

statistical  
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australia

# newsletter

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## BIOMETRICS IN CSIRO

**Tony Pettitt and Peter Jones**

**IPPP Biometrics Unit, Brisbane**

Contrary to what you may have read about the biometricians in CSIRO, they are alive and well and looking to the future with somewhat better expectations now than might have seemed possible only a few months ago. Yes, it is true that the CSIRO Division of Mathematics and Statistics no longer routinely consults and collaborates with other CSIRO divisions and no longer has a biometrics role. This consulting, collaborating and research role has now been taken on by the CSIRO Biometrics Units. And what, you ask, are they?

The Biometrics Units were born as result of the upheaval that the old Division of Mathematics and Statistics (DMS) was subjected to, and their birth reflects a trend towards stability and reasoning in the attitude towards the importance of biometrics in CSIRO. The major decision that was reached by the management of CSIRO was that there was a need for a recognisable grouping of the biometricians in CSIRO rather than dispersing them to the divisions (a fate which also stared other DMS mathematicians and statisticians in the face for some time).

### The Biometrics Units

There are four biometrics units, one each for the following; Brisbane, Canberra/Adelaide, Sydney/Melbourne/Hobart and Perth. These units are attached to the various biological and agricultural insti-

tutes of CSIRO. Hence, for example, it is the 'IPPP' Biometrics Unit in Brisbane, and here we will not go into the upper branches (roots) of CSIRO's management structure except to tell you that 'IPPP' stands for 'Institute of Plant Production & Processing'. No prizes for working out what INRE and IAPP, the other two institutes involved, stand for. The Sydney/Melbourne/Hobart unit was a little low on staff numbers and you may have seen the recent adverts for staff. At present there are about 20 staff in the Units.

The Units were set up to do the statistical consulting and collaboration with the agricultural and biological divisions which the old DMS used to do. Due to the limited resources which were available for this work, CSIRO management decided that education of scientists in statistical matters was a priority in order to overcome the shortage of biometricians. They erroneously have the impression that statistical knowledge can be equated with computing expertise, that is, teach someone how to use a statistical package and they are then a statistical expert. They do not realise that such packages offer neither advice on experimental design nor embody any statistical expertise except for arithmetic correctness. A continuing battle for the whole statistical profession is to convince decision makers of the need for the professional input.

After some heated discussions, senior management realised that research would also have to be an important part of the Units' work if previous high standards set by DMS were to be maintained.

*Editors: D.E. Shaw, SIROMATH Pty Ltd, 156 Pacific Highway, St. Leonards, NSW 2065.*

*E. Brinkley, Australian Bureau of Statistics, PO Box 10, Belconnen, ACT 2616.*

*R.I. Forrester, CSIRO, Biometrics Unit, INRE, GPO Box 1666, Canberra, ACT 2601.*

*The views of contributors to this Newsletter should not be attributed to the Statistical Society of Australia.*

## Role of the Units

The Units were officially set up on July 1st 1988 with a specific brief. This is to participate in divisional research projects, provide statistical consulting services, train staff in basic statistical skills, and initiate and perform relevant statistical research. Thus the Units have to keep a balance between 'service' on one hand and 'research' on the other.

With the number of staff involved in statistical consulting halved from the days of DMS, the involvement of members of the Units with client divisions had to be reconsidered. Of necessity, the consulting services we provide have to be selective, and time management has been required to link projects with high priority to appropriate Unit members. There is now a need to be more active in the overseeing of client projects, especially at the design stage. We don't want to be spending our time doing rescues of poorly designed experiments. Additionally, statisticians have unique skills for asking scientists questions about the validity of their proposed experiments.

To accompany these new directions, the upgrading of client skills is being implemented with education. In the first instance there is a bid to make our clients more statistically computer aware, and we have chosen the Genstat and Minitab packages as the software to be used for these training purposes. We have convinced the organisation to purchase corporate PC licences for both these software packages. Our thoughts here are that this will hopefully stop the proliferation of different statistical software packages and so make consulting easier, and to make available high quality software at low or no cost to the scientists. Minitab and Genstat were chosen because they complement one another to a large extent; Minitab for ease of learning and Genstat for its comprehensive suite of directives.

We are involved in continuing research interests in appropriate statistical areas, and, *inter alia*, this means we are providing the most up-to-date advice and helping to transfer important new statistical developments to the biological and agricultural sciences. The research areas are dictated by the interaction with our client groups in collaborative work. Some examples of these are the design and analysis of experiments taking into account spatial arrangements, the investigation of new models and computational methods for analysing designed experiments, the evaluation of sensory experiments in food research, the development of new meth-

ods for the presentation of data and the development of GLMs for non-standard sampling.

## Meeting of the Troops

Although there are four Units reporting to three different institutes, and therefore it appears we have separate task-masters, each Unit's clients come from divisions in its location, irrespective of their institute. It is essential, therefore that we co-operate.

There are important ways in which collaboration between Units can be effective (publicity is one and brings you this article). We met over a two day period at the end of November last year in Melbourne for a workshop which is planned to be an annual event. We saw, apart from sorting out various administrative problems, a need to co-ordinate our activities in publicity, research, computing and educating our clients. There is a need for our skills to be more widely advertised within CSIRO and to the community at large. Again, this seems to be a problem of the profession as well as ours.

We also have to live with the new reality of 'commercialisation' which CSIRO has to face. It has to find 30 percent of its budget from external funding. This means that we have to charge explicitly for our services to divisions if external funding is involved. It also means that we ourselves can chase the elusive dollar by doing consulting at commercial rates outside CSIRO.

