

Science meets Parliament 2017

A New Logo for SSA

Winners IAOS YS Prize Competition

YSC2017

ISSUE NO. 159

June 2017

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Science meets Parliament event at New Parliament House, Canberra on 21st & 22nd March 2017. PHOTO: MARK GRAHAM

Science meets Parliament 2017

Science meets Parliament, as the name indicates, is a platform for scientists to engage with politicians and a chance to highlight the importance of science in Australian society. Started in 1999, SmP has allowed the advocacy of science at the federal level and continued to provide outstanding opportunities to elevate visibility, awareness and understanding of the scientific community in Australia. Scientists from various disciplines participate in the SmP to represent their respective societies/ organizations.

I was fortunate enough to participate in SmP 2017 as the delegate of the Statistical Society of Australia (SSA). I was sponsored by SSA to attend the two-day conference in Canberra, ACT. Both days were packed with various seminars, discussions, and meeting with parliamentarians. We got to hear from Dr Alan Finkel, Dr Alex Zelinsky, Dr Subho Banerjee, Professor Anne Kelso, Dr Bobby Cerini, Senator the

Hon Kim Carr, The Hon Bill Shorten MP, Senator the Hon Arthur Sinodinos AO and many others. Each segment highlighted various ways of displaying our findings in the media, so that they reach the general populus.

The conference had a number of training schemes, particularly for the early career researchers. Over 200 scientists of various expertise participated and the sheer diversity gave me a glimpse of the vast research ongoing across Australia. A conference, in general, is comprised of experts of the same discipline. However, SmP provides a rare opportunity to meet experts from other fields. The mutual exchange of knowledge itself is worth mentioning. I personally got to know about the upcoming plans of mining industries, which was quite opposite of what I thought. Meeting with the astronomy group was encouraging as they showed immense interest in statistics,

> Continued on next page

Continued from previous page

and described how much quantitative statistics and statistical models are part of their study.

Political liaisons and grant applications are part of scientific study. On the first day, we had a panel discussion among Dr Alex Zelinsky, Chief Defence Scientist; Dr Subho Banerjee, Deputy Secretary, Department of Education and Training, and Professor Anne Kelso, CEO, NHMRC regarding the contribution of science in shaping various policies, and why it is important to have evidence based policies. The amazing part is that the persons who generally decide the grant allocations actually told us what convinced them when they assess the applications. The 'trick', according to Professor Kelso, is to think like a donor or government policymaker: 'What will convince you to give your application a grant if you had very limited resources?' Amidst all these, one cannot but consider why we are politicizing the scientific community. It was answered brilliantly by Dr Zelinsky:

'Scientists can be politically active without politicizing their science.'

The ability to pitch an idea in a short span of time is important. Particularly, if you want a parliamentarian to listen to your project. A parliamentarian or a senior federal officer has a busy schedule and s/he meets numerous persons each day. Therefore, a pitch has to be short and attractive to rise above all the other comments and ideas. Furthermore, it must be simple enough so anyone outside the field study can understand. We had a group discussion on the first day where we practiced pitches of only 15 seconds (Yes we did!). Another way to make sure the message reaches properly is to keep in touch with the senator's team, especially via email. The general advice is to mail them as soon as possible after meeting them; even if it is a simple greeting, it will start the communication.

A parameter of scientific exposure is the citations of a published paper. However, print and electronic media are the best ways to reach the parliamentarians and others who are not commonly readers of scientific journals. A scientific study that might have implications for policy should be advertised through mass media. We had a panel discussion where the journalists suggested that media articles should not have heavy scientific jargons and must show real life applications which they can sell to the public. Application of social media is also important; however, the privacy issues were also discussed.

The gala dinner on the first day was highlighted by a debate between Senator Sinodinos, Minister for Industry, Innovation & Science and Mr Shorten, Leader of the Opposition. On the following day, we heard from Senator Carr, Shadow Minister for Innovation, Industry, Science & Research. All the politicians had one common piece of advice - always approach the cross-bench. Scientific studies usually have long-term implications and it is important that both sides of the house know the importance of such projects. Thus, the budget is going to accommodate the important studies despite any change in the parliament. At the dinner, I was fortunate enough to sit beside Gary Moorhead, chief of staff from the Office of Senator Carr. We had a long chat regarding my project and he offered to help me further in the future. SmP provided many such discussions between the scientists and the federal officers.

We were partitioned into various teams before the conference to meet with one parliamentarian and talk about our project. The aim was to overcome our nerves, and understand their view of science in person. I was assigned to meet with Mr Tim Hammond MP, elected representative from Perth, Western Australia. Unfortunately, our meeting lasted only 10 minutes as Mr Hammond had to leave for a vote in the house. However, it gave us a glimpse of their busy schedule.

Later that day, we had lunch in the press club, where we watched Senator Sinodinos tackle a number of questions from the journalists. And again I felt good about my career choice!

The conference provided a lot of information within a short period of time. I enjoyed the amazing mixture of scientists. It gave us a chance to suit up unlike our day-to-day lab coats! The conference reduced my 'fear to approach' anyone, specially the parliamentarians. Their motivation to invest more in science was visible. Furthermore, their interest in informed decision-making, backed by scientific evidence encouraged us to learn about the local policies and aid them with our studies.

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DEADLINE FOR NEXT NEWSLETTER
10 August 2017

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From the Acting Editor

This issue of the Newsletter is the first to feature SSA's new logo and associated brand imaging. We are very excited about the fresh new look it gives to the Society's printed and electronic presentations - we hope that you, the members, appreciate it as much as we do. A big vote of thanks goes to the logo committee, chaired by Damjan Vukcevic, for its excellent work in developing the new logo and associated material.

In this issue there are two reports on this year's Science meets Parliament, an event organised by Science and Technology Australia (STA). One report is by Raaj Kishore Biswas, Chair of SSA's Young Statisticians Network, who was SSA's nominee to attend Science meets Parliament. The other report is by SSA's Treasurer, Stephen Horn, who attended as a member of the executive of STA. The two perspectives on this event make for interesting reading.

