and Carleton University, Canada jointly organized an international conference on `Recent Development in Statistical Sciences' at the Bangladesh-China Friendship Conference Centre, Dhaka, Bangladesh during 26-27 December 2008. The conference honoured A K Md Ehsanes Saleh, Distinguished Research Professor & Professor Emeritus, Carleton University, in recognition of his outstanding contributions in the development of Statistical sciences through his pioneering research, outstanding supervision of PhD students and postdoctoral fellows, and exceptional professional services via organizing international symposia and editing special volumes and books, and journals over the last 4 decades. Professor Saleh is a Fellow of the ASA, IMS, RSS and Bangladesh Academy of Science; an elected member of ISI; and an honourary member of the Statistical Society of Canada.

The Governor of Bangladesh Bank (Central bank), Dr Salehuddin Ahmed (chief guest); President of Bangladesh Academy of Science, Professor M Shamsher Ali (special guest) and Chair of Board of Governors of NSU, Mr Abdul Awal spoke in the inaugural session and welcomed and thanked Professor Saleh for participating in the conference. The Chair of the Steering Committee and Vice Chancellor of NSU, Professor Hafiz G A Siddiqi; Chair, International Scientific Committee, Dr Shahjahan Khan from the University of Southern Queensland, Australia; and Chair, Executive Committee, Dr Abdul Hannan Chowdhury of NSU welcomed the international and local participants of the conference. Before Professor Saleh

welcomed all the participants, a video snippet on his career was shown to the audience. At the concluding part of the inaugural session, Dr Salehuddin Ahmed presented a crest of honor to Professor Saleh while his wife Shahidara Saleh and grand daughter Sarah Alam watched it with pride from among the audience.

The conference presentations covered many areas of current Statistical research and applications such as statistical inference, distribution theory, probability models, stochastic process, survival analysis, biostatistics, bioinformatics, epidemiology, reliability theory, quality control, sampling methods, statistical computing, Bayesian analysis, time series, econometrics, demography, robust methods, Monte-Carlo methods, statistical education, financial mathematics, forecasting, actuarial science, environmental statistics, economic statistics, official statistics, multivariate analysis, operations research, spatial analysis etc.

Out of over 120 papers, 85 were accepted for presentation in the conference. About 200 delegates from 15 different countries including Australia, Bangladesh, Canada, Indonesia, Malaysia, Iran, Kuwait, Pakistan, Libya, Singapore, UK, and USA participated in the conference. Most of the contributed papers were presented by young academics and researchers from various public and private Universities in Bangladesh. The proceedings of the conference have been published. Some selected papers presented in the conference would be considered for publication in the Journal of Applied Probability and Statistics (JAPS) after peer-review.

The event received significant attention from the local printed and electronic media in spite of prescheduled national election on 29 December 2008. A full-page coverage of the conference was published in a national daily, the News Today on 26 December, highlighting the importance of the event and its scientific and national benefits. The wide ranging role and applications of Statistics in many different aspects of life were focused in a popular article on "Statistics: From Data to Decision and Development" published in the News Today as well as in the conference booklet. Several national dailies also published pre and post event news on the conference. Some TV channels also covered the news.

The closing session of the conference was held in the Sarina Hotel with Bangladesh-style dinner for the participants and guests. The chief guest of the session, Professor Nazrul Islam, Chairman of University Grants Commission, provided some statistics on the current state of the higher education sector in Bangladesh. He also shared his memories with Professor Saleh while both were PhD students at the University of Western Ontario, Canada. Professor Munir Ahmed, founding President of ISOSS, spoke in the session on behalf of the international participants.

The conference paid deepest respect to late National Professor Qazi Motahar Hosain and Shaheed Professor Moniruzzaman for introducing the discipline of Statistics in the then East Pakistan (now Bangladesh) in the early fifties. Other pioneering Bangladeshi Statisticians who participated and was recognized in the conference are M Obaidullah, M G Mustafa, Anwar H Talukder, Kazi S Ahmed, and Sultan Ahmed.

