



statistical society of australia incorporated

n e w s l e t t e r

30 November 1992

number 61

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## ARC GRANT APPLICATIONS

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### Some comments collected via confidential conduits on ARC grant applications

[The following comments have come from a number of sources who wish to make the comments available in order to assist SSAI members. As secretary, I have been asked to co-ordinate and present comments gathered from various people's observations.]

#### "Research Plans, Methods and Techniques"

Compared with experimental scientists, in some projects, statisticians may not have quite the same need for detailed research planning, but it is a very important part of grant proposals and applications. The proposal must show that the applicant has thought deeply and carefully about the topic it is desired to address, and reviewers and the ARC are dependant on the detail of the planning description in judging the proposal. For example, in theoretical work, the nature of the theory, including perhaps regularity conditions, could be conjectured. In numerical or computational work, possible types of difficulties could be predicted, because of either numerical problems or data problems, and then ways of overcoming these difficulties could be suggested.

#### Budget items

Research Associate positions tend to be judged somewhat differently to research assistance. A Research Associate may be more difficult to get because the ranking of investigators tends to be taken into account more in assessing Research Associate allocation than, say, equipment or research assistance.

Questions that are likely to be raised in considering allocation of research assistance tend to be (apart from the merits of project and investigators): why is research assistance needed, and could the project be converted into one appropriate for a PhD program.

It should be relatively (!) easy for statistical scientists doing numerical work to justify purchase of computing equipment. [Author's aside: I have heard an interesting variety of opinions this year on various committees as to the appropriate source of funds for computing equipment, e.g. infrastructure, operating grants, research grants, collaborative, etc. I think that all can be appropriate, and the bottom line is that any particular proposal application should address the criteria for the particular scheme.] If computing equipment is less than the threshold, this could be combined with a PhD scholarship, plus perhaps software. It is only in the first year that the threshold needs to be exceeded.

#### Assessors and interviews

Nominated assessors who are or have been recent visitors to the applicant's department, co-workers on research in the last 5 years, PhD supervisors, etc, are not usually permissible. The assessors' reports are carefully read. It is important that nominated assessors be available to reply to requests for reports. Sometimes 6 assessors are required to obtain 2 reports. Overseas referees are certainly used.

The ratings awarded by the assessors may be "moderated", according to the content of the report plus experience with the assessor. This moderation may not be indicated on returned reports.

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*The views of contributors to this Newsletter should not be attributed to the Statistical Society of Australia, Inc.  
Deadline for next issue: 12 February 1993*

*Printed by Koomarri Printers, Canberra*



The extent of experience is apparently carefully taken into account in assessing track records, i.e. young applicants are not disadvantaged. Apparently, young people and first-time applicants are often interviewed, as the role of the interviewer is significantly to find out about the investigators: their level of energy and enthusiasm, and their knowledge of their subject. It appears to be very important to be very familiar with *everything* in the proposal at an interview. Even if an interviewee is not the expert among the investigators on a particular topic, at

least what is given in the proposal should be completely familiar to all the interviewees.

### General

The tip is that unsuccessful applications should not be simply re-cycled. If a similar proposal is re-submitted, it is wise to ensure that the modifications which have been made in the light of feedback and assessors' reports are identified.

Helen MacGillivray

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## YEAR 12 EDUCATIONAL STATISTICS: CAN STATISTICIANS CONTRIBUTE?

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Around year's end in each state in Australia data from the year's cohort of secondary school leavers aspiring to tertiary entry are processed to determine a Tertiary Entry Score (TES) used to rank such students in the various automated state-wide tertiary entry schemes.

Across Australia these raw data are essentially of at most two types. Surprisingly, each state has its own methodology for coping with this data processing exercise. The bulk of the data processing time concerns input (raw marks) and output (certificates, tertiary admission offers). What usually most interests the statistician is the core data processing stage which is more complex but not so lengthy (in terms of CPU operation on a "slow" IBM-compatible AT PC, the ACT could process its data on c.4,000 students in well under 20 minutes). This core data processing is variously described as scaling, or moderation, or standardisation, *but it is not the only place where the statistician ought to be interested*. The statistician may also properly ask (and I make no apologies for using quasi-technical language in this newsletter):

- Where do the data come from?
- Are the data homogeneous or heterogeneous?
- Are the data expressed to a precision rather smaller than the measurement error?
- Have the raw data been pre-processed? If so, how?
- Are the scales used in telling students their (1) "marks" and (2) "TES", such that the measurement errors are roughly uniform across their respective ranges?
- Are there any significant biases either in the data or introduced as a result of the data processing?

While many of these questions amount to the basic statistical dictum *scrutinize your data*, some are not so obvious without experience in the area; for my own part, I know that each is relevant in some Australian context.

For the purpose of constructing an index for selecting amongst otherwise adequately qualified students for further academic study, the measures should presumably reflect recent academic achievement or proven surrogates. Historically, the roots of Year 12 tertiary entry data are in University Entrance (Matriculation) examinations, when satisfactory completion of Years 8 to 10 constituted a basic

level of education. Nowadays rather more students remain at school to Year 12, but proportionately fewer of those so remaining aspire to tertiary academic study, so a wider range of school courses must be provided. Thus it does *not* follow that all courses should be regarded as potentially of equal merit as preparation for tertiary level academic study: they are certainly not designed that way.

