



The Statistical Society of Australia News

SSAI 

EXPERIENCES FROM ASC-IMS 2014

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Immensely thankful to my department, Department of Econometrics and Business Statistics at Monash University, for funding me to attend the IMS-FPS (Finance, Probability & Statistics) Conference 2014 between 2-5 July at the University of Technology Sydney, in which I presented my PhD research work. This was a satellite conference to the joint Australian Statistical Conference/IMS Annual Meeting held between 7-10 July at the Australian Technology Park, Sydney.

Even only participation in the ASC-IMS 2014 would be a remarkable experience though, I encountered invaluable experiences by attending the conference. There are no words to fully capture and articulate my gratitude to my supervisor, Professor Rob J Hyndman, for offering me funding to attend this conference.

Being an "apprentice researcher" who is aiming to become a fully independent researcher, my participation in conferences opens up doors to the wider world. The ASC-IMS 2014 brought together leading academic experts, practitioners and junior researchers with a great turn up from 35 countries. The keynote speakers and invited sessions from eminent scholars such as Professor Terry Speed, Professor Peter Hall and Professor Alastair Scott highlighted many aspects in the field of Statistics. The conference was well-organized with numerous parallel sessions concentrating important contributions and identifying emerging directions where Statistics will play an essential role in the future. Listening to each presentation obviously enhanced my confidence in being able to present professionally and deal with questions from the audience comfortably.

Besides, the SSAI International Engagement Dinner and the Young Statisticians Dinner held on the first two days of the conference were delightful social events. These spectacular events facilitated me to share research and working experiences with academic and industry professionals. Vitally, the network built with young statisticians from different parts of the world will carry throughout my whole life.

Overall, my fullest participation to the ASC-IMS 2014 was indeed a memorable experience and a terrific learning event. My applause to the conference organizers, SSAI and IMS, for a fruitful and enjoyable event. Yet again, I am truly grateful to my supervisor for funding my participation in the ASC-IMS 2014, which was very beneficial to attend.

Thilaksha Tharanganie

PhD Student

Department of Econometrics and Business Statistics, Monash University



Thilaksha
Tharanganie

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DEADLINE FOR NEXT NEWSLETTER
10 November 2014

EDITORIAL

Many of you will have received a paper copy of this newsletter when you attended ASC in Sydney in July. We hope that this next issue is just as successful at recording SSA activities past and inviting you to participate in activities still to occur this year.

The conference was a great success, as you'll see from the articles and photos in this newsletter. Maybe you had to write a report on the conference for your funding organisation. Why not let it have a second life in the newsletter? Did you write a report on the conference for your blog? Send us the link and we'll publish it here! The newsletter can be a great source of (and resource for) readers, and if you've had to write something, why not let your efforts be seen by a wider selection of your peers? We're always on the lookout for contributors and contributions.

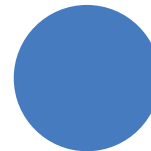
We're also keen to use innovative ways to generate content. Terry Speed will be speaking in Canberra on a Tuesday morning – prime teaching time for many. We've heard that an academic will take a Multivariate Statistics class to the lecture, and ask for a Branch meeting style report from each student. We hope to print the best one here in December. If you have interesting ways to generate content for the newsletter, let us know.

By the time this newsletter reaches you the worst of winter in the southern states will be over and there won't be much of the year left. We wish you well for the projects you have left to finish, and hope that there are aspects of your work that can be shared through this newsletter will all Society members.

Alice Richardson



and **Michael Adena**



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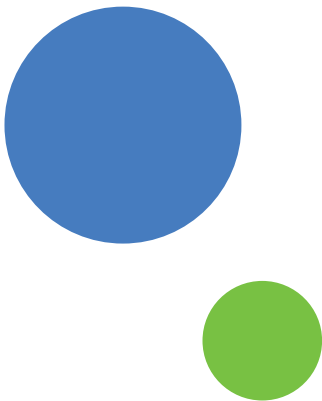
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EVENTS

PROF TERRY SPEED AMSI LECTURE TOUR 2014

August-November, Australia-wide

ANU SPECIAL YEAR CONFERENCE "ROBUST STATISTICS AND EXTREMES"

8-11 September 2014, Canberra

BIostatistical Methods for Analysing Longitudinal Data

29-30 September 2014, Cairns

2014 Combined IUFRO and Society of American Foresters and Canadian Institute of Forestry World Congress Meeting

With David Brillinger and Abdel El-Shaarawi

8-11 October 2014, Salt Lake City, USA

BAYES ON THE BEACH 2014

10 – 12 November, 2014, Surfers Paradise, QLD

ISI Regional Statistics Conference "Statistical Science for a Better Tomorrow"

16-19 November 2014, Kuala Lumpur, Malaysia

BIOINFSUMMER

1 – 5 December 2014, Melbourne, VIC

Australasian Applied Statistics Conference

1 – 5 December 2014, Port Lincoln, SA

ACSPRI Social Science Methodology Conference

7-10 December 2014, Sydney

Conference on Applied Statistics and Public Policy Analysis

11th -12th December 2014, Wagga-Wagga

Young Statisticians Conference 2015

5-6 February 2015, Adelaide

60th ISI World Statistical Congress

26-31 July 2015, Rio de Janeiro Brazil

Joint Statistical Meetings 2015

8-13 August 2015, Seattle Washington USA

2015 RSS Conference

4-10 September 2015, Exeter UK

XXVIIIth International Biometric Conference (IBC 2016)

10-15 July 2016, Victoria, BC Canada

PRESIDENT'S COLUMN

I have just returned from the International Congress of Mathematicians (ICM) in Seoul, South Korea. This was an amazing event, even when compared with previous Congresses. The statistical component was not large, but I will get back to my reasons for going below.

The ICM is organised by the International Mathematical Union (IMU) and has been running since 1897. Today it runs on a four year cycle, and gets much publicity from the announcements and awarding of the Fields Medals. This year there was greater than usual publicity with the first ever award of a Fields Medal to a woman, Maryam Mirzakhani of Iran. (Also announced by the first ever woman President of the IMU, Ingrid Daubechies and presented by the first ever woman President of South Korea, Park Geun-hye.)

As an Australian attending this meeting of over 5500 mathematicians, what impressed me was the difference in support for the basic sciences. The Korean government and business community clearly saw that the mathematical sciences were vital for the country and went out of its way to support the country's mathematicians bid to host the ICM. The support was both financial and moral. The government offered sponsorship to 1000 mathematicians from developing countries to attend. The opening ceremony was broadcast live on national TV. The arrival of the Pope was delayed by a day so that it would not clash with the opening!

What does this teach us about the situation of the mathematical sciences, particularly statistics, in Australia? There are many reasons why mathematics achieved this prominence in Korea, including a culture that respects learning. But one major point is that the mathematical sciences are seen as being a major contributor to South Korea's amazing economic growth, a point made strongly by President Park in her speech. In Korea this is widely accepted as a fact.

All statisticians in Australia need to contribute to educating our community as the importance of what we do. As professionals who are often portrayed as "back room experts" and who are trained to be cautious in what we say, this is not a natural role for many of us. But we all have opportunities, ranging from everyday occasions through to special events.

When at the proverbial barbeque we are asked what we do and the reply "statistician" leads to the question "and what do they do?", there is an opportunity to give examples from either our own work or that of other statisticians of how we have made a difference. Decoding the genome. Designing the trials that really determine whether drugs work. Identifying new varieties of cereals that feed the planet. Collecting the data that helps governments make the right decisions.

