The Statistical Society of Australia
News

SSAI

In this issue

"BETTER DATA, BETTER LIVES"
CELEBRATING WORLD STATISTICS DAY!

On Tuesday 20th October 2015, the Australian Bureau of Statistics and the Queensland Government Statisticians' Office, with the support of the Queensland Branch of the Statistical Society of Australia, hosted World Statistics Day. The event was widely attended by government, private industry and universities.

The first speaker was the Australian Statistician, David Kalish from the Australian Bureau of Statistics (ABS), beamed to us live from Canberra. He explained the transformative changes occurring at the ABS to deal with the fast paced evolution of big data. It is an exciting time for the ABS as the 2016 Census is going digital, and it is expected that 15,000,000 Australians will complete the census online.

Our second speaker was Professor Janeen Baxter, Director of the Life Course Centre at the Institute for Social Science from the University of Queensland, who gave an overview of her work. The Life Course Centre utilises many datasets including The Household, Income and Labour Dynamics in Australia (HILDA) Survey to understand changing patterns of inequality, to help identify groups of deep disadvantage. It is expected that this research will improve policy and practice, and make a genuine difference in people's lives.

Our third speaker Dr. Helen Johnson, a Data Scientist from Investments at QSuper, explained that most of us although well intentioned, do not actively make choices about how our super is invested. This means a large proportion of the population get put into the default option. Historically, the default option was the same risk for everyone, in good times everyone prospers and there was no problem. However, during the recent financial crisis it became obvious that the system was flawed. Older members lost the same as younger members and had substantially less money to retire. Wanting to improve outcomes for its members, Qsuper designed a Lifetime Default Product which takes into account age, and appropriately reduces investment risk the closer members get to retirement.

Our final speaker was Professor Annette Dobson, Professor of Biostatistics as well as a Director for Longitudinal and Lifecourse Research from the University of Queensland. Annette shared her experiences over the last 20 years of the Australian Longitudinal Study on Women's Health (ALSWH). This is a government funded study, which examines factors that affect the health of women and their use of health services. ALSWH currently has four cohorts from young to old, and uses data from surveys and government linked data such as the MBS

> Continued on page 8

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PO Box 213, Belconnen ACT 2616

We are located on the ground floor of ABS House, room GN 311.

Phone 02 6251 3647
Email eo@statsoc.org.au
Website www.statsoc.org.au

Editor

Sonia Langford

Correspondence

Please direct all editorial correspondence to Sonia Langford
Email eo@statsoc.org.au

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DEADLINE FOR NEXT NEWSLETTER
10 February 2016

EDITORIAL

A great opportunity has arisen for you to make a contribution and effect real change at the SSAI.

Two new volunteer editors are needed for the SSAI newsletter, to begin in February 2016 for the first edition that year.

I am resigning from the role as editor, due to substantial increases in family and other commitments. This resignation will be effective after assisting the two new editors with the March 2016 newsletter.

The new editors will have the results of the SSAI newsletter survey to help inform the future direction for the newsletter. As an editor, you can play a key role in realising this vision.

The SSAI Executive will be sending out a formal request for expressions of interest in these roles.

If you have any questions about the editors' role, feel free to contact me via eo@statsoc.org.au.

The SSAI newsletter survey has closed - many thanks to the 105 SSAI members who took the time to complete it. Thank you also to Data Analysis Australia for volunteering their resources for survey finalisation, testing, conducting the survey and performing some data analysis. In particular, Sarah Bruce and Lisa Dinis have done a marvellous job.

Turning now to the newsletter itself, we are extraordinarily fortunate to have a veritable feast of contributions for reading over the festive season. World Statistics day receives several mentions, beginning on the front page. World Statistics day is only celebrated every 5 years, and in 2015 had the theme "Better data, better lives", an objective we try and live as statisticians. Part of achieving this aim is training new statisticians. Our Executive Officer shares both her and a high school student's perspective on attracting female students to STEM subjects. We also have the 2015 Golden Jubilee Travel Grant recipient's feedback on exploring this development opportunity whilst engaging in postgraduate study. Extending on the theme of capability in transforming data to meaningful outcomes, it is worth noting that participation in branch activities provides an opportunity for us to extend our learning, thus allowing us to become better statisticians. In this newsletter, various branches kindly share a taste of their exploration of the useful tools R, Hadoop, Julia, Tessera and Trelliscope. The branches also provide us with some practical applications of statistics, ranging from ranking Cricket Test match batsmen to searching for missing airline flight MH370. So dig in and enjoy these wonderful contributions from our volunteers.

Wishing you a relaxing and enjoyable festive season celebrating with friends and family,

Sonia Langford

EVENTS

BIO INFO SUMMER

7-11 December 2015, Sydney

SPATIO-TEMPORAL STATISTICAL MODELLING

with Noel Cressie and Andrew Zammit Mangion

7 December 2015, Sydney

In conjunction with the following event:

ECO-STATS '15: TECHNOLOGICAL ADVANCES BETWEEN ECOLOGY AND STATISTICS

8-10 December 2015, Sydney NSW

23RD CONFERENCE PROBABILITY AND STATISTICS IN THE ATMOSPHERIC SCIENCES

10-14 January 2016, New Orleans, USA

15TH WINTER SCHOOL ON MATHEMATICAL FINANCE

25-27 January, Lunteren, The Netherlands

7TH INTERNATIONAL CONFERENCE ON DRUG DISCOVERY AND THERAPY

15-18 February 2016, Dubai, UAE

4TH BIOTECHNOLOGY WORLD CONGRESS

15-18 February 2016, Dubai, UAE

FOURTH ASIAN QUANTITATIVE FINANCE CONFERENCE

21 -23 February 2016, Osaka, Osaka, Japan

12TH GERMAN PROBABILITY AND STATISTICS DAYS 2016 – BOCHUMER STOCHASTIK-TAGE

1-4 March 2016, Bochum, Germany

INFO-METRICS INSTITUTE SPRING 2016 CONFERENCE

1-2 April 2016, Cambridge, United Kingdom

UK EASTER PROBABILITY MEETING 2016: RANDOM STRUCTURES ARISING IN PHYSICS AND ANALYSIS

4-8 April 2016, Lancaster, United Kingdom

SIAM CONFERENCE ON UNCERTAINTY QUANTIFICATION

5-8 April 2016, Lausanne, Switzerland

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INTERNATIONAL CONFERENCE ON INFORMATION COMPLEXITY AND STATISTICAL MODELING IN HIGH DIMENSIONS WITH APPLICATIONS, (IC-SMHD-2016)

18-21 May 2016, Cappadocia/Nevsehir, Turkey

STATISTICAL CHALLENGES IN MODERN ASTRONOMY VI

6-10 June 2016, Pittsburgh, PA, USA

ADVANCES IN STATISTICS, PROBABILITY AND MATHEMATICAL PHYSICS

10-11 June 2016, Pavia, Italy

3RD ISNPS CONFERENCE

11-16 2016, Avignon, France

THE 25TH ICSA APPLIED STATISTICS SYMPOSIUM 2016

12-15 June 2016, Atlanta, Georgia, USA

SECOND INTERNATIONAL CONGRESS ON ACTUARIAL SCIENCE AND QUANTITATIVE FINANCE

15-18 June 2016, Cartagena, Colombia

36TH INTERNATIONAL SYMPOSIUM ON FORECASTING

19-22 June 2016, Santander, Spain

STOCHASTIC NETWORKS CONFERENCE

20-24 June 2016, La Jolla, California, USA

FOURTH IMS ASIA PACIFIC RIM MEETING

27-30 June 2016, Hong Kong, China

3RD BARCELONA SUMMER SCHOOL ON STOCHASTIC ANALYSIS

27 June 27 – 1 July 2016, Barcelona, Spain

XXVIIITH INTERNATIONAL BIOMETRIC CONFERENCE (IBC 2016)

10-15 July 2016, Victoria, BC Canada

WORLD CONGRESS OF PROBABILITY AND STATISTICS/IMS ANNUAL MEETING

11-15 July 2016, Toronto, Ontario, Canada

26TH ANNUAL CONFERENCE OF THE INTERNATIONAL ENVIRONMETRICS SOCIETY

18-22 July 2016, Edinburgh, Scotland

5TH BIENNIAL ACSPRI SOCIAL SCIENCE METHODOLOGY CONFERENCE

19-22 July 2016, Sydney

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2016 JOINT STATISTICAL MEETINGS

30 July 2016 –4 August 2016, Chicago, Ilinois, USA

APPLIED PROBABILITY SYMPOSIUM

1-3 August 2016, Ilulissat, Greenland

13TH IRANIAN STATISTICAL CONFERENCE

24-26 August 2016, Kerman, Iran

AUSTRALIAN STATISTICAL CONFERENCE 2016

5-9 December 2016, Canberra

THE 10TH ICSA INTERNATIONAL CONFERENCE

19-22 December 2016, Shanghai, China

61ST WORLD STATISTICS CONGRESS – ISI2017

16-21 July 2017, Marrakech, Morocco

SECTION CHAIRS

Bayesian Statistics

Chair: Scott Sisson
Scott.Sisson@unsw.edu.au
http://www.statsoc.org.au/bayesian-statistics.htm

Environmental Statistics

Co-Chair: David Warton
dwarton@maths.unsw.edu.au
Co-Chair: Jakub Stoklosa
j.stoklosa@unsw.edu.au
Assistant Chair: Mayukh Samanta
Mayukh.Samanta@qut.edu.au
http://www.statsoc.org.au/environmental-statistics.htm

Social Sciences

Chair: Michele Haynes
M.Haynes@uq.edu.au
http://www.statsoc.org.au/social-statistics.htm

Statistical Education

Co-Chair: Michael Martin
Michael.Martin@anu.edu.au
Co-Chair: Peter Howley
Peter.Howley@newcastle.edu.au
http://www.statsoc.org.au/statistical-education.htm

Surveys and Management

Chair: Stephen Horn
srthorn@effect.net.au
http://www.statsoc.org.au/surveys-and-management.htm

