



Heroes of Australian Science and Technology honoured

On Tuesday, 30 March 1999, six Australian "Heroes of Science" received the Clunies Ross National Science and Technology Award at the Annual Award Dinner in Melbourne. The Hon Peter Beattie, Premier of Queensland, presented their awards.

The winners from Adelaide, Alice Springs, Hobart, and Melbourne are:

- Making better flames for large industrial furnaces and for the Sydney Olympic torch;
- Bridging the gap between mainstream technology and the needs of remote Aboriginal communities;
- Giving our children the statistical literacy they need to be effective citizens;
- Easing the frustration of urban motoring through intelligent traffic intersection design;
- Keeping Australia's minerals industry competitive through better, cheaper ways of smelting;
- Creating clear, cheap and reliable microwave links for telecommunications in Australia and overseas.

Each has received the award for their outstanding commitment and contribution to the application of science and technology in Australia and for inspirational leadership of future scientists.

Full citations, photos and background information are available on-line at

www.cluniesross.org.au/media99.htm

The six Australians honoured with the 1999 Clunies Ross Award are:

Professor Sam Luxton, University of Adelaide

Sam Luxton has a lifetime of achievement in mechanical engineering and combustion technology, culminating in his role as Chief Design Adviser for the Olympic Torch combustion system.

Dr Bruce Walker, Centre for Appropriate Technology, Alice Springs

Bruce Walker has provided solutions to Aboriginal communities where mainstream technology has failed. His designs for improved pit latrines, hand-operated washing machines, water treatment and other systems match the needs of remote communities without imposing the consequences of a lifestyle beyond their control.

Dr Jane Watson, University of Tasmania

Jane Watson's career has been committed to enhancing the

statistical literacy which young people will need as active citizens in the modern community. She is applying her research by using newspapers, websites and satellite learning to reach teachers and young people across Australia.

Dr Rahmi Akçelik, ARRB Transport Research, Melbourne

Motorists around the world have benefited, through reduced travel time and reduced pollution, from the practical application of Rahmi Akçelik's research on the design and evaluation of intersections such as roundabouts and traffic signals systems.

Dr Frank Jorgensen, CSIRO Minerals, Melbourne

Frank Jorgensen has pioneered research into new smelting technologies as a Chief Research Scientist at CSIRO Minerals in Melbourne, helping the Australian minerals industry stay competitive. Frank is recognised by industry and his peers for "establishing south-east Australia as a mecca of flash smelting fundamentals."

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Subscriptions

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Advertising

Advertising will be carried in the Newsletter on any matters which the Editors feel are of interest to the members of the Society. For details of advertising rates, etc. contact the Editors at the above addresses.

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**DEADLINE FOR NEXT ISSUE:
16 July 1999**

Mr Andrew Martin, Martin Communications, Melbourne

Andrew Martin made his first radio receiver at the age of eight. When he discovered that no one really knew how microwaves travelled he developed his own theory. His company is now helping telecommunication companies in Sweden, the UK, China and South-East Asia to dramatically improve their microwave telecommunication systems.

Sir Gustav Nossal

A special lifetime contribution award was also made to Professor Sir Gustav Nossal.

Sir Gus has made a remarkable contribution to science and technology including:

- his classic research on the immune system;
- his directorship of The Walter and Eliza Hall Institute of Medical Research for 31 years;
- his campaign to improve global health through WHO;
- his role in the birth of many organisations including: CRCs, VicHealth and AMRAD;
- his influence on government policy especially in his years as President of the Australian Academy of Science.

As a communicator of science he is unparalleled - inspiring future generations of scientists through lectures, radio and television.

About the Award

The Award honours the memory of Sir Ian Clunies Ross, a giant of Australian science. Born in 1899, he dedicated his life to science, technology and the battle against the dark horse of ignorance. The Clunies Ross National Science and Technology Award annually honours heroes of science and technology: Australians who, in the tradition of Clunies Ross, have led in science, administration and communication for the advancement of Australia.

About the Foundation

The Ian Clunies Ross Memorial Foundation was established in 1959 to perpetuate the memory of Sir Ian Clunies Ross.

The Foundation's mission is "To advance science, its communication and application to best benefit a developing Australia and the challenges of our global environment".

His Royal Highness - The Duke of Edinburgh, KG KT OM GBE AC PC, is Patron of the Foundation.

Mr Hugh Morgan AO is the Chairman of the Foundation.

Mary C Bolger
Foundation Secretary
Ian Clunies Ross Memorial Foundation
Suite 505, 89 High Street,
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Email: icr@crnet.com.au
<http://www.cluniesross.org.au>

Central Council

Notes from the meetings of the Central Council of Statistical Society of Australia Inc. (SSAI) and Australian Statistical Publishing Association Inc. (ASPAI) held at the University of Sydney in February 1999.

Accreditation

The President reported on the outstanding job done by the initial Accreditation Committee. The Committee has had to process a large number of applications and make many difficult decisions. They meet once a month, generally via telephone conference, and are spending considerable time examining each of the applications and referees' reports to ensure that a high standard for accreditation is established. There have been 17 applications for GStat and 97 for AStat up until the end of January.

The Central Council debated such matters as marketing accreditation both internally to members and externally to employers and clients, professional development and the

Word documents by contacting the Business Office using the email address

ssai@interact.net.au

After a detailed discussion of costs the Central Council agreed to hold the accreditation application fee at \$100 for 1999 but to increase it to \$150 from 1 January, 2000. The annual maintenance fee will remain at \$30.

The ASC 15 committee is planning various professional development activities for accredited members to be held in conjunction with the conference in July 2000.

The Chair of the Accreditation Committee, Dennis Trewin, and Jane Matthews will be standing down from the committee in July. The President thanked Dennis and Jane for the enormous amount of time and effort they have given to establishing the accreditation process.



Gary Glonek, David Griffiths and Rodney Wolff working hard at the Council meeting.

Central Collection of Subscriptions

The first round of central fee collection went reasonably smoothly. The Council reviewed the 1998 experience and considered ways of improving the process for this year. The 'early bird' discount date for all Branches has been set at 15 January.

Honorary Life Membership

The Council awarded Honorary Life Membership to Dennis Trewin and Richard Jarrett. Citations and certificates will be presented to Dennis and Richard at ASC 15 in Adelaide.

Conferences

The Council received a detailed report on ASC 14 from Walter Robb. The conference should return a profit of \$12 500 to the Society. The President thanked Walter and his team for an excellent conference on the Gold Coast.

WAYS'99 will be held in conjunction with the Industrial Statistics Conference in Wollongong in December* this year.

* WAYS99 will now be held 6th-8th October 1999

Job Web Site

The Society allocated \$1500 towards maintaining the job web site constructed by Gordon Smyth. The site is a very important resource and widely used by members of the Society. The URL is

<http://www.maths.uq.oz.au/~gks/jobs/index.html>



The Accreditation Committee at their meeting in February. Clockwise from top left: Michael Adena, Dennis Trewin, Tony Swain, Richard Jarrett, Jane Matthews and Nick Fisher.

revised application forms. It noted that at least one employer has agreed to pay the accreditation application fees for its employees.