Australian Statistical Conference 2010

The Australian Statistical Conference in 2010 will be held in Fremantle, Western Australia, 6th-10th December, at the Esplanade Hotel. Leading up to this, we will be including "a speaker profile" in the next editions of the SSAI Newsletter. In addition we will include brief snapshots of the area of Fremantle, the Port City of Perth. Confirmed Plenary Speakers for the Conference include Persi Diaconis (Stanford), Noel Cressie (Ohio State), Tadeusz Bednarski (University of Wroclaw, Poland), Adrian Baddeley (UWA), Gordon Smyth (WEHI), and Denise Lievesley (University of London). In addition we have an invited speaker in the area of Survey Methodology in the Foreman lecture to be announced.

As Chair of the Programme of ASC2010 I am pleased to be introducing an international speaker at one of the Plenary sessions, Professor Tadeusz Bednarski, a statistician of some repute and with not only a wealth of technical ability, but also a deep understanding of the philosophical foundations of statistical methodology.

Tadeusz Bednarski trained amongst the Berkeley school of statisticians in California, USA, having gained his PhD with guidance from Lucien Le Cam and David Blackwell. He plays an important role amongst the Polish community of statisticians having been involved in the running of a number of International conferences held in Poland. He is Professor of Mathematics (specialty in Statistics) at Wroclaw University and until recently Deputy Director of the Economics Department of the Faculty of Law, Administration and Economics at Wroclaw University. He is known for both his clear arguments and his good sense of humour.

His main research interests are in asymptotic robust methodology, in particular in applications of Fréchet differentiability to statistical inference in Poisson, Cox and time series models. From the practical standpoint his interests concern longitudinal studies of clinical data, insurance statistics, unemployment statistical studies, and econometric modelling in time series. He is the author of over 40 scientific papers and a book "Mathematics for Economics".

Tadeusz Bednarski has visited Murdoch University in Western Australia on several occasions, spending at least one whole semester in Perth back in 1989. I count myself as being very fortunate to have met him, first in Oberwolfach in Germany, and then on several occasions since, where we have shared an interest in the theory of robustness.

Brenton R Clarke

Chairman Programme ASC2010

CONFERENCE LOCATION

Fremantle holds a unique place in Western Australian history and is one of Australia's

Fremantle.

major port cities. At the mouth of the Swan River, the area is of cultural significance to indigenous people. This relaxed and historic port city has a diverse mix of old and new and the range of activities available for all ages is endless.

Tour the streets and discover art and craft galleries and the famous Fremantle Markets. Sample boutique beers in one of the nearby brewery pubs or enjoy seeing the sun set over the ocean.

Fremantle is within easy reach of the beaches of the Indian Ocean, Rottnest Island and Western Australia's capital, Perth with the Margaret River wine region only a few hours away.
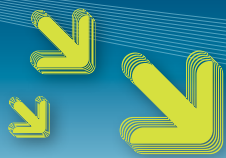
Cafés in Fremantle.

FURTHER INFORMATION

All enquiries should be directed to the conference organisers:

Promaco Conventions Pty Ltd
PO Box 890, Canning Bridge,
WESTERN AUSTRALIA 6153

Tel: 08 9332 2900   Fax: 08 9332 2911
Email: promaco@promaco.com.au

FASTS

Continuing Achievements

FASTS ——— Federation of Australian Scientific and Technological Societies

FASTS is Australia's peak science body, representing over 60 professional societies and 60,000 scientists. You are a member of FASTS through membership of your professional society. Our professional staff serve you, your society and the Australian scientific community in a range of ways, and our ongoing contributions to Australian science include:

- 'Science meets Parliament'—FASTS' annual flagship event, where more than 200 scientists have face-to-face meetings with politicians on key science issues

- Highlighting science with the Prime Minister and the Cabinet through the Prime Minister's Science, Engineering and Innovation Council (PMSEIC)

- Organising forums and workshops on key science issues

- Developing science policy at a high level and providing input to Parliamentary Committees, Government Departments and Government reviews and inquiries

- Assisting member societies to raise and develop issues, and

- Distributing information to member societies weekly, and receiving feedback.