Biostatistics

Co-Chair: Jake Olivier
j.olivier@unsw.edu.au
Co-Chair: Kylie-Ann Mallitt
kmallitt@kirby.unsw.edu.au
Assistant Chair: Nicholas Tierney
Nicholas.Tierney@gmail.com
http://www.statsoc.org.au/medical_statistics

Section for International Engagement

Mark Griffin
m.griffin@adasis-oz.com
http://www.statsoc.org.au/IntEngagementSection

Young Statisticians' Network

Rory Tarnow-Mordi

rtmordi@gmail.com
http://www.statsoc.org.au/about-young-stats.htm

Further contact details for Society Secretaries and Section Chairs can be obtained by contacting the Society on (02) 6251 3647

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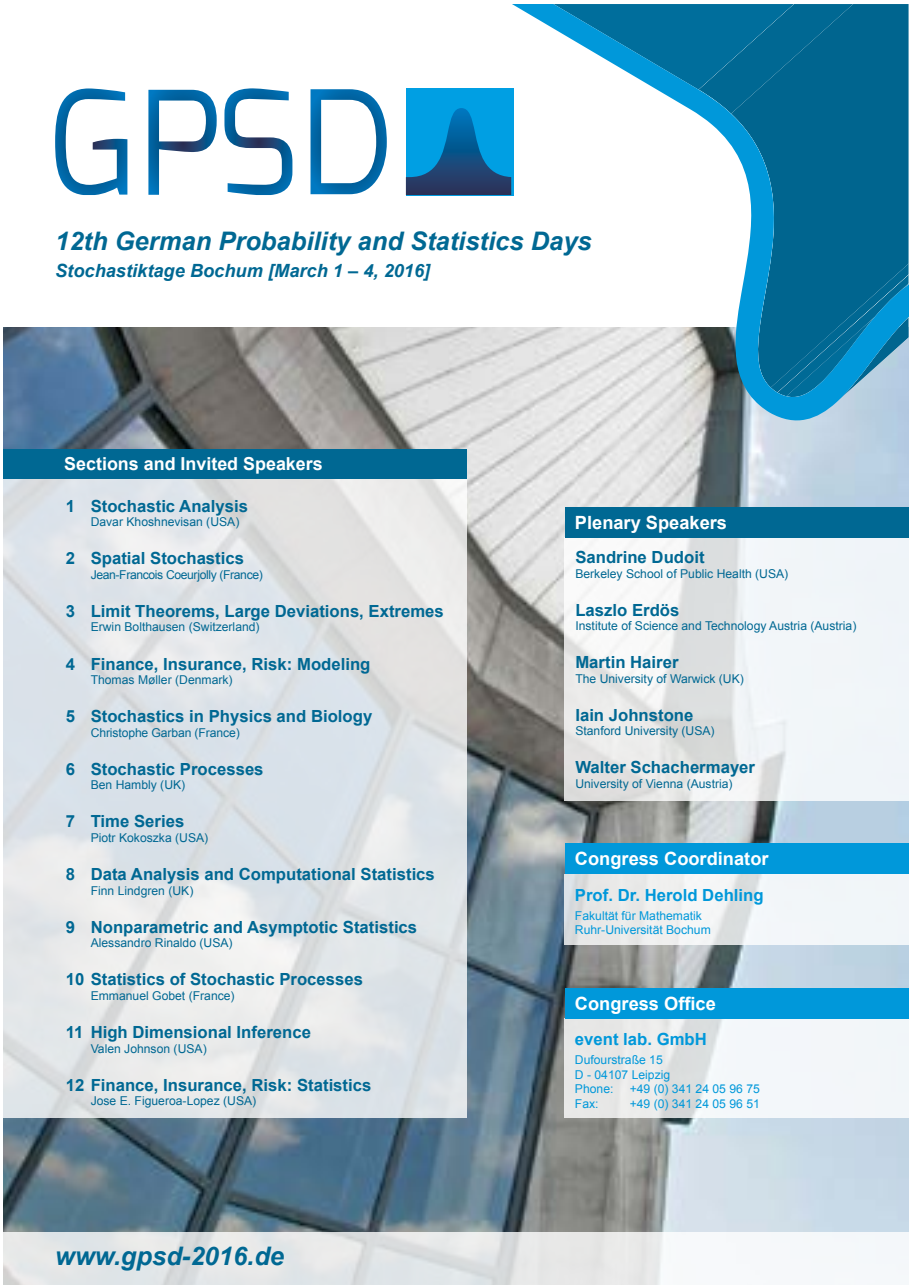
> Continued from page 1

(Medicare Benefits Schedule) and PBS (Pharmaceutical Benefits Scheme). ALSWH is a rich data source that provides information on health usage but will also provide prediction of future use.

The theme through this event was *Better Data, Better Lives*. All speakers highlighted the challenges of big data, including keeping pace with the technology, having the trained staff to understand and provide meaningful outcomes, and developing strong relationships with data custodians. This event showed the willingness of government, private industry and universities to make relationships to further improve data quality and to get the best use out of collected data.

Lee Jones



SIGNIFICANCE OF WORLD STATISTICS DAY, 2015

At the University of Canberra, World Statistics Day was marked with a display of American Statistical Association posters; and a chat-to-a-statistician desk in the central admin building from 10.30 am – 2.30 pm.

Alice Richardson keenly waiting to answer questions about statisticians and statistics

The significance of World Statistics day encompasses concepts including awareness, scope, practice, implementation, statistical body, statistical problem, values, limitation, misuse and statistical tools. It should not be limited to "official" statistics, which help the general public and strategy makers develop informed policies that impact millions of people all over the world, but also needs to concern itself with the application of statistics to any field. On World Statistics Day, the slogan should be "improved data sources, sound statistical methods, new technologies and strengthened statistical systems to enable better decisions" that eventually will result in better lives for millions of people around the world.

The first World Statistics Day was commemorated on 20 October, 2010 and was celebrated in over 130 countries and areas. It has involved worldwide statistical offices and associations, universities, international organizations, civil society organizations and individuals. It is celebrated every five years all over the world. According to a 2010 report by the United Nations Secretary General: "World Statistics Day will aim to raise awareness of the many contributions of official statistics premised on the core values of service, integrity and professionalism. It will address a broad audience, ranging from decision makers and data providers to the generally very heterogeneous data-user community, at the national, the regional and the global levels. The celebration will encourage their support of statistics, bringing together users and producers of statistics. The celebration of World Statistics Day will also acknowledge the service provided by international, regional and subregional agencies in promoting and facilitating the development of national statistical systems."

The celebration of World Statistics Day, 2015 is exceptional because it includes a sustainable goal and lesson, as well as teaching about the 8 Millennium Development Goals. The Goals are a vision for the future: a world with less poverty, hunger and disease, greater survival prospects for mothers and their infants, better educated children, equal opportunities for women, and a healthier environment. UN Secretary-General Ban Ki-moon confirmed the relationship between statistics and the Millennium Development Goals in an August 2015 letter to heads of state: "Statistics are critical for evidence-based decision-making across all cultural and historical backgrounds of countries and irrespective of their level of development….I am encouraged by the efforts made in recent years in many countries to strengthen their statistical capacity, under the leadership of national statistical offices, in areas such as population and housing censuses and the monitoring of the progress of Millennium Development Goals."

Statistics hold a central position for everyone including businesses, nonprofit organizations and government agencies. The application of statistics is very wide. For instance, it plays a vital role in determining the existing position of per capita income, unemployment, population growth rate, housing, schooling medical facilities and so on. To guide our economies and decision making, it is vital to find the answers to statistical questions such as: what is the current unemployment rate, what kind of social and health services are needed for our communities, where is the best place to build new factories or stores, and so on. The results of surveys and the census also affect us by driving policy

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decisions. Official statistics provide the quantitative or qualitative information on all major areas of citizens' lives, such as economic and social development, education, living conditions, health and the environment.

There is no doubt about the use and magnitude of statistics in different fields including:

- being used to find temporary housing when millions of people are affected by a flood;
- being used to monitor and study the recovery of small businesses;
- helping to determine the economic impact of evacuation by business owners;
- helping researchers keep children around the world healthy by analysing data from viral vaccines to ensure consistency and safety;
- being used to map carbon footprints and reduce emissions to make a city climate-neutral;
- improving HIV AIDS programs by tracking patients and monitoring treatments with healthcare providers;
- forecasting the spread of HIV in order to negotiate better prices for medicine with pharmaceutical companies, and
- being used to study and track endangered species.

These are just some examples of how government agencies from around the world rely on statistics to clearly understand their country, its business, and its people.

Finally, we also need to keep in mind the appropriate use of statistical models and methodology in study and experimentation i.e. that statistics are used not to make complexity for publication purposes but instead are aimed at demonstrating the appropriateness of relevant studies. To achieve the latter, proper investigation should be completed at every level including data collection, data entry, data analysis, using appropriate methodology, tools and so on. In this way, the significance of World Statistics Day will be increased and statistics can effectively contribute to reaching the Millennium Development Goals.

Liton Kumar Saha

Source:
https://worldstatisticsday.org/
http://www.un.org/en/events/statisticsday/
http://papersmart.unmeetings.org/media2/2173484/statement-by-desa-item-3m.pdf
http://www.un.org/en/ga/search/view_doc.asp?symbol=E/CN.3/2010/12&lang=E
http://mdgs.un.org

MEMORIES OF THE FIFTH ANNUAL BOOTH BY STAT-HAWKERS ON WORLD STATISTICS DAY

In this article, we recall some memories and share some photographs of the STAT-HAWKERS booth at the Joint Statistical Meeting (JSM)-2015 held in Seattle, USA during August 7-13, 2015.

Fig. 1. L to R: Cheon-Sig Lee, Sarjinder Singh and Augustus Jayaraj at the booth on August 13, 2015.

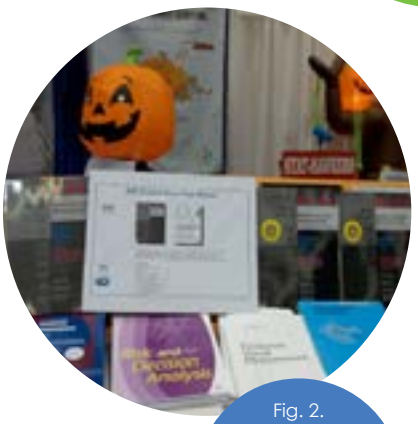

Fig. 2. Journals and books displayed by IOS Press at the booth STAT-HAWKERS.