Members are reminded that the new AStat and GStat application forms are available electronically as

Web Working Party

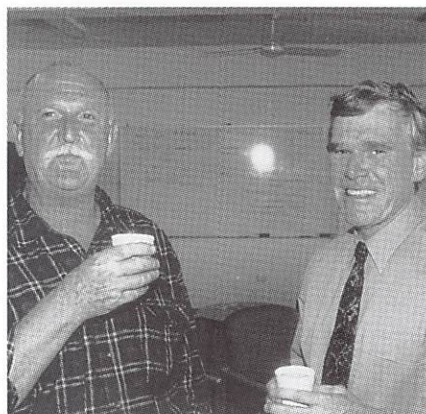
The Society purchased webserver equipment late in 1998. The team lead by Rodney Wolff is establishing a new web structure for the Society. The domain name will be www.statsoc.org.au

Australian and New Zealand Journal of Statistics

Daryl Daley has retired as Technical Editor of the journal after many years of excellent service. The Society owes a great debt to Daryl who has contributed to the operation of the Society in so many ways over the years. Ray Watson has been appointed as the new Technical Editor for ANZJS.

History Project

Professor Gani has compiled folders of obituaries of Australian probabilists and statisticians as well as various articles on the development of statistics in Australia. Many of these articles have appeared in the Australian Journal of Statistics. This material is available at the Society's Business Office in Canberra.



Geoff Bruton and Rodger Robertson chatting during a coffee break.

Service Awards

At the 1998 AGM the Society introduced Service Awards to formally recognise "sustained and significant service to the Society".

The Central Council made 7 Service Awards this year to recognise some of the many people who have contributed to Branch and/or Central Council activities.

Under the Regulations those who have already been awarded Honorary Life Membership are not eligible to receive a service award. The 1998 awards were presented to the recipients at their Branch's



David Griffiths and Virginia Wheway also enjoying the break.

AGM in March. The 1998 Service Awards went to

Name	Branch
Eden Brinkley	Canberra
Robert Forrester	Canberra
E. Ann Eyland	New South Wales
Helen MacGillivray	Queensland
John Field	South Australia
Malcolm Clark	Victorian
Nick Garnham	Victorian
	Neville Weber, Hon. Secretary

ANNUAL GENERAL MEETING - NOTICE

NOTICE of the ANNUAL GENERAL MEETINGS of the STATISTICAL SOCIETY OF AUSTRALIA INC and the AUSTRALIAN STATISTICAL PUBLISHING ASSOCIATION INC.

to be held on Wednesday, 14 July, 1999 commencing at 6pm, in Room 173, Carslaw Building, University of Sydney.

AGENDA FOR THE SSAI ANNUAL GENERAL MEETING

1. Apologies and Proxies

Proxies must be given in writing as per enclosed proforma. They must be given to the Secretary no later than 24 hours before the time of the meeting.

2. Confirmation of the Minutes.

The minutes of the Annual General Meeting, held 7 July, 1998 appeared in the 1998 November Newsletter (No. 85).

3. Presentation of the 1998-9 Annual Report.

4. Presentation of the Treasurer's Report.

5. Appointment of signatories to operate accounts.

6. Election of Section Chairs

Nominations for Section Chairs should be with the Secretary no later than 30 June, 1999. All nominations will require a seconder and a statement from the nominee that she or he is prepared to stand.

7. Any other business.

8. Date and place of the next meeting.

AGENDA FOR THE ASPAI ANNUAL GENERAL MEETING

1. Apologies and Proxies

Proxies must be given in writing as per enclosed proforma. They must be given to the Secretary no later than 24 hours before the time of the meeting.

2. Confirmation of the Minutes.

The minutes of the Annual General Meeting, held 7 July, 1998 appeared in the 1998 November Newsletter (No. 85).

3. Presentation of the 1998 Annual Report by the Editor of the Australian and New Zealand Journal of Statistics.

4. Presentation of the 1998 Annual Report by the Newsletter Editors.

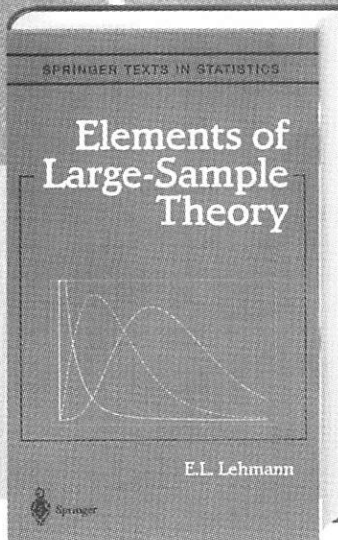
5. Presentation of the Financial Report.

6. Appointment of signatories to operate the accounts.

7. Any other business.

8. Date and place of the next meeting.

Neville Weber,
Hon Secretary.



Springer for Statistics

E.L. Lehmann

Elements of Large-Sample Theory

Elements of Large-Sample Theory provides a unified treatment of first-order large-sample theory. It discusses a broad range of applications including introductions to density estimation, the bootstrap, and the asymptotics of survey methodology written at an elementary level. The book is suitable for students at the Master's level in statistics and in applied fields who have a background of two years of calculus.

E.L. Lehmann is Professor of Statistics Emeritus at the University of California, Berkeley. He is a member of the National Academy of Sciences and the American Academy of Arts and Sciences, and the recipient of honorary degrees from the University of Leiden, The Netherlands, and the University of Chicago.

1999. XII, 631 pp. 10 figs.
(Springer Texts in Statistics)
Hardcover DM 159,-*
ISBN 0-387-98595-6

R.W. Farebrother

Fitting Linear Relationships

**A History of the Calculus of
Observations 1750-1900**

This is a description of the development of statistics, which for more than a century was called "the calculus of observations." The approach will help readers gain a clearer understanding of the historical development as well as the essential nature of some of the commonly used statistical estimation procedures. Detailed descriptions of the fitting of linear relationships by the method of least squares and the closely related least absolute deviations and minimax absolute deviations procedures are presented, along with some of the important work by Laplace, Gauss, and Adrain.

1999. Approx. 290 pp. 3 figs.
(Springer Series in Statistics)
Hardcover DM 129,-*
ISBN 0-387-98598-0

K.E. Voelkl, S. Gerber

Using SPSS for Windows

Data Analysis and Graphics

A hands-on, step-by-step guide to data analysis using one of the most popular statistical computing packages, SPSS for Windows 8.0. With this guide, users learn how to conduct sophisticated statistical analyses using SPSS while gaining insight into the nature and purpose of statistical investigation. The guide includes a discussion of the packages new graphics features in 8.0 and multivariate statistics. Results produced by SPSS are shown and discussed in each application. All data sets used in the book are available via the Internet.