In computing, we decided that systems based on the Sun 3s would give us excellent environments for statistical work and now all Units and most sites have, or are soon to have, Sun 3 workstations. This puts us at the forefront of statistical computing and gives us access to several excellent computer packages (Sun 3s appear almost to be a standard now for statistical research). Additionally, we like to use software which has very similar, if not the same, versions for DOS and Unix so that we can transfer our proposed analyses, developed on Unix, to our clients' PCs.

## Conclusion

All in all, we consider that there is a high degree of optimism for the future role of our Units in performing an important task within CSIRO. Our challenge is to provide the divisions with up-to-date and innovative statistical methods for their research, and this provides an exciting environment in which to work. The appreciation of the value of our contribution to CSIRO should see us grow and prosper in the next decade.

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## FASTS SURVEY

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Enclosed in the *Newsletter* is a questionnaire we are distributing on behalf of FASTS. The Council of the Statistical Society has agreed that we should co-operate with the survey and your assistance would be greatly

appreciated, even if the topic does not appear to be very relevant to you. The SSA will offer assistance in the estimation phase to ensure that appropriate methods are used to adjust for non-response bias.

## BRANCH REPORTS

### New South Wales

#### The Art of Consulting

The Christmas meeting of the NSW Branch in November was addressed by Dr Richard Jarrett, who provided diverse examples of the problems (statistical and otherwise) facing the statistical consultant. For the client, statistical methods must be shown to be common sense. The student of statistics requires more exposure to real problems. Even the "real" data sets in textbooks are contrived compared with real-world problems. The gap with reality needs to be bridged. But where will students of statistics come from? Fewer jobs are being labelled "statistician". The first step is to encourage suitable students into statistics courses.

Richard finished with three points: the importance of statistical thinking; the need for a wider cross-section of students; and, the necessity to demonstrate the potential of statistics to students in other disciplines.

### Victoria

#### Statistical Education

With a simple title, but a wide-ranging, entertaining and challenging talk, Ken Russell showed us many aspects of the task of statistical education at the October meeting. The potential recipients range through practising and trainee statisticians to the public sector, industry and commerce and even politicians and newspaper editors. Methods suggested by Ken are varied to suit the target audience. For trainee statisticians, the need is to learn *statistics* (not just mathematics) and not only how to solve practical problems but how to communicate clearly the meaning of the results. For the public sector, Ken writes letters in response to statistically inadequate job advertisements asking why jobs that have 'statistics' in their title do not mention the need for any knowledge of, or qualification in, statistics. He even gets replies.

Perhaps the overriding thrust of Ken's talk was to ask what the Statistical Society can do to improve statistical education at all levels, but especially in secondary schools and service courses. The New Zealand Statistical Society has made some attempts in this direction with its book *Statistics at Work*. Are there similar opportunities for the Australian Society?

#### Statistics and Computing or Why I Can't Choose a Computer

The 1988 Belz Lecture (22nd November) was given by Dr David Scott, formerly of LaTrobe University and now at Bond University. David gave a comprehensive review of the principles behind his planning for his new role at Bond University in selecting computer systems and software that will meet the current and future needs of students of information sciences. He sees learning about com-

puting as a continuous process, but one which will always have to contend with changing systems and multiple environments. The need for effective interfaces between different software products, as well as different hardware types, is very important, and is probably best achieved by sticking to mainstream products. The aim is to eliminate rekeying of data that have already been entered into one package or system, but are needed in other packages or systems.

David amplified these and other points when considering individually such areas as Word Processing, Database systems, Spreadsheets, Statistical Packages, Graphics and several other computing areas for both PCs and mainframes. He ventured his personal preferences for a range of software and hardware products, but you will have to ask him for the details. The main message was nevertheless very clear — the statistician who utilises the wide range of computer facilities now available can have a much broader role than performing statistical analyses; he or she becomes an information worker, dealing with the storage, retrieval, analysis and dissemination of information on a wide scale.

### South Australia

#### A Monte Carlo Study of Alternative Procedures for Testing the Hypothesis of Parallelism for Complete and Incomplete Growth Curve Data

On November 15th, 1988, the Branch was addressed by Neil Schwertman, who was visiting Deakin University.

Data collected over time on the same experimental unit, frequently called growth data, are typical of many clinical, biological, medical and agricultural studies. Such data are usually highly correlated and may be difficult to analyse if there are missing observations.

Monte Carlo simulations, using a broad spectrum of dispersion structures, are used to compare for significance level and power various procedures for testing the parallelism of the response curves for both complete and incomplete growth curve data.

The various analysis methods used are (1) the split-plot; (2) Hotelling's T-square; (3) analysis of the estimated regression coefficients for each experimental unit by Hotelling's T-square; (4) successive differences; (5) estimation of missing data followed by 1 through 4; and (6), adjusting these procedures using the Geisser-Greenhouse correction as appropriate. Of these methods, for complete data the split-plot analysis using the Geisser-Greenhouse correction was most satisfactory with four multivariate responses, but with eight multivariate responses, Hotelling's T-square on the estimated regression coefficients for each subject was best. For incomplete data the split-plot analysis using the Geisser-

Greenhouse correction from the smoothed dispersion matrix was most satisfactory.

