

## An interview with Frank Hansford-Miller

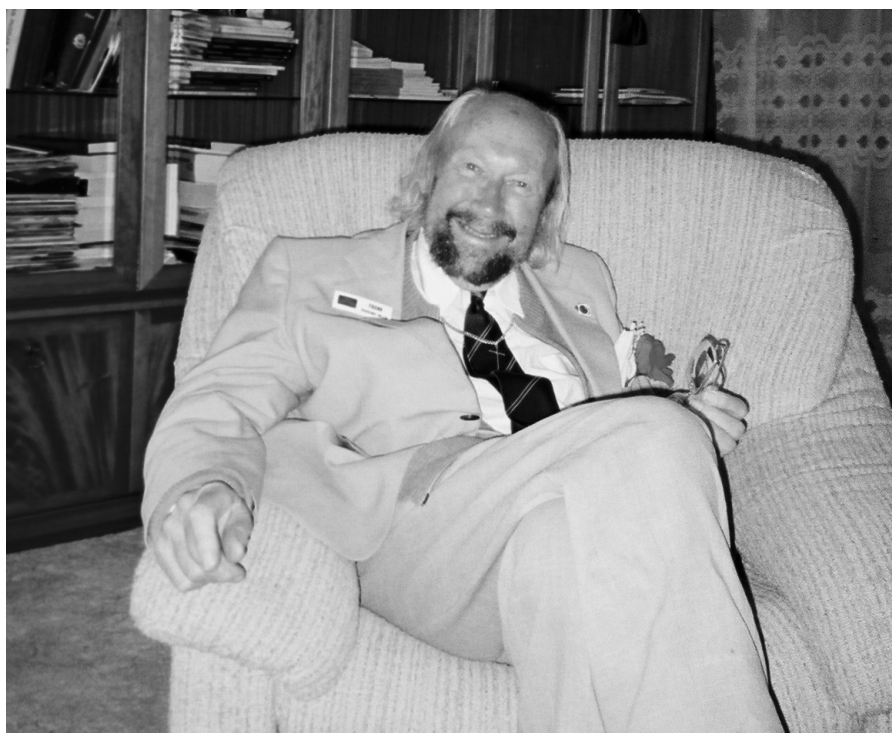
To those who regularly attend the WA Branch of the SSAI meetings, Frank Hansford-Miller is immediately recognizable as the person who almost always asks a question of the speaker. His question is usually spiced with some aspect of his varied life and usually involves

some lateral thinking. Indeed, at the dinners following the meetings, which Frank cannot attend due to his being located north of the end of the train line in Perth, it is often remarked upon about what form Frank was in that night!

As a tribute to Frank the Branch Executive felt that someone from the local branch should interview him. As none of the ladies in the executive felt brave enough, they asked me to interview Frank because I have known him since he tutored statistics part time at Murdoch University in the 80's. I was happy to oblige. The following are some of the facts gained from my interview with Frank on 23rd August 2002 at his house in Yanchep.

Frank Hansford-Miller comes from a working class background. Born in London in 1916, he will turn 86 in November 2002. He was educated at Colfe's Grammar School. In 1940 he volunteered for the Armed Forces and served six years in the war, seeing service in the Royal Artillery defending London against enemy aircraft. He entered University College London, to read mathematics, in 1946. His studies were interrupted in 1947-1949 by a hospitalisation due to tuberculosis of the spine where three vertebrae were eaten away. He was not beaten; he fought back and graduated BSc, later entering King's College in the University of London, at first full time and then part-time doing research for his MSc and PhD.

Frank met Phyllis, his wife to be, in London during the war. They had a happy relationship and were married for 48 years. He misses her greatly and his house in Yanchep is adorned with her paintings. Frank took up singing after his wife's death and two years



*Frank Hansford-Miller*

### In this issue

Shaping the Statisticians of the Future .....	4	Member Advantage .....	7
55th Session of ISI .....	5	Branch Reports .....	8
		Conferences .....	16



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ago was voted the best karaoke singer in the Burswood International Cabaret Lounge. He has produced 3 CD's and 10 singles under his singing name of "Frisky Frank". He is obviously proud of his activity and mentioned that he has produced 50-60 books (on a diverse selection of subjects) not just on statistics and related areas. Frank publishes his many works under ABCADO publishers, which he founded in 1966.

Frank proudly boasts that he is  $\frac{1}{2}$  Russian and  $\frac{1}{2}$  English since his mother's father was born in Russia and he believes this mix is what makes him think differently from others. He has a wide range of interests including religion, politics, geography, poetry and history. While colleagues found it better for their careers to concentrate on one thing, he claimed that was not what he was like.

Frank's introduction to statistics was at University College, and he has always been interested in politics. To him statistics involves the whole of life and that's what he likes about it. He was elected as a Fellow of the Royal Statistical Society while working in London and he is now a life member. During this time in London, meetings were held at the School of Hygiene and Tropical Medicine in Senate House.

Frank says that his interest in statistics stems from wanting to do something for the world and make it a better place. He feels that we have become too technical and should ask "How is this piece of research going to help humanity?" His advice to young statisticians is to try to broaden their interests, try to get in touch with the world and not devote 100% of their energy to the mathematics side but to try to see what really is the end product to society of the new things they are doing. He says we need to adopt a more unselfish approach and to think of others if we are to become better individuals in society. We can't think of statistics outside of society; we need to put statistics back in and make a bigger contribution of society.

Frank denies having any fears for the current millennium. He trusts in the Lord and is a Christian. He said we've

gone through a terrible century with Hitler and Stalin and are more aware now. There's no reason why the world shouldn't be a happy and prosperous place.

The statistician that Frank most admires is Maurice Kendall. Indeed, in a recent RSS News he wrote that he would like to see a plaque commemorating Kendall, just as the RSS dedicated a plaque commemorating Fisher's life. Frank also spoke admiringly of David Cox.

When Frank turned 65, he and his wife emigrated to Australia where he was gladly accepted, being no burden to the state. They came to Perth where his wife's sister and family had settled earlier. He was introduced to Terry Speed, Head of Mathematics at the University of Western Australia at the time, who immediately recognized Frank's name from many published proceedings of the RSS, in which discussions of papers read to the RSS often included Frank's contributions. Consequently, Frank became a tutor at UWA, Murdoch University, and Curtin University. Frank coaxed Terry into doing a marathon with him, and Frank went on to do 7 marathons only retiring when his wife died. Frank was the World Champion Race Walker at the Brisbane World Masters Games in 1994.

At the age of 69 he published a paper on Australian Numbers in the journal "Teaching Mathematics and Its Applications", Volume 6, pp8-12. This paper is a tribute to his endeavour to assimilate into his adopted country and in it he notes the number 69 is in fact "69-any way up". But if in fact one inverts the digits individually, 69 becomes 96. He wrote the article with the idea in mind that Australia is known as "Down-Under" and, jokingly, as being "Upside Down". He aspires to this next milestone which is reaching 96, despite medical setbacks, but he may well do it in his own inimitable way, and I am sure he will accept whatever God has in store.

When I left, Frank was in good spirits, and I'd gleaned much more than I can write here. This is just a glimpse into his long and varied life.

*Brenton R. Clarke*

# Editorial

What did the Australian Science Festival bring to your area? Here in Canberra there was a busy programme of events in August including ActewAGL's Amazing World of Science - an exhibition with displays from over 50 organisations ranging from ACT Workcover to the University of Canberra.