HIGHLIGHTS OF 2008

- Forums on 'Rights and Obligations of Scientists and Researchers' and 'Supporting Risk-Aware Research'

- A national roadshow to gather inputs to FASTS' submission to the Cutler Review

- Submissions to reviews on Higher Education Research Training, Future Fellowships, Defence, Higher Education Endowment Fund, ERA journal ranking, Questacon, CRC

- Continuation of FASTS' successful request for release of ARC grants in early October

- FASTS' statement on Climate Change – reported in 145 media outlets

- FASTS' Taxonomy paper highlighting this endangered species at SmP 2008.

ONGOING AND FUTURE PROJECTS

In 2009 FASTS will:

- Hold 'Science meets Parliament' on 17/18 March – contact FASTS to attend

- Provide to Parliament examples of science success stories from FASTS' members

- Present 'On the Radar' briefings on upcoming issues in science that need to be addressed by government, industry and the media – contact FASTS with your ideas

- Contribute to the development of National Curricula in science and mathematics

- Investigate whether science graduates have sufficient industry-ready practical skills.

VALUE TO MEMBERS

In addition to our continuing and prospective activities we will:

- Establish an expert list of FASTS members for media commentary – via your society

- Hold a forum on Governance of Science – how can science self-organise better?

FASTS seeks your help through your member society to keep science at the forefront of the national agenda in these challenging times. For more information visit the FASTS' website:

www.fasts.org

Professor Ken Baldwin, President
Bradley Smith, Executive Director

PHD Study and Scholarship Opportunities in Statistical Applications to Injury Data

School of Human Movement and Sports Science, University of Ballarat

The University of Ballarat has recently established new strategic research directions for the next 5-10 years. One of the four supported research strength areas is Injury Prevention and Injury Control (see http://www.ballarat.edu.au/ard/ubresearch/docs/UB_IRRRI_FutDir_web.pdf for further details).

Opportunities currently exist for new PhD students to join this internationally recognised research group, led by Professor Caroline Finch, within the School of Human Movement and Sports Science at the University of Ballarat. Whilst all student places will be funded, up to two new PhD scholars will also be eligible to be awarded Australian Postgraduate Awards (APA) to provide further support during their PhD candidature. These scholarship opportunities are only available to Australian citizens/residents.

Scholarships will be awarded on merit and full information is available at: http://www.ballarat.edu.au/ard/ubresearch/hdrs/scholarships/index.shtml

Higher Degree by research application forms can be obtained at http://www.ballarat.edu.au/ard/ubresearch/forms.shtml and applicants are encouraged to phone 03 5327 9608 for advice.

Closing Date is 23rd March 2009.

Candidates with an interest in undertaking research into any of the following potential topics relating to novel statistical applications into injury data and injury data systems are particularly encouraged to apply for these scholarships:

- Critical analysis of existing sports injury surveillance definition statements and national data collection systems, with a view to developing/refining international guidelines for the ongoing collection, classification and reporting of sports injury statistics

- Modelling the impact of injury recurrence on population-level estimates of injury incidence

- Modelling the impact of different definitions of injury exposure (denominator data) on sports injury incidence rate estimates

- Applying newly developed statistical methods (e.g. functional data analysis, recursive residuals, time series, etc) to the analysis of injury data, particularly in the context of sports injuries or falls in the elderly

Successful candidates will hold an Honours (First Class), or equivalent, degree with a good academic track record in research-related subjects. Candidates with backgrounds in biostatistics, statistics, epidemiology and other quantitative disciplines would be highly suited to projects in topic area A. For topic area B, suitable backgrounds would include epidemiology, public health, psychology, behavioural sciences, health promotion.

Main supervision will be provided by Professor Caroline Finch (http://www.ballarat.edu.au/ard/hmss/staff/profiles/caroline_finch_research.shtml) with appropriate co-supervision based on the chosen topic area. For further information about possible research projects, she can be contacted on (03) 5327 9878 or c.finch@ballarat.edu.au.

It is intended that the successful candidates will be based full-time at the Mount Helen Campus of the University of Ballarat.

Variational Approximations in Statistics
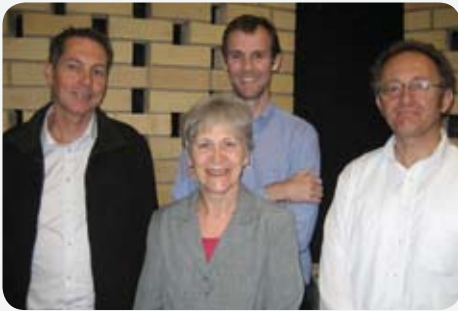
The 2008 Knibbs lecturer Professor Matt Wand with Canberra Branch President, Dr Glenys bishop and sicussants, Dr Mark Clements and Mr Daniel Elazar.