### **Robustness of Analysis of Variance to Extreme Violations of Continuity**

On December 13th, 1988, the Branch was addressed by Kathy Haskard of the Computer Centre at Flinders University. Although many studies of the robustness of analysis of variance have been done, almost all apply only to continuous data. The application of analysis of variance with data from bounded discrete distributions such as from two- to five-point scales was considered. Kathy presented two relevant simulation studies and simulations of her own. From these it appeared that discreteness *per se* had little effect on either significance level or power. Observed effects were primarily those that would be expected from continuous data with the same degrees of skewness, platykurtosis or leptokurtosis, and heterogeneity

of variance, which arise almost inevitably in data of this kind.

The Branch will resume its activities with an A.G.M. in early March.

### **Canberra**

#### **Computer Intensive Statistical Methods: What Does the Future Hold?**

The 1988 Knibbs Lecture was presented by Professor Peter Hall of the ANU, on the 29th November. In the lecture Professor Hall discussed how new statistical techniques, such as Projection Pursuit and the Bootstrap, have emerged which can take advantage of the dramatic computational improvement of recent years. However, some versions of these methods, such as the iterated bootstrap, are still too computer intensive for contemporary PCs. This stimulating lecture concentrated on recent advances in improving the efficiency of resampling methods for the bootstrap.

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## **SPECIAL INTEREST SECTIONS**

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### **Medical Sciences**

The Medical Sciences Section is considering running a Workshop entitled "Statistical modelling of AIDS and other epidemics" as part of the 10th Australian Statistical Conference in July 1990. This topic is receiving increasing attention (e.g., see *JRSS(A)*, 1988; 151: 3-136), and poses the question of just what statistical theory can contribute to an understanding of the AIDS epidemic, given the practical limitations of available data, and of what are the most useful directions future quantitative research on the disease might take.

The section is planning to invite one or two guest speakers from overseas, and is open to suggestions as to whom might be considered. It is intended also to invite local medical researchers to contribute. For persons interested in the literature on statistical modelling of AIDS, Dr C.S. Withers (Applied Mathematics Division, DSIR, PO Box 1335, Wellington, New Zealand) has compiled an annotated bibliography. Please contact Dr John Hopper (University of Melbourne, Faculty of Medicine Epidemiology Unit, 151 Barry Street, Carlton, Victoria 3053) if you have suggestions or comments regarding the proposed workshop.

### **Industrial Statistics**

The Industrial Statistics Section has just held a Workshop for statisticians involved in Quality Management and Improvement at Bond University on February 16-20th.

On the first two and a half days approximately 25 statisticians from throughout Australia met to pursue detailed planning for four objectives. These were:

- Plan course structures and contents for undergraduates and masters level degree training in quality management and improvement statistical methods.
- Develop a list of potential visitors from overseas institutions and industry who would be worth bringing to Australia to present seminars and workshops on an Australia-wide basis.
- Set up a network across Australia of quality management and methods trainers and practitioners so that consulting and training needs can be met on an Australia-wide basis.
- Develop the program for Quality Management Statistics 1989 Symposium to be held in August or September 1989.

The workshop generated considerable enthusiasm amongst the Society's members and we expect tangible and useful outcomes to result from it.

In the next newsletter I will report in detail on the workshop and its outcomes.

William Dunsmuir

Chairman, Industrial Statistics Section

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## FROM THE PRESIDENT

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*The new President of the Statistical Society of Australia is Dr Richard Jarrett who is currently Director of the Statistical Consulting Centre at the University of Melbourne. Before his move there in 1987, he was a member of the CSIRO Division of Mathematics and Statistics in Melbourne.*

In this, my inaugural address as it were, I would like to concentrate on two areas in which I feel the Society as a whole, and you as members, need to take an active role.

The first of these is concerned with getting out into the marketplace. The ideas of quality improvement and quality management have been discussed in a large number of talks given to the Society and its Branches in recent times and reported in the Newsletter. We need to get this moving and I see three phases all of which need urgent action:

- (i) Making business and industry more aware of the importance of statistical thinking and the impact that even simple statistical ideas and tools can have on decision-making processes. I would note here that we will not find it easy to attract students to be "statisticians" as a first choice until we can point to a reasonable number of jobs being advertised for statisticians.
- (ii) Training/educating our students so that they are better prepared for the "real world". This does not necessarily mean reducing the theory content of courses, but it does mean, for example including
  - stressing the "why" rather than the "how";
  - the principles of planning experiments;
  - collecting and analysing data;

- using statistical packages.

I believe a brief introduction to consulting skills and how organizations/management work is also important (but should be picked up in more detail at Honours or M.Sc. level). This may need some support from non-statisticians.

- (iii) Training/educating our own members. We need to know much more about the workings of companies and to be aware of their viewpoint. This means that we need programs to "retrain" statisticians in a broader field, with an emphasis on people skills, organizational structures and management. These should not be taught just by statisticians!

In talking to people about the Society, another major issue that appears is communication. With a Society which is devolved to Branches like ours, there will always be problems getting the information flow moving and tying ideas together into a coherent policy. One example of this is the work on introducing statistical ideas into schools, where people in several branches are working hard against various levels of resistance. Sharing ideas and experiences here could be of great help and I have asked the Statistical Education Section to co-ordinate this. I am sure there are many other examples of this — sharing information about statistical packages for undergraduate teaching, or ideas on how to teach (say) statistics for engineers are ones that spring to mind.

Please use the Newsletter as a forum — letters to the Editor are always welcome. I would also be pleased to hear directly from anyone who has thoughts on where the Society should be going or what activities it should undertake. I can be reached as richardj@mugga.oz or on (03) 344-6995.

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## ISI CODE OF ETHICS

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After many years of discussion and consultation, the International Statistical Institute (ISI) established the following declaration on professional ethics. The ethics only are printed here, but an article in the *International Statistical Review* (1986), 54, 2, pp.227-242 gives background and further explanation.