Doug Shaw
Acting Editor

Events

Events in Australia

International Conference on Robust Statistics 2017

3-7 July 2017, Wollongong

WIMSIG Conference 2017: Celebration of Women in Australian Mathematical Sciences

24-26 September 2017, Adelaide

Developing Your Career to Thrive in a Data-rich, Technology-driven, Reproducible Research Environment

25 September 2017, Tweed Heads

Young Statisticians Conference 2017

26-27 September 2017, Tweed Heads

Joint International Society for Clinical Biostatistics and Australian Statistical Conference 2018

26-30 August 2018, Melbourne

International Events

61st World Statistics Congress - ISI2017

16-21 July 2017, Marrakech, Morocco

Joint Conference on Biometrics & Biopharmaceutical Statistics

28 August-1 September 2017, Vienna, Austria

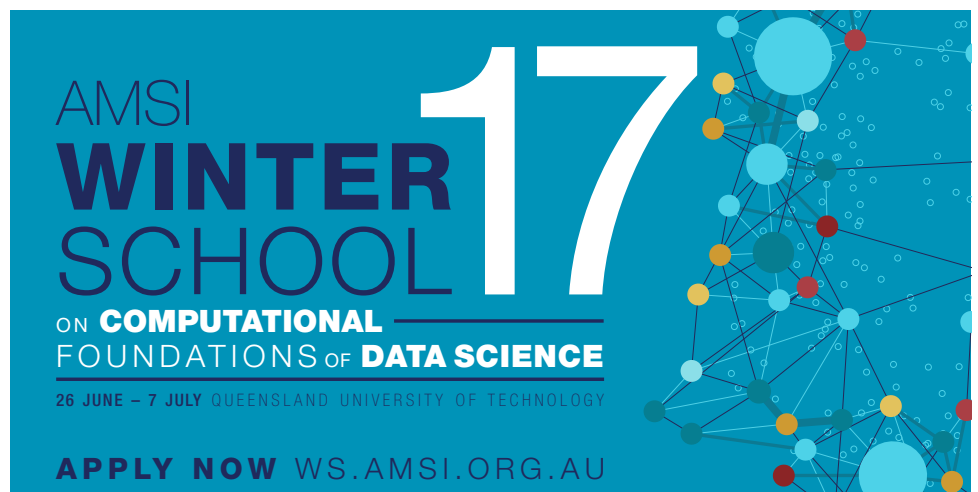
European Conference on Data Analysis (ECDA)

27-29 September 2017, Wroclaw, Poland

3rd International IASSL Conference "Statistics for Good Governance"

28-29 December 2017, Colombo, Sri Lanka

To have your event added to this list, please forward the event details in the above format to eo@statsoc.org.au.



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AMSI RESEARCH

Science meets Parliament 2017, part 2

SmP 2017 was held 27–28 March, the 18th such annual event organised by Science Technology Australia (or its earlier FASTS persona). Like last year, and indeed in a format that has barely changed since the first in 1999, the first day is spent preparing delegates to meet the parliamentarian to whom they have been assigned, on the basis of expressed interests of the latter; in practice each of the 70 MP/Senators who has chosen to take part receives a small delegation drawn from the 200 delegates assembled in Canberra nominated by STA member societies. The meetings fit in with parliament schedules, are short – and subject to change depending on parliamentary business.

Around this key meeting are events that have become part of SmP routine: a gala dinner in the Great Hall – attended by MPs and delegates with address and reply by party leaders; a parliamentary friends of science panel session and following cocktail party, press club lunch with address by the Minister – this year launching the new Science statement; and opportunity for delegates to attend Question Time.

In between there is ample opportunity for delegates to meet across disciplinary boundaries – in exercises to improve individual pitches; and subsequently in events and functions. It is a rare occasion for people from around the country from a variety of institutions and disciplines and career stages to swap notes on their work, their career prospects and reflect on a common science training and aspiration.

This is at the core of STA's mission to represent science and science workers in public; in the formulation of policy concerning investments in research and training; in the role of science in industry and the economy. SmP becomes in this context a professional development activity for future science policy advocates within their professions, as much as its ostensible motivation to place scientists at the

disposal of legislators in understanding contemporary issues affecting future wellbeing of the population.

Indeed it is more accurately seen in this light. The success of the event in the corporate calendar – SmP continues to be supported by major players with interests in the allocation of public funds, beneficiaries of research products and employers of graduates – arises from the ambiguous role that science plays in policy.

Governments are keen to extract economic and political value from investments in 'science'; this requires more than a statistical analysis given the fluid and esoteric nature of activity in this sector. Science-centred institutions are keen to communicate the public dividend from their activities and to bring to the attention of law makers the barriers to their flourishing, or the changing landscape in which they operate.

For individual parliamentarians, science may not have figured highly in their formative experiences, nor be top of mind to their constituents; indeed this has historically been the case with political parties and movements. Yet they are used to talking to all manner of (self-interested) parties with claims and counter claims on their support: a friendly audience with working scientists pitching their research for disciplinary enthusiasm rather than for favourable treatment may be seen as an opportunity as well.

My official role this year as last year was to represent STA to delegates – most of whom would be unlikely to be familiar with this peak body, and often would be only newly introduced to their sponsoring society.

Unofficially, many conversations were about society matters proper to individual societies – the member base of STA. I was talking with physicists, engineers, mathematicians, meteorologists, science teachers; I learnt of exciting work at various boundaries of research and of the

struggles to retain membership of fellow societies, of a general desire to increase industrial coverage, of issues about career paths, particularly of women as well as success stories by women in untraditional roles. The labour market for early and mid-career scientists attracted attention; indeed a satellite meeting was held for this group. There was even talk about teams and collaboration; about "discipline calving"; about the career instability caused by disrupted funding frameworks. Geography was an issue as was the role of multinationals.

One or two observations on what actually passed: while the two visions from science spokesmen for the government and opposition contrasted in presentation they converged in theme: essentially having science on your side was essential for any future for the country. Constructively we were left with major unencumbered investment in defense science (from the government) and qualified investment in research (bias toward commercial viability) on the one side. On the other we had a commitment to public institutions, a commitment to investments to build a knowledge economy.

Mean time we get back to our benches; some of us at least inspired perhaps (as we were promised) by life-time friendships across the wide oceans separating the curious, patient world of science and the furious imperatives of public life in the cauldron that is Parliament.