1999. Approx. 265 pp. 87 figs.
(Springer Lab Manual)
Softcover DM 69,-*
ISBN 0-387-98563-8

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Springer

Branch Reports

NEW SOUTH WALES

Cross-over designs in clinical trials

Sydney. What can you say about it? Indeed, what hasn't been said about it? The home of the Mardi Gras and, all too soon, the 2000 Olympics, has been the subject of many a written word, some fine, some not. Having recently arrived in the harbourside town I was in a unique position to appreciate and enjoy the November meeting of the NSW branch, and, as some of our members may have never had the pleasure, nay, the sheer unbridled joy, of living in this most majestic of cities, I thought I would begin by giving an outsiders impression.

Frenzied. Frenetic. Frantic. A rigmarole ruled by wretches wrapped in a ratrace. But then I'm just a bucolic, backward boy battling to become a big banana in this boisterous burg. Bugger.

November 25 dawned, well, how it dawned I can't really say because I slept in. Not having to work means that you can do this. It was actually a patchy day - cloudy, then clear, then cloudy, then some condensation, then clear and so on. Amidst much hurrying and harrying we proceeded to the UNSW University Club to hear Abie Ekeangaki discuss cross-over designs in clinical trials.

Abie begin his talk by discussing the relative merits of parallel group and cross-over designs. The basic cross-over design is a two period, two treatment design, called an AB/BA design. No mention was made of the original advocates of this design, although yours truly has no doubts it was a Scandinavian foursome. The ABBA design is so called because it consists of two treatment arms, with treatments A and B used in periods 1 and 2 respectively for the first treatment arm, and treatments B and A used in periods 1 and 2 respectively for the second treatment arm.

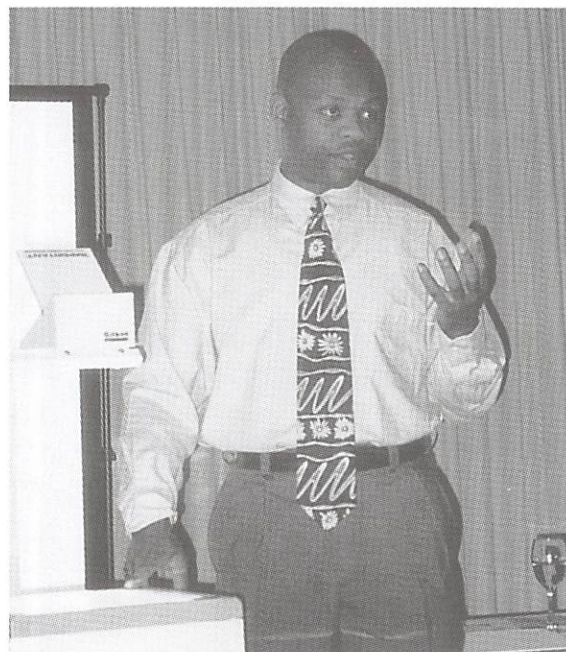
The aim of the cross-over design is to evaluate differences between treatments rather than differences between sequences. However there is a need to test for cross-over differences and this was discussed for the basic "Mama-Mia" design. The "Dancing Queen" design for a cross-over design makes the same assumptions as all designs for cross-over trials, regardless of the numbers of periods or treatments. These assumptions are that there is no effect on the response due to the period of treatment and that there is no period by treatment interaction. Each of these assumptions can be tested.

A further assumption is that there is carry-over effect of treatments from one period to another. The mechanisms of the carry-over can best be thought of using the "Money, Money, Money" design. The carry-over may be seen through the persistence of treatment A or B into period 2 or through the curative effect of treatment A or B into the second period. Similarly a carry-over effect may be aliased/confused/disguised as a period by treatment interaction.

Abie stated, for all cross-over designs, that as the carry-over is not independent of the tests performed then separate tests for carry-over could not be performed. Instead the carry-over could be modelled for treatment effects (necessitating model assumptions) or could be countered by introducing longer wash-out periods into the trial. Alternatively the cross-over effect could be ignored completely.

Next Abie went on to discuss issues specific to the "Knowing You, Knowing Me" design. He noted that the carry-over in this design

was based on between subject variation rather than within subject variation and that there was a need to assume a random subject effect in order to capture the effect of the carry-over. He then went on to introduce higher order cross-over designs for two treatments and to quickly discuss their strengths over the "I do, I do, I do, I do, I do" design. A simple analysis of one of these designs was then presented



Abie Ekeangaki faces his "Waterloo" at the November 1998 meeting.

(complete with SAS code and output), followed by a discussion on whether parallel group designs or cross-over designs should be used.

Abie's talk was followed by drinks and the annual nosh-up, a culinary delight designed to tempt and satiate the most fussiest of diners. The culmination of the evening was the annual quiz, put together with many thanks by Eric "Does Your Mother Know" Sowe and Peter "Take a Chance on Me" Petocz. Congratulations go also to the Median Massagers who took out the nights major prize. The winner takes it all...

Jason Boland

WESTERN AUSTRALIA

Western Australian Young Statisticians Workshop 1999

Held at the Cottesloe Beach Hotel on Friday 19th February, the Western Australian Young Statisticians Workshop was a great success. Altogether, 44 Young Statisticians and 9 invited speakers attended Perth's statistical event of the year. The workshop commenced with two aims. Firstly, to promote statistics as a viable career option, and secondly to develop, maintain and improve contact amongst Perth's Young Statisticians. Feedback received from the delegates indicates that the Workshop's aims were well met.

The Keynote speaker was Dr Mervyn Thomas, Science and Industry Manager of the Mathematics and Information Sciences Division, CSIRO. He discussed the role of the Statistician in the 90s as one of being an equal partner in research projects, as opposed to being a servant in such ventures. Dr Thomas also discussed the active role of CSIRO in researching environmental issues in Western Australia. In particular, statistical techniques used in the management of salinity were highlighted.

Delegates also listened with interest to invited speakers from a diverse range of fields including biostatistics, geostatistics, market research, teaching, mining and statistical consulting. The role of statistics in government was highlighted by invited speakers from Western Power, the Western Australian Police Service, the Ministry of Justice, AgWest and the Australian Bureau of Statistics. The private sector was also well represented with speakers from Bank West, Curtin University, Snowdon Associates Pty Ltd and Data Analysis Australia. Each highlighted the increasing need for statistical expertise, providing

encouragement to those Young Statisticians nearing university graduation.

The award for Best Young Statistician Presentation, sponsored by Roche Products Pty Ltd, was won by Katrina Tiller, a PhD student from UWA. Her talk was entitled "Using GEEs to Investigate Trends in Hospital Admissions for Children With and Without Birth Defects". Her research concluded that babies born with birth defects were three times more likely to experience hospitalisation in their early years, as opposed to babies born without defect.

The Workshop ended a success, with participants reluctant to leave ... without their free drink vouchers! Those celebrating in the bar downstairs could be heard toasting the Workshop's sponsors: the Statistical Society of Australia (WA Branch), Data Analysis Australia and Roche Products Pty Ltd. Members of the organising committee, Jodie Thompson, Narelle Mullan and Wesley Soet, were given complimentary packets of crisps in recognition of their efforts.

