The Statistical Society of Australia
News

SSAI

In this issue

YOUNG STATS - YSC2013

At 8:45am on Thursday 7th February, YSC2013 exploded into life with a video introduction featuring greetings from the American Statistical Association (president Marie Davidian), the Royal Statistical Society (president John Pullinger), Institute of Mathematical Statistics (presented by secretary Aurore Delaigle, live), and SSAI (a script from the president).

After encountering a few obligatory conference technical difficulties it was onto our first renowned keynote speaker. Thus two days of inspirational and informative talks began. With four keynotes, two social activities, two careers sessions, two invited and 41 delegate oral presentations, plus 31 delegate posters, it is genuinely difficult to pull out the highlights, but I would like to note that the conference dinner was exceptional. The team trivia (complete with creative/terrible team names like 'Bayes-ic Instinct', 'Boozian Analysis', and 'We did not google'), fine food, great company, music and dancing made for a memorable event.

The two days had a packed schedule for our keynotes, all of whom participated in judging student oral or poster presentations and the final panel session in addition to giving their own talks. We appreciate them giving so freely of their time. All our invited speakers were phenomenal, and I encourage you to complete the keynote/invited speakers crossword to see all the names (answers given on page 39). Two deserve special mention. Thomas Lumley gave two exceptional pre-conference workshops, judged student oral presentations, participated in the panel session and the academic careers session, as well as giving R syntax tips for drawing random numbers. Kerrie Mengersen wrote a great speech for the conference introduction (although could not deliver it in person), judged student posters, spoke in a careers session, chaired the final panel session and spoke in the conference close.

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**DEADLINE FOR NEXT NEWSLETTER
10 May 2013**

EDITORIAL

As we assemble this issue in mid-February, it's been a great few weeks for statistics in the news.

The Statistical Consulting Unit at the University of Melbourne has carried out an analysis of Victorian police records that has led a claim by six African men of racial profiling and harassment being upheld. The role of the Director of the Consulting Unit, Society member Ian Gordon, in analysing the data, was mentioned in both radio and the print media.

Earlier in January, sport tended to be the focus. In the Australian of 26-27 January 2013 it was no surprise to read a report of Manchar Reid, Tennis Australia's high performance manager, and his colleague Michael Bane, crunching nearly 40 years of tennis data tracking the careers of around 3500 professional tennis players. While it was reported that Bane's PhD is in physics, it was also reported that he's using Bayesian networks to estimate the probability of players finishing within a given ranking band e.g. top 10.

An excellent start to the 2013, the International Year of Statistics. The editors hope that you enjoy reading this issue of the newsletter, both reporting on the last events of 2012 and looking forward to 2013. Do write and tell us what your department or group is doing for Statistics2013 - it's the ideal year to reach out to both the profession and the general public.

Alice Richardson   and **Michael Adena**

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EVENTS

PRACTICAL BAYES FOR BEGINNERS

An introductory course with Professor Kerrie Mengersen   3-5 April 2013, Brisbane

12TH NATIONAL RURAL HEALTH CONFERENCE

7-10 April 2013, Adelaide

CPD44: AN INTRODUCTION TO JOINT MODELS FOR LONGITUDINAL AND SURVIVAL DATA WITH APPLICATIONS IN R

A two-day workshop with Dimitris Rizopoulos   11-12 April 2013, Sydney

BAYSM-BAYESIAN YOUNG STATISTICIANS MEETING

5-6 June 2013, Milan, Italy

MPE2013 AUSTRALIA CONFERENCE

8-12 July 2013, Melbourne

JSM2013

3-8 August 2013, Montreal, Canada

THE 59TH WORLD STATISTICS CONGRESS

25-30 August 2013, Hong Kong, China

INTERNATIONAL CONFERENCE ON STATISTICAL DISTRIBUTIONS AND APPLICATIONS (ICOSDA13)

10-12 October 2013, Mt Pleasant, MI, USA

20TH INTERNATIONAL CONGRESS ON MODELLING AND SIMULATION (MODSIM2013)

1-6 December 2013, Adelaide

FOURTH BIENNIAL INTERNATIONAL STATISTICAL ECOLOGY CONFERENCE (ISEC2014)

1-4 July 2014, Montpellier France

ASC 2014

7-10 July 2014, Sydney

ISBA 2014 - TWELFTH WORLD MEETING OF ISBA

14-18 July 2014, Cancun, Mexico

FROM THE PRESIDENT

Hello everyone

The International Year of Statistics and the year of Maths of Planet Earth have been welcomed in across the world with fanfares and a flurry of events. Australia has participated enthusiastically in this through a range of activities. Almost every state has had presentations and workshops hosted by universities, industries and/or agencies. And it's only February! In addition, there have been larger enterprises such as the Maths in Industry Study Group held at QUT, AMSI's Accelerate Australia event, which brought together academic and industry groups to address the issue of productivity, industry engagement and work readiness of PhDs, and of course our own Young Statisticians Conference. I had the privilege of participating in YSC 2013 and I commend the organisers on creating such a fantastic event. The enormous amount of hard work and dedication that they devoted to YSC was evident by the smooth running of the meeting, the large turnout and the positive atmosphere that was evident among the participants. I also wish to acknowledge the support of the conference sponsors, without whom this opportunity for our young professionals would not have been possible.

In one of the panel session at IYS, the panel members (Peter Hall, John Croucher, Rob Hyndman, Thomas, Ray Chambers, Bhavani Raskutti, Thomas Lumley) were asked to identify significant issues currently facing statistics or statisticians. The responses, and the ensuing discussion by the participants, were fascinating. The issues that were raised included the need to increase awareness of the significance of our profession in the community and among employers, the pressures on young professionals to juggle multiple demands on their time at work and home, the different ways in which statistics research is being undertaken today particularly through competitions such as Kaggle, the different roles of statisticians in academia, government and industry, and the importance and challenges of teaching statistics to different target audiences. Sessions such as these are important for better understanding and shaping our profession.

We also recognise and celebrate the great achievement of Peter Hall in being awarded Australia Day Honours. It is fantastic that his many contributions to Statistics, not only with respect to research but also through mentoring of young people, dedication to a strong Australian Statistics community and representation of Australia on the world stage, have been recognised and acknowledged in this way. Congratulations Peter.

This is a remarkable start to IYS and MPE, and there are many more events scheduled for the coming months. At a different scale, activities are also afoot to better recognise and guide our profession. These include our own SSAI Strategic Plan and the national Decadal Plan in mathematical sciences. There is also a dedicated focus on the urgent need to address the issue of maths at school: to improve maths education, support our maths teachers and enhance the awareness of our profession, statistics, in the school, community and the workplace.

If you know of any events that are not yet advertised on the IYS and MPE pages of our website, please let us know. If you have any ideas for great events either at a local or broader level, please contact Marie-Louise in the SSAI office and we will see how we can help. This is our year – let's make it memorable!

Kerrie Mengersen
SSAI President

Kerrie Mengersen

I liked invited speaker Kendra Vant's tweet of "Looking forward to meeting some of the stars of the future at the YSC2013 industry careers session this afternoon." And the YSC2013 delegates (over 100 of them) were stars! Together we celebrated our research and our profession.

This celebration was successful only because the organising committee worked incredibly hard. Heartfelt thanks to Damjan Vukcevic, Elisa Young, Sandy Clarke, Han Gan, Chris Brown, Andrey Kostenko and Stephanie Chen: It was a privilege to work alongside you. Special thanks to Garth Tarr, who along with many of the above assisted in reviewing abstracts, and also Cattram Nguyen, Geoffrey Brent, Ryan Defina, Mark Griffin and Tania Patrao for providing extra support and hands!

The generosity of our sponsors enabled the conference to be affordable. Thank you to CSIRO (platinum sponsor), NAB, ABS, SAS, AMSI, University of Melbourne, Monash University, Queensland University of Technology, University of Queensland, University of Sydney, Swinburne University and Wiley. Thank you also to the SSAI Branches, all of whom made funding available for student members to attend.

Finally, obviously without the support of SSAI and their belief in the importance of Young Statisticians this conference would not have happened! I would like to particularly acknowledge the efforts of Marie-Louise Rankin who gave 110% to ensure this conference went well.

For those interested, the greeting videos from the ASA and RSS will be made available on the conference website: ysc2013.com. I encourage you to go check them out, as well as have a look at our video and infographic competition winners. Many of the slides from the oral presentations (keynote and delegate) are also available on the conference website.

I hope to see many of you at YSC2015!