Figure 1 shows the front side of the booth on the very last day, August 13, 2015, when Augustus Jayaraj joined Cheon-Sig Lee and Sarjinder Singh with 40 elephants. There were already 100 monkeys of different colours, 100 female giraffes, 100 male giraffes and 100 spidermen. There were also three dozen flashing balls and 100 tiny bears. For the first three days, these toys were given freely to the children who visited the booth, and on the last day the remaining toys were given freely to anyone who visited the booth and asked for the toys.

Almost 400 pens marked with the logo "MASA: An International Journal" were distributed among the attendees to advertise the journal "Model Assisted Statistics and Applications", IOS Press, The Netherlands. Almost 50 hard printed copies of the journal, over 100 flyers advertising the journal, and 30 CDs that included sample journals from IOS Press were distributed. A one-year open access to MASA was given to the "JSM Student Door Prize Winner." Additionally, a few more journals and books by IOS Press were displayed and distributed freely among the attendees (see Figure 2).

There were 45 calendars (4 feet x 3 feet) advertising a new MS program, "Master's Program in Statistical Analytics, Computing and Modeling", which began in Fall 2015 at the Department of Mathematics, Texas A&M University-Kingsville, that were also distributed among the conference attendees. A few attendees had trouble carrying them due to their size. Almost 100 calendars, each 17 inches x 11 inches, were also distributed. There were 50 (8 GB) USB drives that were given to the attendees. Of these, 15 were given as door-prizes during the student mixer.

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Almost 300 flyers advertising the textbook "Thinking Statistically: Elephants Go to School", Kendall/Hunt Publishing Company, Iowa, were distributed among the attendees. A long 8 foot x 2 foot banner was used to advertise this textbook, which can be seen in Figure 3 on the left side of the booth. The monograph by Sarjinder Singh, "Advanced Sampling Theory with Applications: How Michael Selected Amy", Kluwer Academic Publisher, The Netherlands, was also displayed on a 12 inch x 24 inch standing table at the left corner of the booth.

Fig. 3. Booth appearance from the left side corner.

Fig. 4. Pumpkin vine at the STAT-HAWKER booth.

Fig. 5. Pumpkin cadies, corn cadies, chocolate, fruit candies, soft-puffs and bears.

The booth was decorated by blinking LED lights on the front and left side, as seen in Figure 3.

You can see in Figure 3 and Figure 4 that there was a pumpkin man and a seven foot tall pumpkin vine with lights.

The main purpose of the pumpkins was not to keep ghouls away from the booth. Instead, they advertised a new monograph, entitled "*A New Concept for Tuning Design Weights in Survey Sampling: Jackknifing in Theory and Practice*" (2015), by Academic Press, whose five authors (Sarjinder Singh, Stephen A. Sedory, Maria del mar Rueda, Antonio Arcos and Ragunath Arnab) are "*Jackknifing a Jumbo Pumpkin.*" One big banner of size 4 feet x 3 feet and another banner of size 4 feet x 2 feet displayed the cover-page of the new monograph. Over 200 flyers with the cover page of the new monograph were distributed among the attendees. To keep their memories sweet, visitors of the STAT-HAWKERS booth were offered special pumpkin candies, corn candies, chocolate, soft puffs, and fruit candies. In addition, 100 tiny bears were also distributed among the attendees (see Figure 5).

Dr. Stan Lipovetsky and Dr. Wenyaw Chan also visited the booth and are seen in Figure 6.

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Fig. 6. L to R: Sarjinder Singh, Stan Lipovetsky and Wenyaw Chan

Fig. 7. Gurmit and Mohan from Seattle and Vancouver along with their families.

Fig. 8. Children with Giraffe, Monkey, Spiderman and Tiger.

Fig. 9. Children with Monkey and Tiger.

Fig. 10. A child with a brown Monkey and a Tiger.

Sarjinder's college classmates (1980-1986) Gurmit and Mohan, currently living in Seattle and Vancouver, also visited the booth with their families (Figure 7).

Figures 8, 9 and 10 show that the children who visited the booth enjoyed the toys. The purpose of giving toys to children is to build a positive memory in their minds of a statistics conference. During their college days, they might recall that they used to go to a statistics conference where they had fun!

Figure 11 (on page 14) shows that Dr. Fritz Scheuren, the 100th ASA President, and his wife Elizabeth also visited the booth together. It was pleasure to see both of them. They are nice, charming people.

The MASA journal published a special issue celebrating the Golden Jubilee Year of the pioneering randomized response technique, which was initiated by Stanley L. Warner in his 1965 paper, "Randomized response: a survey technique for eliminating evasive answer bias." *Journal of the American Statistical Association*, (1965), 60, 63-69.

The Guest Editor for this special issue was Prof. Arijit Chaudhuri at the Applied Statistics Unit, Indian Statistical Institute, a renowned statistician who has published three monographs on this topic. Prof. Chaudhuri also co-authored the Handbook of Statistics, Vol. 34, "*Data Gathering Analysis and Protection of Privacy through Randomized Response Techniques-Qualitative and Quantitative Human Traits*", which will be published in 2016 by Elsevier Ltd. It is also worth noting that during 2015 Prof. James Fox gave a valuable gift to randomized response technique lovers, his second edition of "*Randomized Response and Related Methods: Surveying Sensitive Data*", SAGE.

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STAT-HAWKERS continued their effort to demonstrate the use of randomized response to the statisticians at the Joint Statistical Meetings. Their aim was to encourage the usage of the randomized response techniques by social scientists. Figure 12 shows an attendee drawing a card from a deck to respond to a sensitive question using the randomized response technique.

At the fifth booth, we applied the 'crossed model' developed by Lee, Sedory and Singh (2013) to the problem of estimation of the proportions of smokers, drinkers and both. We made two decks of cards: Deck-I, a green deck, and Deck-II, a pink deck. Two types of cards bearing two different statements comprised the green deck: 21 cards with the statement, "I consider myself a smoker", and 9 cards with the statement, "I do not consider myself a drinker", so obviously $P = 0.70$. Two types of cards bearing two different statements comprised the pink deck: 21 cards with the statement, "I consider myself a drinker", and 9 cards with the statement, "I do not consider myself a smoker", so obviously $T = 0.70$.

Fig. 11. L to R: Elizabeth and Dr. Fritz Scheuren

Due to limited resources, during the three day period, a total of 31 conference attendees participated in the survey. The respondents took an interest after learning that two decks of cards can be used to maintain their privacy whilst estimating sensitive characteristics. The respondents were observed to be cooperative, and smiled while they drew their cards.

A two-way classification based on the 31 responses is given below:

Table 1. Responses from the survey.

	Pink Deck-II	
Green Deck-I	Yes	No
Yes	1	4
No	12	14

Fig. 12. Randomized response survey.

Unfortunately, for these responses the crossed model did not work, which allowed us to make an improvement to the crossed model proposed by Lee, Sedory and Singh (2013). We applied a square root transformation on the observed proportions $\hat{q}_{ij}$, $i, j = 1,2$ because under such a transformation one may easily write:

$$\sqrt{\hat{q}_{ij}} = q_{ij} + \frac{1}{2}(\hat{q}_{ij} - q_{ij}) - \frac{1}{8}(\hat{q}_{ij} - q_{ij})^2 + \ldots.$$

where q_{ij} are the true probabilities as provided in Lee, Sedory and Singh (2013). After this square root transformation, the estimated proportion of smokers is $\hat{p}_s^* = 0.092$, that of drinkers is $\hat{p}_d^* = 0.236$, and that of smokers-drinkers is $\hat{p}_{s\cap d} = 0.065$. It seems that a smoker is likely to be a drinker, but a drinker may not be a smoker. The estimate of correlation between smoking and drinking is $\hat{r}_{sd}^* = 0.348847$. The positive value of the estimate of correlation coefficient clearly indicated that smoking and drinking are associated. The estimate of the relative risk of a drinker also being a smoker is $\hat{RR}^*(s \mid d) = 7.554$, which means a smoker is 7.554 times more likely to be a drinker than a non-user of both. The estimate of the relative risk of a smoker to be a drinker is $\hat{RR}^*(d \mid s) = 3.710$, which means a drinker is 3.710 times more likely to be

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a smoker than a non-user of both. (Note that an interpretation of the relative risk can also be had from Rosner (2006).) Also, the estimates of the conditional probabilities are $\hat{p}^{*}_{s|d} = 0.2743$ and $\hat{p}^{*}_{d|s} = 0.6999$, where the subscripts s and d stand for smoking and drinking.

We also collected data from the same participants using a black-box technique. Every respondent was requested to give their true status by responding to either the statement a)"I consider myself a smoker", or b) "I consider myself a drinker". Out of 31 responses, only one responded as a smoker and four responded as a drinker. Thus, the direct question responses show that the proportion of smokers is 0.0323 and that of drinkers is 0.1290. The proportion of only smokers using the randomized response technique is 0.028 and that of only drinkers is 0.171. Based on the randomized response technique, this study shows that 73.6% of the conference attendees had neither drinking nor smoking habits. In other words, the majority of educated statisticians neither smoke nor drink.

One could also refer to Singh and Stan (2012), Singh, (2013), and Lee, Sedory and Singh (2013) for similar studies of randomized response techniques. Thanks are due to the IRB Chair Dr. Stephen D. Oller, Research Compliance Liaison Donna J. Pulkrabek, and other committee members for their timely IRB approvals for data collection.

The help from Paul and Rasjel, IOS Press, in promoting the journal "*Model Assisted Statistics and Applications: An International Journal*" has also been duly acknowledged.

Thank you for reading this story.

Sarjinder Singh
Department of Mathematics,
Texas A&M University-Kingsville,
Kingsville, TX 78363, USA

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ICDDT

This international conference is going to be held in Dubai, UAE, from February 15th-18th, 2016, with Dr. Ferid Murad, Nobel Laureate and Prof. Atta-ur-Rahman, FRS as the conference Co-Presidents.