Professor Matt Wand, from the University of Wollongong, discussed the emergence of *variational approximations* as a tool in modern statistical inference. Briefly, this is a suite of analytic procedures, already extensively used in Statistical Physics and Computer Science, which can be applied to difficult probability calculus problems. The material presented focussed on collaborative research carried out with Dr John Ormerod of the same affiliation.

The talk commenced with a brief discussion of some classical techniques, such as least squares and Newton-Raphson, which are naturally applied to estimation for parametric regression models. For semiparametric models it was pointed out that hierarchical Bayesian models are appropriate, and that the intractable calculus problems that arise in their estimation are usually solved using the Markov chain Monte Carlo (MCMC) approach. Furthermore, these solutions can be readily calculated using software packages such as WinBUGS and BRugs. In fact, in contemporary statistical inference this is the most commonly used method of dealing with probability calculus problems for which a closed form solution is not available. However, the main drawback with this approach is slowness; not only does it require vast computing resources but extensive convergence diagnostics are also necessary. The variational approximations approach was touted as a potentially faster and less resource intensive alternative that does not require assessment of asymptotic

behaviour. In addition, it should be noted that there already exist software packages, namely VIBES and Infer.Net, which can be used to implement variational inference. However, it was mentioned that very little statistical theory, for this approach, is currently available.

In essence, the variational approximations procedure can be explained as follows. Consider, for example, estimating the coefficients of a Bayesian regression model. Typically, the normalising constant for their posterior distribution involves an intractable integral; such an integral can be approximated using the following two step procedure. First, using a result such as Jensen's inequality, we obtain the functional form of a lower bound for the logarithm of the marginal likelihood. This constant can then be approximated by evaluating this functional at optimally chosen parameter values; in the most fundamental version of the variational approximations technique, the choice of these values is determined using an EM algorithm argument.

Since the formulation of this fundamental methodology, by Jaakkola and Jordan at the University of California, Berkeley, research at the University of Wollongong has improved its practical performance by modifying the way in which these parameter values are derived. More specifically, two such modifications have been developed; these techniques were referred to as 'Wollongong I' and 'Wollongong II', the Jaakkola and Jordan approach was referred to as 'Berkeley'.

The Wollongong I algorithm can be described as follows. Initially, the parameter space is partitioned into a grid. Then for the functional lower bound of the (logarithm of the) posterior density (rather than the marginal likelihood itself), an optimum choice of parameter values is made within each member of the grid. The approximate value of the normalising constant is then obtained by applying quadrature to all of these approximate density values. Fundamentally, this improvement is novel only in that it is a grid-wise application of the standard method. However, it was shown in a

graphical comparison, where the MCMC solution was regarded as the benchmark, to have marked superior performance.

In Wollongong II, the marginal likelihood is approximated by the maximum value of the functional lower bound. That is, we make the lower bound as tight as possible. This method was illustrated in an application to estimating a (Bayesian) Poisson regression model in which a (multivariate) normal prior distribution was assumed for the regression coefficients. The estimated distributions (for these coefficients) were compared graphically with those obtained using the Berkeley approach and, again, seen to exhibit a closer fit to the MCMC solution; this was particularly apparent when considering the joint distributions of the regression coefficients.

The class of generalised linear mixed models was presented as one of considerable importance. However, in this context, maximisation of the likelihood generally involves intractable integration over a multi-dimensional parameter space. Hence, this situation is seen as one where variational approximations can make an important contribution. More specifically, it was shown that Wollongong II could be applied to estimate a Poisson random intercept model. It was also mentioned that evaluating the Fisher information matrix at the variational parameter estimates was a valid way of carrying out statistical inference on the model parameters. Furthermore, although theoretical results for variational approximations are scarce at this stage, a consistency result has very recently been obtained, but not yet published, for this class of model when applied to grouped data.