Susanna Cramb

Congratulations to our award winners

Student oral presentations

First prize: Garth Tarr
Second prize: Chris Davies
Third prize: Peter Hickey

Student poster presentations

First prize: Svetlana Litvinova
Second prize: Sayar Karmakar
Third prize: Jegar Pitchforth

Pre-conference competition winners
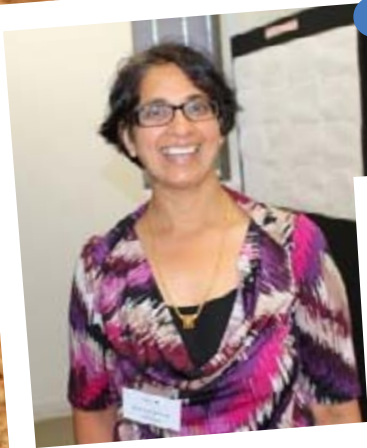
Video
First prize: Chris Brown
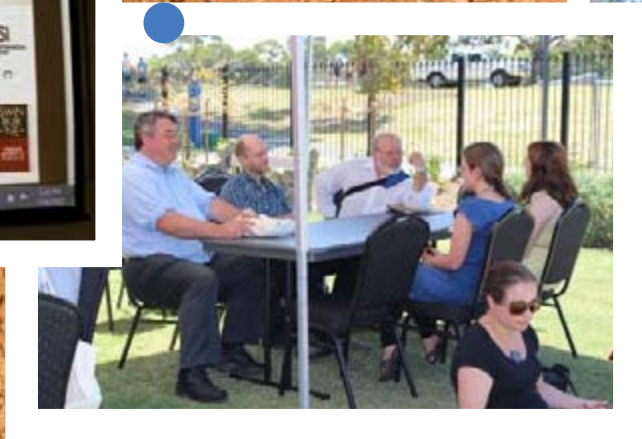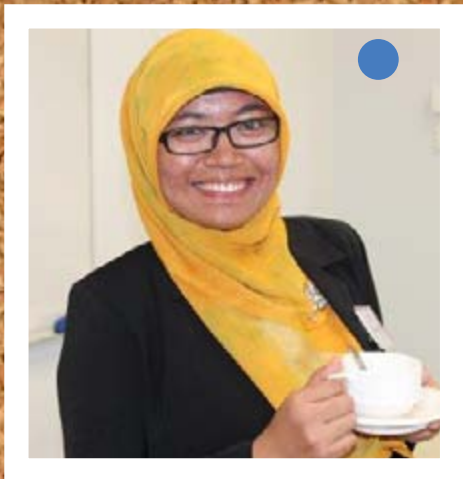
Infographic
First prize: Damjan Vukcevic
Second prize: Courtney Williamson, Stephen Broadfoot, Phillip Wise and Rosalynn Mathews.

Peter Hall and Susanna Cramb with poster prize winners Svetlana Litvinova (1st prize) and Jegar Pitchforth (3rd prize).

YSC 2013
Melbourne

YSC 2013
Melbourne

Thank you to our sponsors:

CSIRO
Australian Bureau of Statistics
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MONASH University Business and Economics
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THE UNIVERSITY OF MELBOURNE
THE UNIVERSITY OF QUEENSLAND
UNIVERSITY OF SYDNEY
WILEY

YSC2013

On the whole, the organisation of the conference was very well done and the standard of presentations were very high. I particularly appreciated the contributed sessions on biostatistics, multiple imputation and applied statistics. The keynote presentations from Professors John Croucher and Rob Hyndman were interesting as they gave examples of different consulting problems they had looked at, from predicting rugby results to acting as an expert witness in court. The invited speakers and careers sessions gave several thought-provoking discussions of the increasing use of 'big data' and the need for change in the Australian education system to promote better understanding of statistics.

I enjoyed giving my own presentation, as this was the first time I have presented at a conference. I was very grateful to receive the award for second best student oral presentation at the conference.

The conference dinner at Feddish was lots of fun, with delicious food, trivia, jazz and dancing. Thank you to SSAI for supporting my attendance at this conference, and also to the conference organisers and sponsors.

Chris Davies

YSC2013 enabled me to present my research in a friendly and encouraging environment amongst my peers, and also gave me the chance to receive feedback from more experienced statisticians. I gave a poster presentation titled "Simulation-Based High Dimensional Experimental Design for Nonlinear Models", which is based on a paper that I have recently been working on. In this work, I presented a simulation-based approach that can be used to solve high dimensional optimal experimental design problems. The approach involves the use of lower dimensional parameterisations that consist of two design variables, which generate multiple design points. Using this approach, one simply has to search over two design variables, rather than searching for a large number of optimal design points, thus providing substantial computational savings. These methodologies were demonstrated on applications that come from pharmacokinetic studies, and involved nonlinear models. Several Bayesian design criteria were compared and contrasted, as well as several different lower dimensional parameterisation schemes for generating the high dimensional designs.

YSC2013 was a very interesting conference which provided exposure to a wide range of topics and applications in statistics. It also provided a great opportunity to meet other young statisticians, as well as more experienced statisticians working both in academia and industry. During the keynote sessions and contributed oral presentations we were provided with excellent careers advice and were educated on both the benefits and issues faced with working in academia or in industry. It certainly was an eye-opening experience. I would like to thank everyone involved in organising YSC2013 for all of their efforts, and for giving me the opportunity to attend this conference.

Elizabeth Ryan
Queensland University of Technology

(Note the answer is the surname. The first name is given in brackets as an extra clue)

Across

1. Director (Data and Performance Analysis) at the Victorian Department of Education and Early Childhood (Michelle, 4)
3. SSAI President (Kerrie, 9)
4. ntroduced M-quantile models (Ray, 8)
6. Academic with extensive government experience (Michael, 5)
7. Head of Analytics and Research Operations at NAB (Antony, 5)
8. PhD in physics (Kendra, 4)

Down

1. Tougher than Bear Grylls (Rob, 7)
2. R guru (Thomas, 6)
4. Was cutting edge with a computer and a calculator watch (John, 8)
5. Winner of the global KDD (Knowledge Discovery and Data mining) cup in 2002 (Bhavani, 8)
9. The Australian Statistician (Brian, 4)
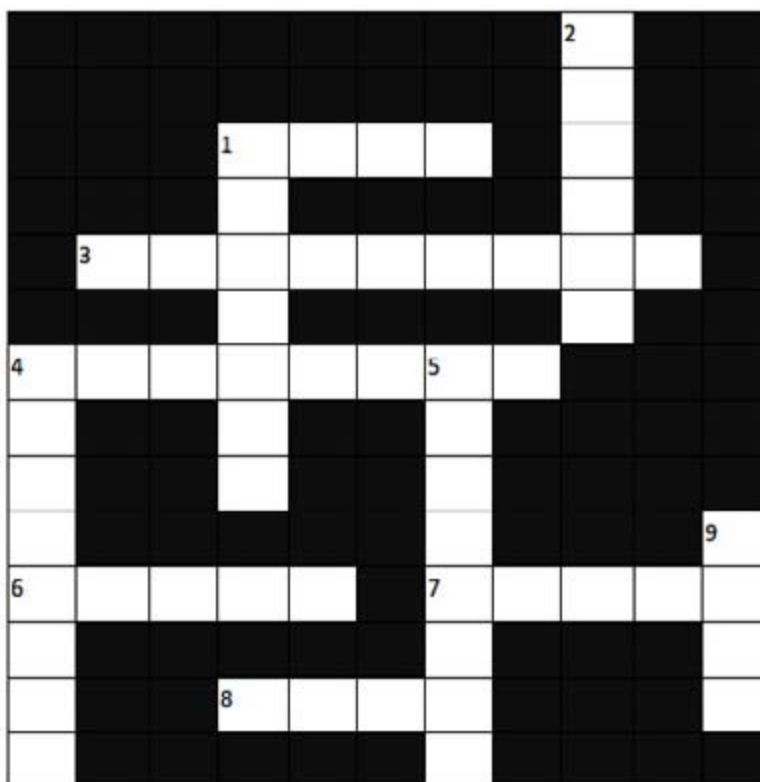
Solution on page 39

MEMBER NEWS

Australia Day Honours

The SSAI would like to congratulate long term SSAI member Professor Peter Hall, who was made an Officer (AO) in the General Division for "distinguished service to mathematical science in the field of statistics through international contributions to research, as an academic and mentor, and through leadership of advisory and professional organizations."

PROFESSOR SHAHJAHAN KHAN RECEIVED Q M HOSSAIN GOLD MEDAL 2012

The Bangladesh Statistical Association (BSA) recognised the world-class scientific contributions and global professional leadership of Australia- based Bangladeshi scientist Professor Shahjahan Khan by awarding him the prestigious Q M Hossain Gold Medal in an international statistics conference held in the Senate Building of Dhaka University on 27 December 2012.

The BSA decided on the award in recognition of his outstanding fundamental research in the areas of estimation and testing with non- sample prior information, predictive inference for Student-t and elliptical models and statistical meta-analysis; supervision and mentorship of young statisticians; effective promotion of statistics and its wide range of applications; world class international professional leadership by leading ISOSS and organising many international conferences; and exceptional professional services through founding and editing international journals and conference proceedings.

Finance Minister of Bangladesh, Mr Abul Maal Abdul Muhith presented the gold medal to Professor Khan in the opening session of the conference organised by the BSA and presided over by its President, Professor M Nurul Islam, Vice-Chancellor of Mawlana Bhashani Science and Technology University. The award was established in 1990, and among the five previous recipients two were based in Bangladesh, two in Canada and one in the USA.

