



## Counting Seabird Nests on NE Herald Cay

Alan Welsh

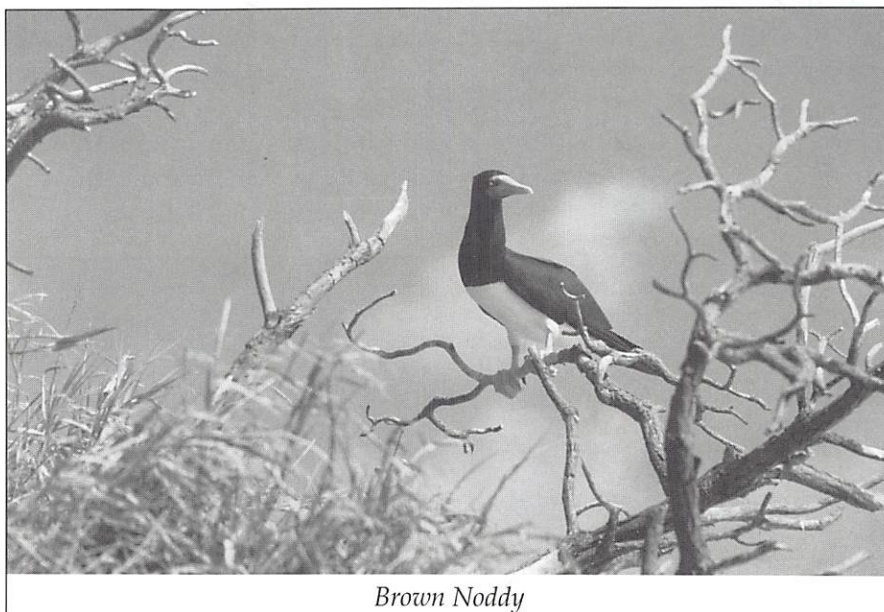
North East Herald Cay (hereafter NEH) is a small 1100 x 500m croissant shaped coral cay in the Coral Sea, approximately 350 km east of Cairns. The coral grit beach rises a few metres from the coral lagoon to a strip of grasses, herbs and argusia (low trees with fleshy leaves). The main vegetation in the centre of NEH is the pisonia forest (dense 2-3m trees with large soft leaves) which is interrupted by a strip of abutylon scrub. Signs of turtle nests are evident on the beach and there are birds everywhere; in the air circling above the island, nesting on top of the pisonia canopy (Frigatebirds and Redfooted Boobies), nesting underneath the canopy (Black and Common Noddies), nesting on the ground (Red-tailed Tropicbirds, Masked and Brown Boobies), and nesting in burrows under the ground (Shearwaters). There are also large numbers of scavenging crabs: green swimmer crabs, hermit crabs (which even climb the trees) and, at night, ghost crabs.

The Australian National Conservation Agency (ANCA), now Environment Australia (EA), has been collecting data on NEH for several years with the intention of establishing a pro-

gram to monitor the nesting activity on NEH. The main focus is on the pisonia forest which provides nesting sites for Frigatebirds, Red-footed Boobies, Common Noddies and Black Noddies. Eleven transects 100m apart with varying numbers of 10x10m<sup>2</sup> quadrants along the transects have been established on NEH. The monitoring program involves counting the number of nests of the four species of seabird in sampled quadrants. Details of the survey and analysis are given

in Welsh, Cunningham and Chambers (2000, Methodology for Estimating the Abundance of Rare Animals: Seabird Nesting on North East Herald Cay, *Biometrics* 5b pp.22-30). The purpose of our 6 day trip in August 1998 was to carry out a census on all quadrants.

Our party of 4 men (Mark Hallam, Tim Reid, Ross Cunningham and Alan Welsh) and 2 women (Narelle Montgomery and Christine Donnelly) was transported to NEH by the Royal Australian



*Brown Noddy*

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**DEADLINE FOR NEXT ISSUE:**

14 July 2000

Navy (RAN) on the Fremantle class patrol boat HMAS Townsville. This was a unique exposure to RAN culture which could fill an article on its own. We had to take everything we needed with us so had food, water and large quantities of equipment. Most of this was packed into the gun bay; about 25 jerrycans of water (filled with a hose on the ship) were lashed on deck. The ship dropped anchor 1.5-2km off the NEH (to avoid any chance of embarrassing mishap) and the tinny (aluminium motorboat) and rubber zodiac were used as transport to and from NEH. Everything gets soaking wet during this transfer so everything needs to be sealed in plastic before departure.

There is no excess space on a patrol boat and the tradition is not to make things easy for first timers. The ship itself is very unstable at slow speed. The ship can go 30 knots but the RAN always leaves at midday and arrives at 8 am and adjusts speed accordingly. We went out at 8 knots in a rough sea which was terrible. The (lucky) women slept in the wardroom which is centrally located so fairly stable. The men were given top, outer, forward racks (bunks) where the motion is the worst. (The front of the ship is actually closed during rough

weather.) There is very little space (about 30cm) between the surface of the bunk and the roof, which consists of heavily lagged pipes so it is as well not to be claustrophobic. To maintain night vision, the ship is lit with red light which adds to the strangeness of the situation. As the ship rose and fell on the swell, your stomach seemed to go up to meet the roof, and stay there. If you make a mess, you have to clean up. Also, you cannot use the toilets because the hydrochloric acid in your stomach reacts with the chemicals in the toilets to produce toxic gases. The RAN issues avomine and large plastic garbage bags (worn at the waist) for personal use. I went out without avomine and came back with it and can testify to its efficacy. It also helps to have a mate look after you.

It was very hot on the cay - by 10 am, it was 34C and climbing. We put up a large main tent for cooking, eating and communal use and each person had their own small tent for sleeping. These were all pitched on the coral grit beach. The statisticians catered and made sure we ate well. The birds were active all night (the Redfooted Booby call is particularly sonorous), and continuous wind and squalls of rain kept the humidity up and made it difficult to sleep. The main pests



*Red-tailed tropic bird and chick*

were ticks the size of a 5c piece which drop off the birds and inflict a painful, burning bite.