The 7th ICDDT will highlight cutting-edge advances in all major disciplines of Drug Discovery and Drug Therapy. This four-day event will feature recent findings from leading industrial, clinical and academic experts in the field, in the form of lectures and posters. The 7th ICDDT will be unique in promoting the translational nature of modern biomedical and pharmaceutical research, with both scientists and clinicians associated with either patient care or with drug discovery research. A number of Nobel Laureates will deliver keynote lectures at the conference. It will bring together leading clinicians, medicinal chemists, pharmacologists, biotechnologists, and other allied professionals to discuss and present the latest important developments in drug discovery and therapeutics.

The previous six conferences of this series of events were held in Dubai since 2008. Thirty five Nobel Laureates and more than 7000 international delegates participated in these conferences! They were outstanding successes by all accounts.

For more details and complete list of thematic sessions, please visit http://www.icddt.com , or you may contact at marketing@icddt.com

BWC

4th BWC is going to be held in Dubai, UAE, from February 15th -18th, 2016, with Dr. Ferid Murad, Nobel Laureate and Prof. Atta-ur-Rahman, FRS as the conference Co-Presidents.

This conference will bring an opportunity to researchers and decision makers in biotechnology to get their latest discoveries acknowledged on the global arena. Presentations would focus on pharmaceutical biotechnology, vaccines, CNS, cancer, antibodies, protein engineering, plant and environmental technologies, transgenic plant and crops, bioremediation, microbial diversity research, business development, strategic alliances, partnering trends, product opportunities, growth business models and strategies, licensing etc.

For details and complete list of thematic sessions, please visit
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2015 GOLDEN JUBILEE TRAVEL GRANT

Cathy Yuen Yi Lee at JSM 2015

I was very grateful to be the recipient of the 2015 Golden Jubilee Travel Grant, organised by the Statistical Society of Australia. The award allowed me to attend the largest international conference for statisticians in North America.

The 6 day Joint Statistical Meetings (JSM) was held in Seattle, United States, from August 8th-13th, 2015. This conference was held jointly by over ten well-established international associations, such as the American Statistical Association, the International Biometric Society and the Institute of Mathematical Statistics. It covered a wide range of state-of-the-art statistical topics including Bayesian statistics, computational statistics, biostatistics, probability and mathematical statistics, plus spatial-temporal modelling.

Presenting and attending at JSM 2015 is definitely one of my highlights for this year. There was a great turnout of over 6,000 professionals from all over the world. The Invited, Topic Contributed and Contributed Technical Sessions were all of a high standard. I particularly enjoyed the session on Statistical Learning and Data Mining (where my current research interests lie!). The four invited speakers (David Blei, Carlos Guestrin, Tamara Broderick and Christopher Re) are well-known experts in the fields of variational Bayesian analysis and scalable computing. I was inspired a lot by their fascinating and well-structure presentations that applied such sophisticated statistical methods to challenging real-world problems. I have learnt a lot by simply having a chat with them about my thesis work after the session!

On the first day of the conference, I presented my research work on "50-year trends and state variation in socioeconomic and racial/ethnic inequalities in U.S. infant death rates". Overall, the presentation was very well received by the conference delegates and generated some interesting and insightful discussions amongst the audience. I also appreciated the positive feedback provided by the Session Chair on my performance.

Despite how tired I was at the end of each day, I thoroughly enjoyed attending the Student Mixer, Meet-Up Groups and Dance Party events. I met and connected with a lot of professionals who have similar interests and professional ambitions. Having conversations and travelling around Seattle with them was great fun!

Overall, I had a fantastic time at the conference and would highly recommend anyone attend this event. I would like to thank the conference organising committee for their time and effort to make sure everything ran smoothly. More importantly, I would like to thank the Statistical Society of Australia for sponsoring me to attend this event. I also appreciate my supervisor providing funds to support the rest of my trip. I highly encourage all eligible students to submit an application for the 2016 Travel Grant, as presenting your research work at an international conference is an amazing experience!

Thank you!

Cathy Yuen Yi Lee
PhD Candidate
University of Technology Sydney
School of Mathematical and Physical Sciences

SSAI GOLDEN JUBILEE TRAVEL GRANT

It provides overseas travel funds to SSAI student members, who can prove consecutive SSAI membership for a minimum of two years and who wish 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 2016.

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, 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.

ELECTION OF EXECUTIVE MEMBERS

Members are advised that the Executive positions of Vice- President (President Elect), Secretary and Treasurer will become vacant at the Society's Central Council Annual General Meeting in 2016.

The SSAI Rules provide for a Nominating Committee, consisting of the current Executive and the Branch Presidents, to solicit nominations and submit a list of nominees to Central Council. Should an election be required, Central Council will then arrange a ballot of all financial members of the Society. Members of SSAI are invited to submit nominations for the three positions to be vacated. Nominations must be in writing and signed by the nominator(s), and must be accompanied by a written and signed statement from the nominee accepting the nomination.

Nominations should be submitted to the SSAI President or to a Branch President before 31st January, 2016

Doug Shaw
Secretary

SOCIETY AWARDS

The Society awards a gold medal, the Pitman Medal, at most once annually, in recognition of outstanding achievement in, and contribution to, the discipline of Statistics. Honorary Life Membership honours outstanding contribution to the profession and the Society, while a Society Service Award may be awarded to a Society member in recognition of sustained and significant service to the Society.

An Awards Committee, chaired by the President of the Society, makes recommendations to the Society's Central Council as to appropriate Award recipients. Pitman Medals and Honorary Life Memberships are usually announced at the Society's Conference.

Members of the Society are encouraged to propose suitable recipients of the Pitman Medal, Honorary Life Membership or a Society Service Award. Suggestions, with brief supporting information, should be emailed to the Undersigned.

Doug Shaw
Secretary

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Damiano Biella

ABOUT

BRAUN BÜFFEL

Braun Büffel was founded in 1887 by Johann Braun in the industrial town of Kirn, Germany. It has gained its reputation over the last century as a designer and producer of top quality leather goods and accessories for men and women.

Damiano Biella who has worked with famed designers Valentino Garavani and Tom Ford, and counts Gherardini, Carolina Herrera and Escada as part of his impressive resume as Creative Director, has come on board Braun Büffel since November 2013 to transform the classic German leather goods label into a fashion-forward accessories house. His credo is to make aesthetically beautiful accessories that have form, function and relevance to contemporary clientele.

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CANBERRA BRANCH

Mathew Roughan – "Abstract Algebras and the Record Linkage Problem"

In late September, the NSW and ACT branches invited Professor Matthew Roughan of the University of Adelaide to present at each branch on consecutive evenings (29th and 30th September respectively).

Matthew is a Chief Investigator of the Australian Research Council (ARC) Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS). His research interests span the statistical and computer science worlds; they include stochastic modelling and measurement, as well as management of networks like the internet.

The talk presented at the NSW and ACT branches was titled: "Abstract Algebras and the Record Linkage Problem". During this presentation, Matthew demonstrated a unique approach to data linking and related de-duplication problems, in the case where a unique record identifier for linking does not exist.

As a starting point, Matthew's approach took advantage of well-developed probabilistic data linking methodology, to determine the best link between a pair of records on different databases. (Probabilistic linkage techniques are driven by record weights that are based on the log odds ratio of the probability that two fields agree versus that they disagree.) The essence of Matthew's method was to extend this pairwise approach to utilise all the relevant information in the entire graph of relationships, without throwing away potentially useful information too early.

This Graph, or Network, approach was described using nodes (for individuals) and edges (for the links between) to explain the degree of relationship between them. Of the possible Graph representations of data, Matthew focused on "Adjacency Matrix" techniques. He showed how "Graph Reachability" was calculated from the Adjacency Matrix, as the number of steps or "hops" to travel between nodes of the graph; if two nodes, representing records, were reachable then they were linked. Matthew discussed how abstract algebras, such as semi-rings, could be used to efficiently traverse the graph to determine reachable nodes. Choosing the right algebra was important, and Matthew gave an example using the bottleneck "semi-ring", which had some desirable properties for the context data linkage.

Matthew's approach took advantage of powerful linear algebra techniques, which helped to simplify complex matrix calculations, especially when linking more than two datasets. Matthew espoused the programming language *Julia**, for doing these calculations on graphs very efficiently.

Gwenda Thompson & Daniel Elazar

**Note: Julia is an easy to program, open source technical computing language with many benefits, including an extensive mathematical function library.*

NSW BRANCH

Samuel Mueller: Interactive and data adaptive model selection with mplot()

A large, diverse audience attended Samuel Mueller's talk on a recent R package arising from his work with Alan Welsh, Garth Tarr and Kevin Murray. The mplot package is a set of graphical tools for model selection in linear and related models. One central idea utilised by this package is that many model selection criteria can be expressed as minus the log-likelihood (a lack of fit measure) plus a penalty; different values of the penalty give different criteria. For a fixed value of the penalty (i.e. a fixed criterion) each covariate's influence can be measured using a bootstrap procedure, which basically gives the proportion of the time that variable is in the best model according to that criterion: this is called the "inclusion probability". One of the graphical interfaces making up the package is a plot of inclusion probabilities against penalty size for each covariate, all on the one display (each covariate plotted using a different colour). A "truly relevant" covariate should have a high inclusion probability over a range of penalty values. Also, a bogus, totally random covariate is thrown in allowing comparison to a non-informative baseline. In a telling, artificial example whose covariates had a certain correlation structure, this graphical approach very clearly indicated the best model, whereas standard stepwise methods had no hope at all.

Samuel also spent some time discussing graphical tools to assist in implementing "the fence". This involves constructing a fence around all models a certain "distance" from the full model, that is models whose log-likelihoods are within a value "c" of the full model's log-likelihood. Once the "c" is chosen, the model(s) with the smallest dimension inside the fence is/are identified as the most desirable. The main difficulty (as is often the case) is how to choose the tuning parameter "c". The mplot package contains some tools for helping to do this based on stability under bootstrapping. That is, for each choice of "c" a measure of stability is obtained, given by the proportion of the time that the best model is chosen. This is plotted against "c", and the value of "c" which maximises this stability measure is proposed as the value to use for constructing "the fence".