CANBERRA

The Canberra Branch has commenced activities for 1999 with three meetings, one of which was our Annual General Meeting. The members elected to council for 1999 are

President:

Dr Alice Richardson,
University of Canberra

Vice-President:

Mr Ross Cunningham
Statistical Consulting Unit, ANU

Secretary:

Mr Paul Brown, INTSTAT

Treasurer:

Mr Michael Johnston, INTSTAT

Councillors:

Dr Simon Barry,
Bureau of Resource Sciences

Ms Melissa Dobbie, ANU

Mr Greg Griffiths, ABARE

Mr Ian McDermid
Australian Customs Service

Dr Terry O'Neill, ANU

Dr Siu-Ming Tam, ABS

Congratulations to Alice who becomes the branch's first female president.

Presentation of Awards

Several branch members were presented their accreditation certificates by Mr Dennis Trewin at the AGM in March (see picture). At the same meeting, Bob Forrester and Eden Brinkley were presented with Statistical Society of Australia Service Awards. This was in recognition for their contribution to the SSAI as Editors of the SSAI newsletter (almost since its inception!) and at the branch level as Treasurer and President, respectively.

Congratulations to Bob and Eden and all of those successful in becoming accredited.

Other News about Members

Dr Jeff Wood was elected as Treasurer of the International Biometric Society for 1999-2002. This is the first time that this position has been held outside of North America.



Members of the Canberra Branch who received Service Awards, AStat and GStat certificates

Branch Reports

Solving the Glitch in Robson Rotation

Dr Ken Brewer's talk in February attracted an audience of statisticians, public servants and ACT Legislative Assembly members, who came to hear about the glitch in Robson rotation. Robson rotation involves rotating the order of candidates on voting forms. It is supposed to reduce the effect of "party linear" voting, that is numbering the candidates for a particular party in order down the column. The different orders used form a Latin square, meaning that five different orderings are used in a five-member seat.

But there is a glitch, which may have resulted in the "wrong" people ending up as Legislative Assembly members. A proposal to fix the glitch, from Elections ACT, involves not five but twenty orderings. Each candidate appears at the top of the list four times, and similar 4 by 4 Latin squares of candidates appear below.

Ken showed that by ensuring this 4 by 4 Latin square was column-complete, a perfect allocation of party-linear votes can be obtained. There is a small residual glitch left in the 7-member seat, which requires a 6 by 6 Latin square. Ken's proposal to fix this up involves "voting above the line with a twist", where political parties do not fix the order of preference of above-the-line voters, but see those above-the-line votes distributed equally among all candidates.

Ken's ideas were well-received, and as a bonus, the *Canberra Times* carried a favourable editorial. It'll be a real achievement for our profession if a sensible statistical solution to the glitch is accepted by the politicians.

Note: For more details on Ken's submission to the Select Committee on the Review of Governance, see the Canberra Branch web page: www.ozemail.com.au/~ssacnb

Alice Richardson



Branch Members enjoying dinner following AGM

Thou shalt not pseudo-replicate

At the conclusion of the AGM, the outgoing President, Mr Ross Cunningham addressed those gathered on the topic of "Thou shalt not pseudo-replicate". An alternative title for the talk was "Go forth and replicate!", which might lead you to believe that it was a talk on population dynamics! In his job as the head of the Statistical Consulting Unit of the Graduate School at the Australian National University, a position he has held for over 18 years, Ross has been consulted by over 2000 students and staff on problems concerning experimental design and design of observational studies. This makes him well placed to discuss a topic such as pseudo-replication.

Ross began by commenting "The most undervalued and unrecognised contribution to a research project made by a consulting statistician is the actual design of an experiment, survey or observational study". He then provided details of several consultancies where effective replication (replication of whole units), control of variability through blocking and purposive

confounding, and randomisation in the designs allowed the questions posed by the client to be answered as directly and correctly as possible. His examples included: a forest fragmentation study, which investigated the effect of fragment context on animal density in a forest system; the impact of tourism on penguins at Bowen Island in Jervis Bay National Park; assessment of factors affecting strength and moisture properties of plastic-bonded particle board; and, a comparison of the natural durability of a two-species particle board composed of white Cyprus pine and radiata pine, with that of commercially produced boards.

Underpinning these examples was the issue of pseudo-replication, and how subtle it can be, consequently often being undetected. In light of his experience, he also commented that one of the really difficult issues in designing experiments is determining which factors to confound in a design. The take-home message from his talk was that designs must be internally valid if the appropriate reference variances are to be efficiently estimated.

The Challenges of a Solo Biometrician

Claiming that contents of meals were the only events remembered by conference attendees, Terry Koen, a senior Biometrician in the NSW Department of Land and Water Conservation at Cowra, approached his talk by summarising the contents into a menu of Appetisers, Main courses and Coffee and mints.

During the Appetisers, Terry gave an entertaining but factual account of the history of his employer. The Main course consisted of cold soup and a baked dinner, during which Terry described his nonbiometrical

and biometrical activities, respectively. Being located at a research station with only 12 staff (four of which are researchers), tasks such as fixing computer/printer problems, maintenance of vehicles, networking installation, etc, fall upon every-one's shoulders, as the resources are simply not available (nor required) for assistance in these matters. A job at this location is certainly not all that it's cracked up to be!

For the baked dinner, Terry presented examples of some consultancies he has undertaken at Cowra. He described a water-use efficiency trial, which examined the rate of water use of four grass types

for two watering regimes. Other examples included: the effect of grazing and season on the growth of *Eucalyptus lignotubers*; prediction of available water content using a database of 3800 soil profiles; and, developing a map of erosivity based on 50-year rainfall records for about 20 sites. With coffee and mints, Terry concluded by summarising the challenges of being a solo Biometrician at an isolated location, and mentioned he was glad the door was open in Canberra at the Applied Statistics meetings to air his statistical problems in an informal environment.

Melissa Dobbie

Special Interests

YOUNG STATISTICIANS

WAYS98 "Get amongst it" or "Danish delights"

For more great photos from WAYS98, see

<http://stat1.stat.auckland.ac.nz/~klein/WAYS98/Pictures>.

Stay tuned for WAYS99 to be held in wonderful Wollongong. Remember... "Get amongst it"

SERVICE AWARDS

In 1999 the Society presented the first set of Service Awards to recognise "sustained and significant" service by some of the many people who have not previously been formally recognised through the award of Honorary Life Membership. The recipients of these awards have all given extensive service to the Society at Branch level and have also contributed to the activities of the Central Council in many varied ways including service on the Society's Executive, as Newsletter Editors, rewriting the Society's constitution and organising Australian Statistical Conferences (ASC's) and Section Workshops.

The Central Council will consider nominations for Service Awards each year at its February meeting.

In 1999 awards were made to the following people.

Eden Brinkley (Canberra Branch)

Eden is currently the Society's Treasurer and has been an Editor of the Newsletter since 1985. Eden has served on the Executive of the Canberra Branch as Secretary and President. His term as Society Treasurer has seen the merger of the journal, the move to a commercial publisher and the introduction of centralised subscription collection. He has also played a major role in proposing and implementing the recent facelift of the Newsletter.