We snorkelled on the SE side of NEH. There is a strong current running to the west where we got into the water and floated along. Of course, you have to get out in time... We saw two sharks. As this was just after a round a world balloon attempt ended in the "shark-infested Coral Sea", we thought it was a bit of a joke. Having found out later that a sequence in "The Nature of Australia" involving a tiger shark and a turtle was filmed at NEH, and having seen a documentary on tiger sharks taking fledging chicks off the surface of the sea metres from a similar cay, I am rather less sanguine now than I was at the time.

We planned to operate in 2 teams of 3. The designated recorder, who would adjudicate in cases of uncertainty, would walk through the middle of the transect and two counters would walk along the edges of the quadrats both to find the quadrat markers (faded red or orange tubes hammered into the ground), identify and count the nests. Black Noddy nests are black, below the canopy and are made from rotten pisonia leaves welded together with excrement. There are usually large numbers of them and counting them can be tricky. Common Noddy nests are usually in forks or on branches below the canopy and are made of grass and twigs. They are much less common than Black Noddy nests and harder to find. The Frigatebirds and Redfooted Boobies nest on top of the canopy because they are not agile birds and need the height to take off. (The frigatebird is a kleptoparasite which cannot walk or swim. They circle above the island on thermals, waiting for Boobies who have been fishing to return to their nests. They then attack the Boobies which, on reflex, regurgitate fish which the frigatebird then steals. During our trip, as we approached, a

Brown Booby regurgitated two flying fish and a Tropicbird garfish so the reflex is strong.) The Booby nests usually involved more sticks than the frigatebirds but both incorporate excrement. A chick in the nest can help with identification: Frigatebird chicks have hooked bills and some brown on their heads, Boobies have straight bills and a bluish mask. The nests above the canopy are detected both by detecting excrement on the ground and by peering through thick foliage into the glare, a process which is hell on necks. At the same time, you have to avoid breaking your leg in a shearwater burrow, a serious issue when medical help is two days away.

The census was very successful and went much quicker than expected by EA. The teams also had time to replicate a transect and got essentially the same counts so we felt very pleased with ourselves. We also did a fringe census in 50m sections around the edge of NEH. We not only counted nests but also classified their stage of nesting as nest building, empty, eggs, naked chick, small downy chick, or large downy chick. This entails lifting birds off the nest which increases the effort and stresses both the scientists and the birds. The function of the adult birds is to keep the nest cool (hot sun destroys eggs and chicks quite quickly) so disturbing nesting birds is not really a good idea. Dehydration and heat exhaustion is also a major peril for the scientists.

On our last day, the Townsville appeared at the regulation 8.00 am and transported us to South-West Herald Cay (SWH), 12-15 kms away to carry out a census of the fringe vegetation and to collect stage of nesting data. SWH is flatter and smaller than NEH with a ring of agusia bush surrounding a central region of herbs and grasses. There is no pisonia forest and no shade. The grass is full of beautiful Sooty Terns which nest on

the ground so we had to be quite careful not to step on them. This side trip was not well planned as we had insufficient food, water and shade so spent a very hot unpleasant afternoon. The navy were assisting a dive boat with engine trouble so could not come before 4.00 pm. The ship steamed back to NEH to drop off two of our party at a magnificent 24 knots, treating us to spectacular spray.

It is hard to believe how pleasant the regulation navy shower (water on, water off, soap up, water on, rinse off, water off - max time 90 secs) turned out to be. We had very interesting conversations with some of the officers and a much better trip back. We were awake very early and as we came closer to Cairns, could watch Rafter beat Sampras in the US open semi-final. On arrival (at 8.00 am of course), we paid our mess bill, bought souvenirs, unloaded our gear and returned to civilian life.

Aside from the obvious interest and enjoyment in the trip, the scientific value of going into the field was enormous. The biologists had never mentioned the trade winds which blow constantly and, through affecting the vegetation patterns, affect the nesting patterns on NEH. By ignoring the effect of the winds, the biologists had established transects which maximised the within transect variation (instead of being as homogenous as possible). This field trip again emphasised to us that statisticians need to get into the field early in a study.



**NOTICE of the ANNUAL  
GENERAL MEETINGS of the  
STATISTICAL SOCIETY OF  
AUSTRALIA**

**INC and the AUSTRALIAN  
STATISTICAL PUBLISHING  
ASSOCIATION INC.**

to be held on Tuesday, 4 July, 2000 commencing at 12.45 pm, in Ballroom A of the Adelaide Hilton International Hotel.

**AGENDA FOR THE SSAI  
ANNUAL GENERAL MEETING**

1. Apologies and Proxies

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

2. Confirmation of the Minutes.

The minutes of the Annual General Meeting, held 14 July, 1999 appeared in the 1999 August Newsletter (No. 88).

3. Presentation of the 1999-2000 Annual Report.

4. Presentation of the Treasurer's Report.

5. Appointment of signatories to operate accounts.

6. Presentation of the Report on Accreditation by the Chair of the Accreditation Committee.

7. Election of Section Chairs.

Nominations for Section Chairs should be with the Secretary no later than 26 June, 2000. All nominations will require a seconder and a statement from the nominee that she or he is prepared to stand.

8. Any other business.

9. Date and place of the next meeting.

**AGENDA FOR THE ASPAI  
ANNUAL GENERAL MEETING**

1. Apologies and Proxies

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

2. Confirmation of the Minutes.

The minutes of the Annual General Meeting, held 14 July, 1999 appeared in the 1999 November Newsletter (No. 89).

3. Presentation of the 1999 Annual Report by the Editor of the Australian and New Zealand Journal of Statistics.

4. Presentation of the 1999 Annual Report by the Newsletter Editors.

5. Presentation of the Financial Report.

6. Appointment of signatories to operate the accounts.

7. Any other business.

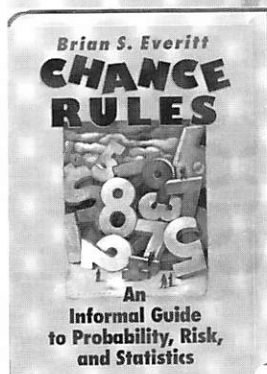
8. Date and place of the next meeting.

Neville Weber  
Hon Secretary

**News about  
Members**

Two distinguished members of the Society, Professor Warren Ewens and Professor Peter Hall, were elected on May 11 to Fellowship of the Royal Society. Our congratulations to Warren and Peter on this magnificent achievement.