Stephen Horn

The Statistical Society of Australia is proud to be involved in a recent **"Open Letter for Science"** organised by our partners of Science & Technology Australia. Its purpose was to illustrate the importance of science and technology to our way of life, and to ensure these sectors are unobstructed and supported by the community, government, and industry.

SSA President Scott signed the letter along with a list of scientific luminaries and their supporters on the eve of the Global March for Science held on Saturday, 22 April 2017.

Science & Technology AUSTRALIA

As Australian scientists and technologists and their champions, we write to express our strong support for our international colleagues in science, technology, engineering and mathematics (STEM).

Collaboration with international counterparts, in all countries and from all backgrounds, is vital to the work of STEM. The common language of STEM serves as a bridge across cultural divides; enables cross-fertilisation of new ideas from different perspectives; and it serves to make the world healthier and more resilient through a period of global change.

It is incredibly important that we as a society support independent research, free of political interference. The scientific method is robust, and through it the sum of human knowledge has been advanced incrementally through the laser lens of objective testing and observation, contestability, replication of results, and intense scrutiny. The growth of 'alternative facts' and the rise internationally of misrepresentation and disregard for science is, at best, troubling. At worst, it's life threatening on a monumental scale.

Climate change, antibiotic resistance, food and water security and other global threats will not be solved by 'alternative facts' but through the steady and logical application of science and technology. In our privileged Australian society, our communities and individual lives are extended, enhanced and made more fruitful every day by science and technology. The achievements of science and technology research have been enabled through successive governments' support for the work of those in the STEM sectors.

We the undersigned call on leaders around the world to recognise and reinforce the value of unencumbered support for the work of scientists and technologists. We call on those with power and influence to work towards a society based on reasoned and substantiated decision making.

We call for a world that supports, celebrates, and learns from science.

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| 
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| 
Adam Spencer
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AMSI Optimise Announced

**MAXIMA at Monash University,
June 26 to 30, 2017**

We are very pleased that the first AMSI Optimise event will take place at Monash University in the week of June 26th, 2017. Hosted by the University's MAXIMA research platform and directed by Professor Andreas Ernst, AMSI Optimise comprises a three day research/industry symposium followed by a two day research workshop. AMSI Optimise joins our other flagship programs co-funded by the Commonwealth. The themes of the three day symposium are logistics and utilities, you can see the full program at <http://optimise.amsi.org.au>

AMSI Winter School 2017: Computational Foundations of Data Science

QUT, June 26 to July 7, 2017

This will be QUT's first Winter School (but we all know there is no winter in Brisbane). Professor Ian Turner (QUT) is the School's Director and Professor Hans de Sterck (Monash) is the Scientific Director. As usual the School is built around a major and current topic, offering considerable benefit to PhD students and ECRs. Under the broad heading of computational foundations of data science the sub-themes are:

Inverse Problems, Numerical Linear Algebra, Bayesian Inference and Data Assimilation, Machine Learning, Model Reduction Methods and Nonlinear Optimisation. You can see further details at <http://ws.amsi.org.au>

NCRIS Passes the Buck!

I have complained about the maths and stats vacuum in the NCRIS (National Collaborative Research Infrastructure) Discussion Paper in AMSI's response. Well, in the subsequent Draft Roadmap <https://docs.education.gov.au/node/42216> we finally rate a mention (on page 17):

"As the complexity of the research methods and technologies to undertake ground breaking research grows, advanced mathematics continues to be an important and scarce resource. Maximising the development of algorithms and predictive modelling scenarios, integral to many areas of research, can only be realised with strong mathematical capabilities."

However,

"While national research infrastructure facilities can provide an enabling and facilitation role, there are limits to the extent that the skills gaps can be addressed by facilities."

And the buck is thereby passed to the universities who are meant to supply this scarce resource by implementing the recommendations of the ACOLA Review of Research Training. You can read AMSI's critique of this lack of leadership at <https://submissions.education.gov.au/forms/2016-strategic-roadmap/pages/index>

AMSI Research Report 2015-2016

Our latest annual Research Report was released at the end of last year covering our workshop program, flagship research training events, internships, ACE program and lecture tours. It contains reports of all our workshops including some features, an interview with Terry Tao, a piece on female participation in research and profiles of interns and vacation scholars. It has been produced in AMSI's usual accessible and classy style and you can find it online at <http://amsi.org.au/publications/research-reports-2015-16/> and in departmental common rooms around the country.

AMSI Intern Expansion

At the time of writing (early March) a draft contract from the Commonwealth is imminent for the \$26m expansion of the AMSI PhD Intern program. This will deliver an expected 1400 places through till the end of 2020 and a significant percentage of these will continue to be in the mathematical sciences. A comprehensive description of the program will appear in the next Newsletter and also be delivered direct to our members.

Geoff Prince
Director, AMSI

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Statistical Education Section Report

National Schools Competition and expert videos

The National Schools Poster Competition (www.ssaipostercomp.info) continues to grow and in June I will be travelling to remote schools in Dubbo, Broken Hill and Griffith for a Department of Education and Training-funded project that unites the National Schools Poster Competition with Environmental Science and Sustainability.

Beyond the wider promotion of the competition some key aspects of the national initiative include the judging of the competition submissions (November), and the connection with schools through mentors attending classrooms to inform teachers and students about the field of statistics, careers and opportunities, and to guide them towards undertaking their own investigation as part of the competition.

You may be wondering what assisting a school to engage with the activity involves, or what teachers and students are saying about the initiative. Please consider the following four videos, each is between 1 and 6 minutes - they're available from <https://www.ssaipostercomp.info/resources.html>:

- Overview - 1 min
- Rationale - 4 mins
- How to run the activity (for mentors and teachers) - 6 mins
- Testimonials (from students and teachers, primary and secondary) - 6 mins

As part of the mentor visit we inform schools about the importance of Statistics in practice, but we cannot be everywhere. To help, thanks to the expertise and time provided by the professionals and statisticians listed below, I've created a series of 13 videos including each speaking about careers and the practice of Statistics, how and

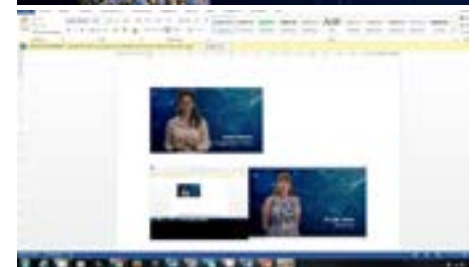
where it is used, and helping to make Statistics more understood, accessible and appealing to school students.