I use examples from my own work. Forecasting energy demand to enable planning for electricity utilities. Helping design the HILDA survey that is used to understand Australian households. Helping medical scientists get new treatments approved. The list goes on and it is surprising how often that, after mentioning a few, one is picked up by the person I am talking to as directly relevant to them. We can all have our own list that makes our subject relevant to others.

> Continued on next page



John Henstridge

An essential part of this is simply being visible as statisticians. In my view statistics is the most applicable of all the mathematical sciences and we should be pushing this message.

Finally, why was I at the ICM when there was not much statistics and almost none of it applied? Apart from personal reasons in wanting to catch up with a number of colleagues, I continually find that what separates statisticians from other professions working with data is our mathematical background. For me the ICM was an opportunity to refresh my mathematical batteries, providing new ways of looking at problems. For example, pure mathematicians such as Australia's Terry Tao are developing algorithms for image reconstruction using approaches (and language) that are quite different to those most statisticians would use. They might not fully answer some of the questions a statistician might ask, but there is still much we can learn.

The link to mathematics is critical when we are trying to publicise statistics. The public has greater recognition of mathematics, although perhaps not greater understanding. Even though we mostly regard statistics as a very distinct part of the mathematical sciences, one that is often misunderstood by other mathematicians, there is more that unites us than separates us.

We – the Society and the Statistical community – need to set ourselves the target of changing how we are perceived. If other countries can do it, so can we.

John Henstridge

President
Statistical Society of Australia



**YOUNG
STATISTICIANS
CONFERENCE**
ADELAIDE FEB 5-6 2015

YSC 2015



ABC IN SYDNEY HELD AT UNSW IN JULY

Monday, 7th July 2014

Following on from ABC in Paris (2009), ABC in London (2011) and ABC in Rome (2013), the fourth instalment of the international workshops in **Approximate Bayesian Computation (ABC)** was held at UNSW in Sydney on 3rd-4th July 2014. The first antipodean workshop was held as a satellite to the huge (>550 registrations) [IMS-ASC-2014 International Conference](#), also held in Sydney the following week.



Workshop speakers, L-R: Brenda Nho Vo, Matt Moores, Gael Martin, Scott Sisson, Zach Aandahl, Chris Drovandi, Guilherme Rodrigues, Dennis Prangle & Pierre Del Moral.

ABC in Sydney was created in two parts. The first, on the Thursday, was held as an "introduction to ABC" for people who were interested to find out more about the subject, but who had not particularly been exposed to the area before. Rather than have a single brave individual give the introductory course over several hours, the expository presentation was "crowdsourced" from several experienced researchers in the field, with each being given 30 minutes to present on a particular aspect of ABC. In this way, Matthew Moores (QUT), Dennis Prangle (Reading), Chris Drovandi (QUT), Zach Aandahl (UNSW) and Scott Sisson (UNSW) covered the ABC basics over the course of 6 presentations and 3 hours.

The second part of the workshop, on Friday, was the more usual collection of research-oriented talks. In the morning session, Dennis Prangle spoke about "lazy ABC," a method of stopping the generation of computationally demanding dataset simulations early, and Chris Drovandi discussed theoretical and practical aspects of Bayesian indirect inference. This was followed by Brenda Nho Vo (QUT) presenting an application of ABC in stochastic cell spreading models, and by Pierre Del Moral (UNSW) who demonstrated many theoretical aspects of ABC in interacting particle systems. After lunch, Guilherme Rodrigues (UNSW) proposed using ABC for Gaussian process density estimation (and introduced the infinite-dimensional functional regression adjustment), and Gael Martin (Monash) spoke on the issues involved in applying ABC to state space models. The final talk of the day was given by Matthew Moores who discussed how online ABC dataset generation could be circumvented by pre-computation for particular classes of models.

In all, over 100 people registered for and attended the workshop, making it an outstanding success. Of course, this was helped by the association with the following large conference, and the pricing scheme -- completely free! -- following the tradition of the previous workshops. Morning and afternoon teas, described as "the best workshop food ever!" by several attendees, was paid for by the workshop sponsors: the Bayesian Section of the Statistical Society of Australia, and the ARC Centre of Excellence in Mathematical and Statistical Frontiers.

Here's looking forward to the next workshop in the series!

This workshop was organised by the Bayesian Section of SSAI.

Scott Sisson

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WE WISH TO CONGRATULATE THE AWARD WINNERS WHO WERE HONOURED AT ASC2014

Matt Wand was awarded the Pitman Medal for 2013 and **Noel Cressie** the Pitman Medal for 2014

Gary Glonek received the SSAI Service Award in recognition of a high level of contribution to the SSAI over a sustained period. Gary held a number of roles within the Society both locally and in a national context. Gary has not only provided twelve years of service to the South Australian Branch but for more than a decade he was a member of the SSAI Awards Committee. As Chair of the ASC 2012 Scientific Program Committee he played a pivotal role in delivering an outstanding conference program.

Alice Richardson received the SSAI Service Award. Alice is a long-standing member of the SSAI and an active member of the Canberra Branch, where she held the position of Branch President from 1999 until 2000. She then went on to become editor of the SSAI newsletter in August 2001, overseeing the transition to an online newsletter in recent years. Through her affiliation with the University of Canberra she has also been very active in running events to promote not only statistics but also the Statistical Society there.

Ian Saunders received a Service Award because the Society wished to acknowledge his distinguished service to the profession and, in particular to the Statistical Society of Australia for more than 30 years. Having been a member of SSAI since 1974 Ian served on the Branch Councils of the Canberra Branch, VIC Branch, QLD Branch and SA Branch. He also joined the Accreditation Committee in its early days in 2001 and became Accreditation Committee Chair after only one year until 2007.

Alan Herschtal was awarded the ASC 2014 Pitman Prize for the most outstanding talk presented by a 'young statistician' at an Australian Statistical Conference. Alan described how he constructed a Bayesian model that enables more precise treatment of cancer patients undergoing radiation treatment.



Matt Wand
with John
Henstridge



Noel Cressie
with John
Henstridge



Gary Glonek
with John
Henstridge



Alice
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with John
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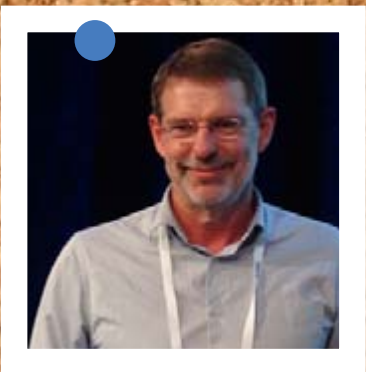
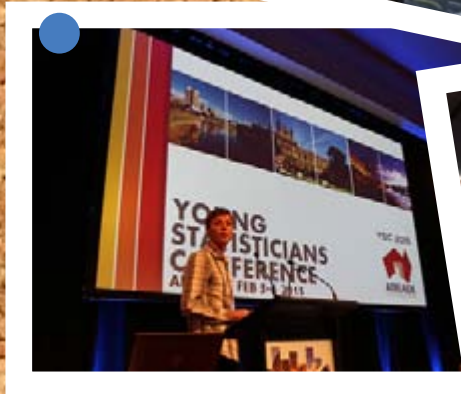