In conclusion, Professor Wand pointed out that although variational approximations was a procedure showing good practical performance for which some interesting theory was emerging, it was still too early to tell whether it would become a "major player" in the statistical analysis of complex datasets. However, he said, "if it does then you can say that you heard about it first at: The 2008 Knibbs Lecture!" •

Small-area Estimation with Spatial Similarity

Canberra
Brett Davis

Dr Nick Longford, from the University of Pompeu (Barcelona) and the University of Reading (UK), discussed use of composite, model-based estimators for small area quantities which are optimal with respect to design-based properties.

In the first instance, we consider estimating district level characteristics using a method analogous to the regression estimator commonly used in survey sampling inference. Specifically, this estimator is comprised of a direct sample expansion estimator and a model-based adjustment term. The latter is a function of district specific model parameters and the difference between the direct estimator and the known value of the corresponding regional characteristic. A novel feature of the model formulation is that it does not include random effects. This is considered an advantage, over alternative estimators, as it alleviates the need for the untenable assumption that the specific set of districts within the region is a random sample from a super population.

This estimator is enhanced by introducing a nominal distance measure for the districts within our region of interest. For a district in the region, we consider the 'ring' (set) of districts which share a common border; we call the districts in this ring 'neighbouring districts'. Next we consider the ring of districts that are neighbours of the neighbouring districts and so on; we refer to these sets as 'proximal ring 1', 'proximal ring 2', etc. Using composite estimation, the mean of the regression-like estimators over districts in each proximal ring can be used to improve the statistical properties of the original estimator. More specifically, we take a linear combination of the original estimate and these means in which the coefficients are functions of (nominal) distance from the district of interest. It is shown that this leads to a reduction in mean square error (MSE).

This technique was illustrated using a simulation study of household Census data from the 41 counties (districts) in the Spanish region of Catalonia. Composite estimates of mean county household size, based on 500 replicated sample draws, showed that the estimator using only proximal ring 1 had a higher MSE than that based on proximal rings 1 and 2. However, due to the presence of atypical (or misleading) information in more distant counties, it was found that the inclusion of proximal ring 3 did not give further efficiency gains. For practical applications, it is generally recommended that the inclusion of neighbouring data be truncated at proximal ring 2. In fact, the use of proximal ring 3 has found to be counter-productive in reducing MSE.

Brett Davis
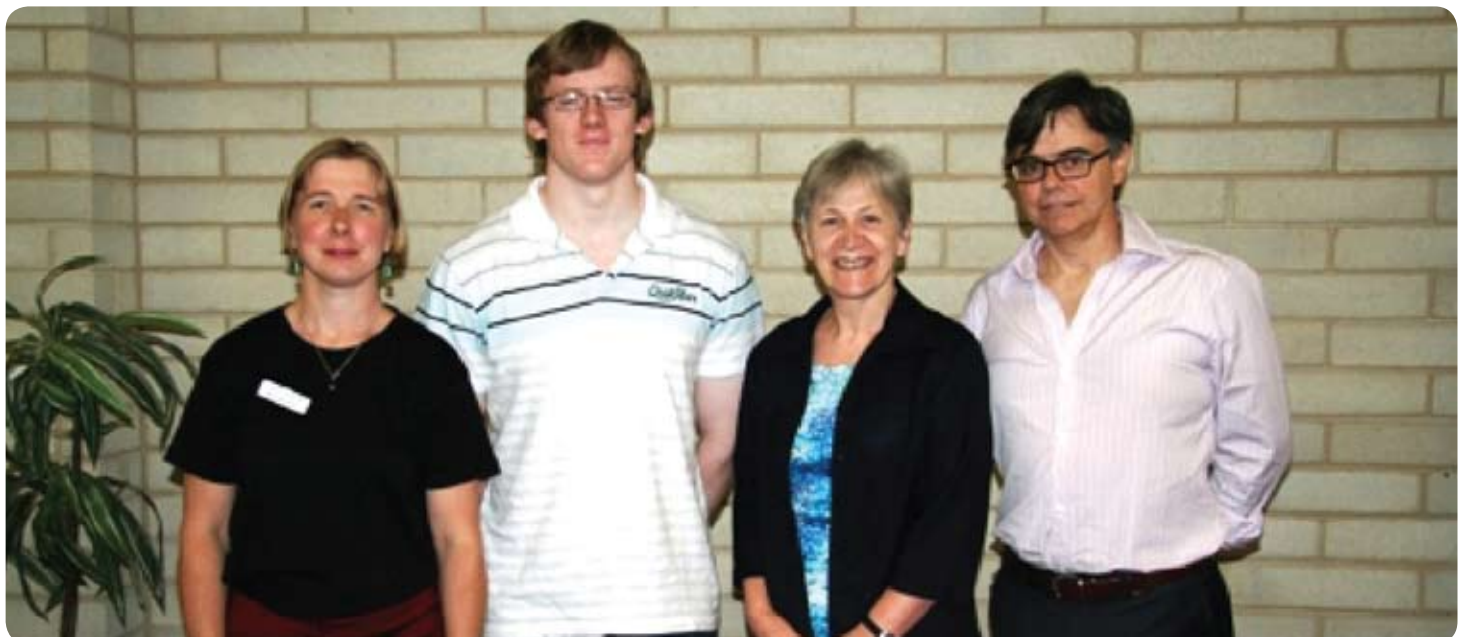
The University of Canberra presented the Statistical Society of Australia (Canberra Branch) First Year prize to Mr Eamon Armour. From Left: Dr Alice Richardson (UC), Mr Eamon Armour, Dr Glenys Bishop (ABS) and Dr Peter Vassiliou (UC) at the ISE Prize Presentation, December 2008.
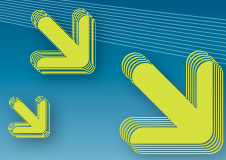
Canberra
Brett Davis