In spite of this truism, it was necessary for Victorian Universities formally to reject as unsuitable some "subjects" that emerged in the new Victorian Certificate of Education; presumably similar action is warranted in South Australia (cf. SA Branch report in this issue with a reference to c.200 subjects!). [For the record, the ACT has typically been regarded as a region with a high Year 12 retention rate. In the period 1977 to 1991, of the Year 12 age cohort, the proportion attending school at some stage in their year rose from about 65% to 85%, while the proportion seeking a tertiary entry qualification edged up from about 48% to 55%.]

For the sake of simplicity I describe school leavers' data as *marks* that measure *relative academic achievement* in several *subjects*: this is not to imply that they *are* examination marks, for a mark may well be derived by assessing a student's work done outside the classroom, or by combining the results of several assessments based on formal tests or homework assignments or special projects.

What is measured in each subject is envisaged, and appropriately so, as some continuous variable. Thus our first interest is the precision used to record measurements. An exceedingly useful concept, and not confined to educational statistics by any means, is the representation

$$\text{observed measure} = \text{true measure} + \text{measurement error}.$$

If we wish to "protect" the true measure here in data manipulation (transformation, rounding), then the unit of precision should be a fraction of the measurement error. It follows that the standard deviation of the measurement error should be several units.

Does this square with practice and public understanding? In New South Wales for example comparison of an external public examination-based mark and a school-based mark provided as an estimate of the student's public exam. mark, showed that, on a scale with an average mark of c.60 on an effective scale of c.30 to 100, the



measurement error standard deviation lies in the range c.4 to c.8 marks, depending on the subject.

And for public perception? Certainly, our culture is such that, when two students have marks of (say) 79 and 80, we and they regard their relative achievement as being about equal, but at 70 and 80 some distinction is made.

Both these examples point to the use of a reporting scale of (say) 60 points as being proper but a scale of (say) 10 points as grossly inadequate: round-off error is then of the order of magnitude of measurement error, so the effective measurement error of the recorded mark is rather larger than necessary. Inherently what is at stake here is fairness: if academic achievement is the basis of tertiary entry selection, then it is not for quirks of the measurement recording and data manipulation processes to make distinctions between students. Yet this is exactly what is happening this year in Victoria where basic information is in many instances being collected on an adequately fine scale, and then being rounded to the nearest mark on a 10-point scale.

A similar example of erroneous thinking on matters of measurement has emerged recently in a push by the Commonwealth National Board of Employment, Education and Training for the possible use of "competency reports" (as in the Carmichael Report and follow-up work by the Mayer Committee) as a means of certification that may contribute to university entry selection and transfer. Of relevance here is the proposal that an individual be "described" by seven generic competencies reported on a 3-point scale. Enough said!

Next comes the core data processing operation. The manipulation of numbers necessarily follows some algorithmic prescription, and the properties of that prescription are most easily handled and understood algebraically: what then is the model used for this data processing?

We can start with a more basic question: is it possible to transform the data to an equivalent but more meaningful representation? As statisticians this can take us into the realm of principal component representations. Given students' marks in a dataset that is ideal in the sense that every student has a mark in every subject in the curriculum, a principal component transformation yields a strong first principal component and one or two others that are discernible and capable of interpretation.

The dominant component represents "*general (relative) achievement*". Others commonly observed include a contrast in achievement between mathematics and science subjects on the one hand and humanities subjects on the other, and a contrast between modes of assessment (e.g. exam. conditions or not, free response or multiple choice test questions, internal (school-based) or external assessment).

The most important implication of this representation is that an aggregate of marks is essentially an estimate of general achievement. For a particular student and depending on the prescription for compiling the aggregate (typically, it is of a student's "best  $n$  marks"), it may reflect

relative strengths, if any, in the other discernible components.

In practice the datasets are far from ideal: rather they can be viewed as a dataset with a large amount of missing data. However, given the interpretation of the components from the ideal dataset, and given the consistency so far as is possible of the second order structure of observed datasets with this representation, we can be encouraged to view more favourably factor models to describe data for such subjects as marks exist.

The dominance of the first component relative even to the other interpretable components, provides partial justification for the variety of one-factor models that are commonly assumed as a basis for describing the data, whether by means of a linear model, a logistic model, or a non-parametric percentile ranking model. As far as description is concerned the linear one-factor model is at best a crude approximation, but as a basis for developing an algorithm to estimate the first principal component (of a suitably scaled version of the data), it turns out to be more than useful. Indeed (cf. Daley and Seneta, *Aust. J. Statist.* 28, 143-153 for a brief review) it can be used as a basis for finding scaling parameters via at least three different estimation procedures, two of which are used in the New South Wales and the ACT respectively. And these procedures can then be evaluated (e.g. by simulation) for robustness to departures from the one-factor model assumption.

Other approaches to scaling use a bivariate adjustment procedure (Queensland and Western Australia), a percentile ranking procedure (Victoria), and a location parameter shift and logistic transformation coupled with least squares (South Australia). Queensland is in the throes of trialling yet another, supposedly based on pairwise comparison methodology. This last method, so far as can be discerned from what "justification" has been released publicly, fails on a number of accounts: it uses a metric that departs radically from linearity over its range; it essentially hypothesizes a discrete measurement scale rather than continuous; it suppresses information in the sense of replacing the raw data concerning the "distance apart" of individual achievements by ranks alone; and the procedure itself is affected by the addition of another student (i.e. it fails an invariance property test). Little wonder, then that, on hearsay evidence, the validity of applying the methodology has not been communicable to the public or teachers, nor even to Queensland statisticians.

With the exception of the ACT, and to a lesser extent New South Wales, none of these scaling procedures has been developed consistently with a model underpinning the algorithm used to process the data. To some extent this has been because as statisticians we may have shied away from becoming too deeply involved in addressing the intrinsic problems of such datasets and doing the hard work of model development and application — and I do not in this belittle the detailed nitty-gritty of the work needed to translate model-based conclusions into practice.