Most videos are about 3-4 minutes; a couple are 7-8 minutes. So who are we fortunate enough to have in the series espousing the value and importance of Statistics and its cross-disciplinary nature?

- Prof Kerrie Mengersen - Jaguar corridors and Cancer mapping
- Dr Jose Martinez - former NASA astrophysicist and current Senior Manager, Airline Analytics Red Planet, Qantas
- Ms Jessica Pritchard - Hunter Valley Coal Chain Coordinator
- Dr Clair Alston - Social and Behavioural Sciences: Criminology and Cyber Fraud
- A/Prof Peter Howley - Healthcare, Forensic Anthropology, Public Health and Education...and National Schools Poster Competition of course
- Mr Kevin Wang - NSW Health and KPMG, Bio-statistics and Senior Data Administrator
- Prof David Lubans - Physical Health and Education
- Ms Cathy Hargraves - Radiation Oncology
- A/Prof Mark McEvoy - Epidemiology
- Mr Nicholas Tierney - PhD Candidate...a road to Statistics
- Dr Susanna Cramb - Spatial modeller, Cancer Council Queensland
- Dr Sam Clifford - Post-doctorate fellow, Climate and Air Quality
- Ms Jessie Roberts - Industry Engagement Officer



6 of the 13 presenters - Video Series - Careers and the practice of Statistics



Dr Clair Alston - Video Series - Careers and the practice of Statistics

So please consider being involved as either a judge or attending the school of simply helping to promote the initiative and the supporting videos.

How much you are involved is up to you; we can discuss options and I'll endeavour to keep your workload as light as you prefer - having points of contact around Australia and additional judges would be invaluable! Please contact peter.howley@newcastle.edu.au or phone 02 49 215518 to discuss.

> Continued on next page

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I also welcome comments about the videos created, or other ideas.

And one last thing...the Nationals Schools Poster Competition has a logo! What do you think?



National Schools Poster Competition Logo

In any event, please advertise widely.

Peter Howley

A/Prof Peter Howley, The University of Newcastle
Chair of Statistical Education
Section, SSA
Follow me on Twitter: @peterhowley0

International Association for Official Statistics - 2017 IAOS Young Statistician Prize Results

The Statistical Society of Australia would like to congratulate SSA member Nicholas Husek on being awarded second prize in the 2017 IAOS Prize for Young Statisticians with his paper on Telematics Data for Official Statistics: An Experience with Big Data. Nick has also just started his term as the Young Statisticians Network Chair of the Canberra Branch.

The first place of the award went to Hannah Thomas of the UK (The Dissemination Game: How to communicate official statistics to non-expert users) and the third place was awarded to another Australian: Andreas Mayer (Improving Seasonal Adjustment by Accounting for Sample Error Correlation Using State Space Models).

Well done to all the participants!



Andreas Mayer and Nicholas Husek

Nicholas Husek on entering the IAOS Young Statistician prize competition

I first started at the ABS in 2015 after I finished my honours degree in statistics and was placed in the Melbourne office where I worked in Annual Industry Statistics assisting with the running of the Economic Activity Survey and other surveys. Soon after starting, I heard about Andreas being the winner

of the 2015 IAOS Young Statisticians Prize and thought that methodology would be the best place to develop my skills. I was then fortunate enough to be moved into Emerging Data and Methods in Methodology at the start of 2016, and had the opportunity to work on the Prime Minister and Cabinet Public Sector Data Management problem on utilising telematics data from freight companies to plan road infrastructure. This was a very interesting project to work on, as it was a joint project between the ABS (EDM and Transport and Tourism) and the Bureau of Infrastructure Transport and Regional Economics, and was to my knowledge the first time that this data source had been utilised by a National Statistics Office.

The project came about as telematics is a relatively new source of data and had not been investigated to see how beneficial the data could be for government decision making. Obtaining data from industry required cooperation, and overcoming confidentiality concerns about the data they were handing over. The EDM team joined at the start of phase 2, where we worked on developing a prototype that could visualise freight movement over Australia and produce key outputs on congestion and identifying routes which vehicles take. The work I performed on the project mainly focused on creating clean data to be given to the rest of the team for the visualisation, and creating congestion statistics. Over 19 million rows of data was received for the project, so I implemented a series of macros in SAS which remove erroneous data, combined with other datasets and created the outputs necessary for visualisation. I thought

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that this work would be of interest to the international statistics community because it is working with a novel data source and big data is something that most National Statistics Organisations are utilising.

After having seen Andreas win the award, I definitely had the award in the back of my mind, and Siu-Ming recommended I pursue a paper for the prize. I did hear that Andreas was writing a paper on Time Series methods he had worked on, so knew that the prize would be very competitive. Additionally, not knowing who else had applied made it difficult to gauge my chances. Initially I thought about just talking about the methods I developed for cleaning the data, but decided to tackle one of the larger problems of big data which is how to deal with sample bias which is a very large problem for big data. For big data sources, often we have a lot of data, but this is not necessarily representative of our population of interest. In my paper, I suggested using auxiliary information we have about freight in Australia to correct for this sample bias so that our data sample is representative of Australia. I demonstrated this comparing the total number of kilometres travelled in Australia over a year with a telematics data sample to data collected from the Road Freight Movements survey which gave an approximate measure, even at the state level. By employing these model-based approaches, we increase the value of the data and inference that can be made as we can justify that our sample is representative of an entire population. Similar methods could be applied to other big data projects to help make data more useful.

Writing this paper was a great experience to summarise work I had completed with the team and contribute to the international statistics community. I wrote this paper predominantly in my spare time, as I was assisting with writing the feasibility paper for the continuation

of this project. I was overwhelmed by the positive reaction, and hope it can inspire people as I was inspired by Andreas.

Nick Husek

Statistician, Advanced Modelling and Optimisation

We have some amazing members who have been with the Statistical Society of Australia for many, many years, some for well over fifty years.