Survival Analysis in a Policy Department

Dr Edmond Hsu, from the Australian Institute of Health and Welfare (AIHW), shared his experience, as a government statistician, of undertaking an evaluation of a funding model. The model was designed for employment service agencies assisting people with disability to find and maintain work. The evaluation was undertaken during 2007 while Edmond was leader of a research and analysis team at the Department of Education, Employment and Workplace Relations (DEEWR). Fundamentally, this presentation gave an insight into the attributes needed by a statistician to work effectively in the government sector.

In this particular evaluation, which is typical of quantitative analysis projects carried out in the government sector, the goal was to provide timely advice that enabled policy development for a rapidly emerging current issue. Emphasis was placed on the use of highly defensible quantitative techniques rather than complex statistical methodology. The key tasks in this policy development process are: discussion with stakeholders which usually involves consultation with the Department's program and policy areas and with staff in relevant peak bodies; determining aims and the approach required in the analysis; undertaking this analysis; formulating and effectively communicating conclusions and recommendations and implementing these recommendations. Edmond made the point that statisticians are often focussed on modelling relationships between random variables. However, for sound policy development to take place it is necessary to build and cultivate healthy working relationships with the other people involved in the project; this is crucial for the successful completion of the above-mentioned tasks.

The subject of the evaluation was a model known as *Case Based Funding (CBF)* that was introduced as a replacement for a much simpler model known as *Block Grant Funding (BGF)*. Under BGF there was no direct relationship between an agency's level of funding and the resources allocated to their clients. In contrast, under CBF, agencies are funded according to specific individual characteristics of their clients. For

example, the anticipated level of difficulty a client will experience in finding, and maintaining, secure employment is a major factor considered in the funding allocation procedure. Other factors considered are geographic remoteness and the nature of the employment pursued by the client. For example, a client who undertakes an apprenticeship will attract additional funding for their agency. The CBF model is also novel in that agencies are "rewarded" when one of their clients is successful in sustaining secure employment. More specifically, an additional payment is received when a client maintains employment for periods of one, four and six months. It should be pointed out that these two funding models were only applicable to disability employment agencies assisting individuals to find work in the open labour market; activities, such as the placement of individuals in sheltered workshops, were outside the scope of this analysis. Also, in order to attract funding for their agency, an individual had to be capable of working a minimum of eight hours a week in the open labour market.