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**B.S. Everitt**

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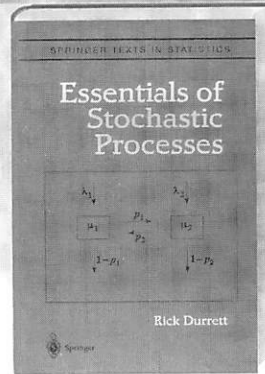
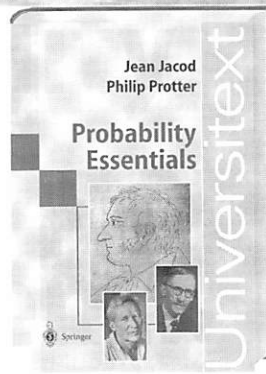
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**M.-H. Chen, J.G. Ibrahim, Q.-M. Shao**

## Monte Carlo Methods in Bayesian Computation

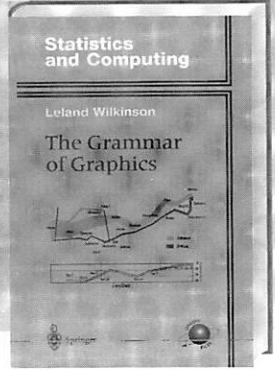
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The International Statistical Institute's SBI Committee aims to support statisticians working in business and industry by monitoring their needs on an ongoing basis, promoting research and applications and best current practices, facilitating technology transfer, and fostering communication among members. The SBI Committee seeks to promote (both to statisticians and to industry) the value and importance of Statistics in Business and Industry, and to support suitable activities, particularly in lesser-developed countries.

A Web site and electronic discussion group have recently been established. We invite you to make use of these, so that we can facilitate international cooperation in business and industrial statistics.

The Web site can be found at: [www.public.iastate.edu/~sbi](http://www.public.iastate.edu/~sbi).

To join the sbi-net Newsgroup, send a message to

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The SBI Committee looks forward to hearing from you.

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# Accreditation

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## Meet some Accredited Statisticians

Are you wondering why SSAI members seek Accreditation? Starting with this issue, we will publish profiles of some of those who have been accredited recently. They have a variety of backgrounds and a variety of requirements for their jobs, and they perceive a variety of benefits in being accredited.

Name: Caro-Anne Badcock

Current position: Manager, Biostatistics and Data Management

Date of accreditation: February 1999

*What is your academic background?*

My first degree was a BSc majoring in mathematics and statistics. I also completed a Dip Ed concurrently but realised that, although I really enjoy teaching and training, teaching teenagers was not for me. Luckily I had taken statistics courses, even if they were just to get a BSc in mathematics. The Manager of the statistics group at Scientific Services - the Water Board laboratories at West Ryde in Sydney - approached the university for a new graduate in statistics to be a Biometrician. They were preferably looking for someone with mathematics rather than science along with their statistics courses. I was encouraged to apply for the position and was thrilled when it was offered to me. I quite quickly realised that I didn't have enough statistical training to progress in this career so I completed an MAppStat part time over the next three years

*What is your work experience background?*

The Statistics group within Scientific Services was my first position. During my time there I consulted on many environmental projects covering water quality in the reticulation systems, sewerage systems and storm water systems and analysed the historical water quality data for Sydney's

beaches and dams. From Scientific Services I moved to Royal North Shore Hospital as the Hospital Biostatistician. Here I was the only statistician supposedly available for any member of the hospital and its environs to consult with. I consulted with all walks of people within the health system including lab technicians, senior lab scientists, nurses, a variety of specialists in gastrointestinal, cardiovascular, respiratory, surgery etc. After a year there I realised that there was at least enough work to support 4 statisticians but that there was no way the hospital would invest in these positions. I felt very sorry to leave my clients who were pleased to get any advice and assistance that was on offer but realised I had to move on. My move took me into the pharmaceutical industry as a biostatistician within Medical Division of Astra Pharmaceuticals to analyse the data collected in the clinical trial program. Astra was a Swedish company but the largest pharmaceutical company in Australia when measured on sales of ethical products. My time at Royal North Shore Hospital was what made me marketable to Astra. I have now been here for over 5 years, Astra has merged to become AstraZeneca Pharmaceuticals, and I have now become Manager of Biostatistics and Data Management.

*What is your current job? What part does statistics play in it?*

I manage a group of 5 staff. Half of myself and one other are the biostatisticians. One is a Clinical Data Manager who looks after our database system from a user's perspective and manages the 3 data coordinators. On the statistics side I am involved in discussions regarding the design of clinical trials, the required sample sizes, the variables to be measured and/or calculated and the analysis methods. I expend quite a lot of effort into ensuring the paper case report forms we use to collect our data are collecting what we require for

analysis. I also ensure that the checks we program to validate our data are appropriate. Occasionally I get involved with requests from the health economics, marketing, manufacturing and sales departments which are quite different to the everyday work within the Medical Division

*What sort of material did you submit with your application for accreditation?*

Working in the pharmaceutical industry you can imagine that most of what I do is confidential. I generally do not publish any of my own work and the results of our clinical trials are usually published under the names of the doctors or investigators who have participated in the trial. I was lucky in that in one such trial the investigator asked if I would be a co-author. I was able to submit this article as one piece of evidence for my accreditation. For other evidence I was able to get one of the accreditation committee members to sign a confidentiality agreement before sending them an internal statistical report for a particular clinical study that I had been involved in

*What do you see as the benefits of accreditation to you?*

The pharmaceutical industry (more specifically in the clinical research area) is one industry where statisticians are a highly regarded commodity. We have to sign off on all protocols and clinical reports indicating that the documents have been completed appropriately for the statistical components. Given this requirement I am expecting that accreditation of the statistician contributing to the clinical trial will become the preferred option. It may even come to the situation that the regulatory authorities require that the statistician is accredited. Certainly, when I am recruiting statisticians I am targeting those that are, or plan to become, accredited. AstraZeneca was one of the first multi-national pharmaceutical companies in Australia to employ an



in-house statistician and continues to be a leader in its clinical research programme. Having an accredited statistician in-house contributes to the company's ability to increase its standing within the health industry in Australia. There are approximately 180 statisticians within the AstraZeneca company worldwide, most in the R&D centres in Europe and the UK. With the technology currently available there is no reason why the statisticians here in Australia should have their work limited to local trials. Accreditation will be one of the arguments I will be using to convince the R&D sites that we have the ability and expertise to contribute to their clinical trial programmes.