The following members joined the Society between 1961 and 1970:

Alan Stark
Duncan Ironmonger
Helen Nicol
Terry Speed
John Robinson
Robert Mellor
Alison Harcourt
Robin Lamacraft
Philip Rayment
Eric Sowe
Susan Wilson
Malcolm Clark
Brian Coote
Ann Eyland

The following members joined the Society between 1970 and 1980:

Tony Pakes
Neville Bartlett
John Best
Kaye Basford
Warren Muller
Alan Brown
Chris Brien
Harmindar Nath
Jane Speijers
William Dunsmuir
Brian Davies
Tim Brown
Ronald Sandland
Richard Jarrett
Karen Byth Wilson
Jeff Wood
Kenneth Russell
John Field
Ian Saunders
Kaye Marion
Ross Maller
Ken Brewer

Ian James
Robert Forrester
Andrew Macneil
David Steel
Raymond Correll
Dennis Trewin
Doug Shaw
Raymond Chambers
Des Nicholls
Daryl Daley
John Henstridge
Noel Cressie
Judy Simpson
Neville Weber
Margaret Mackisack
George Rennie
Ian Gordon
Annette Dobson
Gordon Smyth
Matthew Knuihan
Murray Hannah
Nick Garnham
Neil Diamond
Helen MacGillivray
Walter Robb
Paul Kabaila
Terry Koen

This is extraordinary loyalty and we say a big "Thank you"!

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Keynote Speakers:

- **A/Prof. Genevera Allen**
Rice University, USA
- **Prof. Di Cook**
Monash, Melbourne
- **Prof. Bronwyn Harch**
QUT, Brisbane
- **Violetta Misiorek**
Suncorp, Sydney

Activities:

- **Workshop with Di Cook**
25 September 2017
- **Careers Session**
26 September 2017
- **Conference Dinner**
26 September 2017

Registrations close 1st September 2017

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A Recidivism Risk Prediction Instrument Base on Survival Analysis with Long-term Survivors

Ross Maller, Max Maller, Rod Broadhurst

Feb 28th 2017

Recidivism occurs when someone is released from prison, offends again and is returned to prison. Questions of interest include questions about the proportion of prisoners who are returned and how long they take to do so. Ross Maller gave an entertaining presentation to the Canberra Branch describing his experiences with analysing data on recidivism in WA and trying to answer these kinds of questions; Ross's collaborator, criminologist Rob Broadhurst, was also present and contributed insights, particularly in response to questions.

Ross described trying to improve on his brother Max's initial analysis of some recidivism data by asking him for data on time to return to prison or time to censoring for 1975-1984 so that he could look at Kaplan-Meier estimates of the survival function. Ross found that he needed to subdivide the data into sex x indigenous status groups because the Kaplan-Meier curves looked very different for the four groups. Overall, the recidivism rates were surprisingly high but the Kaplan-Meier curves flatten off at the right extreme (i.e. as time increases), suggesting that some ex-prisoners look like they will never return to prison. These individuals can be regarded as long-term survivors, immune or cured individuals. Ross fitted Weibull distributions to each group separately to estimate the "levelling off parameter". He confirmed that the groups were very different with different levelling off parameters

and rates of recidivism. Later Ross also looked at stratifying the data by parole x marital status; he found that unmarried prisoners without parole have high return rates.

In the 1988 analysis, Ross condensed the censored observations together. This was not the right approach because there is information in the cases that have long times to censoring. Ross then went on to develop methods to estimate and make inference about the immune proportion. The right extreme of the Kaplan-Meier estimator is consistent and asymptotically normal under weak conditions. This can be used to test for the existence of immunes and for sufficient followup. Alternatively, we can use a Weibull model to get a parametric estimate and based inference on that. This can be pushed further by letting the model parameters depend on covariates.

Both Max and Rod worked at the Crime Research Centre of Western Australia (abolished in 2012) which established a database of > 600k records (on > 30k people) with up to 30 years follow up for some cohorts. This is a substantial resource which allows for interesting modelling and analysis. Ross and his colleagues developed the West Australian (Adult) Actuarial Risk Instrument (WAARI) for predicting individual reoffending behaviour in the WA arrest population. This was used by parole boards together with subjective evaluations to estimate the probability of reoffending. The variables in the

model include sex, age, race, prior convictions and type of offence. Age is incorporated into the model as an adjusted age to accommodate the empirical observation that the probability of re-arrest for males decreases at 1/10 th the rate following age 21.5 than it does prior to that age (the female cutoff is 19 years). It is also possible to include age at first arrest or age at first imprisonment. The model computes the probability of return to prison in 1 year, 2 years, ..., 5 years or never with confidence intervals. It turns out that age is a key determinant of recidivism: Ross said "As you get older, you get smarter" but Rod said "As you get older, you get slower".

The predictions from WAARI have been compared with those from the Offence Group Reconviction Scale (OGRS) which is based on a limited set of Welsh data and a logistic regression model using the variables listed above as well as some other variables. When assessed against WA data, WAARI does better than OGRS; Ross pointed out that OGRS is based on very small numbers from a different population, so WAARI should do better. The one exception is in the Aboriginal subgroups where OGRS does better, although no one knows why.

The presentation was followed by a prolonged set of unusually insightful questions from the audience.

Alan Welsh

69th Annual General Meeting of the NSW Branch

On the 21st March 2017, the 69th Annual General Meeting of the NSW Branch of the Statistical Society of Australia Inc. was held at the University of Sydney. 17 members attended the meeting.

President Dr Michael Stewart presented the 2016 Annual Report as well as the Branch Council for 2017 to the audience. We had several exciting changes to the Council this year. In particular, Michael welcomed incoming vice-president A/Prof Jake Olivier. To complete the meeting, outgoing Treasurer Dr Justin Wishart presented the 2016 Statement of Accounts and auditors were set. Next up was the Henry Oliver Lancaster Lecture delivered by Dr Kendra Vant.