Ian Saunders



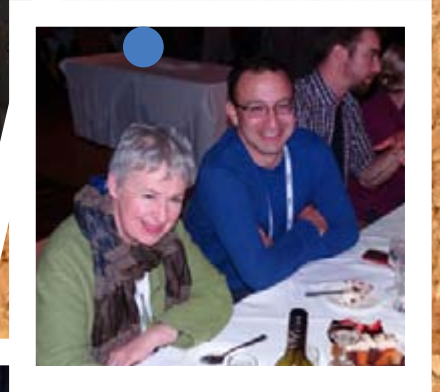
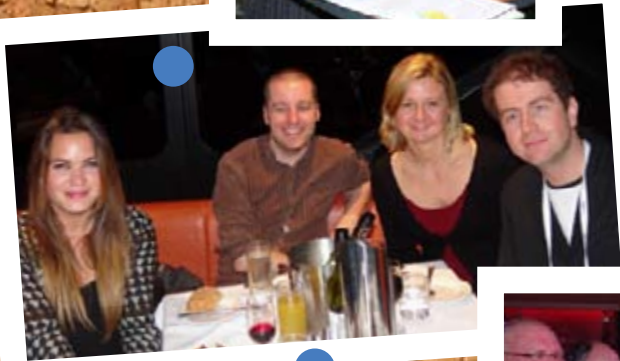
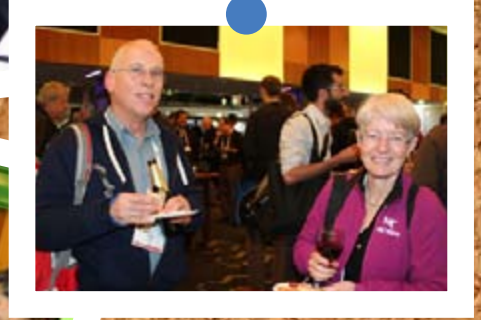
Murray Aitkin
congratulates
Alan Herschtal

ASC2014





ASC2014



BAYES ON THE BEACH

November 10 - 12, 2014

Surfers Paradise, Gold Coast

botb2014.wordpress.com

Bayes on the Beach is an intentionally small international forum for discussing and exploring developments in Bayesian Statistics and its applications. This three day conference will take place in the world-famous Surfers Paradise on the Gold Coast and is designed to have a diverse format including presentations, contributed sessions, workshops, a poster session and tutorials.

The conference is supported by the Australasian Society for Bayesian Analysis and the Bayesian Statistics Section of the Statistical Society of Australia.

FROM THE SSAI OFFICE

It's been a turbulent time at the SSAI Office with travel, software upgrades and website issues.

In June I felt very privileged when I was invited to the Gold Coast by the Gold Coast Business Exchange. For two days other guests like myself and I got spoiled by local businesses eager for us to hold association events on the Gold Coast. I was very impressed with the venues on offer and I would be thrilled if SSAI held a Young Statisticians Conference or Australian Statistical Conference there at some stage. It was not so much the beach setting that blew me away (although that might have helped!) but the general atmosphere, the fantastic weather, the gorgeous meeting venues and the lovely people that had me planning events in my mind there and then. For those of you who would like to get a taste of conferencing on the Gold Coast I'd like to invite you to this year's "Bayes on the Beach" event, which will be held at the Mantra Legends Hotel in Surfers Paradise from 10-12 November 2014 (www.botb2014.wordpress.com).



In July I hopped on a plane again – this time to attend ASC2014. As always it was a great treat for me to see so many of SSAI's members. Some of you I met for the first time and with others it was like meeting old friends again. It makes my everyday work so much more "real" when I can actually associate a name with a face. I had a lot of fun representing SSAI at the SSAI booth. I feel very lucky to be part of the statistical community here in Australia and I'm not even a statistician! If you attended ASC2014 and took photographs perhaps you'd like to add them to our ASC2014 Dropbox folder. Just send me an email to eo@statsoc.org.au if you are interested and I'll send you a Dropbox invitation.

Back at the office my time was immediately taken up with moving our Microsoft Office suite to the Cloud. Putting SSAI's files into the Cloud is particularly useful for a small office such as that of SSAI. With no one else at the office (except for Mondays, when Sonia Cowdroy comes in) it makes all the difference to be able to access all the files and emails remotely during times when I am travelling or at home with sick children. I am very excited that we have taken this step, but obviously this technology is still very new to me and some days it feels like having to learn everything again from scratch.

Our accounting software MYOB moved to the Cloud in June and I can't recommend doing this highly enough. The software is now linked to our bank accounts which makes bank reconciliations a breeze. If any of you use MYOB for your own accounting and you have been thinking about upgrading to the Cloud please feel free to give me a call and I will be happy to discuss the advantages with you.

Soon I will be contacting all the members and asking them to participate in the 2014 Association Matters survey. In 2013 Survey Matters launched the Associations Matter Study - a research project that examined membership of professional associations in Australia and New Zealand. The study surveyed members from 23 professional associations to investigate their motivations for joining, and the value they derive from belonging. Survey Matters received a fantastic response to the inaugural study, with almost 8,000 members taking part in this ground-breaking research. When asked if SSAI wanted to participate this year I put my hand up, which means that I actually volunteered our members' time for this survey. Seriously, if statisticians don't see the benefit of a survey – who will?

By the time to read this newsletter we will be truly into spring and before long the big Christmas rush will start. Enjoy the calm before the storm!

Marie-Louise Rankin

SSAI GOLDEN JUBILEE TRAVEL GRANT

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

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

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



A complete application will consist of

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

The application deadline is 31 March 2015.

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

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

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

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

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

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Register on the SSAI/Wiley Landing Page and from then on you can purchase Wiley books at the 35% discount *without use of a Promotional Code*. For those members outside of Australia and New Zealand, please use the Promo Code SDP92 at checkout to activate the discount. Members who registered on the Wiley site before the SSAI link was available may encounter problems when trying to get the discount. To get the new discount these members unfortunately need to register using another email address.

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Post Graduate Internships

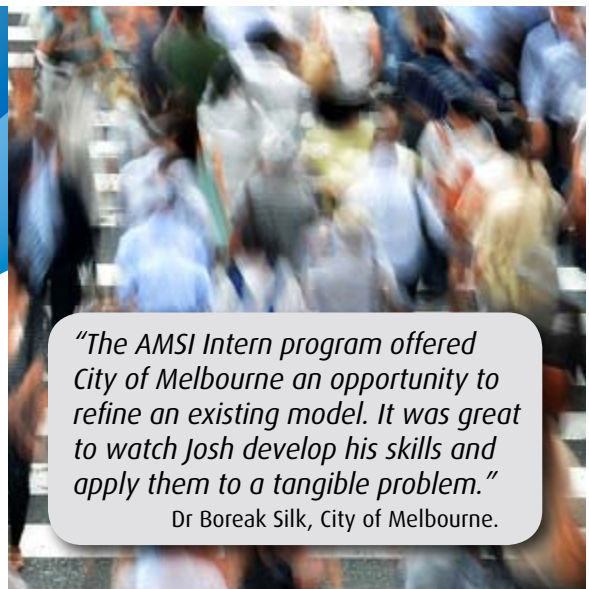
Ready... Stats... Go...

At 18 different locations around Melbourne's CBD the city council monitors pedestrian traffic to determine the impact of events—from a tram running late, tourism trends around specific events, to changes in foot traffic after major social and economic changes such as the stimulus package.

To analyse and translate the foot traffic data, the City of Melbourne enlisted the skills of AMSI Intern Josh Browning from the School of Mathematical Sciences at Monash University.

The AMSI Intern program connects businesses and academics with specialist knowledge. All intellectual property remains with the business, creating a secure environment to grow innovation and productivity through R&D projects.