Professor Khan is the youngest among all the recipients of the above Gold Medals and first to receive from Australia. It may be noted that he is the only Professor of Statistics of Bangladeshi origin in Australia. Professor Shahjahan Khan received his PhD (1992) and MSc degrees in Statistics from the University of Western Ontario, Canada. He obtained his BSc Honours (1978) and MSc degrees in Statistics from Jahangirnagar University, Bangladesh

Prior to receiving the Q M Hossain Gold Medal, Professor Khan received the ISESCO-ISOSS Gold Medal in Pakistan (2001) and ISOSS Gold Medal in Malaysia (2007) for his outstanding contributions to statistical research and development of statistics at the international level. He also received a Multicultural Service Award from the Premier of Queensland, Australia in 2002.

Currently he is the founding Professor of Statistics in the Department of Mathematics and Computing, University of Southern Queensland (USQ), Australia, and Chief Editor of the Journal of Applied Probability and Statistics (JAPS). He served as the President of ISOSS from 2005-2011.

From left: Abdur Rashid Sikder (Secretary) and M Nurul Islam (President), Bangladesh Statistical Association, and Shahjahan Khan, University of Southern Queensland.

From left: Abdur Rashid Sikder, M Nurul Islam, Shahjahan Khan, AAMS Areffin Siddique, and Abul M A Muhit, Finance Minister of Bangladesh.

QATAR HOSTS 12TH ISLAMIC COUNTRIES CONFERENCE ON STATISTICAL SCIENCES

Qatar is the first country in the Arabian Gulf to host any statistics conference organized by the Islamic Countries Society of Statistical Sciences (ISOSS). The 12th biennial Islamic Countries Conference on Statistical Sciences (ICCS-12) was held at the Qatar University (QU), Doha from 19-22 December 2012. The President and Vice Chancellor of Qatar University, Professor Sheikha Al Misnad, as the chief guest, formally opened the conference in the Ibne Khaldoon Hall. The session was addressed among others by the President of ISOSS, Prof Ali S Hadi, and the Chair of the Local Organising Committee (LOC), Prof Ayman Bakleezi from QU. A representative of the Qatar Statistics Authority of the Government of Qatar discussed various statistical activities and programs to meet the growing need and improve the official statistics in the country.

The scientific programs committee accepted 236 papers for presentation but only 151 papers were presented by delegates from 32 countries from all parts of the world. In addition, keynote addresses were delivered by Munir Ahmed (Pakistan), Edward Wegman (USA), Ehsan Soofi (USA), Mohammad Hanif Mian (Pakistan), Abdelhameed El-Shaarawi (Canada/Egypt), Aman Ullah (USA), Shahjahan Khan (Australia), and Mohammad Al Saleh (Jordan). A good number of potential presenters could not participate in the conference due to visa restriction. The largest number of delegates came from Pakistan. The LOC was able to support a good number of international participants through free accommodation in QU guest house.

The conference dinner was held in a local restaurant with attractive Arabian cuisine. In the last day of the conference a city tour was organized to visit some of the attractive places in Doha such as the Katara resort and Souk Waqif (market).

The winners of the ISOSS gold medal for this year, Prof Dato' Wira Dr Jamil Bin Osman of Malaysia, Dr Saleh Omer Badahdah of Saudi Arabia, and Prof Ayman Bakleezi of Qatar University, received their Awards from the chief guest of the opening session.

The business session considered proposals from Indonesia, Malaysia, Tunisia, Oman and United Arab Emirates (UAE) to host the next ISOSS conference. Tentatively it was agreed that ICCS-13 will be held in the UAE in 2014. Due to growing interest to hold conferences in the Islamic Countries, it was proposed that in addition to biennial Islamic Countries Conference on Statistical Sciences, ISOSS would form partnership to hold joint conferences with other societies in appropriate venues.

Like in the previous ISOSS conferences, the electronic version of the Proceedings consisting of papers presented in the conference is accessible from the ISOSS website (www.isoss.net) and the printed version is expected be published in the near future.

The conference re-elected Ali S Hadi, Distinguished Research Professor of the American University in Cairo, Egypt as the ISOSS President.

Shahjahan Khan (Australia)
Ali S Hadi (Egypt)
Ayman Bakleezi (Qatar)

WEBINAR WITH DAVID ELSTON

On Thursday, 14 February 2013, interested SSAI members joined a bedtime webinar with David Elston, Director of Biomathematics and Statistics Scotland. David's endeavour to talk about Statistical Contributions to Climate Change Research led us to the United Kingdom and in particular Scotland. Based on three example projects David explained (1) how to estimate future distributions of crop yields using multiple climate projections, (2) how to model responses of British bird species to weather and (3) how to introduce uncertainty into abatement calculations.

When I first read the title Statistical Contributions to Climate Change Research, I thought clearly there must be more to this webinar than the presentation of quantitative assessments of climate data such as trends in means and variances in temperatures and precipitation. Not surprisingly, David showed some interesting statistical work and work in progress that deals with different aspects of climate change research. For example, given the uncertainty in climate projection it is pertinent to assess different variance components and contributions when modelling future distributions of crop yields. Regardless of climate projection model results show that annual spring barley yield will be less in 2040 and even less in 2080 compared to baseline data. Although, indicative these model runs do not incorporate human behaviour, i.e., farmers might opt for new barley varieties or change management regimes and therefore change crucial model input parameters.

The second example project dealt with modelling responses of British bird species to weather. Remember climate is average weather and breeding success of birds is related to weather during breeding season rather than average weather. David and colleagues tried to identify species at risk and what weather conditions will put these species at risk. Long-term Breeding Bird Survey data from the British Trust for Ornithology and annual weather data were analysed using space-time smooths of data to identify trends in densities, sums over 1 km squares (bird survey sample size) in regions of interest, the combination across species to identify bird community response and use weather covariates for attribution. What struck me the most was the fact all meteorological data and statistics in the world are meaningless without long-term biological data sets, e.g., breeding bird survey data. In David's words: "documenting change is simpler than attributing change".

The final example project focussed on identifying cost effective methods to reduce net CO_2 emissions produced by Scottish agriculture. David and co-workers combined abatement potential with cost to identify priorities for policy measures, i.e., Marginal Abatement Cost Curves. As before, all results are only valid if farming activities remain unchanged – a highly unlikely scenario.

David Elston touched on many different facets to climate change research and concluded that maximising the impact of his results requires efficient communication outside the scientific community which can be a rather daunting task given the complexity of the situation.
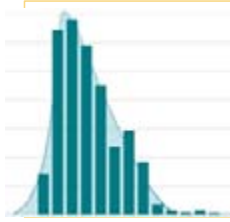
A recording of this webinar can be viewed here: https://attendee.gotowebinar.com/recording/101860205172655616.

Jan Seiler

Photo: Tapasparida, Flickr

ICOSDA 2013

International Conference on Statistical Distributions and Applications

October 10-12, 2013
Soaring Eagle Casino & Resort
Mt. Pleasant, MI USA

Call for Papers

You are cordially invited to join us in discussing recent developments on statistical distributions and their applications

Abstract Submission Deadline: June 10, 2013

Early Registration Deadline: June 10, 2013

Conference website: http://people.cst.cmich.edu/lee1c/icosda

The scope of this conference includes, but not limited to, the following:

- New methodologies for generating generalized discrete and continuous (univariate and multivariate) distributions
- Properties of generalized univariate and multivariate distributions
- Frequentist and Bayesian statistical inferences, including parameter estimation and goodness of fit tests, for generalized distributions
- Development of Bayesian priors using generalized distributions
- Statistical modeling using generalized distributions
- Applications of generalized distributions in biomedical sciences, finance, insurance, survival analysis, engineering and others

Graduate students are welcomed to make poster presentations.

Conference presenters are invited to submit their articles for publication consideration in a special issue of a new international refereed journal -- **Journal of Statistical Distributions and Applications (JSDA)** that will be published by Springer Publishing Company.

2013 ICOSDA Keynote Speakers:

B.C. Arnold, University of California, Riverside, USA

N. Balakrishnan, McMaster University, Hamilton, Canada

M.C. Jones, Open University, United Kingdom

P. Speckman, University of Missouri, USA

Conference Co-Chairs: Felix Famoye and Carl Lee
Sponsor: Department of Mathematics, Central Michigan University

SSAI IS PARTICIPATING IN THE INTERNATIONAL YEAR OF STATISTICS 2013

SSAI is proud to announce it is participating in the International Year of Statistics 2013, a worldwide celebration of the contributions of statistical science to the advancement of our global society.

More than 700 organizations—universities, research institutes, high schools, professional societies, government agencies and businesses—in nearly 100 countries are joining to celebrate and promote the importance of statistical science to the science community, businesses, governments, the news media, policymakers, employers, students and the public.

During this yearlong celebration, SSAI and the hundreds of other participating organisations around the world will be:

• Increasing public awareness of the power and impact of statistics on all aspects of our society

• Nurturing statistics as a profession, especially among high-school and college students

• Promoting creativity and development in the sciences of probability and statistics

Be sure to visit our website in the months ahead to learn more about how Statistics helps shape your everyday life.

Read the latest newsletter on IYS here. To see a list of activities acknowledging the International Year of Statistics please click here.

OVERSEAS STATISTICIANS VISITING AUSTRALIA

We have an "Overseas Visitors" page on the SSAI website (http://www.statsoc.org.au/OverseasVisitors). The aim of this page is to provide a public database with the names of overseas visitors, giving other organisations the opportunity to benefit from the visit as well. If you or your organisation think that they would like to work with one of the visitors listed on the website, simply send an email to the SSAI office, explaining the details of your proposal, and the office will forward your email to the visitor in question.