The talk presented very clearly some rather subtle model selection ideas, aided by Samuel having two planned points during the presentation for questions. It was a pleasure to have an accessible talk from an impressive researcher such as Samuel. Many attendees joined the speaker for a delicious Thai meal afterwards.

Michael Stewart

Workshop: Hadoop for statisticians

Hon Hwang, Jan Luts and Louise Ryan gave two one-day short courses on Hadoop at the University of Technology, Sydney, on the 18th August and the 12th October. This short course differed from others in the market, as it provided an affordable, hands-on introduction to Hadoop for statisticians.

Hadoop is an open source framework for writing and running distributed applications consisting of the Map Reduce distributed compute engine and the Hadoop Distributed File System (HDFS). It allows datasets that are too large to fit into a single machine to be distributed across multiple computers in a cluster, on which analysis is carried out independently and then the results are combined.

At present, only relatively simple statistical analysis tools and methods are available for Hadoop. There are major opportunities for statisticians to contribute by developing new algorithms that work in the distributed data setting. However, there is quite a steep learning curve to getting started with Hadoop, such as programming in Pig and Java, and moving data in and out of HDFS. These workshops aimed to help bridge this gap by providing a hands-on introduction to Hadoop.

Participants had fun computing the mean and median, as well as fitting linear, logistic and Bayesian regression into the distributed settings. The workshop also provided great background knowledge for the subsequent short course, Tessera, on the 13th of October.

We gratefully acknowledge the sponsorship of the ARC Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS), and Amazon Web Services who provided an Education Grant award.

Jarod Lee

Hon Hwang in action at the Hadoop for statisticians' workshop

Young Stats Q&A Networking Evening

The NSW Branch of the Young Stats Network of SSAI held a successful Q&A and networking session on the 1st September at the trendy Chapel room of Kinselas in Taylor Square, Sydney. Analytical careers were the focus of the Q&A, and more specifically how statisticians can apply their sought after skills and launch their careers in industry. The panel consisted of senior executives in the aerospace and consulting services industries, as well as a young statistician on an industry scholarship. It was hosted by the NSW Representative of the Young Statisticians Network, Dr. Justin Wishart.

The night kicked off with a brief mingling session before the three panel members were introduced. The most experienced member being Rob Fowler, CTO (Chief Technical Officer) of the start-up EasyShare, who has extensive experience in handling large data, and previously developed data handling for the NASDAQ markets and Fairfax media. He was followed by Dr. Alex Green, whose background is in robotics, with a strong knowledge of telecommunications infrastructure and using probabilistic methods to deal with spatio-temporal data. The last and youngest panel member was Eddie Toth, a recent graduate of Statistics at the University of Sydney and currently a Ph.D. candidate. His research is funded by a Capital Markets CRC industry partner scholarship, and it has the goal of monitoring and detecting criminal activity in the financial markets.

After introductions, the Q&A session spanned four main areas. They started with the applied skills the panel members hold in high regard, the role statistical software plays in industry, their recommendations for current young statisticians in industry, and finally their advice for career opportunities. The main "take home" statements from the panel were the need to develop the ability to handle dirty data with modern software and the understanding of how to compromise perfection by distilling the framework into a pragmatic model in a quick timeframe. Their recommendations called for a solid knowledge of general statistics, as well as being curious and hungry for a challenge. They also strongly advised balancing statistical knowledge with some fundamental knowledge of computer science.

After the core Q&A session closed, the floor was opened to questions from the audience, which was then followed by opportunities for networking. The mingling, exchange of contact details, and LinkedIn profiles was encouraged with a small bar tab for drinks and finger food, including delicious dumplings, pork buns, and duck pancakes from Johnny Wong's. Attendees not only gained insights and contacts in industry, but were also well fed for the commute home.

Justin Wishart

October: Tessera month!

In October, several events related to the Tessera project for deep analysis of large complex data were held in NSW. Key events are outlined below.

Second Hadoop Workshop

As a warm-up for the Tessera workshop, the highly popular Hadoop for Statisticians workshop from August was repeated (see Jarod Lee's report).

Tessera Workshop

Ryan Hafen discussing Trelliscope

Ryan Hafen, Director of Hafen Associates and adjunct assistant professor in the Statistics Department at Purdue University, gave an outstanding one-day short course on Tessera (http://tessera.io) at the University of Technology, Sydney, on Tuesday the 18th October. The course was co-sponsored by the NSW Branch of the Statistics Society of Australia, as well as the ARC Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS). Tessera allows users to readily visualize and analyse large complex data sets in a familiar R environment, making use of the thousands of tools for analysis, visualisation, and machine learning that are available in R.

Developed over the past two years as part of the DARPA XDATA program in the United States, Tessera (http://tessera.io) is an open source statistical computing environment that enables R users to perform deep analysis of large, complex data sets. Principal contributors to the project are statisticians and computer scientists at Purdue University and Pacific Northwest National Laboratory.

Tessera uses the Divide and Recombine (D&R) approach. In D&R, data are divided into meaningful subsets, embarrassingly parallel computations are performed on the subsets, and results are combined in a statistically valid manner. Using the R datadr package, Tessera provides a simple interface to distributed parallel back end computation environments such as Hadoop. Professor Bill Cleveland, one of the primary drivers of the development of Tessera, opened the course via remote video link.

Ryan Hafen: Visualising large complex data with Trelliscope

On Wednesday the 19th October, Ryan Hafen gave an evening seminar to the branch, talking about the standalone visualization component of Tessera, Trelliscope.

Trelliscope provides a powerful, D&R approach for detailed, flexible, and interactive visualisation of large complex data. By allowing the user to easily navigate to graphical displays defined by specific data subsets, Trelliscope helps the user develop a sense of what is going on in very large data sets, where plotting via usual routines might be difficult.

Louise Ryan

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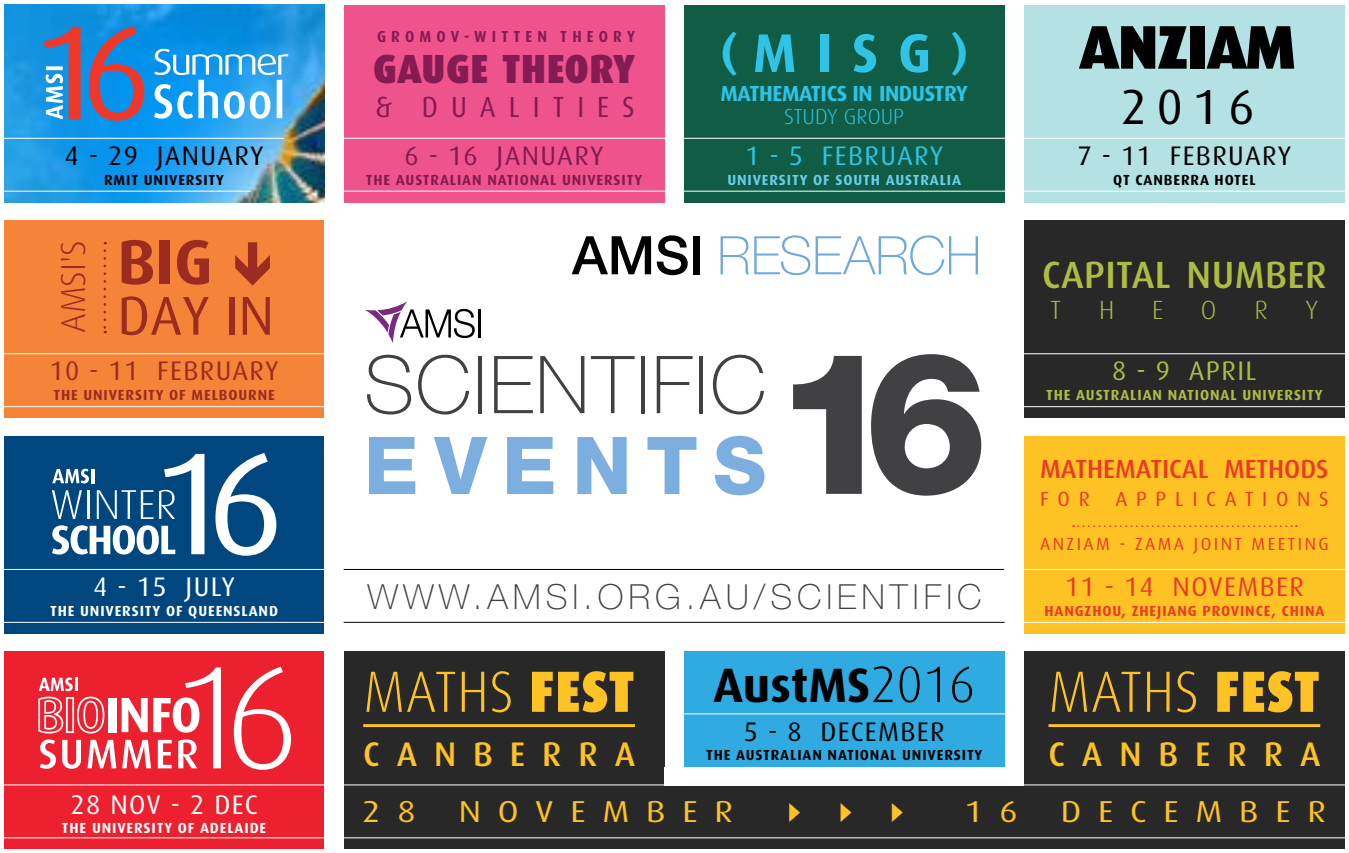

QLD BRANCH

Uncertainty in decision making

On September 8, 2015 the QLD branch held its monthly meeting, where Yoni Nazarathy from the University of Queensland spoke on trying to make the right decision when you can't see everything.

Yoni Nazarathy received his PhD from the University of Haifa in Israel. Prior to his PhD studies he was working as a software developer, group leader and system engineer in the field of wireless network algorithms. Currently working for the University of Queensland, his research is funded by two ARC (Australian Research Council) grants and lies in the field of stochastic operations research, control, statistics, scheduling and queuing theory.

Yoni gave an overview of his current research and highlighted models that allow the user to make optimised decisions which take into account uncertainty. He walked us through a number of models including those for Markovian Restless Bandit Problems combined with partially observable Markov decision processes. These models have application across many areas, for example, the assignment of medical staff to different locations, smart utilisation of computing power, and the allocation of customers to phone queues.