**Name:** Anthony Corr

**Current position:** Quantitative Analyst

**Date of accreditation:** March 1999

*What is your academic background?*

BSc(Hons) 1992 at UTS, PhD to be completed March 2000.

*What is your work experience background?*

3 years at the ABS, 3 years at GMO Australia

*What is your current job? What part does statistics play in it?*

Quantitative analysis of global financial data for investment management. We use a range of mathematical & statistical analysis techniques for security selection building of 'optimal' portfolios.

*What sort of material did you submit with your application for accreditation?*

A report presented to an ABS client and a paper written as part of my Ph.D. My current employer was supplied as a referee. Much of my work here is commercial in confidence.

*What do you see as the benefits of accreditation to you?*

In my opinion Accreditation is mainly for the community at large. A community member at large should seek out an accredited statistician for their statistical advice. Accreditation demonstrates that the person has been judged by an independent panel of the peers that their work is of high quality. In relation to external parties accreditation adds credibility to my qualifications and/or results of my work.

#### Update

The following applications have been approved by the Central Council.

#### Accredited Statisticians:

Peter Button

Trevor Hancock

Martin Hazelton

Jullie Hill

Rob Hyndman

Jenny Kelly

Michael Martin

Walter Robb

Quanxi Shao

Steven Stern

Neville Weber  
Secretary, SSAI

#### Enquiries, Comments and Feedback

To find out more about how to apply for Accreditation, or to make enquiries or comments about marketing matters please contact Lesley Sieper at the SSAI Office:

phone / fax: 02 6249-8266

e-mail: [ssai@interact.net.au](mailto:ssai@interact.net.au)

## Clunies Ross National Science & Technology Award

The Ian Clunies Ross Memorial Foundation is pleased to announce that the Clunies Ross National Science & Technology Award 2001 is now open for nominations.

Now in their ninth year these Awards have honoured 52 special Australians from every state and territory who have made an outstanding contribution to the application of science and technology for the economic, social or environmental benefit of Australia.

Please note that nominations close on Friday 14 July 2000.

Award recipients will be publicly honoured with a silver medal at a formal presentation and dinner to be held March 2001 in Melbourne.

Nomination forms are available from:

Mary Bolger  
Foundation Secretary  
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## Branch Reports

### NEW SOUTH WALES

#### Strategic Plan 2000

Rodger Robertson talks "Strategic Plan 2000" with World Renowned Interviewer, the Rodent Raconteur, Statistical Squirrel.

Statistical Squirrel: Hello all, I'm here today talking with the incoming NSW Branch Council president, Rodger Robertson. Hello Rodger, how are you?

Rodger Robertson: I'm well thank you, Statistical Squirrel, and how are you?

SS: Not too bad, I'm a bit short of nuts at the moment though. But we're not here to talk about me, we're here to discuss the soon to be unveiled "Strategic Plan 2000". The first thing I have to ask Rodger, is what was wrong with the first 1999 strategic plans?

RR: (laughing) Nothing was wrong with them as they didn't exist. A lot of people see the year 2000 as the chance to start anew, to refresh, so I thought I'd try to implement some change in the way the Society was run at the branch level and go for a positive outlook. Strategic planning is where I finished my QANTAS career and I felt that the way the Society was run needed some changes and here it is.

SS: Let's talk about when you first joined the Society. What was it like then?

RR: Well, I joined the Society in 1966 and hung around for 5 years. I found that with the level of statistics I was using at QANTAS the Society became irrelevant for me. The talks were academically oriented, which was not interesting for the commercially oriented people like myself, and for me the Society lost its appeal. It had nothing to offer. So I left.

SS: And yet you are poised to become its president. How did you get back into it?

RR: About three years ago, Eric

Sowey [long time friend and world famous quiz master] said that there were vacancies on the Council, so I joined as Treasurer. I got back into the Society after a long break and found that I understood as much as I did 25 years ago. There was a lot missing, and I thought that if I took on the President's role that I might be able to make some changes.

SS: But what is the most important thing missing, and how do you change it?

RR: I think the most important thing missing is communication. I know this is an old chestnut

SS: Hmmm, chestnuts... (drools)

RR: (ignoring interviewer) but the Society is missing the benefits of the commercial and academic worlds talking to each other in this environment, and the academic world needs to listen as well. But how to change this? Well, we need like minded people to want the change as well, and they are out there. Des [Nicholls] and Jenny [Kelly] spoke on similar themes in their president's talks recently, and Nick [the Fisher of men] is on about the same things. But we need to bring about change to improve things. We need to look at how things are run, who they are run for and so on. If we look at the Council, and this is where the strategic plan will focus, we don't run very well. We don't have a system that works. We meet once a month for most months of the year for about 45 minutes and talk about trivia, revisit issues and there is no accountability.

SS: So are you the statistical Moses leading us out of the desert and into the promised land?

RR: Ha ha, no, not me. Moses dreamt things, I don't. I have no messages from on high and I can only lead people who want to be lead. I won't do what I'm doing if people don't want me to. But getting back to the Council, currently we have the Secretary

and the Treasurer who are accountable. The rest of the council have no responsibility, but if they get a job to do then they must have the same accountability. In the council it has traditionally only been the executive who would be responsible. I want to create jobs with responsibilities but without titles, and let people work out how they do things. I want them to write things down, like where they are going to get to and what they are going to achieve, and let them go off and do it. Then when we have Council meetings we can have reports from people who have something to say.

SS: And presumably excuses from those that don't.

RR: Hopefully there won't be any of them, but as I said, those that have something to say will say it, and those that need help can ask for it and so on. Things will be achieved, but we won't fix all problems. We will give it our best shot, though.

SS: Thank you for that Rodger, but I do have one last question. Do you ever get mistaken for the cute and cuddly Roger Rogerson, friend of Neddy Smith?

RR: (smiling) All the time, there is a lot of confusion with that, especially when I leave messages. You can just tell that people are a bit uncertain, they hesitate. But you learn to live with it (laughs).