If you know of statistical experts from overseas planning a visit to your organisation, please advise the SSAI by sending an email containing the name, details and travel dates of the visitor to eo@statsoc.org.au. We would also need the visitor's email address (not to be published on the website), so that we can ask for his or her permission to put their name up, as well as the name and details of a contact person in Australia.

MATHEMATICS OF PLANET EARTH

Mathematics of Planet Earth Australia is off to a ripper start with competitions, puzzles and Pi Day celebrations to whet everyone's mathematical appetite!

We are pleased to announce Prof. Nalini Joshi, Chair of the National Committee for Mathematics at Australian Academy of Science as an Ambassador for the International Year of Mathematics of Planet Earth Australia. Read her interview and which a short film featuring Prof. Joshi by Trixie Barretto here - http://mathsofplanetearth.org.au/nalini-joshi/

Our office in Melbourne looks dazzling with the wonderful photos from our first competition, *Singling out Symmetry*, on display. We received lots of entries encompassing many facets of symmetry in the natural and man-made worlds. Congratulations to our two winners, Scott Goh and Christina Burt. You can check out all the entries at http://mathsofplanetearth.org.au/competitions/symmetry/.

3.14 may be a rather crude approximation of Pi, but our Pi Day celebrations on March 14 are coming around so fast it's truly irrational. Simon Pampena will host two sessions for school children in Years 6-7 and 8-9 at the Australian Museum, which will be broadcast live to schools across the nation. School teachers can also check out our suite of classroom resources that examine global-scale issues from a mathematical perspective. These include a close encounter with Asteroid DA14, keeping an eye on our water supplies, and calculating the carbon dioxide output of a small car.

Links: http://mathsofplanetearth.org.au/pi-day/

http://mathsofplanetearth.org.au/category/schools/classroom-resources/

Of course nobody is too old for Pi Day, but if you happen to be a tertiary student then we've got something else in store for you. Each month we are releasing a set of puzzles to help keep your mind performing at its best. Mathematical puzzles date back to ancient times, and now it's your turn to continue this mind-bogglingly addictive endeavour. Each month, one lucky winner will receive a signed book by Dr Keith Devlin, Stanford University.

Link: http://mathsofplanetearth.org.au/puzzle-of-month/

Abstract submissions for our major scientific event, MPE Australia, are now open. This conference is designed to put the critical utility of the mathematical sciences on the world stage, and create a platform on which to launch new scientific collaborations. More information about the conference is available at http://mathsofplanetearth.org.au/events/2013/

Finally, we have received some wonderful feedback about our launch event on January 29. Professor Simon Levin's lecture was summed up perfectly by one of the guests: "Outstanding lecturer and content…This is accessible science – clearly articulated." You can read more about last month's launch at http://mathsofplanetearth.org.au/mpe-australia-launched/

Emma Bland

Call for abstracts

MPE Australia 2013
8–12 July 2013
Melbourne

We are inviting abstract submissions from those interested in speaking at MPE Australia 2013.

MPE Australia 2013 is the central scientific event of Mathematics of Planet Earth Australia program—bringing together the scientific community to address the mathematical contribution to the challenges of the planet.

The conference themes are:
- Complex (and dynamical) systems
- A data-based view of our world
- Population censuses and the human face of australia
- Scientific data mining
- Earth system modelling
- Mitigating natural disaster risk
- Sustainability—environmental modelling
- Biological invasion
- Realising our subsurface potential

Abstract submissions close—5pm Friday 31 May 2013
More information: www.MoPE.org.au/events/2013

International year of
Mathematics AUSTRALIA
of Planet 2013 Earth

An Australian Academy of Science
Elizabeth and Frederick White Conference

Australian Academy of Science

Venue : The University of Queensland, Brisbane
Date : 24 June to 5 July 2013

The 2013 AMSI Winter School on the Mathematics of Planet Earth

2013 is the International Year of the Mathematics of Planet Earth, the 8th annual AMSI Winter School will be on this theme. The School is designed for PhD and postdoc students in the mathematical sciences and related disciplines.

Introductory courses run during the first week and specialised advanced courses through the second week, speakers include many eminent national and international lecturers.

The annual AMSI Winter School is funded jointly by the Department of Industry, Innovation, Science, Research and Tertiary Education and the Australian Mathematical Sciences Institute.

More information: www.amsi.org.au/WS2013.php

THE GEORGE INSTITUTE
for Global Health
AUSTRALIA

The George Institute for Global Health and Macquarie University present:

"An Introduction to Joint Models for Longitudinal and Survival Data with Applications in R"

Presented by Dr. Dimitris Rizopoulos

From 9 to 5pm, 11th & 12th April 2013

Macquarie Park Executive Conference Centre, Macquarie University

MACQUARIE UNIVERSITY

About the Workshop

In follow-up studies often different types of outcomes are collected for each subject. These may include several longitudinally measured responses (e.g., biomarkers or other clinical parameters), and the time at which an event of particular interest occurs (e.g., death, disease progression or dropout from the study). These outcomes are often separately analyzed; however, in many instances, a joint modeling approach is either required or may produce a better insight into the mechanisms that underlie the phenomenon under study. To this end a new class of models has been developed known as joint models for longitudinal and time-to-event data.

The aim of this course is to introduce this joint modeling framework, and in particular focus on when these models should be used, which are the key assumptions behind them, and how they can be utilized to extract relevant information from the data. The course will be explanatory rather than mathematically rigorous, but sufficient technical background will be provided to understand the properties of these models. All concepts will be illustrated on real data sets and the course will also feature short software practical sessions illustrating how these models can be fitted in R using package JM.

About Dr. Dimitris Rizopoulos

Dimitris Rizopoulos is Assistant Professor at the Department of Biostatistics of the Erasmus University Medical Center in the Netherlands. He received an M.Sc. in statistics (2003) from the Athens University of Economics and Business, and a Ph.D. in biostatistics (2008) from the Katholieke Universiteit Leuven. Dr. Rizopoulos wrote his dissertation, as well as a number of methodological articles, on various aspects of models for longitudinal data analysis and survival analysis. He is the author of a recent book on the topic of joint models for longitudinal and time-to-event data. He currently serves as an Associate Editor for Biometrics and Biostatistics, and he has been a guest editor of a special issue on joint models in Statistical Methods in Medical Research.

Dr Rizopoulos' recent book: Joint Models for Longitudinal and Time-to-Event Data: With Applications in R, is aimed at applied researchers and graduate students. The text provides a comprehensive overview of the framework of random effects joint models.

Course Outline

Day I

- Introduction & motivation: Which type of research questions require joint modeling
- A brief review of relative risk models
- A brief review of mixed effects models
- The basic joint model and its properties
- Software practical: Fitting simple joint models with package JM

Day II

- Extensions of the basic joint model
- Using joint models to derive dynamic individualized predictions
- Measuring accuracy of longitudinal outcomes with joint models
- Software practical: Extended joint models & dynamic predictions with package JM

Course Outline

9:00 - 10:30	– Theory session
10:30 - 10:45	– Coffee break
10:45 - Midday	– Theory session
Midday - 1:30	– Lunch
1:30 - 3:00	– Theory session
3:00 - 3:15	– Coffee break
3:15 - 5:00	– Software practical

Want to know more?

We have unlimited places available for this exciting two day workshop and would love to have you with us.

Free onsite parking is available for short course participants and is also within walking distance of Macquarie University train station and bus routes.

Macquarie Park Executive Conference Centre at Macquarie Graduate School of Management, Talavera Road, North Ryde, Sydney

Closing dates for early bird registrations are 21st of March and final registrations 4th April 2013.

To register, go to
http://www.statsoc.org.au/CPD44MainPage
Contact: Gillian Heller
gillian.heller@mq.edu.au
or call 02 98 508 541

Learning Objectives

After this course participants will be able to identify settings in which a joint modeling approach is required. In addition, from the course it will become clear which joint models can be used depending on the actual research questions to be answered, and which model-building strategies are currently available. Further, participants should be able to construct and fit an appropriate joint model, correctly interpret the obtained results, and extract additional useful information (e.g. plots) that can help communicate the results in an efficient manner. Workshop Participants will receive a 20% discount off Dimitris' book "Joint Models for Longitudinal and Time-to-Event Data, with Applications in R".

Pricing

Payment before 21 March 2013 (Early Bird):

SSAI Members	$550.00
Non-members of SSAI	$600.00
Full-time Students	$300.00

Payment from 21 March 2013 until 4 April 2013:

SSAI Members	$700.00
Non-members of SSAI	$750.00
Full-time Students	$300.00

Statistical Society of Australia (SSAI)

Computing

Participants should bring their own computers and make sure they have the latest version of "R" and the latest version of package "JM".

R can be downloaded from http://cran.r-project.org/ -- after installing R, the following command should be executed prior coming to the course

install.packages("JM")

Target Audience

This course is aimed at applied researchers, such as statisticians, biostatisticians and epidemiologists, with interest in the analysis of longitudinal and survival data. The course assumes knowledge of basic statistical concepts, such as standard statistical inference using maximum likelihood, and regression models. In addition, basic knowledge of mixed effects and Cox proportional hazards models would be beneficial but is not required.