H. O. Lancaster Lecture: Dr Kendra Vant

The NSW Branch was delighted to have the 2017 Lancaster Lecture, "Building tomorrow: skillsets and mindsets for the AI Generation", delivered by Dr Kendra Vant at the University of Sydney. Dr Vant is a quantum physicist by training, earning her Ph.D. at the prestigious MIT and going on to work at the home of 'the bomb' at Los Alamos National Laboratory. Dr Vant then branched out into industry with roles in insurance, banking, telecommunications, government, gaming and the airline industry before her current role as Principal Data Scientist with Seek Australia. The Society was happy to break with the branch tradition of having an eminent statistician deliver the Lancaster Lecture to bring Dr Vant's knowledge and perspective of the role that deep learning and AI will play in our lives in the near future. Dr Vant did not disappoint and, on the contrary, gave a great motivating talk about the future of data and quantitative disciplines in the wake of the explosion of deep learning and AI.

Apart from the impending automation of jobs in transportation and production, Dr Vant began with insight to how the workforce need to be highly adaptable, with near-future predictions that a typical person will have over a dozen different employers over their career and change jobs about every five years. With this in mind, Dr Vant advised the need for people to constantly reskill every few years since a single university degree alone will no longer sustain them over their entire working life. This is especially true for data science, which is still in its infancy and no professional standards have been established. This led Dr Vant to give her current recommendations for reskilling. Her short-term recommendation is to become skilled in Apache Spark since it allows rapid prototyping and solid deployment. Her long term recommendations included becoming familiar with software development and the professional standards inherent in that development process. Her most important recommendation was to gain knowledge in deep learning since there has been a brain drain in this country and only a handful of experts in this important area.

Managers and leaders of industry were also part of the picture and Dr Vant encouraged them to become aware of deep learning, at least on a basic level so that they are well prepared to ask the right questions to technical experts in their scenario. To help facilitate communication, Dr Vant encouraged technical workers to change their communication and presentation skills from the academic style of introducing the data followed by discussed their methodology and concluding with the final end result. Managers and leaders will likely not have the time or technical knowledge to persevere until the final result of potential presentations of that style. Instead, to avoid alienating their audience, Dr Vant promoted a

'reversal' of this academic presentation style to start with the final results and then mention the methods to get there and conclude with describing the data that allowed this to happen.

Overall, around 41 people from various academic and industry backgrounds attended the talk thanks to the reach of our meetup.com presence. This enabled the talk to finish with a healthy discussion on the future of data and life painted with the impending use of AI. It is indeed an exciting time to be in a quantitative discipline.

Thomas Fung and Justin Wishart

Big Data, Statistics, Google and the changing pace of analysis

If there was ever any doubt about the relevance of statistics in the age of 'data science' and 'big data' this was absolutely squashed when Scott Thomson, Head of Customer Solutions & Innovation from Google presented his talk "Data Driven Marketing" to the NSW Branch meeting of the Statistical Society of Australia in April.



Scott Thomson

Scott started by giving an overview of the incredibly diverse activities that Google and its parent company Alphabet are involved in. Whilst at a glance it seems like these could be the activities of a company that

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has diversified too far, the central underlying theme of all of Google and Alphabet's activities is "to organize the world's information and make it universally accessible and useful". At the core of all of its activities lies machine learning and artificial intelligence.

As Google's primary revenue stream is advertising it was only natural that the focus of the talk was on how data is used in marketing. For context, we're not just talking a few ads here. We're talking data driven marketing at scale, through connected devices, web services, apps and sensors. Scott artfully explored 4 key topics in data driven marketing including Customer Segmentation, Audience Management, Measurement & Attribution and Growth Based Marketing. Each of these topics was illustrated with examples of how machine learning, artificial intelligence and data analysis were critical to marketing success.

As an active practitioner using these tools on behalf of our clients I have seen first-hand how data-driven marketing works. I have also seen the need for statistical thinking and approaches in how to analyse and assess marketing results. One of the points that Scott made during his talk was that the only way to be certain about the benefits of data-driven marketing for a business was to run controlled experiments. The skills required to design, execute and analyse these experiments align strongly with the skill set of statisticians. A key takeaway is that the statistician's skill set is required now more than ever to ensure that the models that are generated from tools such as machine learning algorithms are appropriate, and fine-tuned to generate results.

Another key topic of Scott's talk was focusing on how the Google Cloud platform provides access to tools that allow its users to process and analyse massive data sets at a very low cost. In effect you can create a supercomputer and lease it by the minute. This creates significant opportunities for statisticians to remove restrictions

based on limited computing resources by moving the data and the processing onto Google's infrastructure.

Google is now making machine learning very accessible by providing a range of tools that are readily accessible. It's worth taking a look to see if adding Google Cloud to your toolset makes sense.

As for the statistician's role in business, now more than ever are your skills needed. It is imperative however that the statistician's role is no longer seen as a silent supporter, but as a leader and educator in shaping decision-making behaviour as a result of the new technologies and scale and complexity of data we have available to us today.

Further information and resources can be found at <https://cloud.google.com/ml> and <http://tensorflow.org>.

Rod Jacka

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26-30 JUNE 2017 MONASH CONFERENCE CENTRE, MELBOURNE CBD

Detecting Streakiness using a Bayes Factor

On the 7th of March the Queensland SSA had an AGM and a joint branch event with the Australian Research Council (ARC) Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS). Professor Albert gave an entertaining presentation on detecting streakiness in baseball players.

Jim Albert is a Professor of Statistics at Bowling Green State University. His interests include Bayesian modeling, statistics education, computational statistics, and the application of statistical thinking in sports. His books include *Curve Ball*, *Ordinal Data Modeling*, *Teaching Statistics Using Baseball*, and *Analyzing Baseball with R*.

A general problem in sports is assessing the significance of streaky or hot-hand performances. Here we focus on the spacings or gaps between successes in baseball hitting data. Consistent and streaky hitting models are defined on the basis of the underlying hitting probabilities and a Bayes factor statistic is used to measure the support for the streaky model. One assesses the significance of the streaky patterns in many binary sequences by comparing the Bayes factors with predictions from a consistent hitting model.

Jim's talk provided an education in baseball, focusing on ways to profile players' batting performances over the

season. Dinner discussions included how this modeling could be applied to cricket. However, it was decided that streakiness in an Australian context may need to be interpreted carefully.