Find out more at www.amsiintern.org.au



"The AMSI Intern program offered City of Melbourne an opportunity to refine an existing model. It was great to watch Josh develop his skills and apply them to a tangible problem."

Dr Boreak Silk, City of Melbourne.



MONASH
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SCIENCE MEETS PARLIAMENT 2014

Sometimes, when I get frustrated with the state and standard of Australian politics, I wonder if I should get into politics myself. Roll up the sleeves, and help get things done. But then I go to something like Science meets Parliament and I change my mind.

Held over two days, Science meets Parliament (SmP) is an opportunity for scientists and researchers to learn more about the process of politics, policy making and media coverage of science. Scientists also get to meet with parliamentarians to promote their research. Along with John Henstridge and Damjan Vukcevic (who wrote a great summary of the event here), I was lucky to attend as a representative of the SSAI and mathematical sciences.

We heard from politicians, journalists, policy makers, business leaders and science communicators, and we each had the opportunity to meet personally with parliamentarians to discuss our work. I came away with a better understanding of what politicians need to do to get their job done. They often have to jump from topic to topic, policy to policy, requiring a quick focus change and rapid response time. They also have to talk – all day – with a lot of different people who all want something. Researchers and statisticians, on the other hand, spend their time contemplating the ins and outs of their field, probing topics and increasing their depth of understanding while answering questions about how the world works. Observing the daily life of politics more closely, I came away understanding that I'm definitely in the right job where I am and I'm much better off moaning about politics from afar.

Besides putting the idea of a political future to rest, the event provided plenty of other insights. The clear and consistent message from all speakers at SmP was that scientists need to be more effective communicators. The inherent differences between politics (and journalism) and science, our different languages and motivations, are all significant hurdles that get in the way how well we communicate the value and meaning of what we do. And what happens when we struggle to communicate effectively? The people who are good communicators get to control the 'conversation', and if these same people don't have the relevant information at hand (e.g. 'armchair scientists') then important debates can become misinformed. Therefore it's really important that we become better at talking about what we do, in ways that are meaningful to people outside of our domain.

As statisticians, we often get caught up in detail. We know that details are important and they provide context so that we know whether or not our results are meaningful. However, while we understand that correlation doesn't mean causation, and that our methods come loaded with important parameters, caveats and limitations, everybody else is looking for the "so what?". SmP was a great reminder that if we want to get our work out there, and to have our messages understood and trusted, we need to let go of the detail, focus on the bigger picture, and tell the story. We also need to be better at self-promotion so we can create more opportunities to talk about what we do to the people for whom our work matters. It also helps to know who those people are.

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SmP was a great learning experience. Besides learning that I could never be a politician (the prospect of having to sit through Question Time again is not enticing), I learned to have more confidence about talking about what I do, and that it's ok to let go of the details that statisticians love to cling to. I also learned that self-promotion is a necessary part of getting your work out there, and whilst a path of quiet achievement may seem more appealing, a little self-promotion can go a long way. After all, if I hadn't put myself forward to represent the SSAI then I would certainly have missed out on this opportunity.

Thanks to the SSAI for supporting my attendance at Science meets Parliament 2014. It was a great professional development opportunity and I would gladly recommend that others consider this event the next time it rolls around.

Kirsten Hancock
Telethon Kids Institute



John Henstridge,
Kirsten Hancock
and Damjan
Vukcevic

WHAT'S HAPPENING IN STATISTICAL EDUCATION?

It is with great pleasure we report on recent and current Statistical Education Section activities.

Report on ASC-14

One of the first things you learn when you teach statistics at a University is that there is no randomness to timetabling - 9 a.m. first-year statistics classes are a given, with no chance of a sleep-in for students of the random arts. And so it was at ASC-14, kicking off the red-eye session of the final day of the meeting with Statistical Education leading the way.

Alice Richardson, from the University of Canberra, began the session with a search for meaning in the rich language of statistics. Alice made the observation that although statistics adds many "new" words to students' lexicons, the words themselves are often far from new but have different meanings in their common usage. The challenge, therefore, is to teach new meanings for old words, and Alice described meeting that challenge with a variety of tools, like word games and puzzles.

As the audience mulled on the significance of Alice's linguistic challenge, Peter Howley, from the University of Newcastle, offered his insights into the known challenge of engaging Business students with their first taste of Statistics. Peter described using a tool of business itself, Total Quality Management, to redesign a first-year Business Statistics course, with the remarkable outcome that a course that has historically struggled for student favour suddenly kept students interested and engaged and became one of the best rating courses on offer.

Next, Michael Martin, from ANU, presented a call-to-arms for the Statistical Education section - offering a glimpse of what the Section had been doing over the past year and looking for insight from the audience as to where we head from here. Looking forward, a new initiative, spearheaded by Peter Howley, will be the Poster Competition - described in more detail below - aimed at engaging school students with Statistics as early as possible.

Rounding out the session, James Enoch, Education and Academic Manager at SAS, and Olivera Marjanovic, from the University of Sydney, again looked forward, into a future where teaching from the cloud is a reality and students can access advanced analytics and real-life data and examples from industry through products currently being developed and rolled out by SAS. The future, they told us, is now - and they gave a current example of how this is working in the Business School at the University of Sydney.

For an early session on the final day of a meeting (following a conference dinner and with a World Cup semi-final going into extra time), the room was pleasantly filled, and the Section thanks Alice, Peter, Michael, James and Olivera for what were highly thought-provoking and inspiring presentations. The talks reminded all that when each of us braves the lecture hall first thing on a Monday morning, we are not alone!

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Report on a new activity: Poster Competition

Under the auspices of the International Statistical Literacy Project (ISLP, see <http://iase-web.org/islp/>), the SSAI is supporting the pilot of a national statistical literacy project competition in the Hunter Region in 2014, with a view to expand nationally and work with existing similar Australian projects in 2015 and beyond. SAS has agreed to provide ongoing support for this initiative.

The project may be characterised as secondary school students undertaking an activity-based learning project, in teams of 2 to 5, and creating a poster presentation (as per conference poster) based on the collection, analysis, interpretation and reporting of data (using principles of statistics and scientific method) towards addressing a practical question/problem of interest to them.

There are multiple aims for this project (listed below**) and a unique element of this project's model towards achieving several of these aims is the involvement of mentors/assistants who will be available to attend schools and help facilitate projects with the school teachers. The mentors may be under- or post-graduates (Mathematics, Statistics, Science, Psychology, Business, etc), pre-service secondary Mathematics and Science teachers; retired school teachers; local professional society members; academics; statisticians.

Each mentor may, for example, attend a school on 3 occasions (2hr visit each time) across a 6-week period (between August and November – for regional judging early December) and supervise two or more projects. Project duration may be reduced or increased as required by the school. Timing and duration of visits will depend largely on the local teacher and their school's timetable; an honorarium will be provided to these volunteers in appreciation.

Thus the project will support the cross-fertilisation of knowledge and ideas. Among many key outcomes, it will enable:

- i. pre-service mathematics and science teachers (those studying to become mathematics teachers) to reflect upon their compulsory statistics courses, become more familiar with statistics and have increased in-school experiences;
- ii. under/post-graduates in the afore-mentioned fields to gain experience with Schools and students and potentially raise interest in becoming teachers themselves;
- iii. teachers to upskill and learn statistical concepts via attending facilitators.