SSAI GOLDEN JUBILEE TRAVEL GRANT

to provide overseas travel funds to SSAI student members, who can prove consecutive SSAI membership for a minimum of two years.

Last year the SSAI introduced a travel grant that offers limited travel funds to assist *student members* of the SSAI to attend overseas conferences at which they present a paper or poster.

A maximum of $1000 is available per application, limited to a single trip during the course of the student's studies. Students will not be supported in their first year of study and will have had to be members of the Society for at least 2 years prior to the application deadline. Applications are required to be lodged in advance of travelling. In exceptional circumstances an application can be for post-conference support, but the application will then have to be made within 1 month of returning and the 2 year mandatory membership period prior to departure must still be met. Exceptional circumstances are limited to unforeseeable student out of pocket expenses arising from other funding sources not fulfilling their obligation or changes to the trip that could not have been avoided.

A complete application will consist of

- Information on the conference and its importance to student's work (2-3 lines)
- Details of the paper/s/poster student wants to present at the conference
- A list of other funds sought or promised, including student's home institution
- Student's out of pocket expenses expected
- Any other supporting material student feels is necessary
- A letter of support SIGNED by one of student's supervisors AND student's Departmental Head
- Student's CV

The application deadline is 31 March.

If successful the student member is required to produce original receipts for amounts of equal or greater value than the grant. These receipts will be returned to the student marked with how much has been reimbursed. The student will therefore still be able to use the receipts for proof of attendance or to claim any funding shortfall from other organisations. The student member will also need to supply a report of his or her involvement in the conference to be published in the SSAI newsletter. This report should confirm the actual travel details and papers presented.

Recipients of the grant are asked to acknowledge the SSAI's support in the presentations and in any published version of the paper.

One travel grant is available per year. Assuming that more than one application will be received per year, either the Executive Committee or a special committee would help with the selection process.

For more information or to apply, please contact the SSAI Office (eo@statsoc.org).

With this travel grant program the SSAI seeks to underline its objective to further the study, application and good practice of statistical theory and methods in all branches of learning and enterprise. It has been implemented to confirm to members that the SSAI is willing to support student statisticians and their budding careers.

LOOKING FOR A JOB?

For a listing of current statistical vacancies in Australia and New Zealand visit:

http://www.statsci.org/jobs

Do you have a job to advertise on the website?

Email a position description to eo@statsoc.org.au. Listing is free!

Wiley-Blackwell

25% Discount for Members of SSAI!

Wiley-Blackwell is pleased to offer members of the Statistical Society of Australia Inc a 25% discount on a wide range of books published by John Wiley & Sons. The range of books on offer includes titles from Wiley-Blackwell's extensive list of statistical publications, as well as titles from our brands Frommers, Capstone, Dummies, Jossey-Bass and many more.

How to Register and Purchase Books:

Members within Australia and New Zealand:

1. Click on the link to your Online Book Discount Program Landing Page http://au.wiley.com/WileyCDA/Section/id-410891.html
2. Register if a first time visitor, or start purchasing if a return visitor (note that if you have opened an account with Wiley.com before this discount offer was available, you will have to open another account (Register) using another email address to obtain the discount);
3. Click on the Wiley logo at the top of the page, or the subject link next to the SSAI logo to browse books, or select titles on the Landing Page;
4. Select titles and then click 'Add to Cart';
5. Click on 'Continue Shopping', or 'Proceed to Checkout Now'.

Note: When completing your purchase members in Australia or New Zealand DO NOT need to enter a promotional code.

Members outside Australia and New Zealand:

Complete steps 1-4 as above, and enter the promotional code as shown on the Book Discount Program Landing Page, before clicking Checkout Now.

SSAI'S MEMBER-GET-A-MEMBER CAMPAIGN

SSAI's 'Member Get a Member' program offers an outstanding financial incentive for existing members of SSAI to introduce new full members. With each new full member you introduce, you receive a 25% reduction on your next year's membership: introduce four new full members and your membership next year will be free!

No one knows the benefits of membership with SSAI more than you, our members! Consider sharing your SSAI membership experience and get rewarded for doing so. Through the Member-Get-a-Member program, the SSAI will reward your efforts.

Every time you recruit a new member, you strengthen the SSAI. A vital and growing SSAI means greater recognition of the statistical profession, improved educational and networking opportunities for all members, and the advancement of statistics worldwide.

There are several ways you can help the SSAI grow:

You can simply provide us with the name and contact details of the potential member and we'll send them a membership information package.

You can print out a membership application and give it to the prospective member. Please note your name "Referred By" space before you hand over the form.

You can direct them to the SSAI website where the prospective member can join online right away!

Tips on recruiting new members

- Invite a prospective colleague/student to attend a Branch meeting to experience first-hand the professional benefits of SSAI membership.

- Start a discussion about your SSAI membership, emphasising the benefits and value. If you think a brochure might be helpful, the SSAI office can provide you with some leaflets.

- If you receive the Australian and New Zealand Statistical Journal in hard-copy, keep some issues on display to attract the eyes of potential new members.

- Publish an article in your organisation or university publications explaining how SSAI helped you.

- Post announcements of SSAI meetings/conferences/workshops/webinars.

- When discussing membership with a prospective member, listen for clues as to what they look for in a professional society. Stress those member benefits that meet their needs.

- Coordinate an event at your place of employment with the administrative support of SSAI.
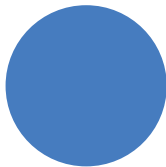
FROM THE SSAI OFFICE

Marie-Louise
Rankin

After the summer break and a couple of weeks with reduced office hours things are back to normal at the SSAI Office. The development of the new database and website is well under way and it shouldn't be long now before we will be able to enjoy better online facilities. The current website is still sending out blank emails that were supposed to contain tax invoices/receipts and I thank you for your patience in dealing with the faulty technology.

Once the new website is up and running, I'd like to get serious about compiling and displaying events with a statistical or mathematical background. I'm not sure yet if we will display the events in a listing or in calendar format, but I'd like to invite you to send me information on your upcoming events, so that I can add them to the list. To be able to promote your event properly, I'll need the name of the event, date, location and a link to a website or a flyer with all the information.

We are currently putting together our webinar program for the next few months. I am aware that we have been focusing on climate change for a while, so I will try to find speakers willing to discuss other topics as well. If you have recently heard a good speaker, please let me know. Also, if there is anything you are particularly interested in, I'd like to hear from you. For now, though, we can look forward to a presentation by John Cook of the Global Change Institute, who has a passion for debunking climate science myths.

John Cook is the Climate Communication Fellow for the Global Change Institute at the University of Queensland. He created SkepticalScience.com, a website that rebuts climate misinformation with peer-reviewed science. In 2011, Skeptical Science won the Australian Museum Eureka Prize for the Advancement of Climate Change Knowledge. John has co-authored the college textbook "Climate Change Science: A Modern Synthesis", the book "Climate Change Denial: Heads in the Sand" and published several papers on climate change and the psychology of misinformation.

I am pleased to advise that on 13 March 2013 John will hold a "Lunch & Learn" webinar for SSAI, speaking about "Climate Change and the Conundrum of Statistics". We are taking registrations for this webinar at https://attendee.gotowebinar.com/register/277362052342579456.

John recently spoke at a QLD Branch meeting and this newsletter contains an article on his interesting talk.

Finally I'd like to thank the members who took pity on me when I was asking for a volunteer to write about our recent webinar with David Elston. I received emails from a number of volunteers and I decided to take up the offer of the first person who responded. Jan Seiler, a member of our VIC Branch, did a great job and you'll be able to read her article in this newsletter.

I also want to let you know that the SSAI Office will be closed from Monday, 21 April 2013 until the following Monday.

Marie-Louise Rankin

BAYESIAN SECTION NEWS

The Bayesian Statistics Section of the SSAI is proud to report the success of the course "Applied Bayesian Modelling", taught by Professor Kerrie Mengersen during the Mathematics in Industry Study Group Graduate School 2013. This workshop was held at Queensland University of Technology (QUT) from 22-26 January 2013, and the Bayesian component covered the theory behind Bayesian modelling with several case studies, with sessions that involved applying these techniques to practical examples.

We look forward to the practical course "Bayes for Beginners", to be held at QUT from 3-5 April 2013, taught by Professor Kerrie Mengersen. Kerrie is a renowned leader in Bayesian methodology, heavily involved in research, teaching and collaboration concerning Bayesian statistics and its application to health, genetics, biometrics and the environment. "Bayes for Beginners" will cover theoretical and practical aspects of Bayesian modelling, with illustrated examples and hands-on workshop components.

Finally, following the resounding success of Bayes on the Beach in November 2012, we welcome researchers with an interest in Bayesian methods to attend and present at Bayes on the Beach 2013 to be held later this year, at a beachside venue to be assigned.