But equally, there is extreme reluctance on the part of some administrations to *allow* us to participate. Most publications concerning the data processing are reports,



and may be endorsed "Internal memorandum" or "Unpublished report: restricted circulation". And reports with technical-based discussion are a rarity indeed: there is little market for them! Sometimes it is as though the processes themselves are patented intellectual property.

Data are often regarded as highly confidential, when the only proper feature of confidentiality relates to student identity. Some authorities (e.g. South Australia and Queensland) protect the identity of individual schools, whereas others (e.g. the ACT) publish considerable detail concerning aggregate relative achievement data for each of the schools for which it is responsible.

Both the lack of publication of information on scaling procedures and restricted access to data have in general hindered development of better procedures and the dissemination and discussion in the statistical community of matters that *ought* to concern it.

I have not alluded here to the problem of how internal and external assessments in a subject may be aligned fairly.

One could mention for example the statistical shoddiness of a "verification" procedure introduced recently in Victoria.

Nor have I discussed the use by some authorities (e.g. Queensland) of releasing to students only their secondarily derived ranks---and then, worse, only in broad bands---rather than the aggregates of scaled marks. To me it is simply ludicrous public deception to use a scale in which the top 30% and top 40% ranks reflect aggregate marks that differ about the same as for the top 3% and top 5% ranks.

As a further topic, while using academic achievement as a basis for ranking students within a state, there has not been fairly addressed the question of establishing inter-state comparability of levels of achievement so as to facilitate equitable admission of out-of-state students. And this in "One Nation"?

D. J. Daley  
Australian National University

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## BRANCH REPORTS

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### New South Wales

#### Problem of Unknown Link Function

The August meeting was addressed by Alan Welsh from ANU on an important issue concerning the generalised linear model: the problem of an unknown link function. The idea is to estimate the link function using a data driven function while retaining as much of the structure of the general linear model as possible. An alternating algorithm was proposed which involves only univariate smoothing to estimate the link. The procedure is only a little more complicated than estimating a parametric class of link functions and less complicated than other nonparametric alternatives which require  $p$ -dimensional local fitting.

#### Stein's method for normal approximations: 20 years on

Malcolm Quine from University of Sydney spoke at the September meeting on the topic "Stein's method for normal approximations: 20 years on". In the proceedings of the Sixth Berkeley Symposium there appeared a remarkable, and in parts, impenetrable, paper by Charles Stein entitled "A bound on the error in the normal approximation to the distribution of a sum of dependent random variables". A key idea in that paper is a certain characterization of the normal distribution; based on this Stein was able to give a bound for the difference between the distribution functions of, respectively, an arbitrary random variable and a standard normal variable. From this bound results such as the Berry-Esseen theorem could be derived for independent random variables and for certain sequences of dependent variables (indeed one of the results contained in the paper took some 10 years and an army of probabilists to confirm via standard characteristic function arguments -

Stein commented subsequently that he knew at the time his paper appeared how to tackle the problem via characteristic function methods!). Stein's ideas were extended to the case of Poisson variables. The talk covered both the normal and the Poisson cases and looked at some recent applications with a statistical flavour.

#### Incorporation

The drama of evolving into an "inc" is reaching a crescendo. Much time has been devoted to the details of the new constitution/rules by some unfortunate individuals on the branch council. All fervently hope that this issue will be sorted out at the forthcoming special meeting of the NSW branch in November when the membership will have an opportunity to vote on the matter.

### Queensland

#### Trend Detection Analysis of Broken Series of Solar UV-B data

Xiaogu Zheng of the New Zealand Meteorological Service addressed the last meeting of the Queensland branch on this topic. The talk covered the approaches used in adjusting UV-B data obtained after the breakdown and subsequent repair of a Robertson-Burger meter. This meter is a broad band sensor whose spectral sensitivity approximates the UV-B erythral sensitivity of human skin. The meter was installed at Invercargill in the far south of New Zealand. A statistical UV-B/ozone model and physical models were both used in rendering the data homogeneous. These adjusted data were then used in trend detection. Xiaogu showed a long-term upwards trend in UV-B of around 6% per decade for this location. The long



term ozone depletion for the same location is about 5% per decade.

### **Statistics in Quality and Management**

A one-day workshop is to be conducted on the use of statistics in quality and management on Friday 6th November 1992. The workshop is to be jointly sponsored by the Queensland branch of SSAI, the Key Centre in Strategic Management (QUT) and the Australian Organisation for Quality (Queensland Division). There is an ongoing problem in establishing the value of data analysis to Australian managers. This workshop aims to develop a set of case study papers that can be used to illustrate the value of statistics to managers. It is also intended to provide a forum for discussion of the barriers to more effective use of data by managers.

## **Victoria**

### **Professional Accreditation**

The July meeting was addressed by Alan Welsh who gave a review of recent developments in relation to professional accreditation. The SSAI is under pressure to act on the issue because of increasing membership awareness, the moves by RSS and ASA on the issue and government pressure on award restructuring and competency standards. The working party set up by Central Council of SSAI in February recommended to July Central Council that more substantial consultation take place with the membership and options on specific criteria and operation be developed for February '93. Alan said that a person's interaction with the wider community and their maintainance of good Statistical philosophies and strategies should be amongst the factors considered in accreditation. The accreditation process has to deal with a diverse group of people and has to cover a broad range of skills and outlooks. It must not be exclusive and peer review should be used. There is a need to work on a higher profile and increased professionalism for Statisticians at the same time. Three fundamental questions that need to be addressed are: (i) Who is accreditation to serve? (ii) What is meant by qualifications and experience? (iii) Do we need multiple levels of accreditation? A lively discussion of the implications of accreditation followed.