The number of individuals with disability likely to be seeking some form of job search assistance was also quantified. Specifically, recent population surveys, conducted by the Australian Bureau of Statistics, have estimated that approximately 11.5% of working age Australians has some form of disability. However, clients of all disability employment agencies comprise only 0.3% of this population; indicating there is considerable unmet demand for employment assistance services within this subpopulation. Based on population survey estimates, it is also known that less than 50 percent of individuals with disability currently receive the Disability Support Pension; thus there is a strong desire of people with disability to actively participate in the labour force.

When this task was assigned to Edmond he was new to DEEWR and the prospect of undertaking the evaluation presenting some seemingly insurmountable challenges; some of the major difficulties faced, and overcome, are described below. Edmond had no staff and no subject matter knowledge

concerning the way in which disability employment agencies operate. The only data available came from administrative sources and so there was a need to consider the viability of collecting more informative quantitative and/or qualitative sample survey data. A detailed timetable had not been prescribed, and moreover, the project objectives and terms of reference were yet to be determined. Furthermore, although there was a clear need to measure the effectiveness, efficiency and appropriateness of the CBF model, these terms had not been defined.

The data used, in this particular investigation, were obtained from a variety of disparate sources including: administrative client level census data which consisted of demographic information and a quantitative measure of each client's anticipated level of difficulty in obtaining secure employment; quantitative data observed in a telephone survey of service agencies (which had a response rate of 96%) and qualitative information (obtained in focus group discussions with selected agencies). The extensive cleaning of the administrative data, and their statistically valid linkage to agency level data, were important and resource intensive aspects of this project

Despite the difficulties experienced at its beginning, this project delivered an informative summary of the operations of disability employment agencies. The results of this evaluation were compiled in a comprehensive report that was highly regarded by the program and policy areas within DEEWR. Moreover, the report received exemplary praise from the Minister for Employment Participation, Mr Brendan O'Connor, and his advisors. As a consequence, the report was publicly released on the Department's website and has subsequently been commended by a Queensland academic as a clearly written, insightful and extremely useful reference. Note that this document is available at the following website - www.workplace.gov.au/workplace/Publications/ProgrammeEvaluation.

Brett Davis

Statistical Adjustment in Epidemiological Studies: What is the controversy?

South Australia
Paul Sutcliffe

At the South Australian Branch Meeting on 25th February 2009 more than fifty members of the Statistical Society and the Australasian Epidemiological Association were treated to an entertaining talk about a standard statistical problem where the association between two variables is reversed after a third variable is included in the co-variate. The speakers, Associate Professor Vivienne Moore and Dr Lynne Giles, both from the disciplines of Public Health and Obstetrics and Gynaecology at the University of Adelaide, are part of a new research group called Life Course and Intergenerational Health.

Vivienne, an epidemiologist, started proceedings with an overview of the research of Barker & Osmond (1987) which shows that, "... past differences in maternal health and physique and in the post natal environment ... may be determinants of current differences in adult mortality ..." explaining that adverse conditions in the womb - which can give rise to restricted foetal growth - result in the 'programming' of physiological systems, thereby predisposing the individual to chronic disease in later life. This work used midwife ledgers from the early 1900s comparing birth weight to other data available in a study which became known as the Hertfordshire Men Study. Most studies cited used birth weight as a proxy for conditions in the womb because it is easy to measure and usually available from retrospective records. A more local example was the Adelaide Family Heart Study (1975) of 856 children, of which 72% agreed to a follow-up interview at aged twenty.

To highlight the confusing results Vivienne cited the work of Tu (2005) which focused on the association between birth weight and blood pressure later in life which had been examined in many publications (because data were available). Often, the inverse association between birth weight and later life blood pressure only becomes apparent after adjustment for current weight. Historically, many statisticians have named the phenomenon a 'paradox' and argued that it signified bias. Recently, this pattern of results has become vexatious among statisticians and epidemiologists working in the area of the early life origins of metabolic disorders and predisposition to chronic disease. Some now argue that this phenomenon is meaningful and reflects the operation of distinct causal paths.