We strolled around looking for the statistical aspects, and almost came away empty-handed. But in one corner the Physics Department at the Australian National University had a quincunx on display. We were told it was a

former Questacon exhibit. Standing about 6 feet high, the idea was to drop a golf ball in the top, watch it rattle past the posts (50% chance of left and right at each post) and watch the binomial proportions settle into place at the bottom of the device. Every time we walked past, there was a small crowd of children and adults, dropping balls and discussing the results with ANU exhibitors on hand.

This display was the only overtly statistical one. But note that if it's statistical it need not be boring - the quincunx seems to indicate

that if it's big, if you can play with it, then it attracts a crowd. What other possibilities are there for statistics to be represented at future exhibitions? ANSTO drew the crowds in with a display entitled "A day in the life ...", describing everyday events and products along with their reliance on radio isotopes. What about "A day in the life ..." with a probabilistic or statistical bent? Any other bright ideas? Think about it for next year, get in on the act and as always, tell us all how it went!

Alice Richardson

# WIN!

**Announcing the first in a series of statistical competitions to be run in the Newsletter.**

The Haiku is a well known short poetical form of Japanese origin, consisting of three lines of five, seven and five syllables each. The subject is traditionally to do with nature, but you are invited to write one on a statistical theme. Here's one to get you started.

Burning midnight oil

Monte Carlo Markov chain

Estimates revealed.

Send your entries to one of the Editors by 20 January. A range of the best entries will be published in the next newsletter.

And the prize? The glory associated with seeing your work in print!

# WIN!

## Correction

### Funding formulae for non government schools

The final formula in my article in the last newsletter contained an error, in the denominator. The corrected formula follows:

The table suggests a proxy for  $\Pr(\text{student}_i \text{ in } CD_j \text{ attends school}_k)$ :

$$SES_{school} = \sum_{students} \frac{(\text{Proportion non government students}_{CD})^\alpha SES_{CD\ students}}{(\text{Proportion non government students}_{CD})^\alpha}$$

where Proportion non government students<sub>CD</sub> is the number in the second column in the table and  $\alpha$  is a parameter to be estimated, and possibly dependent on school. The current formula has  $\alpha=0$  and a uniform value of  $\alpha=1$  would be readily understandable.

#### Disclaimers

1) The original disclaimers apply.

Ray Lindsay AStat

## Web site of the month

Continuing the theme of the Editorial, this month's website belongs to the National Science Week: [www.scienceweek.info.au](http://www.scienceweek.info.au). The site links to activities around Australia, including the Canberra-based Australian Science Festival [www.sciencefestival.com.au](http://www.sciencefestival.com.au) which is the "prototype and centrepiece of National Science Week activities" (quote from the ASF website). The national website contains highlights of this year's Science Week activities, links to other science-based sites and a reminder of the dates for next year's Science Week: Saturday 16 – Sunday 24 August 2003.



# SHAPING THE STATISTICIANS OF THE FUTURE

The National Education Services Unit (NESU) of the Australian Bureau of Statistics aims to promote knowledge and understanding of, and access to, statistics for teachers, librarians and students in Australian schools.

The work of the unit focusses primarily on enabling teachers to make better use of statistics across a range of subject streams in a classroom context. To achieve this goal the unit takes a strategic approach in servicing the schools sector.

Staff in the unit work with teachers on the Teacher Release to Industry Program (TRIP) to produce curriculum activities and lesson plans that support the use of statistics in classrooms. The ABS has been involved in the TRIP program since its inception in 1991 and since then, 18 projects have benefited from the special knowledge and expertise that teachers bring with them. "The TRIP program helps ensure that materials produced in the NESU meet curriculum requirements, reflect current teaching practice and provide useful classroom resources," says Soo Kong, head of the unit.

One of this year's TRIP teachers, Sue McArthur, a media teacher from Newcomb Secondary College in Geelong, has been working on the Australia Now lesson plan series which is used in conjunction with information from Australia Now on the web. Her focus has been on enhancing the useability of existing pages and adding new activities to be used in previously unexplored learning areas such as materials technology. "When I arrived in the unit at the beginning of the year", says Sue, "there were lots of really good material already there. But for teachers searching the web with limited time, materials don't just have to be relevant and of high quality, they have to be easy to find and instantly recognisable as something that can be used in the

classroom." She has now set about applying a similarly rigorous approach to updating the Website for Indigenous Statistics Education (WISE) pages using output from the 2001 census.

For the last three years, the unit has used the internet as the primary medium for delivery of its work and is currently maintaining around 500 pages of information on the web including over 150 lesson plans. The lesson plans form the basis of projects which aim to increase usage of particular ABS datasets or publications in the education sector. Each series has its own explanatory page through which lesson plans can be accessed or teachers can find what they are looking for by Key Learning Area. To view the curriculum materials visit the ABS website on [www.abs.gov.au](http://www.abs.gov.au), click 'Education' on the left navigation bar then 'Teaching Tools and Classroom Activities' under the 'For School Teachers' heading.

Also available on the internet is a mathematics statistics publication entitled 'Statistics - A Powerful Edge' (ABS catalogue number 1331.0). This publication was specially produced for use in mathematics and IT study streams in schools covering a range of topics related to data collection, processing and analysis and the uses of statistical information. It has proven to be a very useful resource for teachers and due to increasing demand, a second edition was published in early 1999. A series of downloadable lesson plans accompanies this publication which teachers can readily use in the classroom.

Limited time for searching out new material is an ongoing problem for teachers in Australian schools and one which has led the ABS National Education Services Unit to implement a promotional campaign aimed at raising awareness among teachers of the availability of ABS statistics and related education

resources. With this aim in mind, the NESU maintains a presence at National and State teacher conferences, particularly Mathematics and Geography conferences, delivering presentations directly to teachers wherever possible; and conducts three direct mail campaigns each year.

The success of the strategy is evident. Usage statistics for the ABS's website indicate increasing use of the Education Services area of the site with hits peaking at 68,000 in the month of May 2002 and schools are still among the ABS' best customers for flagship hard copy publications such as Year Book Australia and Social Trends.

So where to from here? The NESU has traditionally targeted teachers as a way of getting students interested in statistics, but recently more effort has been made to attract students directly. *A Tale of Two Worlds* interactive CD ROM was produced in the lead up to the 2001 Census, a collaboration with a school internet software provider, MyInternet Ltd, has seen the production of four interactive statistical education projects and a project is currently underway to get Census statistics used as widely as possible in Australian schools.

"We'll certainly be looking at doing more for the students," says Soo Kong. "In the end, it's them that we are here for and if we can get them interested in statistics now, then there will be benefits down the track. Not just for them, but for the ABS too. We will need skilled workers in the future and right now those skilled workers are in our schools."

Readers interested to find out more about the resource materials available or any other information should contact the National Education Services Unit on 1800 623 273.

*Eden Brinkley*



## 55TH SESSION OF THE INTERNATIONAL STATISTICAL INSTITUTE (ISI)

5-12 April 2005  
Sydney Convention and Exhibition Centre

[www.tourhosts.com.au/isi2005](http://www.tourhosts.com.au/isi2005)

Dennis Trewin, Australian Statistician, ISI President and Chair of the 2005 ISI National Organising Committee, has extended an invitation to all those interested in statistical matters to attend the 55th Session of the ISI to be held at the Sydney Convention and Exhibition Centre from 5 to 12 April 2005. The 2005 ISI Session will provide an arena for the exchange of ideas and knowledge on statistics among participants.

Did you know that this is only the second ISI Session to be held in Sydney and the first to be held in the Southern Hemisphere since 1981?

2005 is also a very important year for Australian statistics as it is the centenary of the Australian Bureau of Statistics (ABS). The ISI Session will be one of the major events in celebrating the centenary of Australia's national statistical agency.