### **Long Range Correlations in Independent Observations**

At the August meeting, Dr Hampel gave examples of several situations in which observations taken over time would traditionally be considered to be independent observations. These data sets have been found to exhibit long range correlations. These correlations mean that estimates of constants based on independence assumptions can be in error substantially. However contrasts in ANOVA, etc are not affected much because the errors tend to cancel each other out.

### **Studying Literacy Programmes**

At the September meeting, Ken Rowe reported on some work studying literacy programmes. Interest was in what factors affected children's reading ability. A range of

socio-economic/teacher variables were compared with the latent variables used to measure student reading ability. A fundamental problem with standard multiple regression is that it does not allow for correlation between residuals across individual students, which is the case for multi-level data. Structural equation, covariance structure and item response modelling were used to allow for this. It was found that socio-economic factors were not important, but reading activity at home was extremely important - hence the Reading Together project.

## **South Australia**

### **Scaling Year 12 Marks for University Entrance**

Bill Venables of the Department of Statistics, University of Adelaide spoke on educational statistics at the August Branch meeting. The necessity to scale marks for University entrance purposes comes from the unwise decision, made long ago, not to have explicit pre-requisites for University subjects but rather to base University entrance primarily on a single, uniformly calculated aggregate mark.

The year 12 examination in South Australia now in principle allows students to choose from approximately 200 subjects. Given the fact that examiners are able to rank students within a subject fairly well, but they are generally unable to arrive at a reliable absolute achievement score, some scaling adjustment of raw marks is necessary prior to forming any University selection aggregate.

The talk discussed the new scaling system proposed for Year 12 in South Australia. Hard data in this area is very confidential, so the talk was of necessity only in qualitative terms. The speaker compared it with the previous scaling system of Alan James and Jane Pitman.

### **Models for Multivariate Categorical Data**

Gary Glonek, of the Discipline of Statistical Science at Flinders University, addressed the September Branch meeting. Data consisting of several categorical responses and an arbitrary collection of predictor variables are usually modelled by assuming that the response variables jointly follow a multinomial distribution and then seeking to relate the multinomial probabilities to the predictor variables. The composite link function discussed by McCullagh and Nelder (1989) leads to a class of models that may be described as multivariate logistic regression models and possess many desirable properties. In this talk, the general class of models was described and related issues including computation, efficiency and comparison to alternative analyses were discussed.

### **IMAGE - "Integrated Model for the Assessment of Greenhouse Effect"**

Jerzy Filar, Professor of Mathematics, University of South Australia spoke at the Branch meeting on Wednesday 21 October 1992. IMAGE is the Dutch government's model for the assessment of greenhouse effect. It was developed at the RIVM Institute in Bilthoven, The Netherlands.



The model tries to capture the essentials of the complex problem of climate change in a simplified way. It is a multidisciplinary product based on knowledge from disciplines such as economics, atmospheric chemistry, marine and terrestrial biogeochemistry, ecology, climatology and glaciology.

In this presentation an outline of the model was sketched and a demonstration of the model's software was given. It was claimed that this model presents an opportunity for statisticians to interact with natural scientists in their attempts to increase the understanding of the effect of world economic policies on the global climate problems.

## Canberra

### Statistical Process Control is not TQM

Kerry Busted, Senior Consultant with Deloitte Ross Tohmatsu, addressed the August meeting of the Branch. Based on long experience in the TQM trenches, Kerry focussed on the key differences between the traditional statistical process control methods used in industry and the ideas underlying Total Quality Management. Kerry identified six basic elements of TQM — client focus; team work approach; continuous improvement; process orientation; data-based decision making and leadership from the top. Of these, he emphasised the need for senior management to 'totally' accept the need for decision making based on facts and data, and not 'gut feel'. However, he acknowledged that getting this sort of commitment from the senior management of an organisation was probably the most difficult aspect of 'moving' TQM into the organisation's corporate culture. By and large, managers found it difficult to accept the notion that they had to change themselves before they could hope to change others. To a large extent, this reluctance reflected management's lack of knowledge of the fundamentals of the scientific method underlying TQM. In the discussion following his talk Kerry emphasised that a major component of the long term solution to this problem was for statisticians to take a more active interest in the training of managers. The ball is now in our court.

## Burning Questions in Statistics

Dr Wendy Catchpole, from the Australian Defence Force Academy, addressed the September meeting of the Branch on 'Burning Questions in Statistics' — alias the contributions being made by statistics to bushfire research.

There are three main fields of investigation in this area: fire behaviour, fire suppression and fire effects. There are also three main types of model: empirical, physical and simulation. Wendy has primarily been involved with fire behaviour modelling.

Australia, together with Canada, has been very active in empirical research. One way of modelling bushfire behaviour empirically is by mapping the fire's progress from minute to minute. Spread rate is usually a function of windspeed, moisture content and bulk density, the last two often being highly correlated and giving rise to collinearity problems. Moisture content itself varies with vegetation and shading. The measurement of vegetation content is most efficiently undertaken using 'double sampling', that is sampling both by small quadrats and by long transects. Regression may be superimposed on this sampling. It is very important then to ensure that all the important regressors have been included. The omission of dew as a regressor, for instance, can give rise to quite unsatisfactory results.

The US Forest Service uses physically based models of heat transfer by convection and radiation. Statistics is useful in several areas here, including instrument calibration, and parameter estimation. The standard deviations of observations provide a natural measure of turbulence.