Jannah Baker, Scott Sisson

STATISTICAL EDUCATION SECTION NEWS

The Statistical Education Section is planning now for a few activities that we hope to bring to fruition in 2013. The first set of initiatives is the plan to organise two Continuing Professional Development workshops for the SSAI with Statistical Education the prominent theme. The first would be targeted at members of the Society and the Section who are in the University sector faced with teaching undergraduate statistics to school leavers, with the theme of the Workshop being pedagogic content and course organisation. The workshop would be based on bringing key issues of exploring probability concepts and working through to data analysis to the fore within the prism of connecting effectively with students through good course design and course organisation. The second workshop would extend the ideas from the first workshop to include the problem of workplace training in statistics, and would also focus on course organisation and design as key elements in providing effective workplace training. Planning for these workshops is in the very early stages, and potential presenters are yet to be approached, but it is hoped to be able to mount the workshops in the latter half of 2013.

A second initiative planned by the Statistical Education Section is the creation of a user discussion forum for Statistical Education (and other interested) members of the SSAI. It is hoped that this discussion forum will leverage efforts to keep solid lines of contact between the Section and its members and will be additional to the regular mail outs that we plan to run this year as part of our activities.

Finally, planning is beginning now for a Statistical Education session at ASC 14. Again, planning is at very early stages, but we are looking to mount an exciting session at next year's conference as we did in Adelaide last year.

Michael Martin and **Peter Howley**, Co-Chairs
Su Kang, Assistant Chair
Statistical Education Section, SSAI

ENVIRONMENTAL STATISTICS SECTION NEWS

In 2013 the Environmental Statistics section will be boosting communication to section members on topics of relevance to modern environmental and statistical research. I have updated the section webpage (http://www.statsoc. org.au/environmental-statistics.htm which now lists upcoming events both here and abroad, and have started a regular (so far monthly) newsletter to section members which highlights topical news items and recent announcements. Through the Maths for Planet Earth program I hope to help promote and organise workshops. As the year progresses the section will turn its attention towards the planning of a session at the 2014 Australian Statistics Conference in Sydney.

David Clifford
Chair of Environmental Statistics Section

KNIBBS LECTURE 2012

"The thrown coin: who gives a toss?
Adventures in the design of the golden die and in binary regression"

The annual Knibbs lecture was held on 27 November 2012 at ANU, with speaker Prof David Griffiths of the University of Wollongong, and discussants Dr Alice Richardson of the University of Canberra and Dr Michael Adena of Datalytics Pty Ltd.

It has become traditional at Knibbs lectures for the main speaker to give a short biographical summary of George Handley Knibbs, the first Commonwealth Statistician. However David, with some assistance from a grandson of Knibbs, gave a much more in-depth account of Knibbs' life and times. In addition to providing genealogical information on Knibbs, his parents, siblings and descendants, David had uncovered details of Knibbs' early education and career before he became the Statistician. He had been Professor of Physics and of Engineering and had lectured in other subjects, as well as being active in various professional societies and the like, and setting up the Rhodes Scholarships in Australia. He had also been an accomplished painter and been the subject of a short listed entry in the Archibald Prize.

Moving on to the topic of his talk, Binary Regression, he discussed the choice of link function, logit, probit and complementary log-log, and what covariates should be in the model.

David then discussed the probabilities of shapes landing on each face. When the aspect ratio is one, those probabilities are known. David then illustrated his talk with a number of wooden cuboid, but not cubic dice, throwing them to the amusement of the audience. For such dice the model of the probability of landing on a particular face is a binary analogue of a straight line through the origin. A cuboid needs to have an aspect ratio of about 2.65 for minimum prediction variance.

An application of the techniques of binary regression is in calculating the batting average of Don Bradman – 10 of his 80 innings were 'not out', giving a 'censored' problem. Applying different degrees of smoothing to the hazard

function results in values of his batting average different to the usually quoted value of 99.96, and the conclusion that Bradman's average was greater than 100 if you wanted it to be.

Another application is to cost-benefit analysis of road infrastructure investment. A former student of David's, Sathish Redhi analysed data on fatal road accidents on roads around Wollongong. Considering factors such as severity of the crash, road type, curvature and driver factors such as alcohol, speed and fatigue, Sathish was able to show under which circumstances road upgrades would lead to lower accident rates and severities, the economic benefit of which outweighed the cost. On many road segments this was the case, and a copy of the thesis was sent to the RTA.

The first discussant was Dr Michael Adena – who couched his discussion in terms of the meta-analysis of randomised clinical trials, and of the appropriate link functions to use with particular problems. The complementary log-log link is useful for interval censored data, and for giving estimates of relative hazards. Another example is analysis of supply level data from the Pharmaceutical Benefits Scheme, in particular looking at the survival of patients starting beta-blockers.

Michael commended David for the way his talk had made complex issues seem simple.

The second discussant Dr Alice Richardson, posed the question whether Knibbs would have given a toss, illustrating her argument with the experiment by Count de Buffon who estimated pi by tossing needles onto lined paper. She then made the point that communicating the concepts of binary regression to the general public remains a problem. A problem familiar to the general public is the annual awarding of the Academy Awards (Oscars) – she discussed two papers that fitted models for the probability of awards. She discussed two other papers, on quantifying contributions of players in the National Basketball League, and the relationship between thinking and driving styles in young people.

In his response David mentioned other experiments which estimate pi.

In questions the then recent phenomenon of Nate Silver and his predictions of the US election was mentioned. There was also discussion of talks by Percy Diaconis, who has shown that, given sufficient information, coin tossing is an entirely deterministic problem.

At the conclusion of the lecture speakers and members enjoyed dinner at Tossolini's Restaurant.

Ray Lindsay
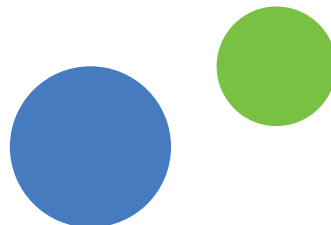
QUEENSLAND BRANCH

Climate change & the conundrum of statistics

The Queensland Branch's 2012 Christmas meeting was held in late November. The speaker was John Cook who is the Climate Change Communication Fellow for the Global Change Institute at the University of Queensland and co-author of the books "Climate change denial: heads in the sand" and "Climate change science: a modern synthesis". John's talk, titled "Climate change and the conundrum of statistics", focussed on the deceptively difficult task of communicating the reality of climate change. Whereas climate is a statistical abstraction, essentially weather average over time and space, the average layperson's thinking about climate is heavily influenced by the daily weather they experience. This influence is illustrated by public opinion surveys showing a stronger belief in global warming when surveys are conducted on hotter days relative to those conducted on colder days. John introduced the concept of "sticky ideas", borrowed from the book "Made to Stick" by Chip and Dan Heath, which he uses in his efforts to explain climate and climate change issues. Sticky ideas are essentially metaphors and a way of communicating complicated concepts with simple, concrete ideas. John gave the example of global warming being equivalent to 900 more Sydney harbours in the atmosphere as a way of communicating the link between climate change and extreme weather and the role played by increased water vapour in the atmosphere. John contrasted sticky ideas with statistics, which he argued are abstract and complicated, and discussed the need to carefully choose the type of statistics to communicate if they are to inform rather than misinform. John created and runs skepticalscience.com, a web site that rebuts climate misinformation with peer-reviewed science and makes good use of metaphors (sticky ideas) to make climate science accessible to the general public. In addition to his co-authored books on climate change, John has helped produce a range of climate communication resources, including the release of smartphone apps for the iPhone and Android phones. The SSAI is pleased to announce that John will present his talk for the QLD Branch as an SSAI webinar on 13 March 2013 at 1pm AEST. To register, please go to https://attendee.gotowebinar.com/register/277362052342579456.

Elaine Pascoe

John Cook

How to collect data in space: an overview of optimal spatial sampling design

The January meeting of the Queensland Branch was held at the impressive Ecosciences Precinct in Dutton Park. The presentation was given by Zhengyuan Zhu who is an Associate Professor in Statistics at Iowa State University and is visiting CSIRO as part of his sabbatical. Zhengyuan's talk was titled "How to collect data in space: an overview of optimal spatial sampling design". He illustrated the statistical properties of spatial data with the example of daily precipitation data collected over 50 years from almost 6000 irregularly spaced weather stations across the United States. He presented numerous additional examples from areas such as agriculture, climate science, and epidemiology to illustrate the many application areas in which data are collected in space and time. Zhengyuan introduced classical spatial sampling design methods and provided formal illustrations of the importance of a well-designed spatial sampling plan. He introduced some newer approaches to spatial sampling and illustrated the application of the methodology with the example of the National Resource Inventory Survey, a large longitudinal survey mandated by the US Congress to monitor conditions and trends in agricultural land use, soil erosion, etc. Zhengyuan concluded the presentation by emphasising the importance of a statistically defensible sampling plan which takes account of the scientific objectives of the research and practical issues such as variation in the quality of the data and in the cost of collecting data.

Elaine Pascoe

SOUTH AUSTRALIAN BRANCH

Statistical Meta-Analysis Short Course
13-14 October 2012

Professor Sinha, Fellow of the American Statistical Association and the International Mathematics Society, is an internationally-renowned statistician, and is the author of more than one hundred original research papers, several books, recipient of Distinguished Medal from ASA's Section on the Environment, and is an expert in many theoretical and applied areas of statistics.

In conjunction with Flinders University, the Statistical Society arranged for Professor Sinha to visit Adelaide and give a two-day short course on Statistical Meta-Analysis at Flinders University. The fifteen participants were mainly health statistics professionals and university students undertaking research in the field.