Yoni explained that many aspects of control theory deal with these types of problems, often modelling the system as a deterministic or stochastic Markovian evolution over some state space. In these cases, once model parameters are roughly known, finding sensible or even optimal control policies is a key issue. Nevertheless, in many situations the system state is not fully observed, or alternatively is observed with some measurement noise. In this case, sensible (or optimal) controllers need to take such state uncertainty into account.

Yoni's talk provided insight into decision making systems that have an ever increasing power in our lives. After the talk, the conversation continued whilst a small group enjoyed good wine and pizza.

Lee Jones

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http://careers.statsoc.org.au/home/index.cfm?site_id=18859 (Job Board)

UQ and ICASSP 2015 Joint Meeting: Professor Neil Gordon and the search for flight MH370

On October 21, 2015 the Queensland Branch held another October meeting jointly sponsored by the University of Queensland as part of the 40th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2015 and SSAI QLD. Professor Neil Gordon of the DST Group and the University of Queensland spoke on Bayesian methods and the search for the missing aeroplane MH370. Neil Gordon received a Ph.D. in Statistics from the Imperial College London, and worked with the Defence Evaluation and Research Agency in the UK from 1988 to 2002 on missile guidance and statistical data processing. He is best known for initiating the particle-filter approach to nonlinear, non-Gaussian dynamic estimation, which is now in widespread use throughout the world in many diverse disciplines. He is also the co-author/co-editor of two books on particle filtering. In 2002, he moved to the Defence Science and Technology Organisation in Adelaide, Australia, where he is currently head of the Data and Information Fusion group. In 2014, he became an honorary Professor with the School of Information Technology and Electrical Engineering at the University of Queensland.

Neil began his talk with a humorous description of how various groups saw statisticians and scientists, which set the scene for collaborators and clients in this project. Next he recounted what was known about the ill-fated flight of MH370.

On 7th March, 2014, Malaysian Airlines flight MH370 from Kuala Lumpur to Beijing lost contact with Air Traffic Control and was subsequently reported missing. An extensive air and sea search was made around the last reported location of the aircraft in the Gulf of Thailand without success. Signals transmitted by the aircraft's satellite communications terminal to Inmarsat's 3F1 Indian Ocean Region satellite indicated that the aircraft continued to fly for several hours after loss of contact.

As a member of the Australian Transport Safety Bureau MH370 search advisory team, Neil was called in to advise on the data analysis of Inmarsat's hourly satellite records. Armed with only a handful of data points, he optimistically thought the analysis would only take a few weeks. As part of an interdisciplinary team of scientists, engineers and statisticians with a detailed knowledge of physics, engineering, signal processing and advanced statistics, much more information was extracted from the original, sparse satellite data and a much bigger picture was painstakingly pieced together. Neil presented a fascinating account of how this collaboration predicted the most likely flight path of MH370.

He described how nonlinear/non-Gaussian Bayesian time-series estimation methods were used to process the Inmarsat data and produce a probability distribution of MH370 flight paths that defined the search zone in the southern Indian Ocean. He also built up a picture of how probabilistic models of aircraft flight dynamics, satellite communication system measurements, environmental effects and radar data were constructed and calibrated. Finally, he outlined a particle-filter based numerical calculation of the probability distribution of the aircraft's flight path, and described how this was validated using data from several previous flights of MH370.

Afterwards, a lively discussion ensued to round off what was a highly engaging and fascinating presentation.

Peter Baker

On the ranking of Test match batsmen

Professor Richard Boys' model of cricketers' performance predicted that Don Bradman was the world's best batsman of all time. No surprises there. As Richard said, if the model hadn't predicted Bradman as the best, then there would have been something wrong with the model.

The race was always for second place, so who won that? The second batsman in the list was Graeme Pollock of South Africa, but the 95% credible interval for his rank ranged from 1 to 135. In other words, he might have been the best, or he might not have even been in the top 100. The reason for this great uncertainty was that there was a glut of batsmen that the model predicted as brilliant, including famous names such as Tendulkar, Sobers and Hobbs. So as Richard concluded, you could get any pundit to name their top ten batsmen in the world and they would be right, as long as they weren't foolish enough to leave out Bradman.

The data were all test cricket matches, from the first test match completed in 1877 right up to current data from 2015, with a sample of over 1000 tests. The regression model predicted a batsman's mean score (or skill level) by modelling their age, their team, their opposition, the era, the innings, and if they were playing away. The model also including a zero inflation parameter to account for ducks (a batting score of zero, for those who know nothing about cricket).

The results for age were interesting. They showed the steady rise and fall in skill that would be expected, but showed a second bump around the age 37. Richard explained that this was likely a "healthy survivor" effect, as anyone who was still playing cricket at that age was likely to be very good.

Richard, a Yorkshireman, tactfully avoided mentioning the Ashes, but he was happy to see Joe Root and Geoffrey Boycott appear in the top 25 batsmen, with Boycott just scraping in at 25. He confessed to know little about cricket, with his co-author providing that expertise. But his knowledge of ranking and uncertainty was "Bradman-class", and there was an interesting discussion of uncertainty and ranks, with a nice insight into university rankings. Richard warned against the practice of using a single number to summarise performance rather than a range, especially when there is great uncertainty.

The talk was recorded and is available on the SSAI web site under the Events page at http://www.statsoc.org.au/events/. You can find it by clicking on 13 October on the calendar.

Adrian Barnett

SAVE THE DATE!

AUSTRALIAN STATISTICAL CONFERENCE 2016

in conjunction with the Australasian Data Mining Conference (AusDM) and the 19th Australian Conference on Teaching Statistics (OZCOTS)

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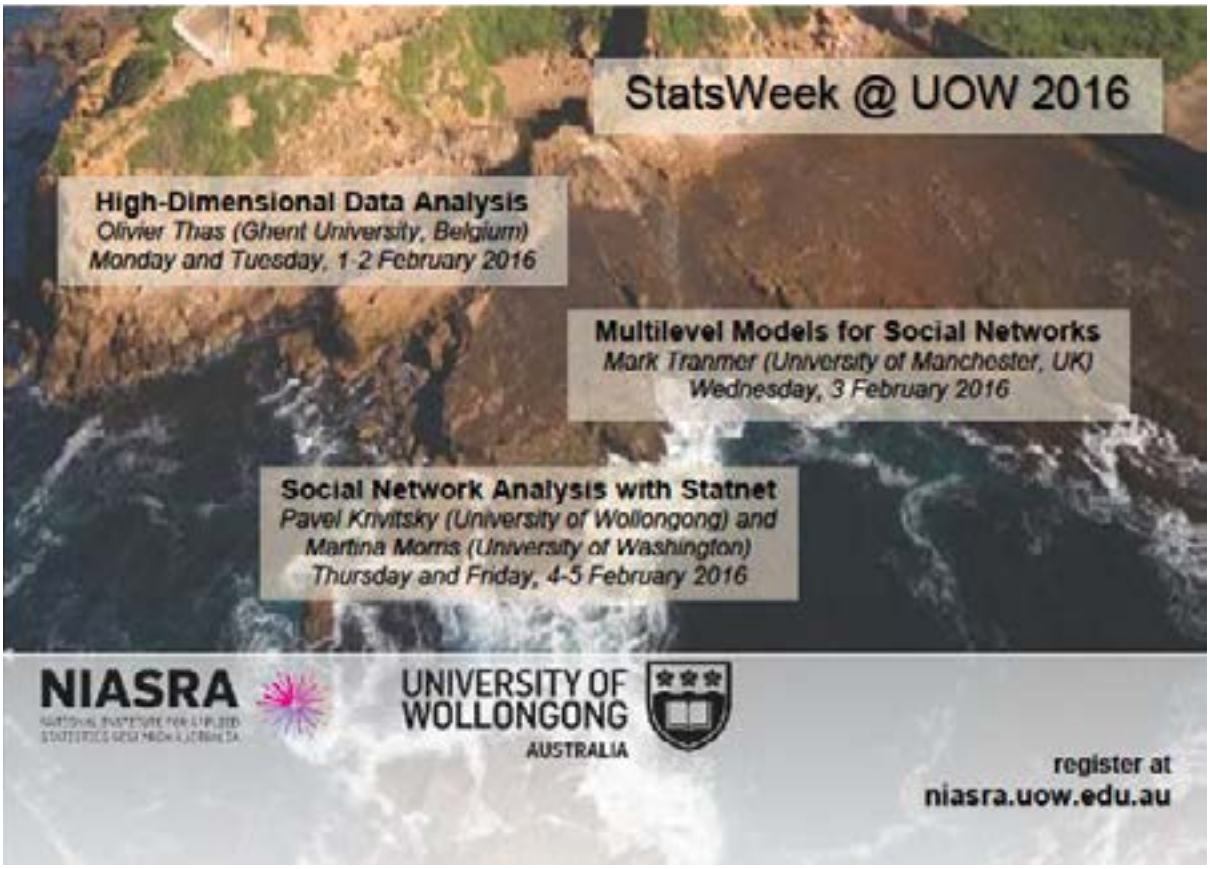

SA BRANCH

Using Networks to Investigate the Dysregulation of Cellular Responses in Disease

The speaker for October was Associate Professor David Lynn, a European Molecular Biology Laboratory (EMBL) Australia Group Leader in the Infection and Immunity Theme at the South Australian Medical Research Institute (SAHMRI), with a joint faculty appointment in the School of Medicine at Flinders University. David's primary research interest is investigating the regulation of the immune system from a genome-wide or systems level perspective.

David began his presentation by highlighting some of the statistical issues that arise in the field of network biology, including the need to deal with huge datasets involving few subjects, departures from standard assumptions such as normality, the presence of batch effects, and the need for new software to handle the data. He also shed light on the differences between computational biologists who use computational techniques to understand biology, bioinformaticians who develop tools to do computational biology, and systems biologists who model the biological system as a whole, rather than looking at individual components.