A diverse and cutting edge scientific program is being developed for the Session, which will provide an opportunity for delegates to exchange innovative ideas, develop new links and discuss current trends and developments in the statistical world. The Session will also provide special days of interest for those concerned with particular topics, for example population and demography matters. Details of the program will be finalised in collaboration with the Scientific Program Committee and any updated information will be included on the 2005 ISI Session website:

[www.tourhosts.com.au/isi2005](http://www.tourhosts.com.au/isi2005)

Preliminary preparations are well underway for the 2005 ISI Session. The venue for the Session, the Sydney Convention and Exhibition Centre, has been confirmed and will provide an ideal location for the Session. Located on the shores of Darling Harbour, the venue has magnificent views of the city and is only a short walk to the Central Business District and a wide range of hotels and restaurants.

An exciting social program is also being developed which will provide delegates, colleagues and accompanying persons the opportunity to relax among friends and experience some of Sydney's unique and varied attractions.

The National Organising Committee (NOC) for the 2005 ISI Session, comprising Dennis Trewin (Chair), members of the ABS and representatives from the Statistical Society of Australia (Nick Fisher and Eden Brinkley), held their last meeting on 8 November 2002. Items for discussion at the meeting included promotion plans, scientific and social program proposals and sponsorship and exhibition plans.

In 2000, Sydney hosted the "best ever" Olympic Games and the NOC is dedicated to maintaining that tradition for the 2005 Session of the ISI.

Further information on the programs and arrangements for the Session will be included in future SSAI newsletters and updated regularly on the 2005 ISI website.

### REGISTER YOUR INTEREST NOW!

You can register your interest in attending the conference on the Session website [www.tourhosts.com.au/isi2005](http://www.tourhosts.com.au/isi2005) or by contacting the Conference Managers, Tour Hosts, GPO Box 128, Sydney 2001.

### NEWSFLASH

Several sponsorship and exhibition opportunities exist in association with the 2005 ISI Session. Please contact the Conference Managers if you are interested in learning about the sponsorship and/or exhibition opportunities available.

# S, S-Plus and R



P. Dalgaard

## Introductory Statistics with R

An elementary-level introduction to R, mainly via code examples with liberal commenting of the code and the output, from the computational as well as the statistical viewpoint.

A supplementary R package can be downloaded and contains the data sets. All examples are directly runnable and all graphics in the text are generated from the examples.

2007. XVI, 268 pp., 48 figs.  
(Statistics and Computing)  
Softcover € 29,95; £ 21,-/\$ 51,50  
ISBN 0-387-95475-9



B. Everitt, S. Rabe-Hesketh

## Analyzing Medical Data Using S-PLUS

How to use S-PLUS as a powerful environment for undertaking a variety of statistical analyses, using data from a variety of medical investigations including epidemiological studies and clinical trials is shown in this book.

S-PLUS script files are listed and available on the web, enabling readers to reproduce all the analyses and graphics.

2001. XII, 195 pp. (Statistics for Biology and Health) Hardcover € 79,95; £ 55,-/\$ 135,-  
ISBN 0-387-98802-9

J.C. Pinheiro, D.M. Bates

## Mixed-Effects Models in S and S-PLUS

An overview of the theory and application of linear and nonlinear mixed-effects models in the analysis of grouped data. A unified model building strategy for both linear and nonlinear models is presented in this book and applied to the analysis of over 20 real datasets from a wide variety of areas, including pharmacokinetics, agriculture, and manufacturing.

The balanced mix of real data examples, modeling software, and theory makes this book a useful reference.

1st ed. 2000. Conc. and parting 2002. XVI, 526 pp., 172 figs. (Statistics and Computing) Hardcover € 79,95; £ 55,-/\$ 135,-  
ISBN 0-387-98957-9



A. Krause, M. Olson

## The Basics of S-PLUS

In a clear style the most important ideas of S-PLUS are introduced through the use of many examples. Each chapter includes a collection of exercises, fully worked-out solutions and detailed comments.

3rd ed. 2002. XX, 419 p., 94 illus. (Statistics and Computing) Softcover € 59,95; £ 42,-/\$ 99,50 ISBN 0-387-96456-2

W.N. Venables, B.D. Ripley

## Modern Applied Statistics with S

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4th ed. 2002. XII, 495 pp., 152 figs. (Statistics and Computing) Hardcover € 74,95; £ 52,50, \$ 121,50 ISBN 0-387-96454-0

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## Meet some recently accredited SSAI members

### Frankie Chan, GStat

My background is in actuarial studies and I am an Associate of the Institute of Actuaries of Australia. My interests lie in modelling the asset price of financial derivatives as well as modelling stochastic volatility underlying market variables. I am also interested in research into development of actuarial statistics.

### Wau Man Li, AStat

I started my statistical analysis career in the Brain Dynamic Centre of Westmead Hospital. My major work was to use statistical methods to compare and identify patient groups (Schizophrenia, Parkinsons and ADHD) by brain wave and skin conductance variables. Currently my work in NSW Department of Housing is to deal with database and statistical computing.

### Helen Parker, GStat

I studied mathematics and statistics at the University of Queensland. I graduated BSc (Hons) Class 1 in 2001, with my Honours thesis on Multiple Imputation. I was a Cadet for ABS during my Honours year and I have been working at ABS since graduating. I will be commencing PhD studies at the University of Glasgow on Optimal Design in January 2003.

### Anne F. Young, AStat

I am currently the Project Statistician for the Australian Longitudinal Study on Women's Health at the University of Newcastle. I completed my PhD in 1999 and won the EJJG Pitman prize at the 15th ASC in 2000. My research interests include longitudinal analysis of linked survey and administrative data.

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\* Comparison compiled from publicly available information 8th August 2002 and subject to change.

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# Branch Reports

## NEW SOUTH WALES

### NSW Branch news

In March, the NSW Branch held its 54th Annual General Meeting. The H.O. Lancaster Lecture was presented by Professor Eugene Seneta of the University of Sydney, who spoke on "In Memoriam: Emeritus Professor Henry Oliver Lancaster AO FAA: 1913 – 2001." A report on this meeting appeared in the last Newsletter.

The April Meeting was addressed by Mr Kevin Price, of BHP Steel, Port Kembla. Kevin's topic was "Alternative Hypotheses". In May we heard from Dr Piet de Jong, of Trowbridge Consulting, Sydney. Piet spoke on "From Academic to Practical Statistics".

Come wintry June, members ventured forth to hear Geoffrey Sayer (General Manager – Research, Health Communication Network) speak on "The General Practice Research Network: A Statistical Check-Up". Ken Russell takes up the story:

Does your GP use the computer to write prescriptions? Mine does, and it's great. I don't have to remember the dosages of all the tablets I take, the pharmacist has no problem reading the GP's writing, and it takes only a few seconds for the scripts to be written.

We were told that Geoffrey's organisation is believed to be the first such network in Australia. Its role is to improve medical records, and it is assumed that demonstrable improvements could be made in health through better communication, information use and information transfer. When a GP belonging to the Network writes a prescription on his/her computer, the record goes immediately to the Network's computer. As well as recording the prescriptions written, the plan is (it wasn't clear to me whether this has already been implemented) that the doctor must give reasons for the prescriptions and is given decision support. This can be something as simple as the statement "Antibiotics are not indicated for the treatment of influenza in an otherwise healthy person". In Geoffrey's words, "Decision support does not replace the experience

and training of a critically thinking clinician."