SS: Thanks Rodger.

RR: Thank you, Statistical Squirrel. I hope all of your wonderful readers get to know of the important work that we are trying to do here.

SS: (mutters) Yeah, right.

And that was that. I turned up on the night of Rodger's talk to see what kind of reaction he would get, to canvas the opinion of the common man on Rodger's bold, new plan. It was a very wet and wild night, so I'm glad I was not out gathering nuts. First came the AGM, at which the big man



was welcomed into the President's office. Such was the excitement at the AGM that I could scarcely keep track of all that was going on, and hence my reporting of it will be somewhat diminished. A thousand pardons.

A rather small crowd turned out to see what Rodger had to say, and to hear his vision for the future. I didn't think that this boded too well. Rodger discussed all of the things we had spoken about, emphasising that he was not offering criticism of past or present officers, but rather on the process. Very nice of him I thought.

Next Rodger told all gathered his vision for the Society. It was to have 'a Society that promotes "statistics" as a commercially and socially important art/science and to have a Society that offers its members and visitors attractive products'. He then spoke on the objectives he was setting himself as President of the Society (and very admirable they were too). Rodger then invited the rest of the Branch council to present the objectives they had set themselves for the year. Unfortunately by this time the meetings scheduled finish time had been and gone, and the crowd were getting restless. I won't bore you with the details, as you can talk to the individuals concerned if you're interested.

The meeting was closed, dinner was planned and all present applauded Rodger's big, bold step into a brave new world. Till next time,

Statistical Squirrel

## QUEENSLAND

### Sulphidic mine wastes impact aquatic ecosystems

At the March meeting of the Queensland Branch, Bronwyn Harch of CSIRO's Mathematical and Information Sciences division described her involvement in the assessment of the impact of effluent from sulphidic mine wastes on downstream aquatic ecosystems in the Adelaide Hills. In a situation that would have unnerved many a speaker (the projection system refused to communicate with her portable computer after the first slide), Bronwyn showed great professionalism: out came the 'hardcopy' version and on went her talk.

Bronwyn began with a photographic 'guided tour' of the landscape downstream and up around the Brukungu Mine. Acid rock drainage from this mine has had a severe impact on the aquatic ecosystems in the Dawesley Creek/Mt Barker Creek/Bremer River system. Over the last 25 years, surface waters downstream of the mine have consistently had low pH and elevated concentration of both trace metals and sulphate, relative to upstream areas and reference streams.

Often the impact of acid rock drainage is assessed from concentrations of certain 'biologically harmful' chemicals. In contrast, Bronwyn's work focussed on the biological effect of the contamination. Substrate utilisation tests were carried out to determine any effects on microbiological activity in the Dawesley Creek/Mt Barker Creek/Bremer River system. These effects were then compared with measurements of water quality parameters relevant to potential environmental impact. Sediment microbiological activity was characterised by patterns of sole carbon source utilisation using BIOLOG=AE microtiter plates.

BIOLOG plates provide a highly streamlined and efficient means for microbiologists to assess the functional capacity of bacteria in a particular system (in this case, river sediments). Inoculum from river sediments was put into the 96 wells of the BIOLOG plate (containing different carbon sources - ie food for the bacteria). As a result of bacteria utilising the carbon sources, the redox dye developed to produce varying levels of colour. Colour development is determined by the bacteria's ability to utilise particular carbon sources. In addition to this, the plates were incubated for a number of time periods (often 3 different times - 24, 48 and 72hrs), because it is not known a priori how long the bacteria need to make optimal use of the carbon sources.

Bronwyn's talk focussed on two main topics:

- a) using 3-way PCA to choose the best time for further statistical analysis, and
- b) the use of redundancy analysis to determine the relationship between the biological information contained in the BIOLOG data and the environmental variables (ie water quality parameters).

Bronwyn showed how these multivariate statistical methods could be applied to such data, and the type of insights she gained from them. For example, she found microbial activity increased downstream of the mine site, carbon utilisation was much lower at impacted sites, and bacterial functioning in the river system was dominated by differences in sulphate, pH and chlorine. Given this set of findings, the microbiologists involved in the study concluded that bacteria would be useful bioindicators of acid mine drainage in this river system, being able to distinguish between sites with moderate and severe impacts.



Another important insight, with implications for remediation of the river system, was that the functioning of the microbial community was also being affected by two other sources of environmental impact: nutrient inputs from a sewerage treatment plant and salinity from Bremer River. Bronwyn concluded that any proposed remediation programme would need to take a whole-systems approach, involving attempts to deal with all of these sources of impact.

Charis Burridge

### **Burglaries and Survival**

At its April meeting, the Queensland Branch heard a presentation from Michael Townsley (Griffith University) on "Survival analysis of repeatedly burgled properties". The topic was taken from Michael's PhD thesis, which is being done in collaboration with Professor Ross Homel and Associate Professor Janet Chaseling, and which he is on the verge of completing.

Michael devoted attention to repeat victimisation in crime, in particular, to burglaries of domestic properties within the south-east Queensland region.

As with any foray into criminal justice modelling, Michael had access to varying quantities of data of varying quality ... as he occasionally noted during the talk with a tone of despair too familiar to statisticians in the social sciences! The baseline population comprised about 40,000 people living in roughly 12,000 properties. From it, Michael considered a sample of 400 solved cases of repeated burglaries from the same addresses over a five year period. About 10% of those cases involved multiple reportings of the same incident from the same address. It was slightly alarming to note that there was data on about 2,000 cases, and the remaining 1,600 represented the usual 80% of cases which police are unable to solve.

It was about this time that your correspondent was wondering if he had remembered to lock his front door.

Michael's approach was to employ methods from survival analysis, in particular, to consider some shape problems concerning estimation of the survivorship function via the Kaplan-Meier estimator (KME). "Failure" was interpreted as a repeated incidence of burglary. An interesting departure of this scenario from the classical medical situation is that, as time increases, it is not the case that everyone achieves the defining event of "failure": not every property is burgled a second time. This was made quite clear in some diagrams comparing the KME with a fitted Weibull function. The diagrams further showed a high propensity for re-offence in short periods after the initial incident.

It was about this time that your correspondent was wondering if he had remembered to renew his contents insurance.