David then described a common challenge in network biology, which is deciding what to do with lists of genes that are identified as being differentially expressed. Biological networks can be used to try and understand the relationships between these genes in an intuitive way, and David has been using these networks to investigate how cellular responses are dysregulated in disease. To assist with this research, David and his team have developed InnateDB. This internationally recognised systems biology platform contains a publicly available database of genes, proteins, interactions and signaling pathways involved in innate response. It can be used for the computational analysis of innate immunity networks and David illustrated some of its key features.

More information about the platform can be found on the website (http://www.innatedb.com/).

Lisa Yelland

David Lynn

An interactive approach to the multivariate allocation of resources

The speaker at the August meeting of the SA Branch was Phil Bell from the Australian Bureau of Statistics. Phil's talk concerned the survey sample design problem of choosing how many units to sample from population strata. He highlighted that a challenge for medium and large surveys is finding a sample allocation which appropriately caters for the large number of objectives for the survey.

Phil introduced this sample allocation problem by discussing how the objectives of a survey can be described in terms of data collection costs and the standard errors (SEs) of a suite of key estimates. The SE of any particular estimate is a function of the number of sample units allocated to the sampling strata. The survey practitioner will often find the survey budget is insufficient to select enough sample to meet the pre-defined SE constraints specified by the users. To produce a sample allocation within budget there needs to be compromises to the SE constraints, and these compromises should reflect the survey's objectives. Settling on a suitable allocation typically involves a cycle of revisions to the constraints in consultation with the survey users, and Phil's interactive approach provides survey users with insight into the nature of the compromises which need to be made.

The underlying theory supporting the interactive approach uses the close link between the dual problems of minimising a cost function subject to SE constraints and minimising a specified combination of estimated SEs subject to one or more cost constraints. Using this link, one can simply transition from the optimal allocation for an initial allocation problem with particular cost or SE constraints, to the optimal allocation for an allocation problem with modified constraints.

Phil demonstrated the interactive approach using a tool implemented in Microsoft Excel. The tool is a graph presenting the relative standard errors for a nominated set of estimates, and the user interacts with the tool via buttons which adjust the 'importance' of a particular estimate. By requesting increased importance for a particular estimate, the sample is shifted to the strata contributing to that estimate. The tool provides the user instant feedback on the trade-offs between the SEs for the suite of estimates. For example, the user can see which estimates have SE constraints that are difficult to satisfy, in the sense that reducing the SE for the estimate requires significant compromises to the SEs for other estimates. This instant feedback saves a lot of time investigating the effect of modifying individual constraints, ultimately leading to a quicker process for settling on the sample allocation.

In the discussion following the talk, Phil noted this approach could be applied to other optimisation problems, in which the constraints to be met are open to reconsideration in the light of costs.

Julian Whiting

SA PMA Mathematics Challenge

The Primary Mathematics Association (PMA) Mathematics Challenge is an annual competition which provides the opportunity for children from all over South Australia to think creatively and innovatively about mathematics. Students from Pre-school to Year 7 submit entries to their own site, and then educators around South Australia select their successful site entries for the State Challenge.

The SA Minister of Education presented awards for the 21st PMA Mathematics Challenge at an evening in October, with more than six hundred adults and children in attendance. Paul Sutcliffe on behalf of the SA Branch of the Statistical Society, presented certificates and trophies to the Year 7 winners. These winners were children from Mawson Lakes and Seaford Rise primary schools.

Paul Sutcliffe

PMA Mathematics Challenge

Analysis of Longitudinal Data when the Length of Follow-up is Informative

The speaker for May at the SA Branch was Tessa Longstaff, a Master of Philosophy student from the University of Adelaide. Tessa began her presentation with the dataset that motivated her research: it consisted of the details for preterm infants who were randomised to one of two treatments and had weight measurements taken daily from trial entry until their feeding tube was removed. Since the tube removal occurred at different times for each infant depending on how healthy the infant was, the different lengths of follow-up needed to be taken into account when estimating the effect of treatment on weight. This is an example of the informative cluster size problem, which occurs when the outcome of interest is related to the size of the cluster.

Tessa described the standard approaches for analysing clustered data i.e. mixed effects models and generalised estimating equations (GEEs), which assume cluster size is uninformative. She then described some extensions to these approaches that have been proposed to handle the problem of informative cluster size. These include adjusting for cluster size, adjusting for baseline covariates related to cluster size, fitting a joint model for the outcome and the cluster size, fitting a GEE with an independence working correlation structure, and fitting a cluster weighted GEE that weights clusters by the inverse of the cluster size.

Tessa showed for her dataset that there was a negative correlation between the random intercept and slope from a mixed effects model, and the number of weight measurements taken on the preterm infants. This indicated that informative cluster size was present.

To understand how different methods for dealing with informative cluster size perform for longitudinal data, Tessa conducted a simulation study with parameters based on her research dataset. Her initial results suggest that some GEE based approaches do not work well and are inefficient in this setting, which may be due to the small number of clusters considered. She is currently investigating the impact of increasing the number of clusters.

Lisa Yelland

[Editor: Please note that this excellent contribution was accidentally left out of the September edition and so has been incorporated with the author's permission in December's SSAI newsletter.]

XXVIIIth International Biometric Conference

Victoria Convention Centre, July 10 – 15, 2016

"I warmly invite you to the XVIIIth International Biometrics Conference in Victoria, Canada, traditional territory of the Lekwungen First Nations, and capital city of British Columbia. Victoria is located on the southern tip of Vancouver Island, off Canada's Pacific Coast. The conference will be held at the Victoria Conference Centre, adjacent to the famous Empress Hotel. Victoria is named the City of Gardens and has easy access to recreational activities such as kayaking, whale watching, hiking, and much more. The temperate climate and relaxed island lifestyle should make for a memorable 28th IBC."

– Laura Cowen, University of Victoria, Local Organizing Chair

SCIENTIFIC PROGRAMME

- Opening Ceremony & Presidential Address
- Invited Oral Sessions
- Contributed Oral and Poster Sessions
- Young Statisticians Showcase Session
- Biometrics and JABES Showcase Session
- Short courses

SOCIAL PROGRAMME

Sunday July, 10	**Welcome Reception**
Monday July, 11	**Young Statisticians Mixer**
Tuesday July, 12	**Regional Officers' Reception**
Wednesday July, 13	**Range of social excursions**
Thursday July, 14	**Gala Cultural Event**

For constantly updated information,
please see the website www.biometricsociety.org

VIC BRANCH

Victoria's Eventful H2 2015

It has been a busy second half of the year for the Victorian Branch of the Statistical Society of Australia (SSA Vic), with several seminars attracting large audiences and some members representing the branch at other events.

On June 30, Associate Professor Prue Francis, Head of Medical Oncology Breast Service at the Peter MacCallum Cancer Centre, spoke on "*Statistical Issues in Randomized Breast Cancer Trials*". The audience of approximately 40 people heard about problems associated with clinical trials concerning breast cancer, where the trials themselves may run for more than 10 years before primary analyses take place. It was great to see many young statisticians attend.

On July 28, a joint event between SSA Vic and Data Science Melbourne (DSM) was held at The Arena in the NAB building at the Docklands. It attracted well over 200 people. Jacob Lindsay, co-founder of Code for Australia, was the opening speaker and his talk was entitled "*Open Data, Citizenship & Code for Australia*". The main speaker for the joint event, Professor Aurore Delaigle from the University of Melbourne, gave her seminar titled "*Big Data, Big Models, New Insights*". Aurore's very interesting talk focused on her main area of expertise, functional data analysis, in which observations are curves rather than realizations from single variables.

The August SSA Vic seminar was held one week later than usual, on September the 1st, to coincide with a visit from Professor Thomas Lumley from the University of Auckland. Thomas' talk was called "*Data Science: Will Computer Science and Informatics Eat Our Lunch?*", during which he detailed the recent catch-up game that statistics has had to play with computer science. Fortunately, we are gaining ground, but now the onus is on us to take on new computing technologies for the betterment of statistics in data science.

On October the 6th, the branch welcomed three exciting young statisticians who delivered short talks as part of the annual Young Statisticians Showcase. Dona Malathi Sajeewani (a PhD student from La Trobe University working with Agus Salim and Luke Prendergast) spoke on "*Incorporating network topology in gene enrichment analysis*", which is used to both reduce false discovery rates and to detect informative gene pathways. Dr Yuguang Fan (a Postdoctoral researcher at the University of Melbourne who is working with Professors Aurore Delaigle and Peter Hall) showed us how difficult it can be "*Clustering Fragmentary Functional Data*", which are data observed on short and irregular intervals. Fortunately, their new and novel method can be used to cluster these fragments. Hema Nathen from the Royal Australian College of General Practitioners provided the audience with useful advice for "*Surviving full time work and study*". Can it be done? Yes, Hema has been doing just that and the key is to prioritise, which may include one sacrificing a social life to keep up with assignment submissions!

Later in October, some members of SSA Vic were actively involved in two data analysis events. The first of these was the "*Melbourne Datathon*" which started on October 15. For this event, teams had one week to analyse a dataset, with the winning team taking home a cool $1,500. This new-to-Melbourne event was organized by the Data Science Melbourne community with support from SSA Vic Council Member Dr Damjan Vukcevic, who was one of several mentors

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for the event. *"HealthHack 2015"* was the second event, and it was run over the weekend starting the 23rd of October. For HealthHack 2015, real data problems were provided by the medical research community, and teams of analysts sought to solve these problems. The event was organized by volunteers from the Open Knowledge Foundation Australia and SSA Vic was proud to be a sponsor. Young statistician Monika Buljan, who is also a member of SSA Vic's Council, was one of the problem owners, and arranged for a team of SSA Vic members to participate. Additionally, Dr Damjan Vukcevic acted as a judge. SSA Vic plans to continue its association with both events in 2016.