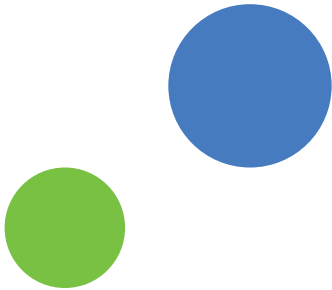
Basically it supports a series of additional 'boundary encounters' that will enrich all those involved.

The focus is to be all-inclusive, inspiring projects from all fields (not simply the Sciences) towards helping students appreciate how Statistics and Statistical Thinking is not only important but also ubiquitous. Similarly, we as statisticians must value the need for applications of Statistics. Thus the project operates in the spirit of everyone requiring one another; that disciplines do not work in isolation from one another but rather rely upon one another. Building cross-disciplinary knowledge, interactions and teamwork is valuable.

Final judging will be in December on-campus at The University of Newcastle; with the winning poster potentially able to compete in the International project (judged in March 2015).

There will be certificates and prizes (including items such as mobile phone microscopes) for winning teams locally.

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So, perhaps you are near the Hunter Region or know of others in the region who would be keen to be a mentor, or are teachers or have secondary school students in the region – whatever the connection, please spread the word.... there is a poster competition and all are invited. Please contact peter.howley@newcastle.edu.au for more details or to register (registration is free!).

Schools/teachers are invited to register interest early so mentors may be arranged (if desired) and to also assist with the general administration of the competition.

If you have any queries or suggestions, or would like a flyer to send to others outlining the project please contact peter.howley@newcastle.edu.au.

This activity brings additional international advertising for the SSAI, now listed under http://iase-web.org/islp/People.php?p=Country_Coordinators and the ISLP's facebook page.

We have begun spreading the word, presenting to those attending the University of Newcastle's Teachers' Visit Day, contacting the Education Officer (Catholic Schools), Head Math and Science Teachers, Schools involved with the Science and Engineering Challenge, Hunter Science HUB associates, colleagues and friends who know teachers and students or can distribute the information through rotary clubs, Facebook and such.

I'm sure we will learn a lot from the pilot and will keep you informed of progress.

Project Aims

Inspire school students aspirations towards Higher Education and careers in Statistics, Mathematics and Sciences

- Build relationships between University – Schools – Teachers – Students – Professional societies (build community) and increase accessibility of Higher Education
- Inspire school teachers and students with practical applications of curriculum content
- Enable Undergraduate and Postgraduate students in Statistics, Mathematics, Sciences, Psychology to experience project facilitation and mentoring and consider career in teaching mathematics/science
- Provide practical opportunities for pre-service teachers to mentor students and facilitate project management
- Increase awareness of the wide application and need for Statistics
- Inspire and enrich through boundary encounters

Peter Howley and **Michael Martin**

Co-chairs of the Statistical Education Section

SSAI SECTION FOR INTERNATIONAL ENGAGEMENT

SSAI Welcomes International Travel Grant Recipient

In 2014 the SSAI established an International Travel Grant that provided partial financial support for a deserving colleague from a developing country to attend the ASC-IMS conference in Sydney and to visit a number of research groups during this visit. In late 2013 Mohamed Razmy from the South Eastern University of Sri Lanka was chosen out of a group of 18 applicants.

Razmy spent a total of three weeks in Australia. His first week was spent in Brisbane, hosted by Mark Griffin (Chair of the SSAI Section for International Engagement). During this time Razmy had meetings with various groups including Helen McGillvray (to discuss curriculum development), Simon Reid and other staff from the UQ School of Population Health (to discuss Razmy's work on the Chikungunya Infections in Sri Lanka and the future possible outbreaks), and staff from the UQ Sports Recreation Program (as Razmy also coordinates the sports program at his university).

Razmy's second week was spent in Sydney, hosted by Louise Ryan (Chair of the SSAI NSW Branch). During this time Razmy spent time with Louise's group to discuss biostatistics, and attended the Advanced Bayesian Computation workshop presented by Scott Sisson (Chair of the SSAI Section for Bayesian Statistics).

Razmy's third week was spent at the ASC-IMS Conference in Sydney. At the conference Razmy presented a seminar on his work, and gave an address at the International Dinner on the Monday night.

A number of long-term relationships and collaborations were established during Razmy's visit, and I personally would like to thank the SSAI and the individuals listed above for making Razmy's visit such a success.

The SSAI will be continuing this International Travel Grant for the 2015 Young Statisticians Conference, where details about this 2015 Grant can be found at <http://www.statsoc.org.au/international-travel-grant>

Please note that the deadline for applications for this 2015 Grant is the 5th of October, 2014. Questions about this Grant can be sent to Mark Griffin, Chair of the SSAI Section for International Engagement, at m.griffin@adasis-oz.com.

Mark Griffin



Mohamed Razmy with Mark Griffin

CANBERRA BRANCH

Young Statisticians Network Careers Tour

On 9-11th of April 2014, the students of the Young Statisticians at the Canberra Branch of the SSAI went on a Careers Tour around the ACT. It was a careers fair with a twist! Instead of the usual careers night set up, where students and many different employers meet at the same venue for a few hours; 22 students spent 90 minutes at 7 different departments over 3 days.

On the itinerary we had the Australian Bureau of Statistics, The ANU Research School of Finance and Applied Statistics, the CSIRO, the ANU Statistical Consulting Unit, the Australian Institute of Health and Welfare, the Australian Taxation Office and the Department of Social Services.

The tour proved a positive experience for students and employers alike. Craig, an engineering student undergraduate student interested in statistics, exclaimed that the trip was "an excellent idea"! He, like myself, saw the public service and statistical careers in general, as a "black box". I didn't know the differences between the departments, and had no idea departments like the DSS hired so many statisticians. Visiting the different offices gave us valuable first-hand experience of the unique culture and work of the individual departments.

Having speakers from different departments work through some of their projects with us was eye-opening. Before the Careers Tour, it was pretty hard to imagine how the statistics we learned at university could be applied in real life. Most of the techniques we learned (for the sake of being examinable) seemed a tad over-simplistic and out-dated. But it became clear that the general statistical thinking and ideas from university could provide a solid foundation for the complex, large-scale models that we witnessed.

Particularly memorable projects included HiLDA at the DSS, the ancient artefacts and music studies at the ANU Statistical Consulting Unit, and the huge data sets and forensic tools at the ATO.

It was a very eye-opening and inspiring three days for the students! We hope to run this event in years to come!

Chaturi Bhaskaran



What financial loss means

Dr Aaron Bruhn of the Research School of Finance, Applied Statistics and Actuarial Studies at ANU, gave the July Canberra Branch presentation. The collapse of Queensland-based Storm Financial was used as a case study to investigate the impact on individuals who suffer from significant financial loss. This also highlights broader environmental issues relating to financial provision for individuals, particularly in retirement. Such issues include regulation, financial literacy, the significant choice available, and the need for professional financial advice. These are particularly significant in the Australian context where financial self-sufficiency is promoted as a desired option in retirement.

A qualitative approach was taken with elements of grounded theory and narrative inquiry utilized when engaging with the available data. Available data from a 2009 Parliamentary Inquiry includes 823 pages of public hearing transcripts and 2879 pages of written submissions. Interviews with 15 different parties were also carried out, giving rise to 33 hours of recorded conversation.

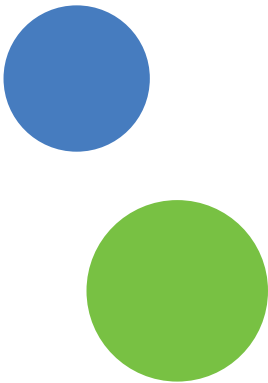
It is apparent that sudden and significant financial loss is devastating. An individual's emotional wellbeing is a primary casualty, and one's mental health is also vulnerable. An individual's social world is also impacted, including relationships with family and friends, how one engages in community activities, and the ability to partake in familial and cultural roles. Financial victims also perceive a sense of judgment from society at large about their losses.