We learned that, in the first year of the Network, 175 GPs had belonged, and that this had grown to 300 in the second year. A lower proportion of older GPs belonged to the Network than existed in the Australian population. Older patients seemed to be more common than in the general community. Consequently, information drawn from the Network may not provide an entirely representative sample of all possible information. The Network does make anonymous data records available to some researchers.

It was an interesting talk, and I'll be keen to find out if my GP belongs to the Network. I'm all in favour of GPs having decision support. But I do find myself wondering how valid will be any conclusions drawn from the data from this sample of GPs, as it's most definitely a self-selected sample.

The prize for the longest title of the year went to our speaker for July, Hugh Jones. His prize-winning effort was "The trials and tribulations of life as a biometrician at the Department of Land and Water Conservation – applications of environmental statistics". Caro Badcock reports on that meeting:

In July we were exposed to the trials and tribulations of life as a biometrician in the Department of Land and Water Conservation by Hugh Jones, Senior Biometrician. Hugh started by telling us that the DLWC is responsible for managing the state's natural resources in a 'sustainable' manner. His greatest challenge is to provide support across a large and diverse organisation that covers areas such as water quality, hydrology, hydrogeomorphology, vegetation mapping, landscape processes and ecology.

Most projects consist of observational type studies like environmental monitoring programs that may contain vast amounts of spatial and longitudinal data. Hugh shared three examples of data problems with us. The first example, detection of long term trends, was illustrated using data of salinity in the Murray-Darling Basin. The various methods of analysis, including non-

parametric seasonal Kendall test, generalised linear models, generalised least squares methods for serially correlated data and generalised additive models, were compared. The second example was on the effect of Keepit Dam on the temperature regime of the Namoi River and its impact on fish spawning. Hugh showed that periodic regression could be used to model the water temperature over time. The variability in the peaks, due to water releases from the dam, was modelled by including the amount and temperature of the water release. Additional analyses also showed that water temperatures changed up to 100 km from the dam and then plateaued. Graphs of the water temperature along the river overlaid with ranges of temperatures for the different types of fish spawning clearly showed why there was a decrease in the number of fish around. The third example was to expose us to zero inflated counts, and estimating the prevalence of mussels along a stretch of the Williams River in the Hunter Valley was used as the example.

All in all Hugh provided us with a very interesting talk, including some pretty impressive photographs and, as one member of the audience told me later, managed to bridge the gap between academia and industry by including real life examples of complex data analyses.

Accreditation has been a topic for spirited debate within the NSW Branch recently. So we seized on the opportunity to let the various points of view be heard at our August meeting. The principal speakers were Dr Philip McCloud and Dr Alun Pope. John Best and Ken Russell take up the story:

At the August meeting Phil McCloud and Alun Pope gave their views on accreditation. Phil reminded us that the details of how to apply, requirements, etc were available on the Society's website. He said that accreditation aided the maintenance of a statistical profession and gave more credibility to public utterances on statistical matters. Employers could have more confidence in hiring and accepting reports etc from accredited members. Currently there are 152 accredited members. If accredited members become valued this would



reflect well on the Society. Before accreditation is discarded it should be given a thorough trial as it has taken some time to put in place. Phil mentioned that one Government Department now has it written into legislation that advice must come from an accredited statistician.

Alun thought we were doing a public service or performing an altruistic act if the community could be told who was a competent statistician. Like Phil he thought accreditation was good for the Society (helped it to get a higher profile). Accreditation seems valued by other professions and so why not statistics? Accredited members might be better able to arrange indemnity insurance, arrange professional development courses, use accreditation in self promotion activities and differentiate, say, from a computer professional. Many would agree that it is good to work to an ethical code. Are there few G.Stats because this type of accreditation serves the same purpose as a degree? The number of accredited members is currently too small to have much impact.

Discussion from the floor raised questions such as does industry want accredited members (were they asked?), does the Society as a whole need to raise its profile, can we interest non-traditional statisticians such as psychological statisticians? The decision to award accreditation seems arbitrary to some. One speaker stated that he was in favour of accreditation, but his own experience had been disappointing: had he known how critical the 'examining panel' would be, he would have been much more careful with his application. Another discussant stated that statisticians needed to make it clear to the general public that bad data analysis will hurt them.

After the meeting, Paul Hutchison advised in writing (we're sounding more like an RSS meeting here):

In the instructions to authors in the *European Journal of Surgery*, the following appears: "If statistical data are provided, the authors are requested to submit an official statement issued by a certified statistician (with a proper affiliation) regarding the validity of methods used."

The same notice is in the *Scandinavian Journal of Infectious Diseases*. Both this and the *European Journal of Surgery* are published by the Stockholm office of Taylor and Francis.

A Members' Forum was held in September, and accreditation featured fairly prominently at that. We're grateful that Nick Fisher (wearing his SSAI President's hat as well as the NSW Branch Member chapeau) was able to find the time to attend. The Branch will make some suggestions for improvements to the accreditation process to the Accreditation Committee.

Many of you will have noticed the recent absence of the Statistical Squirrel from these pages. Impending paternity had restricted the time available to him, and now that it's no longer impending (we understand that he has a darling daughter), we're not sure when he'll be back.

The NSW Branch holds an annual presentation by doctoral students, one from each University. This is now in its third year, under the enthusiastic direction of Frederick Osman. The Branch is delighted to announce that the Awards will now be known as the J.B. Douglas Awards, in recognition of the distinguished service to Statistics and statistical education by Professor Jim Douglas. Jim is a past President of the Branch and a Life Member of the Society. He will make the initial presentations on 27th November. A full report on the Awards, and on the Annual Dinner that will follow them, will appear in the next Newsletter.

Ken Russell

## VICTORIA

### Victorian Branch news

On October 3 and 4 the Department of Statistical Science at La Trobe University hosted a workshop on sliced inverse regression (SIR) in the tastefully renovated Institute For Advanced Study in the northern corner of the Bundoora campus. Through sheer force of personality, hard work and a go-get-it attitude, Bob Staudte persuaded an impressive

array of national and international guests to come to Melbourne to exchange ideas on this powerful method. In the opening address the inventor, Professor Ker-Chau Li of UCLA, illustrated how sliced inverse regression can, almost magically it seems, select variables in a generalised non-linear regression setting. Then Professor Ursula Gather of Dortmund described a robust version of SIR, called DAME — the choice of name being no surprise to students of human longevity. Various speakers described theoretical underpinnings, generalisations (e.g. to functional data), rival methods and applications (e.g. to time series and genetic data). The Victorian Branch made a modest financial contribution to the workshop. It was disappointing to see how few Melbourne statisticians took advantage of this opportunity to listen to a stellar field of speakers. Bob Staudte and his team are to be congratulated for organising such a stimulating meeting.