Malcolm Clark (Victorian Branch)

Malcolm has been an active member of the Victorian Branch since its inception. He has held the position of Branch Secretary and President and was involved with the organisation of both ASC 6 in 1982 and ASC 12 in 1994. He was convenor for the 1985 Branch Data Analysis Workshop.

Ann Eyland (NSW Branch)

Ann has given sustained service to the discipline and the Society over the past 25 years. She has been an untiring worker for the NSW Branch during her 16 years on Branch Council including 5 years as Secretary and as President in 1994-95. Ann was also heavily involved with the Constitution review working party of the Society in 1977-78.

John Field (South Australian Branch)

John has demonstrated exemplary service in a variety of high profile roles. He was Society Secretary for 7 years, Chair of the Industrial Statistics Section for 3 years and has held all Executive positions on the Branch Council including Treasurer (5 years), Secretary (1 year) and President (2 years). John was instrumental in the formal incorporation of the Society and the South Australian Branch.



Bob Forrester receives his Service Award from Ross Cunningham at the Canberra Branch meeting in March

**Bob Forrester
(Canberra Branch)**

Bob has given outstanding service as the Society's longest serving Newsletter Editor, having held the post since 1980. He has also been the Treasurer of the Canberra Branch for 9 years and has played a major role in organising the annual Canberra Branch symposia.

**Nick Garnham
(Victorian Branch)**

Nick is currently the longest serving member of the Victorian Branch Council. He has held the position of Branch Secretary and President. He was Treasurer for ASC 12 and Co-organiser of the Society's first two Statistical Education Workshops in 1992 and 1994. Nick has been one of the Society's delegates on the Australian Mathematical Sciences Council for 5 years up until his election to the AMSC Executive this year.

**Helen MacGillivray
(Queensland Branch)**

Helen has made outstanding contributions to the Society having served as Secretary and President of both the Society and the Queensland Branch. As Secretary, Helen handled the writing of the constitution as a set of Rules and Regulations to comply with the ACT Incorporation Act. As President she coordinated the introduction of optional accreditation and was heavily involved in the negotiations with Blackwell and NZSA concerning the journal merger and move to a commercial publisher. Helen has represented the Society on the National Committee for Mathematics and the AMSC where she is the current President.

Neville Weber

Letter to the Editors

The Editors, SSAI Newsletter

20 April 1999

Dear Sirs,

John Truran offered a comment (Newsletter No. 86) on the origin of the famous quote - "lies, damned lies and statistics", suggesting that it was more likely made by Disraeli than Mark Twain.

John Bibby offers a different view in his highly entertaining "Quotes, Damned Quotes and", (Demast Books, Halifax, UK, 1983) as shown by the following three extracts:

1. Introduction: 'This book was conceived as a pamphlet whilst in Tangiers during January 1981. A local newspaper attributed the phrase "Lies, damned lies and statistics" to Winston Churchill, which conflicted with my prior belief that it came from dizzier Prime Ministerial heights.'
2. On page 29, quoting Mark Twain: 'Figures often beguile

me, particularly when I have the arranging of them myself; in which case the remark attributed to Disraeli would often apply with justice and force:

"There are three kinds of lies: lies, damned lies and statistics". Mark Twain *Autobiography* (1960 edn., p.149; p.246 in other edns.)"

3. Finale, p52: 'So who did originate the "Lies, damned lies" saying? As far as I can tell, Winston Churchill knew that Mark Twain wrote that Benjamin Disraeli has said the oft-quoted phrase. However it sounds most un-Disraelite to me. Lord Blake, biographer of Dizzy, has confirmed as much in a personal letter. The ring of the phrase is more Twain-ish than anything else. I personally would blame M.T. for the abominable quote. To the question why he should want to ascribe it elsewhere, I have no answer.'

Bibby's booklet contains many interesting and amusing quotes, including my all-time favourite:

"We look forward to the day when everyone will receive more than the average wage."
(Australian Minister of Labour, 1973)

Richard Phillips
ABS
Canberra

The Editors, SSAI Newsletter

29 April 1999

Sirs,

I read with interest the informative and very interesting (unsigned) report on the topical and important Belz lecture given by Jane Matthews in the February newsletter. I would like to thank and congratulate both the speaker and the reporter.

I was not at the lecture so the report is my only source of information about the talk. In the report, I found the discussion of the properties of

tests under ideal conditions, particularly the discussion of the diagnostic sensitivity and specificity (or false positive and false negative rates) to be somewhat confusing. While I have no doubt that the issues were expanded on in the talk, it may be useful to provide some additional clarification for other readers of the newsletter.

My confusion arose from the use (in the report) of terms like false positive rate without an accompanying precise definition. So consider a population of studies, in each of which we test a null hypothesis H_0 . Suppose that, in each study, we apply a test of H_0 which is of level $\alpha = P(\text{reject} | H_0)$ and has power $1 - \beta = P(\text{reject} | H_1)$. Suppose that in the population, the proportion of studies in which the null hypothesis is actually true is $P(H_0) = \pi$. Then, my calculations yield the

$$\text{False positive rate} = \frac{P(\text{reject} | H_0)P(H_0)}{P(\text{reject} | H_0)P(H_0) + P(\text{reject} | H_1)P(H_1)} = \frac{\alpha\pi}{\alpha\pi + (1-\beta)(1-\pi)}$$

and the

$$\text{False negative rate} = \frac{P(\text{accept} | H_1)P(H_1)}{P(\text{accept} | H_0)P(H_0) + P(\text{accept} | H_1)P(H_1)} = \frac{\beta(1-\pi)}{(1-\alpha)\pi + \beta(1-\pi)}$$

Observe that the false positive rate is $P(H_0 | \text{reject})$ and the false negative rate is $P(H_1 | \text{accept})$. The point of the discussion seems to be that the false positive rate $P(H_0 | \text{reject})$ is often naively taken to be synonymous with the level $\alpha = P(\text{reject} | H_0)$, whereas it can be quite different from α . When the conditioning is made explicit (as it always should be), the differences in the two concepts become clear and there is absolutely no reason to expect equality. The issue is in the interpretation of two different probabilities rather than in the construction of tests themselves and arises from a lack of clarity as to the precise meaning of the concepts to which the words refer.

Incidentally, in the population used in the talk ($\pi=0.8$), as implied by the

numbers quoted in the report, we can see from the formulas that the false negative rate does not change much over the usual range of values of α , changing more as β changes, while the false positive rate changes more with changes of α and β . As noted in the report, we may be able to achieve specified false positive rates by adjusting α and β appropriately.

Although it is not mentioned in the report, we can also examine the effect on the false positive and false negative rates of changing π . If $\pi \rightarrow 1$, the false positive rate tends to one and the false negative rate tends to zero. As John Maindonald pointed out to me, this may be of concern in legal cases in which nearly all tests in the reference population are carried out on innocent parties.