A loss of trust may be the epitome of financial loss. Any financial promise requires trust in institutions, professional service providers, government via licensing and regulation, and others including oneself. Trust in all of these entities is impacted when loss occurs, and is highly dependent on not just the size but also the circumstances of those losses. The loss of trust and the loss of financial means leads in turn to a lack of control over one's life. Many of these impacts are reflected in other traumatic circumstances, and some are seen to be particularly exacerbated in the specific case of Storm.

These impacts demonstrate that vulnerability exists when encouraging self-sufficiency in retirement. Greater individualization in financial provision introduces risks that current regulation may not be equipped to mitigate, particularly in the areas of licensing and disclosure. Information asymmetry between informed and non-informed participants exacerbates these risks. This highlights the importance of ethical disposition when dealing with financial affairs.

Storm's collapse highlights that money matters but not for its own sake – it is the subsequent loss of control and options that is tangibly impacted. Significant financial loss is therefore anything but trivial, and a strong dependence of overall wellbeing on financial wellbeing is highlighted. Any system which allows unnecessary risks upon the attainment of such financial wellbeing for individuals should therefore be subjected to critical scrutiny.

Gaurav Khemka



A rigorous statistical framework for estimating the long-term health effects of air pollution

Professor Sujit Sahu from the University of Southampton, UK, gave an engaging presentation in the May meeting of the Canberra Branch. The focus of the talk was a Bayesian approach to linking output from a spatial air pollution model with an epidemiological health outcome model. This would allow the propagation of uncertainty from the pollution model into the health outcome model so that the significance of long-term health effects could provide a probabilistic prediction of the outcomes.

Professor Sahu highlighted the interdisciplinary nature of this research. He also explained why it is important from a population health perspective. Currently, in England alone, it is estimated that traffic pollution kills about 5,000 persons per year, and particulate air pollution reduces life expectancy by about 6 months. After the disastrous Great Smog of London in 1952 that killed approximately 12,000 people, air pollution controls and standards for air quality were introduced by parliamentary legislation.

There are two statistical approaches to assessing impact of air pollution: cohort studies where a group of individuals are selected and monitored over a long period of time to examine how their health is affected by exposure to air pollution in their everyday life. The second approach is small area studies that measure the effects at aggregated population level. The second approach is used as it is considerably cheaper to run, but the disadvantage is that individual outcomes cannot be determined from such a study. The epidemiological health model is a Bayesian spatial areal data model with the analysis units being 323 local authority regions across England using data from 2010. One of the covariates risk factors in the model is average air pollution concentration, which can be derived from the Bayesian spatial-temporal air pollution model.

The areal health outcome model is an extension of the Besag, York and Mollie conditional autoregressive (BYM CAR) model. The model was extended to allow for localised spatial smoothness in the random effects surface, that is, subregions of spatial smoothness separated by step-changes, which is much more realistic for modelling health impacts.

The air pollution model was constructed for 5 years' data from 166 monitoring stations across England and also output over a 12 kilometre square grid from an atmospheric dispersion model run by the UK Met Office. These gridded outputs are then aggregated to the same spatial resolution as the health model. The two models are linked by noting that both use the MCMC method. For each MCMC iteration, the simulated pollution concentration is output to the areal health model. This approach makes the (reasonable) assumption that there is no feedback effect from the health outcome model to the air pollution model.

Finally, Sujit mentioned that in the future the aim was to build a spatio-temporal version of the health model so that the potential impacts of air pollution on health can be monitored over time. An interesting question arose from one member of the audience about the assumption being made by estimating the models in separate MCMC chains rather than as a single combined model.

Philip Kokic

NSW BRANCH

The Young Statisticians Careers Evening was held on the 28th of May, at the University of Sydney. Five keynote speakers, from both public and private sectors, gave talks ranging from the methodology and research used in their field of work, to career opportunities.

First, Dr Hugh Jones, from the Office of Environment and Heritage, gave a talk on the challenges and fieldwork involved in ecology statistics. The following talk was delivered jointly by Clare Ringland and Dr Yinny Wan, from the Bureau of Crime Statistics and Research (BOCSAR). The talk began with Clare, telling what it is like to work at the Bureau, and Yinny took over for the second part, to introduce some rather sophisticated models used in her research. Then, Karl Kruszelnicki, from GMO, a global hedge fund, showed the audience an example of predicting stock returns using Google Trends, and warned us how easy it is to misuse statistical methods in this case to create spurious back-test results. The finally talk, by Kevin Wang, from NSW Health, was an autobiographical recount of his experiences as a trained statistician from working in a pharmaceutical company, a management consulting firm, and now as a public servant.

In all, over 60 people attended the event, from the University of Sydney, University of Technology Sydney, University of New South Wales, Macquarie University, University of Wollongong, PwC, Kolling Institute, and the Bureau of Crime Statistics and Research. During the mingle time after the talks, people stayed on to chat, drink, and 21 pizzas were consumed, making the event an outstanding success.

Michael Stewart



Yinny Wan



Hugh Jones



Kevin Wang



The June presentation was given by Jan Luts, Data Scientist at The Search Party. Jan was formerly a postdoc at UTS and the Katholieke Universiteit Leuven, making him a scientist mixing the strength of academic and industrial experience.

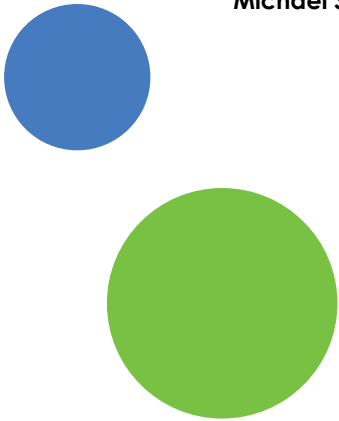
The company he is working for, The Search Party, belongs to the Recruitment industry, and uses the strength of the internet and the Big Data to tackle the problems facing by the traditional recruitment model.

The main idea is to create a large pool of candidates by unifying the information from the numerous recruitment agencies on the marketplace.

Some obvious statistical problems arise from this simple idea as candidates may have different profiles in different agencies, such as clustering and hypothesis testing. However, the dimension of the data (more than two millions candidates) make the classical techniques computationally incompatible with industry purposes. Therefore, some data mining wisdom has to be considered in the same time, making the applied research challenge quite exciting.

During the presentation, Jan gave two examples of problems they had to face. The first one, called deduplication, is linked to the different digital profiles that a candidate can have. The chosen solution, called Canopy Clustering Parallelised presented some convincing results in terms of both accuracy and computational time. The second problem relates to the career path of a candidate, and finding the best way to aggregate the past information so that a potential employer can find its preferred candidates with all available information. The current state of work indicates a short preference for the Markov Chain as a way to model that, but as a work in progress, no further details were disclosed.

Michael Stewart



QLD BRANCH NEWS

Beyond Standard Averages: Improved Individual Performance Metrics in Limited Overs Cricket

Steven Stern, newly appointed Professor of Statistics (ABS Chair) at the Queensland University of Technology, was the speaker at the June meeting of the Queensland Branch. His presentation, "Beyond Standard Averages: Improved Individual Performance Metrics in Limited Overs Cricket", drew one of the largest audiences in recent years to attend a monthly Queensland Branch meeting.