The ISI has published the Declaration "with the hope and in the belief that this document will assist colleagues throughout the world in the pursuit of their professional goals and responsibilities."

### 1. Obligations to Society

#### 1.1 Considering conflicting interests

Statistical inquiry is predicated on the belief that greater access to well-grounded information is beneficial to society. The fact that statistical information can be misconstrued or misused, or that its impact can be different on different groups, is not in itself a con-

vincing argument against its collection and dissemination. Nonetheless, the statistician should consider the likely consequences of collecting and disseminating various types of data and should guard against predictable misinterpretations or misuse.

#### 1.2 Widening the scope of statistics

Statisticians should use the possibilities open to them to extend the scope of statistical inquiry, and to communicate their findings, for the benefit of the widest possible community.

#### 1.3 Pursuing objectivity

While statisticians operate within the value systems of their societies, they should attempt to uphold their professional integrity without fear or favour. They should also not engage or collude in selecting methods designs to produce misleading results, or in misrepresenting statistical findings by commission or omission.

## 2. Obligations to funders and employers

### 2.1 *Clarifying obligations and roles*

Statisticians should clarify in advance the respective obligations of employer or funder and statistician; they should, for example, refer the employer or funder to the relevant parts of a professional code to which they adhere. Reports of the findings should (where appropriate) specify their role.

### 2.2 *Assessing alternatives impartially*

Statisticians should consider the available methods and procedures for addressing a proposed inquiry and should provide the funder or employer with an impartial assessment of the respective merits and demerits of alternatives.

### 2.3 *Not pre-empting outcomes*

Statisticians should not accept contractual conditions that are contingent upon a particular outcome from a proposed statistical inquiry.

### 2.4 *Guarding privileged information*

Statisticians are frequently furnished with information by the funder or employer who may legitimately require it to be kept confidential. Statistical methods and procedures that have been utilised to produce published data should not, however, be kept confidential.

## 3. Obligations to colleagues

### 3.1 *Maintaining confidence in statistics*

Statisticians depend upon the confidence of the public. They should in their work attempt to promote and preserve such confidence without exaggerating the accuracy or explanatory power of their data.

### 3.2 *Exposing and reviewing methods and findings*

Within the limits of confidentiality requirements, statisticians should provide adequate information to colleagues to permit their methods, procedures, techniques and findings to be assessed. Such assessments should be directed at the methods themselves rather than at the individuals who selected or used them.

### 3.3 *Communicating ethical principles*

To conduct certain inquiries statisticians need to collaborate with colleagues in other disciplines, as well as with interviewers, clerical staff, students, etc. In these cases statisticians should make their own ethical principles clear and take account of the ethical principles of their collaborators.

## 4. Obligations to subjects<sup>a</sup>

### 4.1 *Avoiding undue intrusion*

Statisticians should be aware of the intrusive potential of some of their work. They have no special entitlement to study all phenomena. The advancement of knowledge and the pursuit of information are not themselves sufficient justifications for overriding other social and cultural values.

### 4.2 *Obtaining informed consent*

Statistical inquiries involving the active participation of human subjects should be based, as far as practicable, on their freely given informed consent. Even if participation is required by law, it should still be as informed as possible. In voluntary inquiries, the subjects should not be under the impression that they are required to participate; they should be aware of their entitlement to refuse at any stage for whatever reason and to withdraw data just supplied. Information that would be likely to affect a subject's willingness to participate should not be deliberately withheld.

### 4.3 *Modifications to informed consent*

On occasions, technical or practical considerations inhibit the achievement of prior informed consent. In these cases, the subject's interests should be safeguarded in other ways. For example:

1. *Respecting rights in observation studies.* In observation studies, where behaviour patterns are recorded without the subject's knowledge, statisticians should take care not to infringe what may be referred to as the 'private space' of an individual or group. This will vary from culture to culture.
2. *Dealing with proxies.* In cases where a 'proxy' is utilised to answer questions on behalf of a subject, say because access to the subject is uneconomic or because the subject is too ill or too young to participate directly, care should be taken not to infringe the 'private space' of the subject or to disturb the relationship between the subject and proxy. Where indications exist or emerge that the subject would object to certain information being disclosed, such information should not be sought by proxy.
3. *Secondary use of records.* In cases where a statistician has been granted access to, say, administrative or medical records or other research material for a new or supplementary inquiry, the custodian's permission to use the records should not relieve the statistician from having to consider the likely reactions, sensitivities and interests of the subjects concerned, including their entitlement to anonymity.

<sup>a</sup>This section of the declaration refers to human subjects, including individuals, households and corporate entities.

4. *Misleading potential subjects.* In studies where the measurement objectives preclude the prior disclosure of material information to subjects, statisticians should weigh the likely consequences of any proposed deception. To withhold material information from, or to misinform, subjects involves a deceit, whether by omission or commission, temporarily or permanently, which will face legitimate censure unless it can be justified.

#### 4.4 Protecting the interests of subjects

Neither consent from subjects nor the legal requirement to participate absolves the statistician from an obligation to protect the subject as far as possible against potentially harmful effects of participating. The statistician should try to minimise disturbance both to sub-

jects themselves and to the subjects' relationships with their environment.

#### 4.5 Maintaining confidentiality of records

Statistical data are unconcerned with individual identities. They are collected to answer questions such as 'how many?' or 'what proportion?', not 'who?'. The identities and records of co-operating (or non-co-operating) subjects should therefore be kept confidential, whether or not confidentiality has been explicitly pledged.