In order to capture the structure in the population, Michael further introduced mixture modelling to identify the "immunes" (no repeated burglary) and "susceptibles" (repeated burglary), and presented approaches to estimating the mixture parameter. This was considered in separately fitting crimes committed by juveniles and mature-age offenders. Michael's intention was to use the latter idea to introduce covariates into his analyses, a subject for the final throes of his thesis preparations.

In closing, Michael indicated the usefulness - and wider availability - of overseas data sets. For example, the British Crime Survey results are made public after government analyses have been completed.

Lively discussion continued over a few refreshments, followed by rapid departure of all present to check if they still had their stereos at home.

Rodney Wolff

## **SOUTH AUSTRALIA**

### **Stopping to look at the flowers**

At the March meeting Dianne Cook of Iowa State University spoke on graphical techniques and how these supplement data modelling. A variety of examples illustrated the strength of this emerging force in data where "art meets science". Segments of a "picture" can be rescaled and brushed to reveal previously undetected structures. This area goes way beyond the three dimensional constraints we may be used to; moving beyond the flat page graphical presentation into the "multiple views paradigm".

Interactive graphics such as direct manipulation explore the conditions, relationships and variables; whereas dynamic graphics (eg. 3D rotation) show the joint distributions up to some arbitrary dimension. The analyst can find features not detected in a model, show departures from the trend and illustrate sparse structure in high dimensions. For example, a regression model did not reveal all the vagaries of tipping behaviour in a US study. The graphics showed the level of tip was dependent on gender and smoking status.

Graphics are especially useful in Sparse Structures Detection in high-D space such as 7D particle physics to reveal linear relationships that principal components and density estimation cannot resolve.

To conclude, data visualisations are always applicable wherever data are collected. Dianne conducted a straw poll to determine which graph amongst 16 represented the original data amongst 15 other permutations.

### **Other South Australia News**

Several stalwarts of The South Australian Branch have moved interstate in recent months: Dr Glenys Bishop



## Branch Reports

to the ABS in Canberra, Lynne Giles to AUT, New Zealand, Dr Berwin Turlach to UWA and Dr Bronwyn Harch has returned to CSIRO in Queensland. All these members will be sorely missed and their South Australian friends and colleagues wish them well.

Margaret Swincer

### CANBERRA

#### The war of the weevils and wasps

The Canberra branch began the year 2000 with a talk on tracking a bio-control agent, presented by Dr David Baird, who has been a Biometrician with AgResearch in Lincoln, New Zealand for over twenty years.

The Argentine stem weevil, which originates from South America, is costing New Zealand \$250 million per year to resow paddocks, which it has denuded. This little pest (<1mm in length) takes about three years to denude a paddock of ryegrass. A simple solution to the problem is endophytes (a fungus), which are present in the ryegrass and kill or re-

pel the weevils. Grasses high in endophytes are not damaged by the weevils. A disadvantage of endophytes, however, is "ryegrass staggers": toxins build up in animals such as cattle and sheep as a result of high endophyte levels.

The introduction of a bio-control agent, a parasitoid wasp, is currently being explored as an alternative solution. In the life cycle of the weevil, the parasitoid wasp sterilises the weevil by depositing an egg in its ovaries. This explanation was accompanied by some great video footage of a wasp in action. The wasp marks the weevil after an egg has been deposited so that other wasps know that a particular weevil has been infected with larvae. Eventually the weevil dies, the larvae pupates and the cycle recommences.

In an experiment, which was designed and analysed by David, wasps were commercially released at numerous sites in New Zealand and their dispersal was studied. The temporal and spatial effects were explored, and a 5% yearly contour plot nicely summarised such effects (see figure below). David presented other analyses he had undertaken regarding parasitoid oviposition behaviour and

determination of specific origin in South America of the Argentine stem weevils in New Zealand.

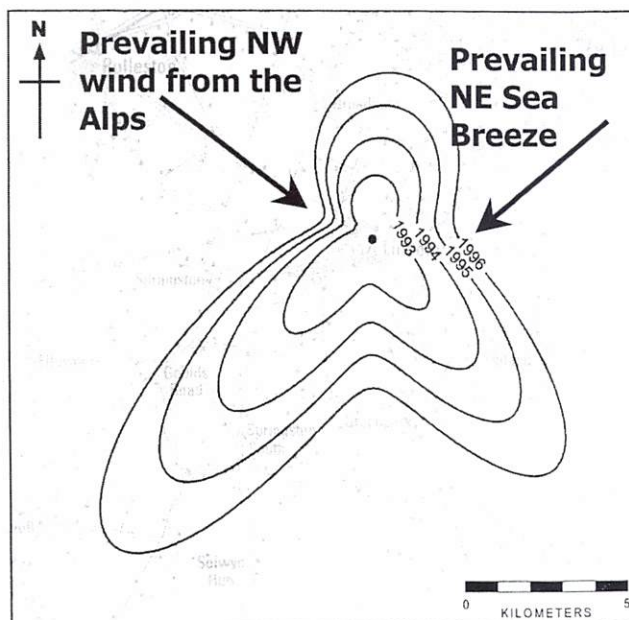
The wasp treatment has been very successful on the North island of New Zealand but the impact on the peak of weevil numbers on the South island has not been so good. Although the introduction of the wasp has been a sensible part of the management strategy of weevils, scientists are currently trying to create ryegrass strains with endophytes that suppress weevil numbers but do not hinder grazing animals.

After the meeting, the branch held a BBQ in the leafy surroundings of the Australian National University. Those present enjoyed warm weather, tasty food, and pleasant conversation.

#### Statistics practice in a policy department

The late February meeting of the Canberra branch was a double act: Ms Justine Gibbings and Mr Stephen Horn presented a combined talk on their work on the Tuggeranong Plains (a southern township of Canberra), where they are employed as statisticians in the Department of Family and Community Services (DFCS).

They commenced with a brief history of sociometrics, from its founding in the 1670s by William Pettit to its activity at present. A summary of the emergence of statistics practice in DFCS was subsequently presented, followed by a more detailed discussion of a couple of the current activities of DFCS. One of these activities is the creation and analysis of a longitudinal (5 years) data set of administration data. This is a large and complex dataset by DFCS standards, which comprises 100Gb on the mainframe. The second activity is an event history analysis involving multiplicative models of 42,000 social security payment records concerning a cohort of young people.