There have been several changes in the Victorian statistical scene recently. The Department of Statistics at RMIT University has been amalgamated with the Department of Mathematics, and a South African operations researcher, Professor John Hearne, has been appointed Head of the new department. The former Head of Statistics, Dr Peter Smith, is now the Acting Head of the School of Creative Media at RMIT. Peter enjoys a dual career as statistician and artist. Members who attended ASC 12 at Monash University in July 1994 would have viewed an exhibition of Peter's unique artwork incorporating statistical notation, graphics and themes. Fima Klebaner, for many years at the University of Melbourne, has accepted the Chair of Statistics at Monash University with a mandate to develop financial probability and statistics. Dr John Taffe, a Victorian Branch Councillor formerly lecturing at Swinburne University, has completed his doctorate and has transferred to the Monash Medical Centre. He works as a statistician in the Centre for Developmental Psychiatry and Psychology in the Department of



*SIR cast members, from L to R: Brenton Clarke, Louis Ferre, Laurie Davies, Lixing Zhu, Claudia Becker, Ursula Gather, Bing Li, Megu Ohtaki, Bob Staudte. Photo courtesy of Megu Ohtaki.*

Psychological Medicine in the School of Psychology, Psychiatry and Psychological Medicine in the Faculty of Medicine, Nursing and Health Sciences at Monash University!! Dr Alan Veevers, member and former Leader of the Production Process Improvement Group at CSIRO, has decided to hang up his computer and don his boots, because in retirement he intends to improve his bushwalking handicap. Alan worked in the areas of quality and reliability, appropriately so because his professional contributions exhibited both these characteristics. Dr Caroline Finch, member of a well-known Victorian statistical family, has been appointed Head of the Victorian State Trauma Registry. Caroline is a sports injury epidemiologist based in the Department of Epidemiology and Preventive Medicine at Monash University, and in January was appointed Editor-in-Chief of the *Journal of Science and Medicine in Sport*.

The Victorian Branch extends its sympathies to the family and friends of the two Monash University students, William Wu and Steven Chan, tragically killed whilst attending an econometrics tutorial on October 21.

*Geoff Laslett*

### **The PISA Project**

Dr Ross Turner of the Australian Council for Educational Research addressed the June meeting of the Victorian Branch.

The Organisation for Economic Cooperation and Development

(OECD) initiated a major research project in the late 1990s, the Program for International Assessment (PISA). This project operates among the OECD's contributing countries, along with a few non-OECD countries, and is designed to generate high quality indicators of educational outcomes, and to relate these to various student-level, school-level and system-level factors. A sample of 15-year-olds is tested in the language of instruction in each country, to determine levels of 'reading literacy', 'mathematical literacy' and 'scientific literacy' (and a test of generalised 'problem-solving' is to be added).

The first results from the PISA 2000 main study will be published in December 2002. Further reports will be published as more detailed analysis takes place. PISA is a longitudinal study, with testing planned to occur at three-yearly intervals. The next round of testing will occur in 2003. Some of the major challenges of the PISA project are: the logistics involved in coordinating such a complex project across a large number of countries; developing comparable test instruments across 40+ countries; sampling, weighting and variance estimation; item analysis and scaling; quality monitoring; and scale construction and data products.

In his presentation, Ross described the PISA context and some of the results, and discussed some of the statistical challenges.

### **Optimal Designs for Choice Experiments**

Associate Professor Deborah Street, of the University of Technology, Sydney, gave a very interesting talk entitled "Optimal Designs for Choice Experiments" to the July Meeting of the Victorian Branch of the Statistical Society. A choice experiment consists of a number of choice sets, each set consisting of a number of choices each described by a set of attributes. Respondents are asked to choose their preferred option from each set. It is of interest to determine which attributes are the most important, whether there are joint effects and how the choice sets should be constructed.

To begin with Associate Professor Street talked about the important case where all attributes have only two levels and each choice set consists of two choices. The multinomial logit model is used in which the probability that  $T_{ij}$  is preferred in a choice set  $T_{i1}, T_{i2}, \dots, T_{im}$  is given by an associated parameter  $p_{ij}$  divided by the sum of all the associated parameters  $\pi$  in the choice set.

For main effects the D-optimal design when all the  $\pi$ 's are the same consists of all pairs with all attributes different. On the other hand if we just want to test for the interaction effect then the design should not include the pairs with all attributes different. For the situation where main effects and interaction effects are of interest then the optimal design has all pairs occurring equally often.

If there are more than two attributes then some restrictions need to be imposed. Associate Professor Street and her co-workers assume that pairs with  $m$  attributes different appear equally often and show that for estimating main effects the D and A optimal designs occur for pairs with all attributes different. For estimating main effects and two factor interactions the D- and A- optimal designs consists of pairs with  $(k+1)/2$  attributes different when  $k$ , the number of attributes is odd, and pairs with  $k/2$  and  $(k/2+1)$  attributes different when  $k$  is even. For example, for 8 attributes the number of pairs required is 128 and 16,128 pairs respectively.



*Recent speakers at Victorian Branch Meetings: Joanne Kelly and John Taffe. Photo courtesy of Brian Phillips.*

To reduce the number of pairs a regular fractional factorial design can be used and the pairs obtained by pairing each row with its foldover run with duplicates discarded. Such a design has D-efficiency of 100% for estimating main effects and reduces the number of pairs required from 128 pairs to 8 pairs. An example was given showing that regularity was essential. For estimating main effects and two factor interactions a recursive construction based on adding a small number of suitable generators to designs of resolution V results in designs with high efficiency. For example with 8 attributes a 1120 pair design gives efficiency of 99.97% while a 256 pair design gives efficiencies of 92.96%.

Associate Professor Street then explained how these results could be extended to situations where there are more than two choices in the choice set, to situations where some attributes have more levels than other attributes and also described work that explored whether choice consistency depended on having more attributes different in the choices within a choice set and the tradeoff between statistical efficiency and respondent efficiency. Finally she indicated some directions for further research.

*Neil Diamond*

### **New uses of statistics in the credit lending process**

Joanne Kelly works in the area of credit scoring with the ANZ, and shared some of her experiences at the August meeting of the Victorian Branch. Credit scoring involves creating algorithms

for assessing the credit-worthiness of bank customers. Originally the idea was limited to the screening of applicants for loans, but it is now finding application in a variety of other areas. To a lending institution, the event of a customer paying off a loan or credit card debt early is just as much a problem to be avoided as is the event of a customer defaulting (failing to repay a loan). And banks are now interested in estimating not only whether, but also when, such unfortunate events will occur. Joanne introduced us to the issues involved in credit scoring and to some of the modelling methods currently being developed by banks and financial institutions.

In the situation of deciding whether a customer applying for a loan was likely to repay it, banks used to rely on the expertise of senior employees, who would take into account and weigh the relative importance of various pieces of information according to what they had learned from experience. The use of statistical models has enabled more people to be more easily trained for the assessment of credit risk.

Regression-based models evolved naturally out of early 'scorecard' approaches. An advantage of their use is consistency, in that the same range of information is taken into account in all cases. These models typically take into account information in a 12-month 'sampling window', a period before a loan is issued, and a 12-month 'performance window', after the loan is issued. Various predictor variables are assessed for their effects on the odds of the outcome event (default, early repayment), and logistic regression models for different groups of customers are developed.

Joanne described several techniques in current use. She observed that models are continually being developed, and that the main focus of the exercise is gradually changing. The shift is towards more general models of profitability, as financial institutions begin to realize that "one can, at least in principle, make a customer from any type of applicant. It is simply a question of charging the appropriate rate of interest." So the old approach of

refusing to do business with a customer assessed as likely to default on a particular type of loan may give way to an approach of offering the customer a different product more consistent with his or her credit risk profile, ideally to the mutual benefit of the bank and the customer.

*John Taffe*

## **QUEENSLAND**

### **Statistics and History**

During Joe Gani's September visit to the University of Queensland (visiting the Department of Mathematics), the Qld branch was fortunate to have Joe as a guest speaker.

The main emphasis in Joe's presentation was on highlighting the relationship between statistics and the course of history, the most obvious example being the use of population censuses to establish taxation norms. Joe reminded us of the census conducted by William I and the collation of the Doomsday Book. William I endeavored to achieve a relatively high level of accuracy and information was collated in a fair amount of detail. Of course the main motive was to tax his subjects according to the information gathered.