Computer simulation of fire growth is being developed with a view to providing strategies for sending out control teams. Real time modelling is likely to be sufficiently well developed four years from now to be of immediate assistance in fire control. Percolation models have met with only limited success. Elliptical growth models have been more fruitful, as fires do often grow in elliptical patterns.

There remain many unsolved problems in bushfire research, and there is ample scope for statisticians to play a part in it.



## YOUNG STATISTICIANS' PROFESSIONAL DEVELOPMENT WORKSHOP

### From the Organisers

The venue for the second Young Statisticians' Professional Development Workshop was next to one of Newcastle's beautiful beaches and took place from 30 September to 2 October 1992. We were pleased to welcome 33 'young' (or young at heart) statisticians from NSW, ACT and even one from Adelaide, and managed to produce enough sunshine to thaw our visitors from wintery areas such as Armidale and Canberra.

The atmosphere was very relaxed: formal talks (invited and otherwise) were complemented by informal discussions around the breakfast, lunch and dinner table and into the night. Young statisticians from universities, public service, CSIRO and industry came to enjoy themselves and to benefit from meeting and listening to one another and our invited speakers. One of the aims of the workshop was to give young statisticians a chance to talk about their work or their studies in a supportive environment - amongst people like themselves.

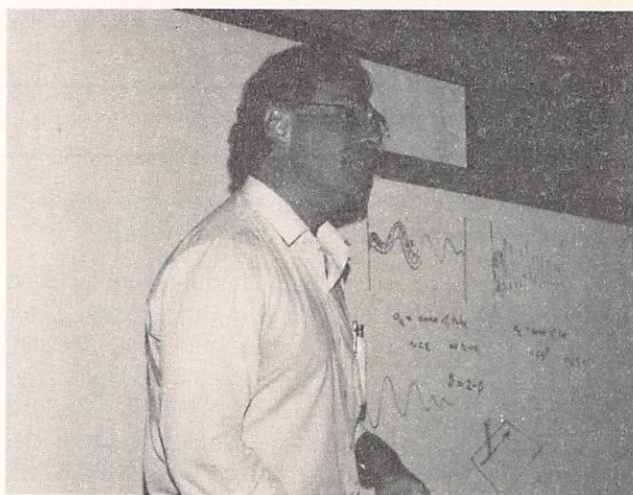
Two-thirds of the participants gave talks; the topics ranged from time series to evaluation of fabrics, from sample surveys to rowing machines, from medical statistics to quality control. The workshop opened with an invited talk from Dennis Sinclair (Uni Newcastle and Newstat) who enlightened us about quality and quality control. On the following morning Peter Hall (ANU) showed us, with the example of estimating fractal dimensions, how problems arising in industry can lead to interesting theoretical questions whose solution sheds new light on the industrial application. During the second evening Ron Sandland (CSIRO) shared with us his feeling of excitement in working with industry, illustrating his talk with examples of successful applications of statistics in industrial research and consulting. Ann Cowling (ABARE) described the work of ABARE by expanding on '(Gum)bootstrapping and smoothing sheep'; and Alun Pope (Uni Newcastle) discussed his experiences with the problem of predicting how safe firing ranges are.



Enjoying a break in the YSPDW programme (from left): Colleen Hunt, Bhamathy Parameswaran, Jane Wright and Patrick Cannon.

The enthusiasm of the young statisticians was particularly refreshing for the oldies. It was of course the main reason for the success of the workshop, but mention must also be made of the generous contributions of our sponsors; namely the NSW and the ACT branches of the Statistical Society of Australia, Newstat (The University of Newcastle's statistical consulting company) and The University of Newcastle. Finally thanks are due to two Young Statisticians, Paul Dickman and Craig Shaw from The University of Newcastle, who so enjoyed the previous year's workshop that they enthusiastically undertook the task of organising this year's event.

Inge Koch  
University of Newcastle



Peter Hall talking about estimation of fractal dimensions

### A Participant's Perspective

This year 40 or so cheery 'young' statisticians from NSW, ACT and SA travelled to Newcastle for the annual Young Statisticians Professional Development Workshop. The workshop, organised jointly by the NSW and Canberra Branches, proved to be an excellent opportunity for the people starting their career as statisticians to hear the type of work their peers are performing within Universities and the Private or Public Sector, whether it be statistical research, applied analysis or consulting.

The program included invited speakers along with presentations by most of the 'young' attendees. The range of topics covered 'recent developments and present day opportunities in statistics'. The invited speaker program included a talk on the Estimation of Fractal Dimensions by Peter Hall (ANU). Ron Sandland overviewed the vast opportunities available for statisticians in the Division of Mathematics and Statistics of CSIRO. Ann Cowling had a similar task for presenting statistical research projects of ABARE. Dennis Sinclair (NEWSTAT) gave us an insight to Statistics and Quality and Alun Pope spoke of the Safety of Firing Ranges.



Those attendees from Universities spoke of their research for Honours, Masters or PhD related topics, such as Generalising Lifetables - down to the point where a single female has two choices in life: marriage or death! (thanks Ian!). On a more serious side we did hear about theoretical research such as robust estimation of variance components. From the field of Health statistics we learnt of the Quality of Life Assessment.

Attendants at the workshop also came from ABS, ABARE and CSIRO. Some of these topics included Quality control in the Public Sector, Imputation for Survey Non Response and Evaluating Fabrics (for example, their wrinkles) - subjective assessment and image analysis. There were also representatives from OTC, ADFA and AGB Australia.