Steven began by pointing out that the simplest and most common measures of individual performance in limited overs cricket are the batting and bowling averages but that these well-known measures are often misleading with regard to the true value of an individual player to the team's success or failure (best player is on the losing side). Steven described how he and his colleagues had continued and extended the work of Duckworth and Lewis (the D/L method) to develop a measure of the actual relative contribution of each batsman and bowler to the final scores in a limited overs match, avoiding many of the pitfalls of the standard measures (assumptions of comparability and equal relevance of components). Steven introduced a performance metric which adjusts for the circumstances in which runs are scored, such as batting order and quality of the bowler in the given match. Using this new metric, the adjusted net runs attributable (aNRA), Steven and colleagues ranked the best performers in both batting and bowling during the four Indian Premier League (a Twenty20 cricket tournament) seasons from 2010 to 2013 and examined the relationship between aNRA and the official match statistics. Accounting for context lead to some interesting differences between predicted and actual winners of man-of-the-match awards, much of which could be explained by the less-than-perfect relationships between the average aNRA and batting averages ($r^2 = 0.44$) and bowling averages ($r^2 = 0.19$).

Elaine Pascoe



Steven Stern

SA BRANCH NEWS

The power and limitations of mathematical models and Plato's Cave Parable

Professor Jerzy Filar, a strategic professor of Flinders University, presented his thoughts about "The power and limitations of mathematical models and Plato's Cave Parable" in the SSAI South Australia Branch meeting on May 2014. He is a broadly trained applied mathematician with research interests spanning a wide spectrum of both theoretical and applied topics in operations research, optimisation, game theory, applied probability and environmental modelling. He is also plays a leading role in practical research projects that achieve mathematical solutions for sponsors and industry partners. These have included uncertainty analysis of integrated models of enhanced greenhouse effect, modelling the risk of accidents at level crossings and analysis of Australian sea-level data.

Jerzy's talk basically replicated his ambitious thoughts about mathematical education in both theoretical and applied settings. He stated from Plato's Cave Allegory that we are like prisoners chained to the wall of a cave, forever unable to look at the cave's entrance, which would take us to the actual reality. According to this analogy, he mentioned about our hope of ever catching a glimpse of true reality is by looking at the shadows cast by the objects that happen to pass by the cave's opening.

Professor Jerzy described the rationale for referring to Plato's Cave Parable which describes in a visual and an emotive way what is arguably the essence of the challenge facing most of the modern era researchers involved in the mathematical modelling of complex phenomena; especially life support systems. The challenge is that of creating a model whose outputs – Plato's shadows of images – correspond very closely (under a wide spectrum of inputs) to the measurements of the outputs of the real phenomenon being studied. For instance, a sound model of the spread of an epidemic in a population should be able to estimate the sizes of the different cohorts affected by the disease, at various stages of the epidemic. And yet, the mathematical modelling cognoscenti will be conscious of the fact that even a best model of an epidemic is essentially distinct from the epidemic itself. It is more like a wooden figure of an animal in Plato's parable than the animal itself.

Although accompanying many wonderful opportunities for using mathematical modelling for discovery and support of intelligent decision making, there are also many opportunities for their misuse and abuse, he said. Even setting aside the obvious problems of logical flaws, and errors in implementation, there are many traps to be avoided. Jerzy mentioned about three important modern traps: (i) the proper domain and induced phenomenon trap, (ii) the infallibility & backlash trap and (iii) the integration=kitchen sink trap.

He emphasized a mathematical model which needs a documented domain within which it can be reasonably safely used for the intended purpose. This is especially important now that models not only imitate phenomena but can also induce new phenomena. The societal reliance on mathematical models to support planning, technological innovation, engineering design, and business and development practices is greater than ever before in the history of civilisation, Jerzy said.

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Jerzy Filar

Furthermore, as availability of high speed computing increases, this trend can only continue. Therefore, the question addressed in this talk is not whether mathematical modelling is valuable or desirable – that is taken as self-evident – but rather: What are key pitfalls to guard against when mathematical models of complex phenomena are developed, implemented and used.

Professor Jerzy concluded that mathematical modelling is here to stay and benefits of mathematical models have been far reaching researchers involved in the science – and the art – of mathematical modelling have much to look forward to. But it will be prudent for them to remember Plato's Allegory of the Cave and guard against the discipline's modern traps. He hoped that, somewhere in Hades, the spirits of Socrates, Glaucon and Plato rejoiced this evening that some of their thoughts have been repeated in 2014 AD, in Adelaide, Australia at SSAI South Australia Branch meeting, in a context that they (probably) never intended.

Dr Shahid Ullah
Flinders University

Analytic issues related to large-scale longitudinal cohort studies

The presenter at the July meeting of the South Australian Branch was Professor Lyle Palmer, the recently appointed Head of the School of Translational Health Sciences, University of Adelaide. Lyle has returned to Australia after five years at the University of Toronto where he was Professor of Biostatistics and Professor of Epidemiology, Dalla Lana School of Public Health and Professor of Obstetrics and Gynecology, University of Toronto, Toronto, Canada.

Lyle began his presentation by describing how progress towards rapid and effective translation of new information into clinical and public health applications will ultimately depend upon the availability of large and well-characterized population-based cohorts studies. It is essential that such studies are underpinned by total population, longitudinal data and family record linkage so that all those with and without disease, their risk and protective factors, including both genetic and environmental contributions, can be studied in an unbiased way throughout the whole life span. Such underpinning linkages and resources already exist in Ontario. Lyle and his collaborators are in the process of developing a national and international research platform that will build on unique Ontario population health data collected and managed over the last three decades.

Lyle described The Ontario Health Study (OHS) to the audience. The OHS is a population-based cohort study that serves as an integrated platform for a wide range of studies that explore how lifestyle behaviours, physiological measures, genetics, and community-level factors contribute to the development of cancer, heart disease, diabetes, asthma, and other chronic diseases. The OHS (www.ontariohealthstudy.ca) is the largest volunteer cohort study ever conducted in Canada, and seeks to collect extensive data from every consenting Ontarian 18 years of age and over - a sampling frame of ~9.5 million people across the province. The OHS will follow participants for their entire lifespan through both active and passive (data linkage) follow-up. An online questionnaire is used to

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Lyle Palmer



collect detailed information at baseline from participants regarding their socio-demographic background; personal and family medical histories; and health behaviours. Additional measures collected during active follow-up will include assessments of diet, various aspects of mental health, environmental exposures, and residential and occupational histories. Subsets of volunteer participants are also having physical assessments and donating a biospecimen.

Lyle concluded his presentation with an outline of some of the critical challenges in conducting a study of this size and the technology developed to address some of these. Building the biostatistical and bioinformatics tools and resources necessary to fully utilize and grow the OHS into an internationally competitive research resource is an ongoing issue.

Following the presentation, the speaker and branch members braved the inclement weather and adjourned for dinner at a nearby Thai restaurant.

Lynne Giles

Analysis Issues in Perinatal Trials with Multiple Births

The presenter at the June meeting of the SA Branch was Dr Lisa Yelland. Lisa is an NHMRC Postdoctoral Research Fellow at the Women's & Children's Health Research Institute, and in the School of Population Health at The University of Adelaide. She is a biostatistician specializing in maternal and infant health, and a chief investigator on three large perinatal trials. Lisa gave the SA branch a preview of her invited presentation to be given at the ASC-IMS meeting in Sydney. Lisa began her presentation by explaining the unique statistical challenges presented by perinatal trials including infants from both single and multiple births. Although methods for analysing clustered data are widely available, perinatal trials are somewhat different to the usual clustered data settings due to the small cluster sizes. Also, many clusters consist of only a single infant, which results in a mixture of independent and clustered data.