*The spatial and temporal distribution of wasps released at a particular site in Lincoln, New Zealand*



Justine and Stephen are located in the Research and Data Services Section of DFCS. The section is self-inventing, so it is always changing to keep up with a change in government, policy, statistics and computing. The section's money is mostly spent on surveying customers, that is, collecting data. Statisticians in the group act as consultants on projects within the department and also apply for tenders and research projects outside of the department. A brochure, which summarises how the section can assist with a client's statistical issues, was produced for internal and external clients.

The section has recently gained their own survey to run, a generalised customer survey covering all general payments. The section spent time deciding the form of the best design. Standard statistical designs were not relevant because information about non-respondents was known. Ironically, because of a lack of numbers of statisticians, the section invited tenders for the job of running the survey. Several issues concerning the survey were discussed, including data management and the method of surveying (CATI versus face-to-face).

In DFCS, statistics will always be seen as an activity which supports other sections in the department and would not be accepted as a productive section in its own right. The speakers ended on a very positive note, by proclaiming that the future of statistics in DFCS is bright, and that a good graduate program was in place. Further tales were told over dinner at a local restaurant.

#### **On Making an Impact on the Use of Statistical Methodology in Application Areas**

Mr John Maindonald, Statistical Consulting Unit at the Australian National University, presented the March talk to the branch after the AGM. John commenced by providing some illustrations of poor statisti-

cal presentation in top-notch non-statistical journals. There were further examples as the talk proceeded.

John discussed his personal philosophies on what clients think about statistics, the current situation in statistics, how we should promote good statistical practice in application areas and raise the design and analysis standards expected from authors in application areas.

John then noted some reasons for optimism. Gaps between mainstream statistics and statistical practice in some applied areas are now so large that they must attract attention and concern, from within those areas as well as from the statistical community. Software developments may help bring application area specialists closer to mainstream statistics. The best statistical software ignores application area divisions and taboos.

Here the *R* system, which has pretty much followed the Linux development model, seems important. It is the work of a highly talented group of collaborators and contributors, drawn internationally. It offers free software with abilities similar to *S/S-PLUS*. Wide interest in *R* from application area communities, and participation in the *R*-help e-mail list, will assist communication with statistical user communities.

John concluded by demonstrating the capabilities of the graphics in the PC version of *R* (Version 1.0.0) using their demo program. One of the graphics demonstrated was a pie chart, which invoked cries from the audience such as "Get it off".

At the conclusion of the talk, members of the audience asked John why the Statistical Consulting Unit was so successful, whether he thought an Accredited Statistician should be present on Ph.D. panels in application areas, and to clarify his view on non-statisticians doing their own sta-

tistics. Elements of John's talk stimulated many audience members, and thoughts about what actions individuals and the society should take in improving the situation of our profession, were undoubtedly the topic of discussion at the dinner afterwards, which was held at the Lemongrass Thai in Civic.

#### **Other Canberra News**

In March, the Annual General Meeting was held, with the branch electing the following council for 2000:

##### **President:**

Dr Alice Richardson  
(University of Canberra)

##### **Past President:**

Mr Ross Cunningham  
(Australian National University)

##### **Secretary:**

Ms Anna Poskitt (ABS)

##### **Treasurer:**

Mr Michael Johnston (Covance)

##### **Councillors:**

Mr David Hirst  
(Australian National University)

Mr Ian McDermid  
(Australian Customs Service)

Dr Teresa Neeman (ABARE)

Dr Terry O'Neill  
(Australian National University)

Dr Siu-Ming Tam (ABS)

Dr Mark Westcott (CSIRO)

At the AGM, a service award was presented by the acting President Ross Cunningham to Dr Jeff Wood of CSIRO Mathematical and Information Sciences, in recognition of Jeff's tremendous service to the society, both at a national and branch level.

In his work for the Canberra Branch as Councillor, Treasurer, President and Past President, Jeff contributed significantly to council and branch meetings, to organising speakers, and to planning and organising a number of very successful panel discussions

## Branch Reports

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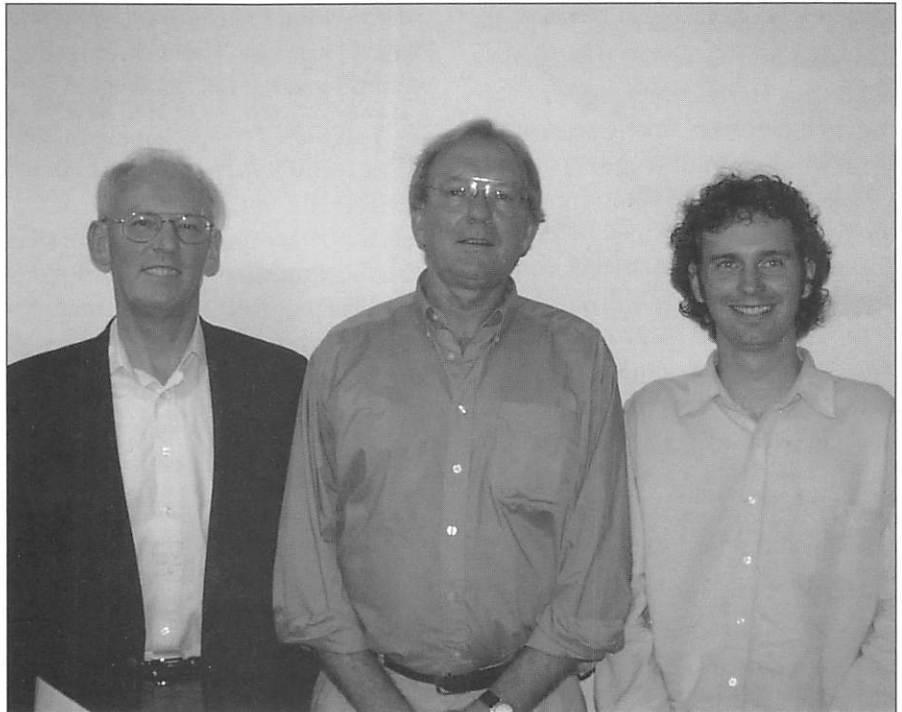
and workshops. Jeff was Treasurer, Central Council, from 1989 to 1992 and Acting Treasurer in 1988. He was Circulation Manager from 1993 to 1996 and in 1987 he was a member of a 3-person subcommittee doing the preparation for ASPAI. He played a major role in getting ASPAI and the society incorporated. Jeff has made continuing and significant contributions to the statistics profession over a long period (> 28 years). Without Jeff's contribution, many important activities would not have been successfully completed. Jeff is strongly committed to Statistical Science and is always generous with his contributions. He gives willingly and does not seek praise or reward for his contributions.