Lee Jones



Jim Albert with QLD Branch Secretary Dimitrios Vagenas

An Evening of Epidemiological Modelling

The Victorian Branch of the Society kicked off the year with our AGM on March 28, which was followed by an evening of Epidemiological Modelling, with talks from two experts in the field: A/Prof Manoj Gambhir of Monash University, and A/Prof James McCaw of the University of Melbourne. Attendance was excellent, with over 150 people keen to learn more about the maths behind epidemics. Manoj discussed his work at the Centers for Disease Control and Prevention in Atlanta during the 2014 Ebola epidemic in West Africa, highlighting the need for mathematical models to answer important questions during the epidemic such as when it would end, and how many cases would be expected before then. James spoke about his work in forecasting epidemics, and spatio-temporal modelling of influenza outbreaks. He demonstrated his flu forecast website, which can use surveillance data to forecast the number of cases in

different cities around Australia. Both Manoj and James emphasised just how important mathematical models are for understanding epidemics and planning appropriate public health response plans.

Our April seminar (held on May 2) was presented by Steve Bennett, the Senior Open Data Specialist at the City of Melbourne. Steve's talk, entitled "Open data: unlocking Melbourne", drew a crowd of 130 people. He discussed what open data is, how the City of Melbourne and other councils around Victoria are providing open data sets, what this open data can be used for, and how you can get your hands on it. Steve discussed how making data sets openly available brings with it considerable challenges, involving changing the culture of councils from that of protecting data to sharing it. In the spirit of openness; his slides are available at bit.ly/unlocking-mel

Jessica Kasza

ACSPRI are offering 2 weeks of social science methodology short courses at the University of Queensland in our 2017 Winter Program from June 26 - July 7.

Get in early for a discount, particularly if you are a full time student. The early-bird deadline for enrolment is May 3.

For more details about the courses on offer, visit the Winter program course page on our website: Winter Programs 2017, click on the workshop/masterclass links above, or feel free to contact ACSPRI on 03 8376 6496 or email: info@acspri.org.au

ACSPRI courses:

- for researchers and higher degree students
- are all small group (10-20 people)
- are intensive - a semester worth of information packed in 1 week
- are 'hands on', practical and applied and come with course notes that you can keep as a handy reference.
- cover a wide range of social science research and methodology from statistics to data management, survey design and analysis.



ISCB/ASC 2018

The Australian Statistical Conference (ASC18) will be held in Melbourne, Australia, from the 27th to the 30th of August 2018, in conjunction with the 39th conference of the International Society for Clinical Biostatistics. This will be the first ISCB conference that has been held in the Southern Hemisphere providing the perfect opportunity to broaden the prominence and scope of this society to a wider audience.

The conference will be held at the Melbourne Convention and Exhibition Centre, a purpose-built centre on the picturesque Yarra River in the heart of Melbourne. The conference will comprise a full 4-day program, with afternoon excursions from walking tours of the artistic laneways to winery trips planned to enable delegates to experience the delights of Melbourne and the surrounding countryside. The plans for the conference program are well underway with a number of exciting speakers already agreed, including Susan Murphy, Chris Holmes, Louise Ryan, Thomas Lumley and Stijn Vansteelandt, and many more to come. Keep up with the latest developments on the conference at <http://iscbasc2018.com/>.

The joint ISCB/ASC conference promises to be an exciting event in one of the world's most vibrant and cosmopolitan cities. Put the date in your diaries!

South Australian SSA 22 March 2017 Meeting

Models of Missingness in Mass Spectrometry Data

Daniel Kon, University of Adelaide

Daniel presented a talk about his research project to model missingness patterns in mass spectrometry data. Mass spectrometry (MS) is a technology involved in the discovery of proteomic biomarkers which correlate with disease states. If these biomarkers can be identified there is potential they can be used to develop non-invasive diagnostic tests for diseases.

MS datasets comprise measures of concentration of proteins from a large number of experiment samples. Unfortunately MS datasets typically suffer from a high proportion of missing values and the probability of missingness is related to protein concentration. Daniel described the generalised linear mixed model he has developed for the probability of missingness of target observations on a dataset from an experiment investigating gastric cancer in mice. He compared models of varying complexity and his results showed the best-performing model was the one incorporating all three of the random effects associated with sources of variation arising from the experiment design.

The next stage of Daniel's research is developing a joint model for the missing and observed data. By accounting for missingness mechanisms the bias of parameter estimates for protein expression should be reduced, leading to improved biomarker discovery over existing methods of analysis.

Motivation: Improved identification of biomarkers for disease diagnosis.

What's New: Modelling the missingness mechanism in mass spectrometry data.

Statistical analysis technique applied for study: Generalised linear mixed modelling.

What's Next: Joint model for missing and observed data which incorporates the missingness pattern model.

Julian Whiting
Australian Bureau of Statistics

DNA Sequence Estimation using Alignment and Quality Data

Sarah James, University of Adelaide

Sarah discussed her research into improving DNA sequence estimation, the process of identifying a sequence of bases (nucleotides A, C, G and T) on a DNA sequence alignment. Sarah motivated the DNA sequence estimation problem with a discussion of how DNA sequences from ancient and modern specimens can be used to investigate evolutionary relationships.

The data from Next-Generation DNA sequencing methods are a collection of 'reads' (copies of DNA fragments), where typical read length is around 75 bases. The data from the reads are described in an 'alignment matrix', where a row represents one read and a column represents a site along the DNA sequence. The alignment matrix data is imperfect, since reads can contain errors, reads can be incorrectly aligned to the reference genome and some sites may be covered by fewer reads than other sites. Churchill and Waterman (The accuracy of DNA sequences: estimating sequence quality. *Genomics* 14.1 (1992)) describe an application of the EM algorithm to estimate sequencing errors and the consensus sequence based only on data contained in the alignment matrix.

Sarah discussed her research into a method which improves the Churchill and Waterman method by including information on the quality of the reads. She presented the results of a simulation which show how incorporating the quality information reduces the uncertainty of sequence estimates, particularly at sites with sequencing errors or where fewer reads are available.

Julian Whiting
Australian Bureau of Statistics

A New Logo for the Statistical Society of Australia

May 2017 was a big month for the Statistical Society, because we finally launched our new logo and branding, making the switch from "SSAI" to "SSA" complete.