#### 4.6 Inhibiting disclosure of identities

Statisticians should take appropriate measures to prevent their data from being published or otherwise released in a form that would allow any subject's identity to be disclosed or inferred.

## MISCELLANEA

### Surplus Journals

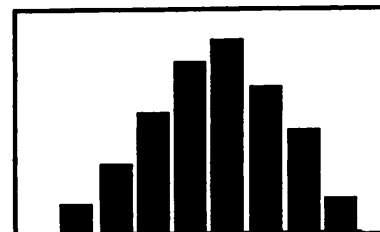
The Society has surplus stocks of volumes 13-22 (1971-1980) of the Australian Journal of Statistics. These are available to members for the cost of postage and packing (about \$2 per volume of three issues within Australia) until 31st May.

If you want to take advantage of this contact The Statistical Society of Australia, Statistics Research Section, School of Mathematical Sciences, Australian National University, G.P.O. Box 4, Canberra, A.C.T. 2601.

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## CONFERENCES

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### It Runs in the Family

**III. Statistical Methods for Linkage, Pedigree & Twin Analysis, 29–31 March 1989, The University of Melbourne**

**SPECIAL GUEST & KEYNOTE SPEAKER — PROFESSOR KENNETH LANGE, Chairman, Dept. of Biomathematics, U.C.L.A.**

Supported by THE HOWARD NORMAN TRUST, this third annual workshop, organised by the Australian NHMRC Twin Registry to promote and advance twin research, will be based around two computer programs for the genetic analysis of human pedigree data (MENDEL, FISHER) produced by Professor Lange and colleagues. Professor Lange has made important contributions to mathematical methods in genetics and genetic epidemiology.

Wednesday and Thursday sessions will demonstrate and teach use of the packages. Application of the programs to participants' data sets will be possible, given suitable prior arrangements. Contributed papers from participants are invited for Friday's session.

If you are interested in attending, and wish further information as details are finalised, please contact the Australian NHMRC Twin Registry, 151 Barry Street, Carlton 3053. Phone (03) 347 2983 (Bobbie Renard), or (03) 344 6990 (John Hopper).

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### CONSORTIUM FOR RESEARCH IN COMPUTER INTENSIVE STATISTICAL METHODS

#### Workshop on Empirical Likelihood and the Bootstrap, 28–31 March 1989

A Workshop on Empirical Likelihood and the Bootstrap will be held at Bond University under the auspices of the Consortium for Research in Computer Intensive Statistical Methods, during the week starting Monday, 27th March 1989 (Easter Monday). Invited speakers will include Tom DiCiccio and Art Owen of Stanford University. The Workshop will address both theoretical and practical aspects of empirical likelihood and the bootstrap.

Attendance at the Workshop will be limited, in order to provide a real chance for constructive output. Some limited financial support may be available. Persons interested in attending should write to:

Professor Peter Hall  
 Consortium for Research in Computer  
 Intensive Statistical Methods  
 Department of Statistics  
 Australian National University  
 GPO Box 4  
 CANBERRA ACT 2601.

### Workshop on 'Optimization Methods in Statistics', 15–16 June, 1989

A workshop on optimization methods in statistics will be held at the University of Wollongong, 15–16 June 1989. The workshop will be directed towards educating the statistician and other researchers. Professor Jagdish S. Rustagi will be the main speaker at the workshop, which will be largely based on his forthcoming book (with the same title as the workshop) to be published by John Wiley. There will be additional talks by local speakers including Professor David Griffiths and Assoc. Professor Greg Doherty.

The workshop will provide a general overview of optimization techniques including methods such as mathematical programming, variational methods and stochastic approximation, and will include coverage of such recent developments as simulated annealing and the Karmarkar algorithm.

For further information, contact:

O.M.S. Workshop  
 Department of Mathematics  
 University of Wollongong  
 WOLLONGONG, N.S.W., 2500.

telephone (042) 27 0836  
 fax (042) 27 1675  
 Email cmg@wolfen.cc.uow.oz

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### Vere-Jones and Daley for Sydney Conference, 3–7 July, 1989

Professor David Vere-Jones from the Victoria University, Wellington, N.Z. is to speak at the conference of the Australian Mathematical Society to be held at Macquarie University, July 3 to 7, 1989. The Statistics and Probability sections will be held on Monday and Tuesday, July 3 and 4. Professor Vere-Jones has agreed to speak on some statistical aspects of point processes, particularly in their applications to earthquake data. Dr Daryl Daley from the Institute of Advanced Studies, ANU will speak on some probabilistic aspects of point processes.

#### Maths Education

As well, Professor Vere-Jones has agreed to speak in the Mathematics Education section. New Zealand has an exciting senior school curriculum, Mathematics with Statistics, to which members of the New Zealand Statistical Society have made a major contribution.

#### Papers Sought

Papers are invited in applied probability or in statistics. We would like to develop, over the two days, the theme of stochastic processes and associated questions

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of collection and analysis of data from such processes.

If you are interested in further information please write to:

Dr Ann Eyland  
School of Economic and Financial Studies  
Macquarie University, NSW 2109.

## STATCOMP 89, 6-7 July, 1989

The Statistical Computing and Survey Management Sections of the SSA will be holding STATCOMP 89, the 4th biennial conference focusing on statistical computing, in Adelaide 6-7 July 1989.

Themes for STATCOMP 89 are:

- Expert systems
- Methodology for simulation studies
- Computer applications in survey operations and analysis.

Invited speakers include Dr D. Pregibon, of AT&T Bell Laboratories and Professor P. Diggle, University of Lancaster.