The use of hypothesis testing as a broad spectrum approach to be

applied to almost any problem is not to be recommended. Indeed, the consequences of a "p-value culture" are entirely negative. To the long list of issues in the use and interpretation of tests (including the asymmetry in the treatment of null and alternative hypotheses, the choice of level, the appropriateness of one and two-sided tests, the effects of sample size, the substantive importance, multiple tests, etc.) Jane Matthews and the report writer have added the reminder that there are a variety of sources of potential bias which also need to be dealt with. However, it is important that the discussion of meaning and interpretation be made as clear as possible, and this letter is an attempt to assist this process.

To end on a philosophical note, the report provides an inadvertent illustration of the general point that much dissension in statistics is generated by the use of words to which many people attribute a nontechnical, intuitive meaning when in fact a limited and very precise technical meaning is intended. Nearly all the confusion, apparent contradiction etc. arises from the wrongly assumed intuitive meaning. We need to be aware of this danger, particularly when faced with demands for simple nontechnical explanations of complicated concepts.

Yours sincerely

A.H. Welsh

Clunies Ross National Science and Technology Award for 2000

The Ian Clunies Ross Memorial Foundation is pleased to announce that the Clunies Ross National Science and Technology Award is now open for nominations.

This prestigious annual Award, introduced in 1991, has now honoured forty-six special Australians who have made an outstanding contribution to the application of science and technology for the benefit of Australia.

Please note that nominations close on Monday 12 July 1999.

Award recipients will be publicly honoured with a silver medal at a formal presentation and dinner to be held March 2000 in Melbourne.

Nomination forms are available from:

Mary C Bolger

Foundation Secretary

Ian Clunies Ross
Memorial Foundation

Suite 505, 89 High Street,
Kew Vic 3101

Tel: (03) 9854 6266

Fax: (03) 9853 5267

Email: icr@crnet.com.au

<http://www.cluniesross.org.au>

ACCREDITED MEMBERS

The following applications have been approved by the Central Council.

GStat:

Donald Findley

Ky Mathews

Yuan Wu

Accredited Statisticians:

Janice Miller

Nick Nicolopoulos

James Pearce

Michael Sparks

Neville Weber
Secretary, SSAI

NEWS ABOUT MEMBERS

Dennis Trewin to head up International Statistical Institute from 2001

Dennis Trewin, Deputy Australian Statistician at the Australian Bureau of Statistics, has been elected to lead the International Statistical Institute (ISI), which has an elected membership drawn from the world's leading statisticians in more than 90 countries.

Dennis will be President-Elect from 1999 to 2001, becoming President in 2001 for a two-year term. He will be the first president from Australia.

The Minister for Financial Services and Regulation, Mr Joe Hockey, and Australian Statistician, Mr Bill McLennan welcomed the appointment and congratulated Dennis.

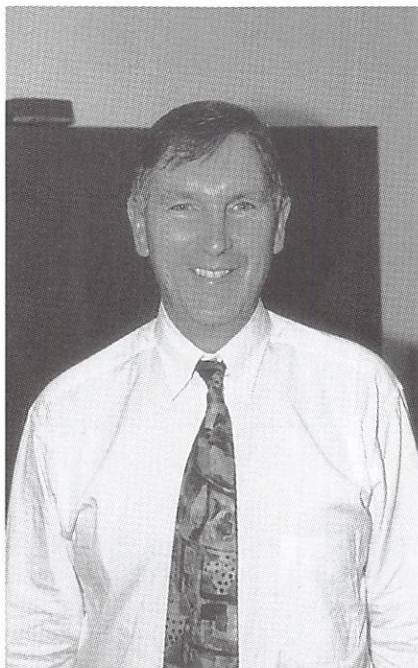
Mr Hockey wrote, "I would like to offer you my congratulations on this great achievement.

"I am aware that you have made a significant contribution to official statistics both nationally and internationally, and it is pleasing to

see your efforts rewarded in this way. It is a great honour for you and indirectly for the ABS as well.

"You have made Australia proud through this international recognition. I wish you well for the challenging tasks ahead."

The ISI, which celebrated its centenary in 1985, is one of the oldest functioning international scientific associations. The ISI seeks to develop and improve statistical methods and their application through the promotion of international activity and co-operation.



Dennis Trewin announces the news at the Accreditation Committee meeting in February

Dr Malcolm McIntosh, Chief Executive of CSIRO, has recently announced that Dr Ron Sandland, currently Chief of CSIRO Mathematical and Information Sciences, has been appointed to the position of Deputy Chief Executive of CSIRO. Ron will be one of four Deputy Chief Executives, and will take up his new position about the middle of this year.

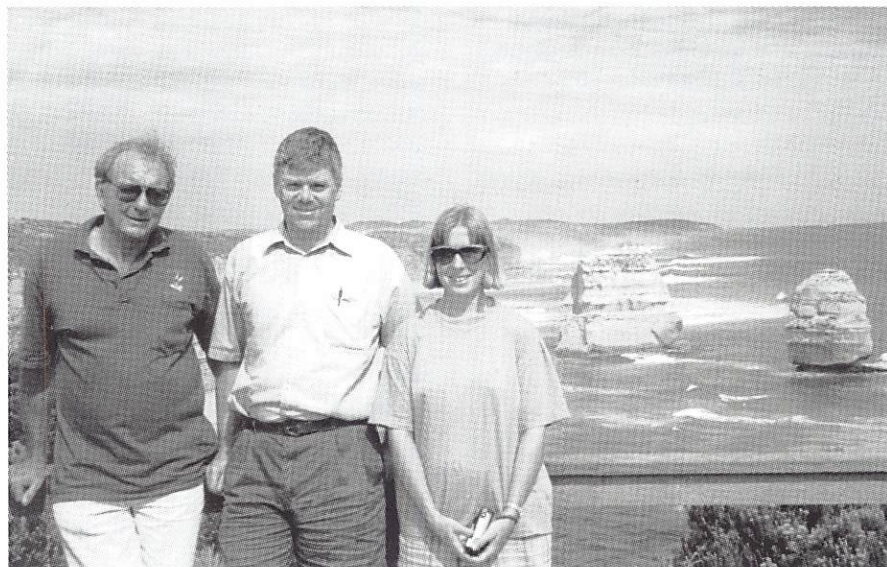
Conferences Report

Genstat 99

Approximately 80 people, mainly from Australia (yes, that does include Tasmania!) and New Zealand, gathered together at Erskine House (a Country House Hotel) at the relaxed beach village of Lorne, Victoria from 3 to 5 February for the Australasian Genstat Conference.

The theme of the conference was Applications, Advancements and Enhancements. Invited speakers included Christine Hackett (Scotland), Robin Thompson (England), John Nelder (England), David Baird (New Zealand), John Eccleston (Australia) and Roger Payne (England). Roger Payne demonstrated a novel 'version' of Genstat known as STABLE in which the Genstat algorithms are implemented in a 'visual programming environment' based on the IRIS Explorer system. John Nelder gave an entertaining and provocative talk on how to make statistics relevant to the needs of scientists and technologists - should 'mathematical statistics' be called 'statistical mathematics' or even 'statistical science'? A number of other papers were presented demonstrating the use of Genstat for various applications.