Congratulations to Jeff on receiving this award and well-deserved thanks for your significant contribution to the society.

Congratulations also go to Mr Michael Johnston (Covance) and Ms Susan Linacre (ABS), who have been accredited by the society as GStat and AStat, respectively. Michael was present at the meeting to personally receive his certificate from Ross Cunningham.

Professor Alan Welsh, Centre for Mathematics and its Applications, Australian National University, has accepted the Chair in Statistics at the University of Southampton, UK. Alan departs Australian shores in December. Best of luck is offered to Alan in his new position. The Friday morning applied statistics group also wishes him well - your fearless remarks and insightful contributions to discussions will certainly be missed!

Melissa Dobbie



*Service award recipient Jeff Wood (left) and GStat award recipient Michael Johnstone (right) following presentation of their awards by the acting Branch President, Ross Cunningham (centre)*



## Conference Report

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### **Young Statisticians Meeting, 10 - 11 April 2000, London.**

The Young Statisticians Meeting in England for 2000 was organised by James Carpenter and held at the London School of Hygiene and Tropical Health (LSHTM). About 110 young statsters came, from universities, pharmaceutical companies and medical research units around England, along with a handful from European and international institutions.

The meeting opened with a stimulating talk by Professor Sir David Cox about causality, then split into three sets of three parallel sessions. Contributed talks ranged from statistical theory to spatial statistics and Bayesian statistics. There was a high proportion of invited speakers, mostly young statisticians speaking on technical subjects related to their work in genetics, medical statistics and environmental statistics.

Because of the small number of spaces available for contributed talks, participants were encouraged to opt to present a poster and a poster session/exhibition/wine reception took place on Monday night. The official poster prize went to David Robinson of the University of Sheffield for "Planar procrustes analysis of tooth shape". However my vote went to Tim Clayton and colleagues of the LSHTM for a study of the graphical presentation of survival curves in medical journals. Ross Cunningham and colleagues in Australia have been pursuing similar aims in the biological context and I am sure that the notions of clear arguments and achievable recommendations in Tim's project could be transferred to this and many other contexts.

There was no opportunity during the workshop to discuss issues of importance to young statsters such as isolation at work, consulting skills and

accreditation. On the other hand, there was a research students conference in Cardiff following on from the YSM, with another opportunity for PhD students to give talks and maybe to raise such issues that have proved to be of interest to young statsters in Australia.

On a lighter note, the prizes for best poster and best talk were supplemented with a sheet with 16 names and 16 pictures of statisticians handed out at the start of the meeting. The idea was to "Name that Statistician". Your lucky correspondent managed to score 7 and took away a copy of Minitab for her efforts! For the bonus prize, what is the distribution of the number of correct answers?

Alice Richardson,  
on study leave at the  
University of Southampton

## Logo Competition

Many thanks to all  
those members who  
sent in entries.

Central Council are  
pleased to  
announce that  
**Joan Hendrikz**  
is the winner of the  
\$100 book voucher!



## Australasian Conferences

### CONFERENCE SUMMARY

**15<sup>th</sup> Australian Statistical Conference**, 3-7 July 2000, Adelaide.

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

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

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

## Overseas Conferences

**Statistics and Health**, 11-13 June 2000, Biostatistics Research Group of University of Alberta, Edmonton, Canada. An international conference and workshop creating a forum where statisticians, health services researchers, epidemiologists, policy analysts and other scientists can interact to identify and discuss issues and solutions for health research. The workshop on hierarchical modeling in health services research will be given by Dr Constantine Gatonis on Sunday, 11 June 2000, including data analysis using MLn and BUGS software.

Information: <http://www.stat.ualberta.ca/~brg/conf.html> or email [brg@stat.ualberta.ca](mailto:brg@stat.ualberta.ca), K.C. Carriere, Associate Professor of Statistics, Department of Mathematical Sciences, University of Alberta, Edmonton, AB T6G 2G1, Canada.

**XX<sup>th</sup> International Biometric Conference**, 2-7 July 2000, University of California at Berkeley.

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

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

Information: email: [MAM3@econ.kuleuven.ac.be](mailto:MAM3@econ.kuleuven.ac.be); <http://www.econ.kuleuven.ac.be/man3>

**Compstat 2000, XIV Compstat conference of the International Association for Statistical Computing**, 21-25 August 2000, Utrecht, The Netherlands. Statistical computing provides the link between statistical theory and applied statistics, from development and implementation of new statistical ideas through to user experiences and software evaluation. and relevant to those in universities, industrial companies, government agencies, research institutes or as software developers. Information and registration website: <http://neon.vb.cbs.nl/rsm/compstat>; Anouk Denis, fax: +31 30 253 5851, email: [compstat@fbu.uu.nl](mailto:compstat@fbu.uu.nl) or FBU Congress Bureau, Utrecht University, Attn: Mrs. Marcelle Buma, PO Box 80125, 3508 TC Utrecht, The Netherlands.

**IASE Round Table Conference on Training Researchers in the Use of Statistics**, Meiji University, Tokyo, Japan, August 2000. Information: Carmen Batanero, Dept. Didactics of Mathematics, University of Granada, 18071 Granada, Spain; email: [batanero@goliat.ugr.es](mailto:batanero@goliat.ugr.es); URL <http://www.ugr.es/~batanero/iasert.htm>

**Bayesian Nonparametrics (BNP) Workshop**, 27 July - 2 August, 2001, University of Michigan, Ann Arbor

Information: Contact Paul Damien ([pdamien@umich.edu](mailto:pdamien@umich.edu)) in Canada and the USA, Stephen Walker ([s.walker@ic.ac.uk](mailto:s.walker@ic.ac.uk)) in Europe.

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