Opportunities exist for sponsorship and the hire of display facilities.

Enquiries and expressions of interest should be directed to Chris Brien at

School of Mathematics and Computer Studies  
South Australian Institute of Technology  
The Levels, SA 5095.

Telephone: (08) 236 2211 Fax: (08) 349 6939 Email: MACBOLEVELS.SAIT.OZ

## Combinatorial Mathematics, 10-14 July, 1989

The Fifteenth Australasian Conference on Combinatorial Mathematics and Computing will be held at the University of Queensland, Brisbane, Queensland, from 10th to 14th July 1989. All interested persons are cordially invited to attend. Contributed papers are welcome in areas of combinatorics and combinatorial computing, pure and applied. Invited speakers are being arranged. Accommodation on campus at the University of Queensland will be available.

Those who are not members of C.M.S.A. but are interested in attending the conference, please write to:

Professor Anne Penfold Street  
Director, C.M.S.A.  
Dept. of Mathematics  
University of Queensland  
St. Lucia, Queensland 4067.

The Combinatorial Mathematics Society of Australasia was formed in 1978 to promote combinatorial mathematics. It disseminates information about combinatorics and combinatoricists through its newsletter *Combinatorics*, and it conducts an annual conference with refereed published proceedings. There are currently about 120 members from all over the world.

Any interested person is invited to join the C.M.S.A. Annual subscription for 1988 is Australian \$5, payable to C.M.S.A. Members receive the newsletter and a reduction in the conference registration fee. Please address all enquiries, giving your full name and address, to Professor Street at the above address.

## Australasian Meetings of the Econometric Society, 13-15 July 1989, Armidale, NSW, Australia

Information: George E. Battese, Dept. of Econometrics, Univ. of New England, Armidale, NSW 2351, Australia.

## CONSORTIUM FOR RESEARCH IN COMPUTER INTENSIVE STATISTICAL METHODS

### Data Analysis Workshop, September, 1989

A Workshop Series designed for those who are interested in the analysis of complex data sets of fundamental practical importance is being organised under the auspices of the Consortium for Research in Computer Intensive Statistical Methods. Each Workshop will concentrate on a single theme chosen for its relevance and broad applicability, and will establish the current "state of the art" in its respective field.

The first Workshop will be held in September 1989 at the ANU, and its theme will be the formulation, fitting and statistical analysis of **linear simultaneous equation models**. These models are used in Econometrics, Marketing, Quality Control, Education, Psychometrics, Physical and Chemical Sciences, Biological and Medical Sciences, Statistical Science, Behavioural Science, Social Science and Political Science. It is hoped to attract data analysts from all these disciplines. Linear simultaneous equation models have many alternative names, including covariance structure models, latent variable models and LISREL models. Many users may not be aware of the literature under these different titles. It is hoped to rectify this situation.

**Professor Brian Everitt**, author of the monograph *An Introduction to Latent Variable Models* (Chapman and Hall, 1984), will be the Workshop's keynote speaker. The Workshop will confront the methodological and practical problems of linear simultaneous equation models with a novel format designed to have maximum impact.

Are you interested in participating in the Workshop? If so, please contact Sue Wilson for information on data distribution and Workshop contributions on (062) 49 4460, or at the address below.

Dr Sue Wilson  
DAW Co-ordinator  
Statistics Research Section  
Mathematical Sciences School  
ANU, GPO Box 4, Canberra, ACT 2601.

### 10th Australian Statistical Conference, 2-6 July, 1990

The 10th Australian Statistical Conference will be held in Sydney, at the University of New South Wales, from July 2 to July 6, 1990. This conference will also constitute the 2nd Pacific Statistical Congress, and will occur in the year of the centenary of the birth of Sir Ronald Fisher.

The Programme Committee has issued invitations to several prominent overseas statisticians to be Keynote Speakers at the Conference.

- Professor George Box has tentatively accepted an invitation as Keynote Speaker on the topic of "Quality";
- Professor Brad Efron has accepted an invitation as Keynote Speaker on "Computer intensive methods in statistics"; and
- Professor Adrian Smith has accepted an invitation as Keynote Speaker on "Analysis of dependent data".

The opportunity exists for Australian organizations to extend the visits of these Keynote Speakers, subject to the speakers' availability. To provide some co-ordination, it is requested that initial approaches to the overseas speakers be made through the Chairman of the Programme Committee, Dr Doug Shaw, SIROMATH Pty Ltd, Level 5, 156 Pacific Highway, St Leonards NSW 2065.

Other sections of the Conference programme are under consideration; the May issue of the Newsletter will carry further details. Suggestions from Society members are most welcome, and should be addressed to the Chairman of the Programme Committee at the address given above.

### ICOTS 3, 19-24 August 1990

The Third International Conference on Teaching Statistics is to be held on 19-24 August 1990, at the University of Otago, Dunedin, New Zealand, sponsored by the International Statistical Institute and the University of Otago.

Key objectives include improving the quality of statistics instruction on a world-wide basis, fostering international co-operation among teachers of statistics and promoting the interchange of ideas about teaching materials, methods and content.

The programme will include plenary, invited and contributed paper sessions, workshops, panel and poster sessions. Teaching from beginning school to college, polytechnic and university level will be included, as well as sessions on teaching statistics in government, business and industry. Opportunities will be provided to see and experiment with the latest in computer hardware and software.