Statistical meta-analysis deals with a variety of sophisticated statistical methods to efficiently combine the results of several studies all with common objectives. The common data situation in meta-analysis is the availability of only published data like effect size estimate plus standard error or effect size estimate plus confidence interval. Some common application areas include gender studies in education, EPA studies of effects of second-hand smoking on women, and controlled or comparative trials in medicine and epidemiology. The course described the basic concepts of effect size for continuous measurements as well as qualitative attributes, combining the results of their estimates of effect size, tests for homogeneity of effect sizes, fixed versus random effects models of meta-analysis, meta-analysis of binary data, meta-regression, and publication bias.

The course had an emphasis on the theory of meta-analysis and was rated highly by participants interested in the theoretical aspects. The focus on the theory came at the expense of coverage of applications and applied issues such pitfalls to avoid and for some participants the theoretical made the course challenging. An extensive set of notes and presentation slides were provided to participants.

Paul Sutcliffe

Professor Sinha

South Australian SSAI November 2012 Meeting

Inference for population dynamics in the Neolithic period

The November meeting of the SA Branch welcomed Professor Richard Boys from Newcastle University (UK). Richard described his recent work (with Andrew Baggaley, Andrew Golightly, Graeme Sarson and Anvar Shukurov) on inference for population dynamics in the Neolithic period. An "accidental" collaboration with mathematical colleagues, the aim was to model the spread of Neolithic era populations across Europe. Radiocarbon dating of Neolithic era artefacts such as pottery, bone, seeds and charcoal has provided the date of first arrival at numerous individual sites. An appeal of using population dynamic models on this data was to account for the topography of areas the Neolithic culture spread through, and hence the different transport speeds due to mountains, rivers or coastlines. Richard outlined the different approaches he and his colleagues used to tackle this numerically intensive task.

Existing work using the Fisher-Kolmogorov-Petrovsky-Piskunov (FKPP) equation from Davison et al found a "reasonable" fit between the FKPP model and the radiocarbon dates with SD(error) ≈ 820 years. Richard and his colleagues were interested in trying to improve on these predictions, however solving the FKPP equation using a parallel finite difference scheme on a lattice of the hundreds of possible parameter values was too computationally intensive and not feasible. Hence Richard turned to statistical methods, specifically Bayesian and MCMC methods to estimate the posterior distribution of the parameters. After a very useful overview of Bayesian methods and the MCMC framework, Richard brought us to his next major hurdle. The MCMC scheme was still too slow – while more efficient than the lattice approach it was still going to take over 1000 years to solve the FKPP equation.

Richard's solution was to abandon the FKPP equation and instead turn to a particle-based model that would capture the key features of the wavefront of the population spread. This model is simpler and yet produces very similar wavefronts to the FKPP equation and other similar models. Richard took us over the basics of particle-based models, illustrating how the longitude and latitude of each observation can be accounted for in a model for diffusivity. This produced a full European simulation for the time of first arrival in less than 10 seconds, however the full MCMC scheme was still going to take around 4 months.

Finally, Richard used Gaussian process (GP) emulators to approximate the arrival times from the particle-based model. He took us through the workings of GP emulators and how they can be used to interpolate between design points. A GP emulator could be built for each site as a stochastic approximation and a function of the diffusivity, the river speed and coastal speed. This brought the full simulation down to only fractions of a second. Richard showed us the interesting results from this approach when applied to the European Neolithic data. The marginal posterior distributions revealed that assumptions made by previous researchers about important parameters may have substantially off, and the fit of Richard's model was improved with an SD(error) ≈ 570 years. Spatial maps of the mean and variance of the estimated arrival times showed a clear spread to the north-west from the origin at Jericho, leading to the United Kingdom.

Richard's entertaining talk was followed by lively discussion on aspects of archaeology, Bayesian inference and population dynamic models.

Kylie Lange

Ref: Baggaley AW, Boys RJ, Golightly A, Sarson GR, Shukurov A (2012). Inference for population dynamics in the Neolithic period. Ann Appl Statist. To appear.

VICTORIAN BRANCH

Belz Lecture 2012 – The Need for Speed

Chris Wild, The University of Auckland

Chris Wild from the University of Auckland was the 2012 Belz lecturer (October 23, 2012). A diverse audience of around 80 people enjoyed Chris' rich visual presentation with his entertaining metaphors and analogies, and his challenging innovations in teaching and learning statistics. The need for speed refers to the need to get statistics students "much further, much faster and with better comprehension". Chris described this as a quantum leap in ambition.

Future statisticians will need to be able to deal with a deluge of data – more and more data will become available, and data will arise in new settings and in new ways. Statisticians will be challenged to embrace new ways of looking at data. How will they cope?

Some innovations in software provide seeds for the solution. These include Hans Rosling's Gapminder, and Leland Wilkinson's AdviseStat – a statistics expert in a box. Tableau - analytics software – has the aim of democratizing data analysis by providing tools to decision makers. More generally, developments in statistical visualization are important.

How can students uncover the stories in this data deluge? How can they see the patterns in data through the frosted glass of uncertainty? Chris describes looking at the world using data as like looking through a window with ripples in the glass and he likened current approaches to teaching data analysis as making students crawl over broken glass. The glass shards impeding them include jargon and formalisms, the complex systems they need to learn, and a fear of "mathematics" – all a kind of "dark magic". The aim should be to arouse a desire to find out what is on the other side of the frosted glass. Chris' vision for early statistics is to create excitement about "what I can do with data and what data can do for me". Students can learn by personal discovery that there are many interesting things to be found in data.

In the context of increasing amounts of data and the need to speed up understanding, the amount of time available for teaching and learning and our capacity for holding ideas in working memory does not change. As Chris said "something's got to give" – and software with visualization and simulation holds the key.

Chris argued that the future of improved understanding of both data and inferential concepts is visual. This belief led to the development of two software packages – learning accelerators – iNZight and VIT.

iNZight is simple software for exploring data; it is designed to very rapidly give the user sensible statistics and graphical displays for data in several dimensions, facilitating "exploring data at the speed of your thoughts". The requirements for learning the software are kept to a minimum. There is interactivity, similar to the kind of interactivity available in Gapminder, that allows dynamic exploration of more dimensions of data than is typically available in modern software.

VIT refers to Visual Inference Tools. VIT is designed to help build conceptual understanding of the principles and practice of statistical inference – to "help dispel the Dark Magic". Users are encouraged to think about the questions they
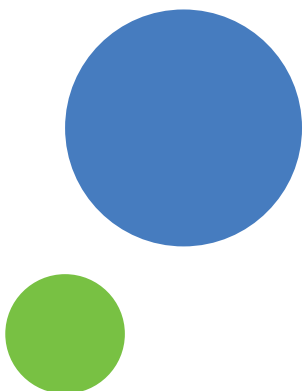
can ask of the data, the patterns they can see and the inferences they can draw, rather than on the requirements of getting the right output. However, while encouraging students to explore the data, there is a need to learn that apparent patterns in the data are typically a blend of fact and artifact: "what we see is not quite the way it really is".

VIT depicts inference and data production, sampling variation and uncertainty intervals in several modules: Randomisation variation, Randomisation tests, Sampling variation, Bootstrap confidence intervals and Confidence interval coverage. Chris argued that learning should start in the context of randomness by design. Confidence interval concepts arise naturally in the context of random sampling whereas significance test concepts arise in settings using random assignment. Chris quoted Efron & Tibshirani (1993): "The traditional road to statistical knowledge is blocked, for most, by a formidable wall of mathematics." He suggested that the essential ideas of inference can be taught entirely visually: once the fundamental ideas are in place (intuitively, visually), mathematical formalisms can be introduced.

Important inferential concepts arise in the context of normal theory and in the context of bootstrapping and randomization. Chris asserted that the inferential method should mirror the process of data production; this is possible with modern computer intensive methods with natural visual representation and a good connection to intuition.

In the VIT modules about statistical inference and sampling variation, the starting point is exploring sampling variation. For example, "boxplots with memory" are generated by repeated sampling a given sample size from a finite population. Boxplot are plotted overlaid tracking the medians and quartiles, as shown below.
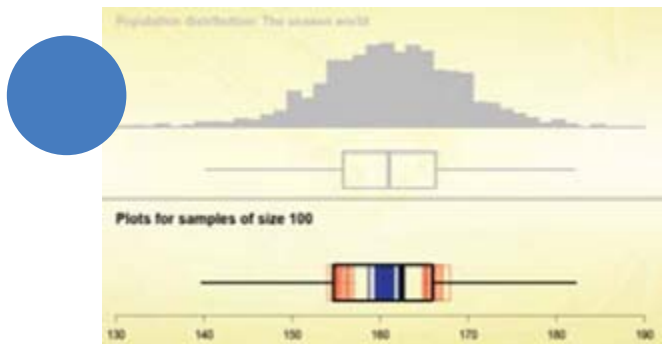
Sampling from single populations and from two independent populations can be explored. The effects of sample size can be investigated by comparing boxplots with memory for different sample sizes. It is hoped that students will develop a reflex where they think of potential variation (boxplots with memory) when they produce a boxplot of their own data.