Considerable discussion was generated from two panel sessions. The first, 'Statisticians, packages and managers', discussed the changing role of the statistician in the computer age and in the current age of economic constraints. Murray Cameron brought back memories for many of us when he produced an acoustic coupler; Nye John challenged us on where we should put the comma in the title of his talk - 'Think, not crunch!' or 'Think not, crunch!'; and Alan Welsh explored the claim that you do not need to know any statistics to use a computer package to analyse data. A discussion of the standing of the profession followed. In the second panel session, Christine Donnelly, Trevor Hancock and Roger Payne shared



Ross Cunningham, David Baird and Alice Richardson on the Great Ocean Road tour.

'Experiences in teaching Genstat'. The advantages and disadvantages of teaching clients to use Genstat were discussed and also the issue of statistical training.

The more energetic adjourned one afternoon for a 'friendly' game of beach cricket (I'm sure the Australian selectors had their scouts there!). Others braved the cool waters (and icebergs) and went swimming in the famous southern ocean (where were the waves!?) while others went for a relaxing walk on the beach while pondering the challenging talks of the day.

The conference dinner was held at Erskine House on Wednesday evening with a good time had by all. Two notable ragers (Ari and Chris I believe - real names provided to embarrass the guilty) were eager to dance but despite many valiant efforts to encourage others to join them, they had to settle with dancing with each other.

Thursday afternoon those with strong stomachs boarded buses for a tour along the scenic Great Ocean Road to view the 12 Apostles, returning via the inland route through Colac for an evening meal. Meanwhile, the more adventurous went for a bush walk to Erskine Falls. I hear a small contingent of

'experienced' walkers took on a more difficult walk and ended up 'temporarily disoriented'!

Two, one-day applied statistics workshops were held in Melbourne on 1-2 February prior to the conference. The first workshop was on 'Analysis of correlated data using REML' presented by the dynamic duo of Sue Welham (Rothamsted) and Brian Cullis (Wagga Wagga). The workshop utilised examples and included practical sessions. Christine Hackett (Dundee, Scotland) and Robin Thompson (Rothamsted) conducted the second workshop on 'Linkage analysis and QTL mapping'. Christine began with a basic overview of genetics before moving into the more complex area of linkage analysis and QTL analysis. Robin discussed marker-assisted selection.

Many thanks to the Biometrics unit of Agriculture Victoria for organising the conference and to the Program Committee for arranging a varied, entertaining and informative conference program.

David Reid
Senior Biometrician
Qld Dept of
Primary Industries

Report on the International Biometric Society conference, 13-18 December 1998

About 450 people gathered the week before Christmas in Cape Town, South Africa for the XIXth International Biometrics conference, the first large international conference to be held in Cape Town. Seventeen of these delegates were from Australia. The venue was the University of Cape Town, situated on the slopes of Devils Peak in "a setting unrivalled for its imposing natural beauty and scenic views". In fact, this last statement summarises the location of Cape Town itself, which is set against the spectacular backdrop of Table Mountain.

The conference commenced with a reception on the Sunday evening, at which delegates mingled and acquaintances were made or renewed. Sue Wilson commenced the more formal proceedings on the Monday with the official welcome and presidential address. The rest of the formal program was a

mixture of invited and contributed talks, and posters. The contributed talks were generally limited to 15 minutes each, except in the case of John Nelder who negotiated 1.5 hours for his contributed talk! There were invited paper sessions concerning:- Analysing mixtures of discrete and continuous data, Statistics for participatory studies with farmers, Analysis of longitudinal data, Statistical methods for modelling interactions between genetic and environmental factors, Analysis of infectious disease data: methods and applications, Bayesian modelling and analysis of complex biomedical data, and Space-time modelling of epidemiological data, amongst others. On the Tuesday evening, Ari Verbyla et al's paper on "The analysis of designed experiments and longitudinal data using smoothing splines" was presented by Ari as a Royal Statistical Society Read paper. Brian Cullis responded briefly to the comments received both at the meeting and in writing beforehand.

On the Wednesday delegates were offered the opportunity to explore the city and surrounding countryside somewhat, depending on which tour (if any) was undertaken. I took the adventure option of hiking up Table Mountain (1100m) from Kirstenbosch Botanical Gardens (150m above sea level). Inclement weather forced a slow start and subsequently, the goal of reaching the top was revised. The day ended beautifully and we were afforded wonderful views of the Atlantic Ocean, Robben Island and Cape Town as we descended from about 800m after lunch on the western side of the mountain.

Congratulations to Tim Dunne of the University of Cape Town, who did a splendid job of coordinating the Local Organising Committee and ensured that the conference ran to plan. The next IBC will be held in San Fransisco on 2-7 July, 2000.

Melissa Dobbie

Australasian Conferences

CONFERENCE SUMMARY

50th Anniversary Conference of the New Zealand Statistical Association, 5-7 July 1999, Victoria University of Wellington.

Information: NZSA 1999 Conference Secretary, PO Box 1731, Wellington, New Zealand; email: nzsa99@mcs.vuw.ac.nz.

First Western Pacific/Third Australia-Japan Workshop on Stochastic Models, 23-25 September 1999, Christchurch, New Zealand.

Information: Professor M.J. Faddy, Dept of Maths and Stats, University of Canterbury, Private Bag 4800, Christchurch, New Zealand.; email: M.Faddy@math.canterbury.ac.nz

WAYS99, 6-8 October 1999, Wollongong.

Information: Virginia Wheway, AI Department UNSW. (02) 9385 3988

SEEM3 - Third Conference on Statistics in Ecology and Environmental Monitoring, 6-10 December 1999, University of Otago, Dunedin, New Zealand

Information: Email enquiries to: igoodwin@maths.otago.ac.nz; <http://www.casm.otago.ac.nz/courses/SEEM3/>

International Biometric Society Australasian Region Biennial Conference, 12-16 December 1999, University of Tasmania, Hobart.

Information: Helen Stewart, Convention & Venue Services, University of Tasmania; tel (03) 6226 2799; fax (03) 6226 1777; email Uni.Centre@utas.edu.au; <http://www.cmis.csiro.au/biometrics99/>

15th Australian Statistical Conference, 3-7 July 2000, Adelaide.

Information: <http://www.sapmea.asn.au/15ASC.htm>

There is a list of Australasian statistics conferences for 1999 and 2000 at:

<http://www.maths.uq.oz.au/~gks/webguide/conf.html>

50th Anniversary Conference of the New Zealand Statistical Association

Victoria University of Wellington, New Zealand
5-7 July 1999

As part of the celebrations of 50 years of the New Zealand Statistical Association, the 1999 conference will be in Wellington, where the first conference was held in 1949. To help mark this special occasion we would encourage all members to attend.