Plenary speakers confirmed to date are:

Denis Lindley	Inference in statistics
Jim Landwehr	Statistical Graphics
Niels Becker	Disease and Statistics
Peter Holmes	Success and Failure in Teaching Statistics
Geoff Jowett	Expanding Statistical Education
M.A. Devaki-Jain	Women and Statistics

There will be approximately 8 invited paper sessions offered within each of the following streams:

- Teaching Probability and Statistics in Schools
- Teaching Probability and Statistics in Universities and Technical Institutes
- Statistical Training Outside the Teaching Institutions: General Issues

There will be approximately 8 workshops on topics ranging from using calculators and computers in the classroom through to seasonal adjustment methods for economic time series.

You are invited to submit a conference paper, workshop, poster or other exhibit for presentation at ICOTS 3. Where appropriate, contributed papers should link to a particular session. Further information including lists of the sessions and addresses of session organisers are available from

The Secretary  
ICOTS 3 Local Organising Committee  
Department of Mathematics & Statistics  
University of Otago  
P.O. Box 56  
Dunedin, New Zealand.

## OVERSEAS CONFERENCES

Fifth Conference on the Scientific Use of Statistical Software (SoftStat '89), 2-6 April 1989, Heidelberg, West Germany.  
Information: Hans-Martin Uehlinger, Conference Director, Soft-Stat '89, ZUMA, Postfach 5969, D-6800 Mannheim 1, West Germany.

International Topical Meeting on Probability Reliability and Safety Assessment, 2-7 April 1989, Pittsburgh, PA, USA.  
Information: PSA '89, c/- David Squarer, Westinghouse R&D Center, 1310 Beulah Rd., Pittsburgh, PA 15235, USA.

Conference on Environmetrics: An International Conference on Statistical Methods for the Environmental Sciences, 4-7 April 1989, Cairo, Egypt.  
Information: A.H. El-Shaarawi, National Water Research Inst., P.O. Box 5050, Burlington, Ontario, Canada L7R 4A6.

21st Symposium on the Interface of Computer Science and Statistics, 9-12 April 1989, Orlando, FL, USA.  
Information: Kenneth Berk, Dept. of Math, Illinois State Univ., Normal, IL 61761, USA.

Hong Kong International Computer Conference, 10-14 April 1989, Hong Kong.  
Information: George R. Eggert, 2000 E. Devon Ave., Suite 268, Del Plaines, IL 60018, USA.

43rd Annual Quality Congress, 8-10 May 1989, Toronto, Canada.  
Information: Shirley A. Halladay, American Society for Quality Control, 230 W. Wells St., Milwaukee, WI 53203, USA.

11th International Conference of the International Society of Parametric Analysts, 9-11 May 1989, McLean, VA, USA.  
Information: Cynthia Castellana, Mitre Corp., Mail Stop W964, 7525 Colshire Dr., McLean, VA 22102-3481, USA.

1989 IEEE International Conference on Computer Vision and Pattern Recognition, 4-8 June 1989, San Diego, CA, USA.  
Information: Rama Chellappa, PHE324, Dept. EE-Systems, Univ. of Southern California, University Park, MC-0272, Los Angeles, CA 90089, USA.

6th Annual Conference on Quality and Productivity Research, 5-7 June 1989, Waterloo, Canada.  
Information: Jerald F. Lawless, Dept. of Statistics and Actuarial Science, Univ. of Waterloo, Ontario, Canada N2L 3G1.

International Symposium on Bayesian Decision Theory, 5-9 June 1989, Sherbrooke, Canada.  
Information: Jean-Francois Angers, Dept. of Math & Information, Univ. of Sherbrooke, Sherbrooke, PQ, J1K 2R1, Canada.

Singapore Probability Conference, 8-16 June 1989, Singapore.  
Information: J.H. Lou, The Organising Secretary, Singapore Probability Conference, Dept. of Mathematics, National University of Singapore, Lower Kent Ridge Road, Singapore 0511, Republic of Singapore.

International Conference on Computational Techniques and Applications, 10-12 July 1989, Griffith University, Brisbane.  
Information: School of Australian Environmental Studies, Griffith University, Nathan, Queensland 4111.

Australasian Meetings of the Econometric Society, 13-15 July 1989, Armidale, NSW, Australia.  
Information: George E. Battese, Dept. of Econometrics, Univ. of New England, Armidale, NSW 2351, Australia.

GLIM 89 and 4th International Workshop on Statistical Modelling, 17-21 July 1989, Trento, Italy.  
Information: Brian Francis, Ctr. for Applied Statistics, Univ. of Lancaster, Fylde College, GB-Lancaster, LA1 4YF, UK.

39th Gordon Research Conference on Statistics in Chemistry and Chemical Engineering, 31 July-4 August 1989, New Hampton, NH, USA  
Information: Lewis Sheiner, Univ. of California, C255, San Francisco, CA 94143, USA.

18th International Congress of the History of Science, 1-9 August 1989, Hamburg and Munich, Federal Republic of Germany.  
Information: Professor C.J. Scriba, Institut für Geschichte der Naturwissenschaften, Bundesstr. 55, D-2000 Hamburg 13, Federal Republic of Germany.

1989 Joint Statistical Meetings, 6-10 August 1989, Washington DC, USA.  
Information: ASA, 1429 Duke St., Alexandria, VA 22314-3402, USA.

6th International Conference on the New Quality Philosophy in Statistical Research and Statistical Education, 6-10 August 1989, Washington, DC, USA.  
Information: V. Shvyrkov, IS-SSE, 536 Oasis Dr., Santa Rosa, CA, USA.