Lisa described a literature review she conducted to determine how multiple births were taken into account in the analysis of recently published perinatal trials. From 26 trials identified, Lisa found that 2 trials avoided the problem of clustering in the analysis by defining the primary outcome at the cluster level. Of the remaining trials, two thirds of trials completely ignored clustering in the analysis. Only a third of trials accounted for clustering due to multiple births in the analysis, although half the time this was only done as a secondary sensitivity analysis and was not considered important enough to be part of the primary analysis. For those trials that accounted for clustering in the analysis, the most common approach was to use generalised estimating equations. Other approaches used were a mixed effects model, an adjusted chi-square test, and a sensitivity analysis including only 1 infant per birth.

Having described recent approaches to dealing with data including multiple births, Lisa detailed a simulation study she conducted to investigate the performance of various methods for analysing such data. The effects of varying multiple birth rate and intracluster correlation were assessed for each method. The methods investigated were logistic regression (which ignores the clustering), GEEs and mixed effects models. Lisa found that ignoring clustering can produce misleading results unless both the multiple birth rate and ICC are low, so it's safest to use a method of analysis that takes the clustering into

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account whenever multiple births are included in perinatal trials. With the small cluster sizes seen in perinatal trials, GEEs did seem to perform better than mixed models but whether a GEE or a mixed model should be used depends on the interpretation that is most relevant.

Lisa finished her presentation by covering analysis options for the problem of informative cluster size, where the outcome is related to the size of the cluster. In the context of perinatal trials, the condition required for cluster size to be uninformative will be violated if the outcomes of multiples tend to be worse than singletons (often the case) and birth size isn't included as a predictor in the analysis model. The first method Lisa considered of handling informative cluster size was including cluster size as a predictor in the analysis model. This was found to solve the problem of informative cluster size in some situations but not all. The other two ways to handle informative cluster size are to weight each subject equally in the analysis or to weight each cluster equally in the analysis. Both of these methods were found to perform well, with the choice between them depending on whether a cluster level or an individual interpretation is of interest. Following the talk, discussion continued over dinner at Taj Tandoor Indian restaurant.

Chris Davies



Dr Lisa Yelland

VIC BRANCH NEWS

On the 27th of May, the Victorian Branch of the Statistical Society of Australia welcomed Tim Gant, founder and director of Life Cycle Strategies Pty Ltd. Tim gave an overview of statistical issues in Life Cycle Assessment (LCA) and provided several examples that highlighted the usefulness, and indeed the complexity, of this important field. LCA refers to the impact of a product over the entire duration of its life time. This includes analysis of the impacts in the raw material production phase, manufacturing, distribution and packaging, use, recycling or reuse and final disposal. The emphasis for LCA analyses is in regards to different environmental impacts which effect human health, ecosystem health and the availability of resources. Impact scores are calculated which avails us with the means to compare competing products and appreciate the impact that they have in the short and long term.

Cradle to gate refers to the phase in a product's life cycle that ends in production. This includes life cycle inventory, a term used to describe flows to and from the natural environment. To illustrate the types of things that need to be considered during this phase, Tim compared the production requirements for a cup made of plastic coated paper to that of a polystyrene cup. Processes in production for the paper cup require, for example, natural gas production, pulp production and polymer coating to name just a few. The resources required for the processes are tracked and this list of resources can be surprisingly long.

Following the cradle to gate analysis, post-production concerns are also considered. For example, what happens to each of the types of cups considered once the consumer is finished with them? Well this is not so straightforward since multiple options are usually possible. Tim highlighted three possibilities for the paper cup. Firstly, the cup may be recycled. This leads to impacts due to transportation and re-processing. The cup may also be re-used and here we would consider the impact of washing the cup prior to re-use. Finally, the cup may end up in regular garbage which could then lead to the cup being used in land fill or perhaps to combustion. These post-production factors are combined with cradle to gate phase to make up a product's total life cycle.

So, with respect to LCA which type of cup is best? Well the paper cup scored worse on most of the indicators that Tim highlighted. For example, it scored worse with respect to carcinogens and climate change although it did fare better with respect to ecotoxicity. Tim pointed out that this is mainly due to the weight of the cups being compared since the paper cup can be some ten times heavier than the polystyrene cup which leads to greater impact during production and post-production.

Tim also discussed environmental input output (IO) analyses. The models used for IO analyses can be very comprehensive, taking into account major components such as the main material and energy inputs but also can include many minor factors such as personnel related expenses. The basis for the Input Output analyses is the System of National Accounts developed by the Australian Bureau of Statistics. Tim provided several flow charts that illustrated the interactions between products and processes mapped to the product being assessed. For example, one chart depicted the considerations and weightings for the production of farmed fish. One pathway started with beef, from which beef byproducts are used to make fish food which is then used to feed the fish prior to being farmed and finding their way to our stores. Other factors considered were transport, electricity production and more.

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A major consideration for LCA is with respect to uncertainty in acquired data. Data is sourced from many different data bases and thought must be given to whether the data is reliable. Some degree of uncertainty is tolerated, although further analysis is needed to determine whether the difference detected between two products is real. Tim uses Monte Carlo simulations to carry out these analyses although, as he pointed out, there exist complex correlations between the variables used in the LCA modelling. Consequently, modelling of uncertainty is an evolving field in LCA and one in which Tim and his colleagues are at the forefront. While Tim stressed that he was not a statistician, it was very clear by the end of his talk that he certainly is on top of his game in LCA modelling and his identification of uncertainty underlines why Life Cycle Strategies is so highly regarded in an ever evolving industry. Tim welcomed questions from the audience and enlightening discussion continued over dinner which was attended by many members.

Luke Prendergast

Overthrowing the Tyranny of Null Hypotheses in Health and Medical Sciences

On 22nd July one of the leading contributors to modern theory in epidemiology and biostatistics, Sander Greenland (Emeritus Professor at the Department of Epidemiology and Department of Statistics, University of California, Los Angeles) spoke about "Overthrowing the Tyranny of Null Hypotheses in Health and Medical Sciences". Professor Greenland argued that statistical methods play a pivotal role in health and medical sciences, but not always an enlightened one. Problems well known to academics (and members of SSA!) are frequently overlooked in crucial non-academic venues such as regulation and litigation, even though those venues can have profound impacts on population health and medical practice. Professor Greenland gave many examples (both serious and humorous) of highly credentialed statistical experts using arguments that conceal high prior mass (spikes or point priors) on null hypotheses, including conflation of "nonsignificance" with support for the null and inappropriate use of multiple-testing adjustments. His central claim is that these examples illustrate a more general and universal null bias in standard teaching and practice of statistical inference, a pseudo-religion which he referred to as "Nullism". This bias is not justifiable scientifically and is absent from the writings of J. Neyman and E. S. Pearson who made a fundamental contribution to the foundations of statistical theory and practice. According to Professor Greenland, this bias may have originated in the transformation of defensible parsimony heuristics into dubious parsimony metaphysics, and confusion of decisions with beliefs, bolstered by fallacious statistical and biological arguments. The "evidence inflation" it produces adds to the burden of cognitive problems in both informal and formal evidence assessments. Professor Greenland entertained questions from a crowded lecture theatre before finally taking a break from travel, having only arrived in Australia from the USA that morning.

Lyle Gurrin