Boxplots with memory can be used to engage an intuition about the likely distance of the median of a set of data to the true population value. The repeated sampling introduces the idea of an "uncertainty" band. Of course, in everyday data analysis there is no repeated sampling and hence the "uncertainty" band cannot be seen. This raises the question of how to estimate the width of the uncertainty band from a single sample.

In 1979, Brad Efron introduced the idea that sampling with replacement from a single sample could mimic the process of sampling from a population. Chris suggested the simple bootstrap, using resampling with replacement, could provide a useful intuition about the uncertainty band for a single

sample. Investigating the plausibility of bootstrap uncertainty intervals can be embedded in a discovery learning methodology where a need is identified and simulation is used to find what works.

The module on randomization tests illustrates random relabelling of group members, and introduces the idea of evaluating experimental differences relative to the magnitude of those producing by random relabelling.

The approach in both software packages is to avoid "beginner-killing abstractions" (e.g. null hypotheses, parameters versus estimates, test statistics), dense clouds of details and dependence on (poorly understood) mathematical ideas. They take "concrete" ideas that make sense in the context, provide fast access to a wide range of important applications and help build a substantial body of intuition and experience as a foundation to then build abstractions upon. Chris' "vision" is of initially creating an appreciation of a very wide array of data types and what they can tell you and only then back filling the details for those who need it.

You can download and enjoy the packages from:
http://www.stat.auckland.ac.nz/~wild/iNZight/
http://www.stat.auckland.ac.nz/~wild/VIT/

Sue Finch

The People of the British Isles: A Statistical Analysis of the Genetics of the UK

Stephen Leslie, formerly of Oxford University and now a laboratory head of Statistical Genetics at the Murdoch Children's Research Institute in Melbourne, gave the talk at the November meeting of the Victorian branch of the Statistical Society entitled "The People of the British Isles: A Statistical Analysis of the Genetics of the UK". Some of Australia's most well statisticians have made substantial contributions to genetics research, such as Pat Moran, Terry Speed and Peter Donnelly. Indeed, it is Peter Donnelly, alongside Sir Walter Bodmer (a student of RA Fisher), who is leading the People of the British Isles project (POBI); Stephen headed up the statistical analysis of the project.

Stephen spoke on a major aim of the project, which is to identify geography-specific genetic variation in the British Isles. For example, what (genetically) differentiates a Cornish woman from a Scottish Highlander? This is useful for both historical reasons (the project includes two Oxford archaeologists who are experts on British migration patterns for help in this regard) and for understanding the unwanted variation in large genetic association studies of disease. The project has now collected blood samples from over 4500 people from rural populations in the British Isles, to obtain a collection of samples with well characterised geographic-genealogies. This careful sampling took nearly 5 years to complete.

Stephen largely presented the results relating to the historical migrations of people to the British Isles, a topic of broad enough interest that it has generated media attention including from BBC Radio 4 and television documentary makers. The analysis he presented used some 2000 samples; for each of these samples it is known that all four of their grandparents were born within 80km of one another which ensures a good degree of geography-specific ancestry. DNA from these 2000 samples was assayed using SNP chip microarrays. These microarrays interrogate specific locations along the DNA, called single

nucleotide polymorphisms (SNPs), which correspond to well-known sites of genetic variation in the wider population. This allows Stephen and his colleagues to infer which samples are most similar to one another based on their genetic data alone.

After a succinct introduction to genetic recombination, linkage disequilibrium and "chromosome painting", Stephen introduced the fineSTRUCTURE methodology. fineSTRUCTURE, developed by Stephen's colleagues Daniel Lawson, Garrett Hellenthal, Simon Myers and Daniel Falush, assigns each sample to one of K population clusters based on its SNP chip data. It also estimates the number of population clusters based on the data alone rather than by pre-specifying this parameter.

fineSTRUCTURE is in a sense an extension of the widely used STRUCTURE methodology developed over the past decade by Matthew Stephens and Jonathan Pritchard with colleagues. STRUCTURE uses a Gibbs sampler to assign each sample to one of K subpopulations, based on their genotype data. A difficulty with STRUCTURE is in choosing K, the number of subpopulations. fineSTRUCTURE gets around this difficulty by using a reversible jump Markov chain Monte Carlo technique to simultaneously estimate K and assign each sample to a cluster. Stephen explained that by using a reversible jump MCMC, fineSTRUCTURE does a better job of estimating the number of subpopulations than the original STRUCTURE method.

After applying fineSTRUCTURE to the data from the 2000 microarrays, each sample is assigned to one of K clusters. These correspond to K subpopulations, where those samples in the same cluster are inferred as sharing a genetic similarity due to geographic or historical structure. This can be further viewed as a hierarchical tree, where each branching of the tree corresponds to a population split. At the top of the tree are the two most distinct populations, which separate the Orkney Islanders from the rest of the United Kingdom. The Orkney Islands are an archipelago to the north of Scotland and were a home of the Norwegian Vikings for several hundred years. So it is perhaps not surprising that the current inhabitants of such geographically isolated isles are the most genetically distinct from the rest of the British Isles.

The presentation of these results was very entertaining, with samples plotted on a map of the British Isles and coloured by subpopulation membership as we moved down the tree. The beauty of the results was in how closely the genetic clustering delineated well-known county borders and in Stephen's explanations that tied together these plots with archaeological records. As the final paper is still awaiting publication, Stephen requested that the more detailed results he presented were not shared outside of the talk.

The final part of the talk presented the analysis of a different set of samples. This dataset comprised 6000 mainland European samples that were genotyped on SNP chip microarrays and their data analysed using the fineSTRUCTURE methodology. These 6000 samples came from studies of genetic disease and so don't have as strong geographic-ancestral information. Whereas in the POBI dataset it was known that all four grandparents of the sample were born within 80km of one another, in this dataset the only information available to the researchers was generally the hospital or city where the sample was born.

The point of including this dataset was to pull apart the genetic contributions of each European population to the subpopulations identified in the analysis of the POBI data. For example, Stephen and his team have sought to address the long-standing question in British history of whether the Anglo-Saxon invasion
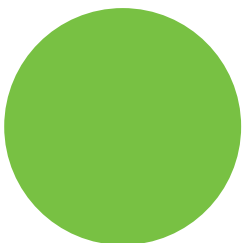
resulted in a wiping out of the ancient British people or whether modern day Britons are a mixture of the ancient British people and the Anglo-Saxons as a result of breeding between the invaders and the "locals".

It was very impressive to see that the fineSTRUCTURE method, which only uses genetic data from present-day people, was able to reconstruct well-known geographic ancestry that is based on historical records. Furthermore, the analysis identified new hypotheses on the relationships of different subpopulations and provides evidence to settle disputes over migration patterns.

This was a fantastic talk and the results of this study will be (and already are) of interest to many people. I look forward to reading the upcoming paper detailing the POBI study. In the meantime, the fineSTRUCTURE methodology has recently been published in Lawson, D. J., Hellenthal, G., Myers, S., & Falush, D. (2012). Inference of population structure using dense haplotype data. *PLoS Genetics*, 8(1).

Peter Hickey

The Orkney Islands (highlighted in red) are off the northern coast of Scotland. These island were invaded by the Vikings in the late 8th to early 9th centuries. Combined with their geographic isolation, this means that the people of the Orkney Islands are genetically distinct from people from the rest of the UK.

Statistical modelling of social networks

At the September meeting of the SSAI Victorian Branch for 2012, held at The University of Melbourne, Professor Murray Aitkin gave a talk on a topic he has worked on with collaborators for the last 8 months: the statistical modelling of social networks. In an era where the very term "social networking" is dominant in sociological, political and marketing spheres, and "The Social Network" is a recent movie, this talk offered an insight into the way statisticians are thinking about the structure and the substance of the phenomenon.

There are, of course, many other forms of network, in telecommunications for example, bur Murray's concern is a social network, a social structure made up of a set of actors (such as individuals or organisations) and the ties between these actors. Examples include networks on social media (the whole of Facebook could be considered a very large social network), investors in the stock market, friendship groups in a school, terrorist cells or organisations, and so on. An old data set that has been much studied, and which Murray discussed extensively, concerns the participation of 18 women in 14 social events in Natchez, Mississippi, during the 1930s. There have been (at least) 22 analyses of this data set, prompting the question in my mind whether Miss Templeton could have ever imagined the statistical attention given to her attendance or non-attendance to the bridge club that afternoon in summer 1935.

Murray gave an excellent survey of the variety of models that have been proposed for such networks, especially for the purposes of identifying groups within the network. It is easy to see applications (criminals, terrorists) where finding groups could reveal or suggest crucial insights. He spoke of Rasch models, random graph models and mixture models, finishing with a description of some depth on Bayesian mixture models, which is where he has made his own contribution to the theory and analysis of social networks.

A key feature throughout the talk was an emphasis on the fundamental concerns of models and model-fitting, including inference on parameters, correctly accounting for precision, and goodness of fit.

A highly engaged audience interrogated Murray on several of the statistical aspects, and a group enjoyed dinner after the seminar with Murray and Irit, at a nearby restaurant.

Notes: **Ian Gordon**

SOUTION

Keynote and Invited Speaker crossword