It all started in 2015, when we put a vote to the members, asking their opinions on the name of this association: "Statistical Society of Australia Inc" and if it should be changed. We received a variety of suggestions for alternative names, some of them more daring than others, from "ASS" (yes, 4 members liked this one) to "SSA". The majority of members opted for a small change – simply dropping the "inc" from the trading name and acronym. Once the decision to do this had been made a certain sense of achievement was felt, but who could have imagined how much work was yet to come!

It then took a dedicated Logo Committee, two professional designers and over a year of hard work to get to the point where we are now.

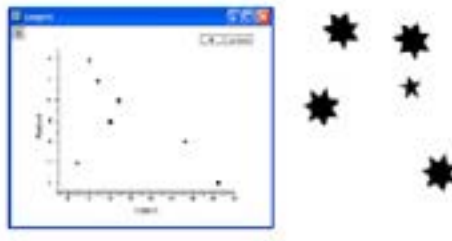
The new logo focusses on the idea of a straightforward and highly recognisable dot graph. The edge of the graph has been reduced to a simple line for a clean, understated look, and the dots of the "i"s have been enlarged slightly and created in different colours to represent the data on a graph.

When she created the new logo the designer Suzy Tuxen took inspiration from Edward Tufte, statistician and artist, and Professor Emeritus of Political Science, Statistics, and Computer Science at Yale University. Tufte wrote, designed, and self-published 4 classic books on data visualisation. The New York Times described Edward Tufte as the "Leonardo da Vinci of data," and Bloomberg as the "Galileo of graphics." Tufte came up with the concept of the 'ink: data ratio' and

is famous for creating elegant and minimalistic information displays. Pretty much everything he designs is considered top notch. If you would like to know more about Edward Tufte, check out his website: <https://www.edwardtufte.com/>.

Another source of inspiration was David McCandless. David McCandless is a British data-journalist and information designer based in London. He is the founder of the visual blog "Information Is Beautiful" and also has his own website (<https://www.davidmccandless.com/>).

The new logo is not only about statistics. There is a secondary level in the chosen design where coincidentally the dots are placed to resemble the Southern Cross, a subtle reminder that the Statistical Society is Australia-wide.



The Logo-Committee and other stakeholders at SSA felt like this was a simple, yet effective design.

We have started to roll out the new logo, which comes in different variations, on our own website and any other sites where the Society is represented. If we have overlooked the old logo somewhere, please don't be shy about telling us, so that we can replace it. While the SSA website now shows the new logo, the general rebranding of the site itself will only occur in the next couple of months. We are still in the process of creating a bit of a fresh look for the website.

I have been a regular visitor at a local printing shop, overseeing the printing of new documents, such as certificates and other stationary. If you apply for accreditation now you may have the honour of being the first recipient of a certificate with the new logo!

Over the next few weeks we hope to be able to make the change to the new logo complete. The branches were issued with "Brand Packs" giving them the opportunity to use the new logo straight away.

As mentioned before, the new logo was designed by Suzy Tuxen, of the Melbourne based design company "A Friend of Mine".

Marina Watson, a free-lance designer also based in Melbourne, then used the new logo and branding to create the documents that we will use in our day-to-day work. She also provided all the templates for our web presence.

The Logo Committee was made up of representatives of each SSA branch, led by Committee Chair Damjan Vukcevic of the Victorian Branch. Damjan did a tremendous job leading the committee and liaising with the designers, taking on a huge amount of work. At today's Central Council meeting SSA President Scott Sisson made a special point of thanking Damjan and the Logo Committee for their excellent work.

We love the new logo. We hope you'll like it too.



Main Logo



Facebook Logo



Facebook Image

Marie-Louise Rankin
Executive Officer

Register now for our workshop

Developing Your Career to Thrive in a Data-rich, Technology-driven, Reproducible Research Environment

with presenter **Professor Di Cook, Department of Econometrics and Business Statistics, Monash University**

held on **25 September 2017 in Coolangatta, at the Oaks Calypso Plaza, 99 Griffith St, Coolangatta.**

Professor Di Cook is a Fellow of the American Statistical Association, and Ordinary Member of the R Foundation. Her research is in data visualisation, exploratory data analysis, multivariate methods, data mining and statistical computing. She has developed methods for visualising high-dimensional data using tours, projection pursuit, manual controls for tours, pipelines for interactive graphics, a grammar of graphics for biological data, and visualizing boundaries in high-d classifiers. She has experimented with visualising data in virtual environments, participated in producing software including *xgobi*, *ggobi*, *cranvas* and several R packages. Her current work is focusing on bridging the gap between statistical inference and exploratory graphics. She is currently doing experiments using Amazon's Mechanical Turk, and eye-tracking equipment. Some of the applications that she has worked on include backhoes, drug studies, mud crab growth, climate change, gene expression analysis, butterfly populations in Yellowstone, stimulus funds spending, NRC rankings of graduate programs, technology boom and bust, election polls, soybean breeding, common crop population structures, insect gall to plant host interactions, Melbourne pedestrian traffic sensors, soccer and tennis statistics.

The workshop will be about

1. Reproducible research, for publications, talks, and web sites using Rmarkdown with the R ecosystem. Many journals now require you to submit code to reproduce the results reported in your paper, and this will become the norm over the next few years. Maintaining a public profile is important for many careers, and new tools using hugo enable web site construction, including blogs.
2. Why and how to organise data. Concepts of tidy data, and learning to rearrange data will be covered. It is often said that the data cleaning stage, often neglected in statistics education, takes 95% of your time. Being efficient in data handling can allow you to spend more time thinking about the problem to be solved.
3. Making effective plots, grammar of graphics, good practices: Mapping data to graphical elements in plots using ggplot2. Simple plots, scatterplots, bar charts, time series, profiles, boxplots. Using cognitive principles to improve plots. Advanced graphics, layering, maps, interactivity: Layering different data sets, drawing maps, exploring model fits, multivariate plots. Simple interactive graphics.

For more information and to register please check out our website:
<http://www.statsoc.org.au/events/ssai-events/cpd85-developing-career-thrive-data-rich-technology-drive-reproducible-research-environment/>.