Joe focused on five main topics:

- 1) The Accuracy Of Statistics – The focus here was on governments having accurate records and methods of collating relevant data that is independent of the actual government in office – "prevents the government from fiddling the records". Refuting spurious demographic statements with 'the hard evidence' was also demonstrated with Joe's example of using the country of birth information for Australians.
- 2) Optimal Presentation Of Statistics – The main message (with no surprises) was visual representation of information can have a dramatic impact.
- 3) Modelling And Testing Statistical Hypotheses – The simulated history of the settlement of the Polynesian



# Branch Reports

islands was a fascinating example used to illustrate the inference that could be obtained via modelling and testing statistical hypotheses. Simulated modelling was used to calculate the probability of extinction of the various island groups of Polynesians by incorporating information on migration patterns.

- 4) Fertility And Survival – This section of Joe's talk focused on how changes in fertility rates, the age of child bearing and so on, has influenced and continues to influence Australia's (and the world's) future history.
- 5) Research And Development In Economic And Historical Progress – Finally, Joe concluded with highlighting Australia's Research and Development (R & D) expenditure in a worldwide setting and also how R & D in Australia is funded via business, Commonwealth and State government and the private/non-profit organisations. Again, our history in the future depends on our investment in R & D.

Joe's presentation certainly highlighted that statistics has much to contribute to history.

## BIOGRAPHY:

Joe Gani is a Fellow of the Australian Academy of Science, one of the highest scientific accolades in the country. He is one of the four trustees of the Applied Probability Trust, and co-founder and Editor (1964-1989) of the *Journal of Applied Probability*. He has worked at a number of places including the University of Sheffield, the CSIRO and the Australian National University.

## Statistical Analysis of Microarrays

At our August meeting, Jess Mar presented a colourful introduction to the statistical analysis of microarrays. Jess is currently based at the University of Queensland, where she is undertaking an Honours degree in Statistics with Prof Geoff McLachlan. Jess's introduction to microarray statistics began almost 2 years ago, while working as a vacation scholar at the

Walter and Eliza Hall Institute for Medical Research in Melbourne and more recently as a student with the Cooperative Research Centre for the Discovery of Genes for Common Human Diseases and the Centre for Bioinformation Science at the Australian National University in Canberra.

Firstly, Jess outlined the biological and chemical processes involved in microarray technology. Microarray experiments are currently being employed to study gene expression levels in diverse areas ranging from medical to agricultural applications. For instance, scientists may be interested in finding those genes with different expression levels in healthy and cancerous cells. Many thousands of genes may be studied at once which results in some challenging statistical problems. Issues related to image analysis, quality control, normalisation, measuring differential expression and clustering were discussed.

In particular, several of many available image analysis packages were compared. This revealed considerable variation between packages with the result that different biological inferences may be drawn. Jess also outlined simple plots to detect artifacts such as intensity saturation problems and pointed out that these image analysis programs were not all equal when it came to highlighting these problems. Also, spatial and problems with estimating background levels were noted.

Next, Jess outlined methods for finding differentially expressed genes such as t-tests and the B-statistic. She also briefly described clustering techniques, which scientists often use to group genes that behave similarly.

Finally, a number of open research questions, that are currently intriguing statisticians, were posed. These include taking into account the huge number of tests by adjusting for multiple testing; finding better ways to cluster genes and tissues to search for biologically meaningful substructures; and better ways of designing microarray experiments.

Peter Baker

## Environmental Statisticians: Missing, Inaction?

For the Qld branch's October meeting, Professor David Fox from the Department of Civil and Environmental Engineering at the University of Melbourne spoke about his experiences as an environmental statistician and the opportunities and challenges in Environmetrics.

'Environmetrics' is now an established discipline and sits comfortably alongside other 'metrified' disciplines such as pedometrics, biometrics, econometrics, and chemometrics. Curiously, few academic institutions have incorporated Environmetrics into their teaching programs with most 'environmental statistics' being provided through generic service units offered by Statistics departments or 'in-house' variants of the same.

David focused on three main topics:

### 1. Why Environmetrics?

As a society we demand certain things from our environment. We have a pretty long wish list that includes us wanting clean air, clean soils, good quality drinking water, and so the list goes on. We are concerned not only about human health but ecosystem health, the management of natural resources and the sustainability of human activities on a global scale. All of these sciences require quantification/metrification and hence 'environmetrics'.

Some environmental problems, like salinity and algal blooms, are proving quite elusive. Why? The complexities of the systems involved encompass multiple cases and multiple effects. They are characterised by non-linear relationships and numerous feedback loops and time scales vary across the components involved.

### 2. Challenges And Opportunities In Environmental Research

Often, environmental phenomena have unexpected timing and spatial location but have predictable consequences. Certain environmental incidents are characterised by discontinuities in smooth trends and sometimes we need to deal with unanticipated consequences of deliberate actions (eg

CFCs, introduced pests). It is these pressures of humans interacting with the environment that provides big opportunities for environmental statistics.

Where can statisticians get involved? Quantifying risk assessments and integrating the triple bottom line (social/economic/ecological) into these assessments; compliance monitoring for both human health and ecosystem health; setting statistically verifiable standard or guidelines values for particular indicators of 'health'; incorporating uncertainty into all aspects of natural resource management. David also emphasised the crucial role of statisticians across the four Ms of environmental management: measurement, monitoring, modeling and management.

David recommended Bjorn Lomborg's book "The Skeptical Environmentalist", where Lomborg (a statistician) questions some of the claims made by environmentalists about the state of the world's environmental health. Basically, Lomborg questions the data sources and how this data was analysed and interpreted.

### 3. Case Studies

David then went on to highlight some case studies of major environmental projects that he was personally involved with and had the environmental statistician as an integral member of the team. In some cases the statistician was the leader of the project team. Some of the studies David has been involved with include research programs in Port Philip Bay, the Gippsland Lakes, the North West Shelf and Adelaide Coastal Waters.

David concluded by outlining that there is a growing awareness that the assessment of environmental condition is an imprecise science which invariably requires the application of robust statistical methodology. He emphasised that statisticians must be part of the environmental debates occurring throughout Australia. David also suggested that the current interest in Environmental Risk Assessment, power analysis, complex systems science, statistically verifiable limits, spatio-

temporal variability, ranked set sampling, multi-criteria analysis and a plethora of other techniques should bode well for our profession.

### BIOGRAPHY:

David Fox is currently on secondment from CSIRO Land and Water and is based at Melbourne University where he is Professorial Fellow in the Department of Civil and Environmental Engineering. He has held academic and research positions at Exeter University, Curtin University, Monash University, University of Colorado, and the University of Wyoming. He has also operated his own statistical consultancy in Australia and the United States and has appeared as an expert witness for the WA Police Department and Melbourne Water. He has published in the statistical, medical, operations research, and natural resources literature. David is Director of the new Adelaide Coastal Waters Study.

*Bronwyn Harch*

## WESTERN AUSTRALIA

### If I only had a brain

The presentation given at the August meeting of the WA Branch of the SSA was made by Dr. Michael L. Levitan, currently visiting the Maths and Stats Department of the University of Western Australia. Although Michael's permanent position is at Villanova University in Pennsylvania in the States, it can be assumed that he has a strong affinity for Western Australia since this has been his fifth academic leave to Perth. His talk had the rather curious title, "If I Only Had a Brain." The title alone had the potential of exposing Michael to the exuberant utterances and jibes of the audience. However, exercising their usual statisticians' incredible self-control and stoicism, they held themselves in check with the exception of one or two stalwarts, who just could not restrain themselves.