Lynne, a statistician, used an example of Simpson's Paradox where simulated data concerning birth weight, current weight and adult blood pressure had been used to show that the 2x2 contingency table between birth weight and blood pressure suggested that high body weight was a risk factor for high blood pressure, but protective against high blood pressure when adjusted for current weight. A neat graphical presentation in a paper by Paik, M. (1985 - American Statistician, 39: 53-54) highlighted the disproportionate numbers of subjects when the participants were dichotomised into low and high current weight. Another example was presented in terms of Lord's paradox, which emerged from use of ANCOVA within non-experimental studies in which direction of relationship between a categorical exposure and continuous outcome reverses with the introduction of a continuous covariate to a categorical exposure with a continuous outcome.

Lynne concluded by presenting a discussion of suppressor variables. The suppressor variable is an independent variable that (1) has no correlation with the outcome variable, but (2) is correlated with the other independent variable, and (3) increases the variance explained, R^2. The term suppression is used widely to encompass range of situations including enhancement and redundancy. In the third presented by Lynne, enhancement was demonstrated when current weight was introduced into the linear regression of blood pressure on birth weight.

The conclusion was that the statistical phenomenon of reversal was well understood, but the were more factors such as multicollinearity, impact on cohorts and assumptions linear relationships to suggest that discussion should not be framed in terms of bias. In summing up Lynne suggested that ongoing dialogue between epidemiologists and statisticians is helpful and that prior knowledge and theory play an important role in the statistical modelling of non-randomised data.

Feedback from the event suggested the initiative to hold two joint meetings per year was well received and appreciated by members of both groups. Special thanks must go to the Australasian Epidemiological Association who as 'hosts' put on impressive pre-meeting food and drinks.

Paul Sutcliffe
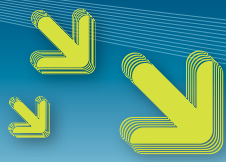
Victorian Branch News

Fiona Beer, Victorian Young Statisticians organiser, signing up a member for the Stats Society, at the YS beer and pizza night on 9 October 2008.

At the September meeting of the Victorian Branch the speaker was Dr Geoff Robinson, a long standing Branch and Society member, a former Branch President and a holder of the Society's Service Award. Given this substantial involvement in the Society on the part of the speaker, it was interesting to note that among the select audience were two members of the Branch's inaugural Council (1964), namely, Alison Harcourt (nee Doig) and Bruce Craven.

Geoff's title was "Simple procedures for data analysis based on continuous-time Brownian motion". The juxtaposition of "simple" and "continuous-time Brownian motion" was a little daunting to your correspondent, but I was reassured by a graph of data from a metallurgical plant on slide four and a further list of interesting and clearly important applications. A heading on slide was entitled "Mathematical stuff", which was covered quickly and efficiently.

The kind of data considered were from time series which may be naturally unequally spaced, or are measured discretely but are actually continuous in nature, such as the ripening of fruit. Some measurements at a given point reflect the process over an interval; Geoff quoted Koopmans (1950) who wrote that "a continuous treatment ... is the best way to study fully all aspects of the identification problem of relations between economic time series".

Three models were introduced and discussed: (1) Brownian motion plus white noise (spot data), suitable for spot samples; (2) Brownian motion plus white noise (interval data), suitable for flow data for example, and (3) Integral of Brownian motion + white noise (Spot data), suitable for variables showing inertia, such as a building cooling down after a heat wave.

Geoff demonstrated that the use of discrete-time models for data in a continuous process, such as the "local linear trend model", can lead to incorrect standard errors, even when the data are regularly spaced.

How all this fits into such prosaic methods as those of Statistical Process Control was addressed; Geoff suggested that the "hypothesis of only white noise is not really tenable", and made the observation that underlying processes are always changing.

The audience was left with a clear understanding that these approaches were well-researched, sound mathematically and applicable to a large range of contexts, many of which the speaker had encountered: an impressive combination of attributes.

A number of the audience enjoyed a meal at a nearby restaurant afterwards, at which it was observed that all present, except for your correspondent, were past Branch Presidents! ●

On October 9 2008 the Young Statisticians (YS) of the Victorian Branch held a beer and pizza night designed as an informal night to assess what people wanted from the YS network in 2009. About 20 people came, almost all students, and there was a good deal of informal networking and discussion of preferences for activities. Further, the enthusiastic leaders of the group, Fiona Beer, Karl Jackson and Candy Caradoc, managed to sign up 14 people as members on the spot. The energy and commitment of this group is encouraging for the future of the Society.

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