The programme is starting to firm up, and has three broad themes: history and education; risk; and datamining. Risk will be a common thread, running through much of the Conference with specialisations to medical, environmental, insurance and economic risks. The history and education sessions will be concentrated on the first day (Monday 5 July), while the final day (Wednesday 7 July) is being jointly organised with the NZ Society of Actuaries. Invited speakers include the Government Statistician (Len Cook), Garry Tee, Jane Watson, Brian Easton, Alan Agresti, Bruce Weir, and Joe Gani. A special lunch will be held on Monday in connection with the launch of Stan Robert's book on the development of Statistics in New Zealand. Long-standing members of the Association are especially invited to attend. The Monday evening will feature a forum on issues facing the future of Statistics in New Zealand, while the Association's AGM and the Conference dinner will be held on Tuesday.

The main source of information is the conference web page

<http://www.mcs.vuw.ac.nz/stat/nzsa99/>

Information and facilities available include:

- A listing of accommodation options and rough prices. It will

be the responsibility of registrants to find their own accommodation.

- Registration and submitting of abstracts.
- Timetable and listings of invited and contributed talks, being updated as the programme develops.

Further Enquiries:

Email: nzsa99@mcs.vuw.ac.nz
NZSA 1999 Conference Secretary, PO Box 1731, Wellington, New Zealand

International Biometric Society Australasian Region Biennial Conference

University of Tasmania, Hobart campus, Churchill Avenue, Sandy Bay, Tasmania 12-16 December 1999

Major Themes: Genetics, Biomedical Studies, Longitudinal Studies with Spatial Correlation, Planning Experiments

Closing Dates: Early bird registrations close Friday 3 September. Submission of abstracts close Friday 1 October

Invited Speakers: Sue Wilson, Gary Churchill, Scott Emerson, John Neuhaus, Patrick Hegarty, Peter Johnstone

Sponsors: Roche, CSIRO Mathematical and Information Sciences, QUT Dept of Mathematics, University of Newcastle Dept of Statistics

For more information contact: Helen Stewart, Convention & Venue Services, University of Tasmania

Phone (03) 6226 2799

Fax (03) 6226 1777

Email Uni.Centre@utas.edu.au

Visit the Conference Web site at

<http://www.cmis.csiro.au/biometrics99/>

Overseas Conferences

Society Secretaries

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Secretary: Dr N.C. Weber
Email: neville@maths.usyd.edu.au

New South Wales

President: Ms J. Kelly
Secretary: Mr E. Bosworth
Email: ebosworth@cuscal.com.au

Canberra

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Email: stat.cbr@tpgi.com.au

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Email: geoff.brunton@buseco.monash.edu.au

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Email: gary@stats.flinders.edu.au

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President: Dr G. Smyth
Secretary: Dr R. Wolff
Email: r.wolff@qut.edu.au

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Email: llim@mail.newcastle.edu.au

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Survey and Management

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Industrial Statistics

Ms T. Dickinson and Dr G. Robinson
Email: theresa.dickinson@cmis.csiro.au

Young Statisticians

Miss V. Wheway
Email: virg@cse.unsw.edu.au

Further contact details for Society Secretaries and Section Chairs can be obtained by contacting the Society on (02) 6249 8266

19th International Symposium on Forecasting, 27-30 June 1999, Washington, DC, USA.

Information: Symposium website <http://ifsm2.ifsm.unbc.edu/ISF/> of Publicity Chair, Stephen MacDonald fax +1 (202) 694-5823; email stephenm@econ.ag.gov.

5th International Decision Sciences Institute Conference, 4-7 July 1999, Athens, Greece.

Information: Program chairman, Prof. S. Zanakis, Florida International University, email dsi_athens@fiu.edu or conference co-chairman Prof. G. Doukidis, Athens University of Economics and Business, email douk@aub.gr; <http://www.dsi99.athens.gr>

14th International Workshop on Statistical Modelling, 19-23 July 1999, Graz, Austria.

Information: Herwig Friedl, Institute of Statistics, Technical University Graz, Lessingstr. 27/1, A-8010 Graz; email friedl@stat.tu-gaz.ac.at; www.cis.tu-graz.ac.at/stat/iwsm/;

The Eighth International Workshop on Matrices and Statistics, 6-7 August 1999, Tampere, Finland.

Information: The Workshop Secretary, Dept. of Mathematics, Statistics and Philosophy, University of Tampere, PO Box 607, FIN-33101 Tampere, Finland; email workshop99@uta.fi; fax +358-3-215-6157; web site www.uta.fi/~sjp/workshop99.html.

52nd Session of the International Statistical Institute, 11-18 August 1999, Helsinki, Finland.

Information: ISI Permanent Office, 428 Prinses Beatrixlaan, PO Box 950, 2270 AZ, Voorburg, The Netherlands; tel 31-70-337 5737; fax 31-70-386 0025; email isi@cs.vu.nl; website <http://www.cbs.nl/isi/>.

School on Modern Statistical Methods in Medical Research, 6-24 September 1999, International Centre for Theoretical Physics, Trieste, Italy.

Directors: J.L. Hutton, E.J.T. Goetghebeur and P.J. Solomon; Sponsors: UNESCO and IAEA
Information: email smr1122@ictp.trieste.it or sci_info@ictp.trieste.it;

website <http://www.ictp.trieste.it>; International Centre for Theoretical Physics, PO Box 586, I-341000, Trieste, Italy.

International Conference on Survey Nonresponse Error, 28-30 October 1999, Portland, Oregon, USA.

Information: Email: icsn@survey.umd.edu; www.jpsm.umd.edu/icsn99.

Workshop on Hierarchical Modeling in Environmental Statistics, 14-16 May 2000, Ohio State University, Columbus, Ohio, USA
Co-sponsored by Ohio State University and American Statistical Association's Section on Statistics and the Environment

A tutorial on Bayesian hierarchical modeling will precede the conference on Sunday morning May 14, 2000.

For more information, contact Noel Cressie (ncressie@stat.ohio-state.edu)

XXth International Biometric Conference, 2-7 July 2000, University of California at Berkeley.

Information: website, <http://www.biostat.ucsf.edu/IBC2000/> Kevin L. Delucchi, PhD, Dept. of Psychiatry, Box 0984-TRC, University of California, San Francisco, 401 Parnassus Ave, San Francisco, CA 94143-0984; USA; e-mail: kdelucc@itsa.ucsf.edu; tel +1 (415) 476-4180; fax: +1 (415) 476-7677.

MAM3: The Third International conference on Matrix-Analytic Methods in Stochastic Models, 12-14 July 2000, Leuven, Belgium.

Information: email: MAM3@econ.kuleuven.ac.be; <http://www.econ.kuleuven.ac.be/man3>

IASE Round Table Conference on Training Researchers in the Use of Statistics, Meiji University, Tokyo, Japan, August 2000.

Information: Carmen Batanero, Dept. Didactics of Mathematics, University of Granada, 18071 Granada, Spain; email: batanero@goliat.ugr.es; URL <http://www.ugr.es/~batanero/iasert.htm>