To round-off a busy October, the premier event on the SSA Vic calendar was held on October 27th. The Belz Lecture and Dinner are held annually in honour of Professor Maurice Belz, who played a huge role in the advancement of statistics in Australia. This year, SSA Vic was proud to announce Professor David Balding (Professor of Statistical Genetics at the University of Melbourne and Director of the new Centre for Systems Genomics) as the 2015 Belz Lecturer. David spoke to a crowd of about 130 people on *"Statistical evaluation of evidence in criminal casework"*. David certainly did not disappoint, and his reputation for delivering a very interesting talk resulted in many new faces attending an SSA Vic event for the first time; in particular from the student community. Among other examples, he spoke of the important role his work played in the recent identification of Richard III's skeleton. Around 35 people attended the Belz Dinner that followed, and an excellent time was had by all. We would also like to pass on our gratitude to the two sponsors of the Belz Lecture and Dinner, Minitab and the Lean Sigma Institute. Support of any Statistical Society of Australia event is support for our statistics profession as a whole. SSA Vic plans to strengthen ties with industry for mutual benefit in the coming years.

Luke Prendergast (left) and 2015 Belz Lecturer Professor David Balding

There are two final events which will finish off the year, both of which follow the submission date for this newsletter article. The first of these is an Industry Discussion Panel on the topic of *"What does industry need from statisticians?"* which includes panel members Professor Geoff Prince (Director of AMSI), Antony Ugoni (Head of Market Pace Analytics at SEEK and Chairman of IAPA Specialist Advisory Committee), Kathryn Buttler (Senior Manager, Advanced Analytics at ANZ), Jon Buttery (an experienced public servant in the health sector) and Dr Roger Hilton (Managing Partner at Lean Sigma Institute and Member of SSA Vic Council). The discussion will be moderated by Dr Damjan Vukcevic. Finally, on the 10th of December, SSA Vic is proud to be involved in the 2nd Melbourne Analytics Charity Christmas Gala, which is a joint event between Data Science Melbourne and SSA Vic. Special guests include Antony Ugoni, who is also involved in our Discussion Panel, and Anthony Goldbloom who is the Founder and CEO of Kaggle. This year we are hoping to raise $7,400 for the Cambodian Children's Trust.

Have a safe holiday period everyone!

Luke Prendergast

ACSPRI
Australian Consortium for Social & Political Research Inc.

ACSPRI are offering a huge array of courses in practical and applied approaches to research methods and data analysis in the upcoming 2016 Summer program. All ACSPRI courses are small group, hands on and run over 5 days and use highly skilled and experienced instructors from around Australia and overseas.

Week 1 will be held at the Australian National University from **January 18 to 22**.

Week 2 will be held at the University of Melbourne from **February 1 to 5**.

Week 3 will be at the University of Melbourne from **February 8 to 12**.

Our Summer 2016 program includes all the more popular courses as well as a selection of new courses on offer for the first time including:

- *Foundations of Qualitative Comparative Analysis*
- *Data Envelopment Analysis for Management and Non-economists*
- *Introduction to Data-mining for Large and Complex Data Sets*
- *Introduction to Survival or Time to Event Analysis Using Stata*

For more information contact ACSPRI at:
info@acspri.org.au, phone 03 8376 6496
or visit the ACSPRI website at: https://www.acspri.org.au/summerprogram2016

FROM THE OFFICE

I recently had the opportunity to attend a public speaking event for high school students organised by UN Youth Voice (https://unyouth.org.au/event/voice-qld/). Sitting for three hours in a lecture hall listening to speeches given by students from year 7 to year 10, you can't help but let your mind wander from time to time. However, one speech topic that made me think about other things, in this case my work, was "How can we encourage more females to enter STEM area studies and careers?". Several other female students also spoke about their love for numbers and their aptitude for anything to do with maths, and the fact that they were the only females in their respective coding classes. One student used an example from the TV series "The Big Bang Theory", where the academic girls are portrayed as nerdy and not so attractive, whilst the non-academic girls are the "hot" ones. If this is how academically inclined females are viewed, no wonder that most high school girls shy away from STEM area subjects.

Whilst I understand that it can be difficult to get some girls to believe in themselves enough to take up these subjects, I do feel that the female population is quite substantially represented amongst our members and at our statistical conferences. When I look out from my SSA stand at the different Australian Statistical Conferences that I have attended over the years, it always fills me with pride for my gender when I see the (attractive!! Hello Big Bang!) women there.

On the way out after the above mentioned speeches, I started chatting with the mother of one of the girls who had spoken about girls taking up STEM area studies. She gave me her card and I emailed her some information on careers in statistics. When the mother replied to my email she told me that she and her daughter had had no idea about the vast career opportunities that a qualification in statistics offers. To me that shows that the school which the girl attends has not done an adequate job in educating students in the career choices available to those who love maths. It also shows an opportunity where the SSA could play a greater role – spreading the word on what statistics is all about and the many faces it can have. Peter Howley and Michael Martin of the SSA Statistical Education section have made a fantastic start with the High School Poster Competition – now in its second year (http://www.statsoc.org.au/events/ssai-events/national-statistical-literacy-project/). I tried to get my children's high school involved with this event and sadly never received a reply to my email, but I will try again next year.

Another initiative is the A$22M partnership launched in April 2015 by BHP Billiton and the Australian Mathematical Sciences Institute (AMSI).This aims to increase the representation of women in the field of mathematics, by influencing the perception of mathematics amongst girls and young women (http://www.bhpbilliton.com/investors/news/the-bhp-billiton-foundation-helps-girls-to-choose-maths). The funding will be provided by the BHP Billiton Foundation over five years. It is expected to go some way towards addressing a decline in Australians studying maths and entering STEM related careers.

In terms of positive role models, our former member Inge Koch, Executive Director for AMSI, is leading the Choose Maths program, building on her passion for engaging girls and young women in her love for mathematics. She is an inspiration to girls who love maths.

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Marie-Louise Rankin

Another inspiration for these girls is Nalini Joshi. In October this year, Nalini was recognised as a "Woman of Influence" on the 2015 Australian Financial Review-Westpac 100 Women of Influence list. As a Georgina Sweet Australian Laureate Fellow and the first female professor at the University of Sydney's School of Mathematics and Statistics, Nalini is not just a passionate advocate of her discipline, but would like others to embrace maths just as she does: "I would like to tell everyone how human mathematics is. It is not an esoteric and elitist pursuit, but a beautiful creation of the human mind, which has turned out to be useful in all walks of life." (Indian Link - http://www.indianlink.com.au/women-of-influence/).

I think this is a wonderfully positive note on which to end this newsletter and the year 2015. I wish all our members the very best for the festive season, safe travels if you are going away and some quality time with your loved ones.

Marie-Louise Rankin

PS: Here is the speech that impressed me and made me think about our female members. It was written and presented by Claudia Kos, a year 9 student at St John's College, Nambour. Claudia was successful with this speech and became one of 16 semi-finalists at the UN Youth Voice Public Speaking Event. Her speech is food for thought and should inspire all of us to have more discussions with our daughters, nieces and friends about the possibilities out there for everyone:

How can we encourage more females to enter STEM area studies and careers?

I am a girl. I also love maths and science. But I am a girl and these areas in education and the workforce are still male dominated. Why should I limit myself? Or allow others to limit me? Because I am a girl?

My name is Claudia and I go to St Johns College.

I am here to talk about encouraging more females to enter in the areas of Science, Technology, Engineering and Maths, or STEM for short.

Here are some facts:

- *In 2011, only 28% of STEM employees were female.*
- *Only 33% of tertiary qualifications were awarded to females in STEM fields.*
- *In 2013, less than 7% of female Year 12 students studied an advanced mathematics subject.*
- *Of the 27 students in my graphics class, there are only 5 girls - including me.*

There are many limitations on females choosing STEM subjects and careers. They start almost from birth. Although women have come a long way, from a young age there is still stereotyping, negative perceptions and bias against girls having interest in, and entering, STEM areas.

The causes are deep in our culture.

As a Year 9 student, I see many of the girls my age already tuned out of STEM subjects and careers. Research shows, even in university and into a STEM career, the barriers and bias continue.

> Continued on next page

These barriers also hurt the Australian economy. We think differently from men, and diversity is key to Australia becoming a world leader.

We are a technology driven society and, if we are losing roughly half of our trained workforce and not utilizing their potential expertise, we lose competitiveness and future prosperity.

Much has been done to tackle the issue by government, organizations and professional bodies.

The Government allocated 12 million dollars into improving the quality of STEM subjects in schools in this year's federal budget.

Google Australia announced a 1 million dollar fund to help 10,000 young people consider STEM careers.

Engineers without Borders Australia is expanding its STEM and computer science focused training to 5,000 young people, with a particular focus on young women.

There are many similar initiatives out there.

Despite all this, research shows the number of people in STEM is declining.

The solution I propose is a national advertising campaign under a unique, easily recognised logo.

For the campaign to be successful, it requires an emotive approach. It will have slightly different messages and deliveries for four key groups – teenagers, people in STEM, parents and teachers of children and the general public.

Teenagers live in the social media era and would be best reached through social media campaigns similar to US's #runlikeagirl.

This flips a common phrase on its head.

People in STEM need a reminder that we support, encourage and are proud of what they are doing. This can be done with a campaign with STEM women sharing their experiences and achievements.

Parents and teachers of children could be reached through a campaign modelled on Ver-i-son and Maker's "inspire her mind". An emotional campaign, such as this, that hits home is vital for success.

A campaign for the general public to spread awareness and help stop unconscious bias about genders in STEM is essential.

The biggest hurdle is funding. We need federal politicians and professional STEM bodies on board. The federal Office of Women in the Department of Prime Minister and Cabinet could coordinate.

I hope, little by little:

- *That maybe more girls enrol in my graphics class.*
- *That maybe the statistics will be different.*
- *That maybe Australia becomes a leader in innovation.*

But I am just a girl, and these are just ideas. But this is a real issue facing Australia today.

Would you like to contribute to the SSA newsletter?

Please contact your branch's newsletter correspondent:

Editor: **Sonia Langford** (woo_langford@iinet.net.au)

NSW: **Dr Michael Stewart** (michael.stewart@sydney.edu.au)

VIC: **Dr Sandy Clarke** (vic.branch@statsoc.org.au)

ACT: **Dr Robert Clark** (robertgrahamclark@gmail.com)

QLD: **Lee Jones** (lee.jones@qut.edu.au)

WA: **Ryan Admiraal** (r.admiraal@murdoch.edu.au)

SA: **Shahid Ullah** (shahid.ullah@flinders.edu.au)