Michael began with a brief foray into the Wizard of Oz from whence this phrase was derived. Immediately thereafter, he

turned to the real topic of the talk, a discussion of the growth of the chick embryo brain. He and his co-author, Mary E. Desmond of the Biology Department, also from Villanova, recently had a paper accepted for publication. Michael presented his analysis of her data, comparing and contrasting experimental chicks, whose brains had undergone premature cauterization, with control chicks, whose brains had developed naturally. His presentation ventured into Hodges-Lehmann estimators and, subsequently, into bootstrapping and resampling techniques.

To cap off Michael's presentation, he noted that while doing a web search on Hodges and Lehmann, he had come across the name Daniel Ellsberg of Pentagon Papers and Watergate fame. He gave a historical review of those times for the uninitiated, and soon wound up discussing what has become known as the Ellsberg Paradox in decision theory. At that point, he enlisted the aid of the audience, asking them to play the role of non-statisticians, trying to guess what strategies "lay people" would choose for various gambling situations. Using similar paradoxes, the audience, either unwittingly or with expert acting ability, demonstrated how cavalierly and disdainfully they dispensed with the axioms of probability.

Finally, after having observed the vagaries of Michael's thrusts and parries throughout his presentations, there were some members of the audience who suspected that perhaps Michael had chosen the title of his talk for a more appropriate reason!

### Counting leaves on a tree and neurons in the brain

What have the following got in common: (i) The Hindu epic the Mahabharata; (ii) brain cell loss; and (iii) tomato salad? If you know the answer, then you were probably a member of the (sizeable) audience who turned up to hear Professor Adrian Baddeley's talk to the WA Branch in September.

Adrian's presentation was concerned with stereology (a process for obtaining information about a 3-dimensional

# Branch Reports

object from a 2-dimensional image). He explained that stereology can be thought about in terms of classical sampling theory. (This is where the Mahabharata entered proceedings. It contains a very early example of sampling, where King Rtuparna estimates the number of leaves on a tree on the basis of a sample of a few twigs.)

An interesting and important application of stereology involves counting the number of cells in the brain. It had long been accepted that the brain progressively loses neurons (nerve cells) with age. However, as Adrian pointed out, the arguments in support of this finding are dubious. Some of the problems with these arguments involve a failure to account for variation in cell size when estimating total cell numbers from thin slices of brain. In essence, big cells will be overrepresented in comparison to little cells in section planes. Adrian explained this using a tomato salad analogy. Consider a mixed salad with equal numbers of small green and large red tomatoes. Set this salad in jelly and cut a thin slice. This slice is likely to intersect with more red than green tomatoes because of the size difference.

Adrian concluded his polished presentation with comments on some outstanding problems (and controversies) in stereology. A lively discussion followed. After the meeting, several members of the audience joined the speaker and Branch President for dinner.

The restaurant was Vietnamese and the food tasty, but they didn't serve tomato salad.

## What is a statistical method?

For our October meeting, the branch was fortunate in snaring Dr Jock Mackay from the Institute for Improvement of Quality and Productivity, University of Waterloo, Canada who was visiting the CSIRO quality group. Jock made us all think about the basis of our discipline with a very practical example of what statistical method really is.

He made the proposal that statistical method is a set of elements and

procedures common to all statistical investigations. These elements can be organized into a five-step process that we label PPDAC [Problem, Plan, Data, Analysis, Conclusion]. Associated with each of these steps are sub-steps and appropriate language to describe them.

In his talk, based on joint work with his colleague R.W. Oldford, Jock discussed the PPDAC process and some of the ramifications of describing statistical method in this way. He used the model of a project to reduce variation in alignment characteristics of trucks, describing the thought processes which he had followed in attempting to set new standards for the quality of an automated process. He also described the difficulties he had encountered in teaching the engineers involved in the process how to tackle this problem.

He also briefly contrasted the way that a statistician would approach this problem with the more enigmatic Scientific Method and with process improvement systems such as Six Sigma and Statistical Engineering.

This was a very interesting talk, and engendered a lively discussion about how statisticians, particularly in the consulting area, go about their business.

## SOUTH AUSTRALIA

### Goodness of fit tests for continuous distributions

At the September meeting, Kerwin Morris, a fixture of the statistics department (in its various guises) of the University of Adelaide for over 40 years, and who has taught many branch members as undergraduates, presented an interesting talk on joint work with Dominik Szydal of Lublin, Poland, on some goodness-of-fit tests for continuous distributions. The talk was casual and entertaining in typical Kerwin style, as he quipped about the S-M test (following the trend of other pairs of initials, from the  $\chi^2$  goodness of fit test of Pearson and later Fisher, P-F, Neyman-Pearson N-P, to Kolmogorov-Smirnov K-S). S-M could be taken for Szydal-Morris or for "simple-minded". He also made

reference to the use of  $K_0$ , the "Kerwin constant" and D, the "Dominik statistic", included "homework" exercises, and alluded to the depth of a proof by probabilists.

The tests are based on two characterisations of the uniform distribution on  $(0,1)$ . The first characterisation (at least among continuous distributions) of the  $U(0,1)$  distribution is that  $E[X^2] - E[X_{2:2}] + 1/3 = 0$ , where  $X_{k:n}$  is the  $k^{\text{th}}$  order statistic in a sample of size  $n$ , in other words  $X_{2:2}$  is the maximum of two observations. The second characterisation is that  $E[X^2]=1/3$  and  $E[X_{2:2}] = 2/3$ . Kerwin also defined dual characterisations, based on  $1-X$  which of course is  $U(0,1)$  iff  $X$  is  $U(0,1)$ .

He then formulated tests of  $H_0: U \sim U(0,1)$  based on comparing estimates of appropriate quantities with their expected values using these characterisations, and using large sample approximations via asymptotic theory. The observations in a random sample of size  $n=2N$  are paired into  $N$  successive disjoint pairs and the quantity  $\frac{1}{N} \sum_{i=1}^N \max(U_{2i-1}, U_{2i})$  is used to estimate  $E[U_{2:2}]$ , and the mean  $\frac{1}{N} \sum_{i=1}^N U_i^2$  is used to estimate  $E[U^2]$ . It was noted that the test is non-invariant to the choice of pairing. Kerwin prefers to take the observations in the (random) order in which they arose.

This was then generalised to the cases of testing  $H_1: X \sim F$  where  $F$  is completely specified, and  $H_2: X \sim F = F(x; \lambda)$  where  $F$  involves  $p$  unknown parameters  $\lambda$ . The first case is easy, using  $X \sim F \iff U = F(X) \sim U(0,1)$ , so  $U_i$  is simply replaced by  $F(X_i)$ . Note that  $\max(F(X_{2i-1}), F(X_{2i})) = F(\max(X_{2i-1}, X_{2i}))$ , since  $F$  is an increasing function. The maximum likelihood estimates are (mostly) asymptotically normal, although in irregular cases (for example Pareto distributions in which the range of the variable depends on a parameter) the asymptotic variance matrix may be singular. The second case involves estimation of the unknown parameters, and consequent modification of the tests. In many cases it turns out that the "Kerwin constant"  $K_0$  does not depend on the true value of  $\lambda$ , and in other cases the maximum



likelihood estimate can be substituted without changing the limiting distribution of the test statistic.

Examples were given for each case, using the exponential distribution.

*Kathy Haskard*

## CANBERRA

### A brief future of forecasting

At the August meeting, the Canberra branch enjoyed a very interesting talk given by Prof Rob Hyndman from the Business and Economic Forecasting Unit at Monash University, which is the only general forecasting research group in Australia and the largest in the world. He talked about forecasters' inauspicious beginning, dabbling with divination, sheep's livers and vapour-ridden caves in the mountains of Greece; he went through the history of forecasting and finished forecasting the future of forecasting.