In between this packed program of talks, we were treated to fine dining and motel rooms with spectacular ocean views. One of the afternoons was especially left for 'unstructured interaction' such as for a trip to the Hunter

Valley Wineries for a little of our own biased sampling, or a scenic walk around the city. This time also allowed for informal comment from peers which was found most valuable for advice on projects and contacts for people performing similar work. Friday lunch was time for award presentations, including ...the speaker who best managed to not mention a client's name/subject, best dressed presenter. Congratulations to Madeleine King (Westmead Hospital) and Linda Stephens (Biometrics Unit, CSIRO) who tied for the award of Best Presentation.

Many thanks to organisers Craig Shaw, Paul Dickman, Inge Koch and Alun Pope for a most informative and enjoyable workshop. Thanks are also extended to the NSW and ACT branches of the Statistical Society and NEWSTAT for their sponsorship of the workshop.

Angela Reid  
CSIRO

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## OBITUARY - Bill Armstrong

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Statistics lost one of its most impassioned advocates with the suicide of Bill Armstrong at the end of August.

Bill was educated in England and his early work included involvement with the steel industry in Birmingham. Later he spent two periods in Wellington, New Zealand, practising for a while as a private consultant, and concluding as a quality specialist with the New Zealand Dairy Board. Bill moved to Australia at about the beginning of 1986, and initially worked with CSIRO DMS at Clayton. Then he set up as a private consultant, and recently had been working with the printing group, John Sands, and other clients.

It was not in Bill's nature to be comfortable working within an organisation, which is probably why he changed employment quite frequently. Nor did he fit comfortably into the Society, although he did serve on the Council of the Victorian Branch and was the editor of the inaugural issue of the newsletter "Variations".

Bill believed passionately in the application of statistical thinking to overcome problems with the quality of a product, and he was happiest when he was showing clients how their problems could be overcome. He recently produced a small book entitled "Managing with Variations". Those fortunate enough to have a copy will recognise Bill's marvellous sketches, his anecdotes, and his keen thinking on the issue of statistics and quality.

Bill was larger than life, and the manner of his death leaves those who came into contact with him bewildered and bereft. Outside Statistics, his interests included wrestling and judo, and music (he played the tuba and trombone, and was active in a number of bands). He will also be remembered for the occasional hilarious hoax.

But Statistics and quality came first. Right now, I envisage Bill exhorting St Peter on the need to improve the quality of the inward goods coming through the Pearly Gates. Rest in peace, Bill.

Ken Russell

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## NEWS ABOUT MEMBERS

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**Alan Gleeson** has taken up the position of General Manager, Information and Biometric Services at the Head Office at Orange of the NSW Department of Agriculture.

**Dr E.A. (Ted) Catchpole** has recently been promoted to Associate Professor at the Australian Defence Force Academy, Canberra, University College of University of New South Wales.

### News from Wollongong

**Chandra Gulati** is currently on study leave at Ohio State University. **Ken Russell** goes on leave at the beginning of December, and **David Steel** will be in Southampton for the first six weeks of 1993, working with Tim Holt on the analysis of survey and census data. **Doug Stirling** from Massey University, NZ, will visit the Department over the summer to continue his work with **David Griffiths** on developing modules for Doug's software package for the Macintosh computer, "Models 'n' Data", and writing a book for use with the package.



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## MISCELLANEOUS

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### Formation of Department of Applied Statistics

From 1st January, 1993, there will be a Department of Applied Statistics at the University of Wollongong. This will be formed from the statisticians currently in the Department of Mathematics, namely David Griffiths (Professor), Francis Crumplin, Pam Davy, Chandra Gulati, Yan-Xia Lin, John Rayner, Ken Russell and David Steel, together with our general staff members Kerrie Gamble and Brenda Evans. We expect to have an additional academic position from early 1993. The change is intended to focus more the work of both the statisticians and the mathematicians remaining in the Mathematics Department (which may have a change of name).

The University's recently-adopted Mission Statement includes the aim that all graduates will be statistically literate; one task for the new Department in 1993 will be to pilot a statistical literacy program in the Faculty of Law. This will subsequently be extended to other Faculties. The statisticians are already involved in a postgraduate Total Quality Management program in conjunction with the Departments of Management and Mechanical Engineering, and it is planned to introduce a Master of Statistics degree in 1994. The Department's Ten-Year Plan is a lengthy and ambitious document, which will keep every member active.

Ken Russell

### Competition for Young Statisticians from Developing Countries, 1993

The International Statistical Institute (ISI) announces the Sixth Competition among young statisticians from developing countries who are invited to submit a paper on any topic within the broad field of statistics, for possible presentation at the 49th Session of the ISI to be held in Florence, Italy, in 1993.

Participation in the competition is open to nationals of developing countries who are living in a developing country, and who were born in 1961 or later. Papers submitted must be unpublished, original works which may include material from participants' university theses.

The papers submitted will be examined by an international jury of distinguished statisticians who will select the three best papers presented in the competition. Their decision will be final.

The authors of the winning papers will be invited to present their papers at the Florence Session of ISI, with all expenses paid (i.e. round trip airline ticket from his/her place of residence to Florence plus a lump sum to cover living expenses).

Manuscripts for the Competition should be submitted in time to reach the ISI not later than January 1, 1993.