Eleventh International Joint Conference on Artificial Intelligence, 20-26 August 1989, Detroit, MI, USA.  
Information: Claudia Mazzetti, AAAI Office, 445 Burgess Dr., #100, Menlo Park, CA 94025, USA.

International Conference on Recent Developments in Statistical Data Analysis and Inference, 21-24 August 1989, Neuchatel, Switzerland.  
Information: Yadolah Dodge, Univ. of Neuchatel, Groupe d'Informatique et de Statistique, Pierre-a-Mazel 7, CH-2000 Neuchatel, Switzerland.

11th World Computer Congress (IFIP Congress '89), 28 August-1 September 1989, San Francisco, CA, USA.  
Information: Adrian Basili, AT&T, 30 Knightsbridge Rd., Piscataway, NJ 08854, USA.

47th Biennial Session of the International Statistical Institute, 29 August-6 September 1989, Paris, France.  
Information: ISI Permanent Office, 428 Prinses Beatrixlaan, P.O. Box 950, 2270 AZ Voorburg, Netherlands.

10th Annual Meeting of the International Society of Clinical Biostatistics, 11-14 September 1989, Maastricht, Netherlands.  
Information: Dr R. Does, Dept. of Medical Informatics & Statistics, Univ. of Limburg, P.O. Box 616, 6200 MD Maastricht, Netherlands.

International Conference on Forensic Statistics, 2-4 April 1990, Edinburgh, Scotland.  
Information: C.G.G. Aitken, Dept. of Statistics, The King's Bldgs, Univ. of Edinburgh, Mayfield Rd., Edinburgh, EH9 3JZ, UK.

44th Annual Quality Congress, 14-16 May 1990, San Francisco, CA, USA.  
Information: Shirley A. Halladay, American Society for Quality Control, 230 W. Wells St., Milwaukee, WI 53203, USA.

World Organization of Systems and Cybernetics 8th International Congress, 11-14 June 1990, New York, NY, USA.  
Information: Constantin V. Negoita, Congress Chairman, Dept. of Computer Science, Hunter College, CUNY, 695 Park Ave., New York, NY 10021, USA.

1990 Joint Statistical Meetings, 6-9 August 1990, Anaheim, CA, USA.  
Information: ASA, 1429 Duke St., Alexandria, VA 22314-3402, USA.

Third International Conference on the Teaching of Statistics, 19-24 August 1990, Otago, New Zealand.

Information: The Secretary, ICOTS3, Dept. of Math. and Stat., Univ. of Otago, P.O. Box 56, Dunedin, New Zealand.

International Congress of Mathematicians, 21-29 August 1990, Kyoto, Japan.

Information: ICM-90 Secretariat, Research Inst. for Math Sciences, Kyoto Univ., Kitashirakawa, Sakyo-ku, Kyoto 606, Japan.

Institute of Mathematical Statistics 53rd Annual Meeting, August 1990, Uppsala, Sweden.

Information: Lynne Billard, Dept. of Statistics, Univ. of Georgia, Athens, GA 30602, USA.

### International Congress of Mathematicians, 21-29 August 1990, Kyoto, Japan

The host Institution is the Mathematical Society of Japan with the cosponsorship of the Japan Society of Mathematical Education, the History of Science Society of Japan, the Institute of Actuaries of Japan, the Japan Society for Software Science and Technology, the Japan Statistical Society, and the Operations Research Society of Japan. The sponsorship of the Science Council of Japan is being requested.

Information:

ICM-90 Secretariat  
 Research Institute for Mathematical Sciences  
 Kyoto University  
 Kitashirakawa, Sakyo-ku  
 Kyoto 606, Japan

### USERS of S and ACE

For anyone who has purchased *S* from Siromath, or *Ace* from Graphics Computer Systems, or an *S* source-code licence from AT&T, CSIRO Division of Mathematics and Statistics now offers an *S Software Support Service* featuring:

- Regular upgrades, including bug-fixes, new dms functions, the latest version of *S* available from AT&T and improved graphics facilities.
- A Newsletter
- A Hotline Service for rapid response to problems

Contact Sue Clancy on (02) 467 6549 or (02) 416 9317 [Fax], or by *email* using *clance@dmssyd.dms.oz* for more information.

## THE UNIVERSITY OF SYDNEY

### BIostatistician (RESEARCH FELLOW/SENIOR RESEARCH FELLOW)

Reference no.04/36  
 NHMRC CLINICAL TRIALS CENTRE

Applications are invited for the position of Biostatistician with the NHMRC Clinical Trials Centre which has been recently established to co-ordinate multi-centre clinical trials in Australia and provide expertise to assist clinical investigators throughout Australia in the design, implementation, analysis and reporting of clinical trials. The position should provide the successful applicant with a challenging and exciting career in clinical trials research.

The successful applicant will be responsible for statistical advice on the design and analysis of clinical trials, statistical consulting for clinical investigation and undertaking research in clinical trials methodology or a related area. Close liaison with data managers will be essential and interest in database/statistical computing advisable. There will also be an opportunity for some teaching. Applicants with a suitable PhD or equivalent preferred.

Appointments will be made for up to 3 years in the first instance. The level of appointment is subject to qualifications and experience. We reserve the right not to make any appointment.

Further information from Dr John Simes, telephone (02) 692 4561/4562.

#### SALARY:

Research Fellow \$30,737-\$40,100 p.a.

Senior Research Fellow \$40,937-\$47,564 p.a.

Applications, quoting reference no., including *curriculum vitae* and the names and addresses of two referees, to the Registrar, Staff Office, University of Sydney, NSW 2006, by 31 March 1989.

Equal employment opportunity is University policy.