Forecasting developed very rapidly in the last 40 to 50 years, from exponential smoothing in 1959 and ARIMA models in 1970 to non-parametric forecasting in 1994. Credit risk, crime, climate, clinical information systems, demography, finance, labour market, supply chain, telecommunications and tourism are all areas of increasing application of forecasting.

In forecasting the future of forecasting Rob said that the forecaster is going to need methods for large datasets like density forecasting or quantile forecasting, methods for functional data like the Lee-Carter method forecasting functions rather than observations and methods for multiple datasets, fast and accurate automatic algorithms for univariate series.

Rob said that there are more forecasting problems than forecasters can handle and he invited us to get involved in forecasting. He finished his presentation with a very nice phrase: "A good forecaster is not smarter than everyone else, he merely has his ignorance better organised".

*Veronica Rodriquez*

### Towards modelling streamflow in ungauged catchments

At the September meeting Barry Croke of the Integrated Catchment Assessment and Management Centre (iCAM) and Centre for Resource and Environmental Studies (CRES) at the ANU gave a talk titled: "Towards modelling streamflow in ungauged catchments".

He explained that estimation of flow regimes in ungauged catchments is the major problem facing hydrologists in order to be able to reliably estimate the impacts of land use and management practices. Account needs to be taken of the geophysical attributes of a catchment (eg area, slope, soils) as well as vegetation cover and land management practices. A variety of approaches have been tried in the past, which include:

- 1 Physics-based – these use measured attributes at a fine scale, and are then aggregated to catchment level. These models are data intensive and so are sensitive to errors in the data.
- 2 Complex conceptual models. These provide a good fit when calibrated, but have many parameters. However they are impossible to regionalize, there being too much interaction between parameters.
- 3 Simple conceptual models. These over simplify catchment response, but regionalisation is possible.

In the simple models effects on streamflow included vegetation cover, and soil moisture index. These combined with rainfall events determined how much water flowed into streams and when.

He discussed the merits of previous examples of regionalisation of simple models, IHACRES and SIMHYD. The SIMHYD model has been simplified from 17 to 7 parameters. It has daily timesteps, but parameters are optimized monthly. IHACRES has been used for modelling stream flow in Australia, the USA and UK. Some problems in these models included lack of information in observed

streamflow, uncertainty in estimation of catchment attributes and heterogeneity.

There are also data limitations, in particular inadequate spatial and temporal coverage. For good spatial coverage there is a need to have gauges at less than the scale of the event, and for good temporal coverage need to be able to record events on the scale of minutes, so short intense events can be properly recorded. Data errors reduce the number of events of peak rainfall, and increase the apparent number of rainy days.

Another factor which influences runoff is the impact of forest cover on evapotranspiration. Current models typically underestimate variability in the runoff coefficient as the impact of only a few of the possible drivers can be identified. Further, the influence of using daily rainfall data generally results in an underestimate flows in very big events.

In summary Barry said that a model suitable for predicting flow in ungauged catchments should be: sensitive to the primary drivers of streamflow; able to be used on catchments with limited climate and geophysical data; be applicable over a wide range of catchments and climates.

The current position is far from this ideal. In order to achieve this goal, the impact of data errors and limitations must be understood.

He ended his talk with a quote from Sir Josiah Stamp (1929): "The government are very keen on amassing statistics. They collect them, raise them to the nth power, take the cube root, and prepare wonderful diagrams. But you must never forget that every one of these figures comes in the first instance from the village watchman, who just puts down what he damn well pleases."

Web reference <http://inres.anu.edu.au/icam/>

*Ray Lindsay*

# Australasian Conferences

## Australasian Genstat Conference 2002

4 – 6 December, 2002  
Abbey Beach Resort, Busselton,  
Western Australia  
Information: <http://www.agric.wa.gov.au/biometrics/genstat2002> or email [genstat2002@agric.wa.gov.au](mailto:genstat2002@agric.wa.gov.au)

## Pre-Conference Workshop on Matrix Population Models

4 – 6 December 2002, Dunedin,  
New Zealand  
Information:  
<http://maths.otago.ac.nz/SEEM4/> or  
email [igoodwin@maths.otago.ac.nz](mailto:igoodwin@maths.otago.ac.nz)

## Biostatistics Workshop

5 – 6 December 2002  
University of Auckland,  
New Zealand  
More details about the workshop  
plus details of how to register can be  
found on the Clinical Trials Research Unit  
website

<http://www.ctr.u.suckland.ac.nz/education/trainwork/biowrksp.html>  
Enquiries, Derrick Bennett  
[d.bennett@ctr.u.suckland.ac.nz](mailto:d.bennett@ctr.u.suckland.ac.nz) or (+64 9)  
373 7599 x4724.

## Fourth Conference on Statistics in Ecology and Environmental Monitoring Population Dynamics. The Interface between Models and Data

9 – 13 December, 2002  
Dunedin, New Zealand  
For details, see  
[www.maths.otago.ac.nz/SEEM4](http://www.maths.otago.ac.nz/SEEM4)  
or email [igoodwin@maths.otago.ac.nz](mailto:igoodwin@maths.otago.ac.nz)

## New Zealand Statistical Association Conference 2003

2 – 4 July, 2003  
Massey University, Palmerston North  
website will be at <http://www-ist.massey.ac.nz/stats/nzsa2003/>  
Contact: Duncan Hedderley,  
[D.I.Hedderley@massey.ac.nz](mailto:D.I.Hedderley@massey.ac.nz)

# Overseas Conferences

## 4th Conference of Asian Regional Section (ARS) of the International Association for Statistical Computing (IASC)

5-7 December, 2002  
Westin Chosun Beach Hotel in Busan,  
Korea.  
Conference theme is 'e-Statistics for  
Information'  
Information: <http://ars.ssu.ac.kr>

## International Conference on Applied Statistics, Actuarial Science and Financial Mathematics

17 – 19 December, 2002  
University of Hong Kong and The Hong  
Kong Polytechnic University.  
Organised by The Hong Kong  
Polytechnic University, The University of  
Hong Kong. The co-organisers are  
Commonwealth Scientific and Industrial  
Research Organisation, Peking University  
and The Chinese Academy of Sciences.  
Information: [//web.hku.hk/~icaaf/  
content.htm](http://web.hku.hk/~icaaf/content.htm)

## SCRA2002-FIMIX: International Conference on Statistics, Combinatorics and Related Areas and the Ninth International Conference of the Forum for Interdisciplinary Mathematics

21-23 December, 2002  
Allahabad, India.  
Information:  
<http://www.alluniv.edu/scra2002>

## 8th Islamic Countries Conference on Statistical Sciences (ICCS-V111)

21 – 24 December, 2002  
University of Bahrain, Bahrain.  
Conference Theme: "Business,  
Population, Environment and IT  
Strategies of the Islamic World"  
Information: Dr Akram M Chaudhry,  
email: [akrammoh@internic.uob.bh](mailto:akrammoh@internic.uob.bh)

## Hawaii International Conference on Statistics and Related Fields

5 – 8 June, 2003, Sheraton Waikiki Hotel,  
Honolulu Hawaii USA  
Submission Deadline: January 16, 2003  
Sponsored by: University of Hawaii –  
West Oahu  
Web address <http://www.hicstatistics.org>  
Email address: [statistics@hicstatistics.org](mailto:statistics@hicstatistics.org)

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