The rules governing the preparation of papers, application forms and full details are available on request from the ISI Permanent Office. The address is as follows: The Director, Permanent Office, International Statistical Institute, 428 Prinses Beatrixlaan, 2270 AZ Voorburg, The Netherlands

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## An Invitation to STATISTICS '93

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STATISTICS '93 will be held at the University of Wollongong from 27th September to 1st October, 1993. The Conference will have three strands: Statistical Computing, Statistical Education, and the application of Statistics to Quality. These all fit into the overall theme of "Working Smarter with Statistics". There will be invited speakers for each strand. Contributed papers on any topic relevant to one or more of the strands are sought; software displays and poster sessions will be organised if demand warrants this. In keeping with the Quality theme of this Conference, papers and Abstracts will be required to meet a high standard of content and presentation.

Each strand will last for several days, and there will be some overlap of strands. Half-day tours and the

Conference Dinner will be held on Wednesday, 29th September.

The First Circular should be enclosed with this Newsletter. [If it is not, please write, e-mail or fax the Conference Secretary for your copy.] Please return the tear-off reply slip to indicate your interest in attending. Further information may be obtained by writing to the Statistics Conference Secretary, Mathematics Dept, University of Wollongong, Northfields Ave, Wollongong NSW 2522, or via e-mail (statconf@uow.edu.au) or facsimile (+61 42 214845). We look forward to welcoming you to wonderful Wollongong in 1993.

Ken Russell



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## AUSTRALASIAN CONFERENCES

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### CONFERENCE SUMMARY

**Workshop on Practical Applications of the Bootstrap**, 2-4 December 1992, Canberra. (Full details in Newsletter 59.)

Information: Kim Anh-Do, Statistical Sciences Division, CMA, Australian National University, Canberra, ACT 2601.

**Analysis of Repeated Measurements Data: An Overview**, Hamilton, 3-4 December 1992, New Zealand.

Note: To be held prior to IBC 92 at the University of Waikato.

Information: David Fletcher, Department of Mathematics and Statistics, University of Otago, Box 56, Dunedin, New Zealand.

**International Workshop on Matrix Methods for Statistics**, University of Auckland, 4 - 5 December 1992

**Dynamic Graphical Analysis of Statistical Models**, 6 December 1992, University of Waikato, Hamilton, New Zealand.

Note: Short course prior to IBC 92.

Information: B. Dow, IBC 92 Secretary, Ruakura Agricultural Centre, Private Bag 3080, Hamilton, New Zealand.

**The XVIth International Biometrics Conference**, 7-11 December 1992, Hamilton, New Zealand. (Full details in Newsletter 57, 58 and 59.)

Information: IBC 92 Secretary, Ruakura Agricultural Centre, East Street, Hamilton, New Zealand.

**Molecular Evolution Workshop**, Rotorua, 12 - 13 December 1992.

**Methods for Correlated Data: Current Research**, Queenstown, 14 - 16 December 1992

**International Conference on Environmental Biometrics**, 14-15 December 1992, Sydney. (Full details in Newsletter 59.)

Information: Dr John Evans, Water Board, PO Box 73. West Ryde NSW 2114; fax (02) 334 0817.

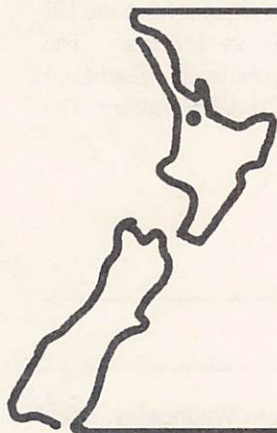
**2nd Australasian Genstat Conference**, Forest Research Institute, Rotorua, 14-16 December 1992

**1993 Mathematics-in-Industry Study Group**, 15-19 February 1993, Melbourne.

Information: Dr N.G. Barton, CSIRO Division of Mathematics and Statistics, PO Box 218, Lindfield NSW 2070; tel. (02) 413 7702; fax (02) 416 9317; email noel@syd.dms.csiro.au. (Full details in Newsletter 60.)

**Australasian Meeting of the Econometric Society**, 7-9 July 1993, Sydney, Australia.

Information: Denzil G. Fiebig, Department of Econometrics, University of Sydney, Sydney NSW 2006.



## 1992 (XVI<sup>th</sup>) International Biometric Conference

Hamilton, New Zealand 7-11 December 1992

IBC92 Secretary  
Ruakura Agricultural Centre  
Private Bag 3123  
Hamilton, New Zealand

Phone 64 (7) 856 2836  
Fax 64 (7) 838 5012  
E-mail (internet) [ibc@ruakura.maf.govt.nz](mailto:ibc@ruakura.maf.govt.nz)  
[ibc@ruakura.cri.nz](mailto:ibc@ruakura.cri.nz)

### BIOMETRIC SOCIETY

#### Sixteenth International Biometric Conference

University of Waikato  
Hamilton, New Zealand, 7-11 December 1992

IBC92 and the nine satellite meetings are about to happen!

#### IBC92 Registration Snapshot

As at October 29, registrations comprised 105 from New Zealand, 82 from Australia, 99 from North America, 95 from

Europe, 31 from Asia, 5 from South America and 6 from Africa. These 423 participants have offered 260 contributed papers, in addition to the 20 invited papers.

**More information** is available by anonymous ftp from [rua2.ruakura.cri.nz](ftp://rua2.ruakura.cri.nz).



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## OVERSEAS CONFERENCES

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### **Seventh International Conference on Multivariate Analysis (Part 3), 16-22 December 1992, New Delhi, India.**

Information: S.K. Mitra, phone 91-11-664741, telex 31-73274 ISI IN, e-mail isidlmtra%vikram@shakti.ernet.in.

### **ASA Winter Conference, 3-5 January 1993, Fort Lauderdale, Florida, USA.**

Theme: Families and Children - Research Findings, Data Needs and Survey Issues.

Information: Meeting Department, American Statistical Association, 1429 Duke Street, Alexandria, VA 22314-3402, USA.

### **Fourth International Workshop on Artificial Intelligence and Statistics, 3-6 January 1993, Fort Lauderdale, FL, USA.**

Information: R.W. Oldford, University of Waterloo, FL, USA.

### **7th Conference on the Scientific Use of Statistical Software (SoftStat '93), 14-18 March 1993, Heidelberg, Germany.**

Information: SoftStat '93, ZUMA, Postfach 12 21 55, D-6800 Mannheim 1, Germany.

### **NIH Conference in Current Topics in Biostatistics, 25-56 January 1993, Bethesda, MD, USA.**

Information: Jonas H. Ellenberg, Biometry and Field Studies Branch, NINDS, NIH, 7550 Wisconsin Avenue, Room 7A-12, Bethesda, MD 20892, USA.

### **US Census Bureau's 1993 Annual Research Conference, 21-24 March 1993, Arlington, Virginia, USA.**

Topics for ARC 1993 will include: design of survey questionnaires, quality measurement for automated surveys, effects of automation on the survey workforce, estimation techniques for small subdomains, behavioural research on contextual effects, modeling social and economic phenomena, nonresponse in surveys and censuses, coverage issues in censuses and surveys, research issues for 2000 census planning.

Information: Maxine Anderson-Brown, Conference Coordinator, Bureau of the Census, United States Department of Commerce, Washington, DC 20233-0001, USA.

### **Biometric Society (ENAR) Spring Meeting, 21-24 March 1993, Philadelphia, PA, USA.**

Information: Boris Iglewicz, Statistics Department, Temple University, Philadelphia, PA 19122, USA.

### **International Conference on Establishment Surveys, 27-30 June 1993, Buffalo, NY, USA.**

Information: Brenda G. Cox, National Agricultural Statistics Service, USDA, 14th Street & Independence Avenue, S.W. Room 4835, South Building, Washington, DC 20250-2000, USA.

### **1993 Joint Statistical Meetings, 8-12 August 1993, San Francisco, CA, USA.**

Information: ASA, 1429 Duke St., Alexandria, VA 22314-3402, USA.

### **10th International Conference on the New Quality Philosophy in Statistical Research and Statistical Education, 10-12 August 1993, San Francisco, CA, USA.**

Information: Prof. V. Shvyrkov, IS-SSE, 536 Oasis Dr., Santa Rosa, CA 95407, USA.

### **International Symposium on Statistics with Non-precise Data, 17-20 August 1993, Innsbruck, Austria.**

Information: Prof. R. Viertl, Institut f. Statistik U. Wahrscheinlichkeitstheorie, Technische Universität Wien, A-1040 Wien, Austria.

### **Chemometrics and Environmetrics — CHESM-93, ISI Satellite Meeting, Bologna, Italy, 21-24 August 1993.**

The aim is to stimulate communication between practitioners and researchers concerning significant problems arising in these two important areas. Presentation of significant practical problems will be emphasised.

Information: Prof. Daniela Cocchi, Dipartimento di Scienze Statistiche, "Paolo Fortunati", Università di Bologna, Via Belle Arti 41, 40126 Bologna, Italia, tel. +39 51 258234, fax +39 51 232153, email cocchi%statbo.cineca.it@icnucevm.cnuce.cnr.it.

### **49th Biennial Session of the International Statistical Institute, 25 August-3 September 1993, Firenze, Italy.**

Information: ISI Permanent Office, 428 Prinses Beatrixlaan, PO Box 950, 2270 AZ Voorburg, The Netherlands.

### **IFCS '93 - 4th Conference of the International Federation of Classification Societies, 31 August-4 September 1993, Paris, France.**

Information: INRIA Secretariat, INRIA - Rocquencourt, Bureau des Colloques, Domaine de Voluceau-BP 105, 78153 LE Chesnay, Cedex-France.

### **11th International Conference on the New Quality Philosophy in Statistical Research and Statistical Education, 1-3 September 1993, Firenze, Italy.**

Information: Prof. V. Shvyrkov, IS-SSE, 536 Oasis Dr., Santa Rosa, CA 95407, USA.

### **SPRUCE II (Statistics in Public Resources, Utilities, and in Care of the Environment), Rothamsted Experimental Station, 13-15 September 1993.**

Following the very successful first SPRUCE International Conference in Lisbon in Spring, 1991, a second will be held at Rothamsted Experimental Station, Harpenden, UK. This will be in conjunction with the 150 year celebrations of the Station, where so many major contributions to the development of statistics have been made from the time of R.A. Fisher and F. Yates.

The Conference theme will be "Statistics of Water" covering the crucial areas of quality and pollution; water as energy; water supply, management, irrigation and drainage; rainfall and climate; sea-levels and coastal protection; and hydrological modelling.

Information: Vic Barnett, SPRUCE Chairman, or Roger Payne, Local Organiser, both at Department of Statistics, Rothamsted Experimental Station, Harpenden, Herts., AL4 2JQ, UK, tel. +44 582 763133, ext. 2376, fax +44 582 467116, email SPRUCE@UK.AC.AFRC.RESA.

### **Fourth International Conference on Teaching Statistics, Marrakech, Morocco, 25-30 July 1994.**

Information: Mr EL GHAZALI Abdelaziz, Chairman of the Local Organizing Committee, I.N.S.E.A., PO Box 6217, Rabat-Instituts, Rabat, Morocco.

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Members are requested to notify their local branch secretaries (see this page of the Newsletter) of change of address, so that Newsletters and Journals can continue to be despatched to them.