The International ENVIRONMETRICS Society - TIES

Newsletter

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Editors: Teresa Alpuim and Sylvia Esterby

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1. A Message from the President

Peter Guttorp

I just returned from the Johannesburg meeting, which was scientifically successful, but disappointingly small (about 40 participants; see conference report for details about the meeting). Of course, a small meeting was to be expected due to the timing, which made it difficult for many of our academic members to leave their teaching. Having the meeting parallel with that of the South African Statistical Association (SASA), which celebrated its 50th anniversary, was, I think, quite beneficial to both groups. TIES benefited from a very well organized structure, and plenary talks from David Cox and Trevor Hastie, while SASA participants were exposed to a plenary talk from Jim Zidek, and lots of sessions on material that they would not ordinarily encounter at their meetings. Indeed, we received at least ten new membership applications from SASA conference participants during the meeting. We are very grateful to Ray Correll and Jacky Galpin for organizing the program, and to Jacky for her incredible work, resulting in a very smooth local organization.

During the last nine months, the TIES Board of Directors has had an extensive discussion about the opportunity to become the International Statistical Institute (ISI) section on environmetrics. There is

strong interest within the leadership of ISI to form sections based on subject matter rather than, as is currently the case, methodology. During the board meeting in Johannesburg we had the opportunity to discuss the issues with former ISI vice president (and longstanding TIES member) Jef Teugels, who now chairs the ISI Committee on Environmental Statistics, as well as with our past presidents Sylvia Esterby and Abdel El-Shaarawi, and founding member Ian MacNeill.

The board, after several hours of intense discussion, reached consensus to go ahead with the following process: the minutes from the board discussion will go out to all board members (only about half the board was able to come to Johannesburg), and the board will vote on whether to proceed. Assuming we decide to do so, the board will put together a document with what we see as advantages and disadvantages of becoming an ISI section. This will go out to the members, probably in late December. By that time, we will have a TIES discussion board for members available on our web site, and we hope to get a vigorous discussion on this important issue. At the same time, president-elect Anders Grimvall and I will work on a proposal for statutes for the new section, which will be similar to the current TIES by-laws, but will have some structural changes needed to conform with ISI policies. At the TIES 2004 meeting in Portland (Maine), USA, in June, the Annual General Meeting will vote on a formal motion to go ahead with becoming an ISI section.

If the AGM vote is in favor, the ball will be in the ISI court. First, the ISI council will have to agree to the statutes. They are meeting in August, 2004. Provided the statutes are acceptable, and the council approves the creation of a new section, this will then be an issue for the General Assembly of the ISI at their meeting in Sydney, Australia, in April of 2005. The TIES by-laws would then have to be replaced by the new statutes, either at the 2005 meeting, which hopefully will be in Beijing, China, or at the 2006 meeting in Europe.

At this point, I will not discuss the advantages and disadvantages of becoming an ISI section. This will all be spelled out in the message from the board later this year. This entire process assumes, of course, that the decision in each previous step has been positive. If not, we will simply tell the ISI that we do not feel it is in our best interest. I hope this process will allow all TIES members to consider, discuss and influence how the goals of our society can best be reached.

Here are a few more board meeting decisions. We will be extending our web site to have a members-only section with discussion board, access to the latest newsletter, etc. Members can now choose only electronic access to the newsletter if they want. The default delivery remains the printed mailed version. We will also start a preprint service, where members will be able to post recent work, which will then be accessible to everyone. This will provide the scientific community a better idea of the variety of research done by TIES members.

Due to increasing costs, we had to increase some fees slightly. Most importantly, membership without journal increases from USD 25 to USD 30 for next year, and print subscription to *Environmetrics* increased from USD 130 to USD 140. The fee for retired members, students, and electronic subscription to *Environmetrics* stay the same.

The board wants to make another attempt at a meeting in China, which we hope can take place in 2005. Ray Correll is organizing that meeting. In 2006, the meeting will be in Europe. So far, the Czech Republic and Sweden have expressed interest. We want to hold the 2007 meeting in Latin America, and will be soliciting expressions of interest.

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2. TIES News

2.1. New Members

Richard Katz

Welcome to the 23 new members who have joined TIES between May 2003 and November 12, 2003. Conferences, the web page and promotion of TIES by current members continue to be the major means by which individuals are learning about the Society.

Akhouri, Neela	USA
Barão, Isabel	Portugal
Distiller, Greg B.	South Africa
Elbergali, Abdalla K.	Libya
Fefferman, Nina H.	USA
Ferris, Ian Glen	Austria
Hacker, Robert J.	Austria
Hornsby, Susan	USA
Hrdlicková, Zuzana	Czech Republic
Jain, Shaleen	USA
Liu, Minglei	USA
Mesbah, Mounir	France
Muller, Martie	South Africa
Nenadic, Oleg	Germany
Neubauer, Jiri	Czech Republic
Nicolis, Orietta	Italy
Njeri, Wabiri	South Africa

Nunes, Helena Mouriño	Portugal
Ramahenina, Sarindra	USA
Rondeau, Virginie	France
Thierfelder, Tomas K.E.	Sweden
Werner, Linda	Sweden
Zidek, James V.	Canada

2.2. Member's News

- Fellow of the Royal Society of Canada, 2003. **James V. Zidek**, Professor of Statistics, University of British Columbia was one of two statisticians elected to the premier national body of distinguished Canadian scientists and scholars. Sixty-five new fellows were admitted this year in all areas of natural and social sciences and humanities. TIES was honoured to have Professor Zidek present the J. Stuart Hunter Lecture in Johannesburg.

- Fellow of the American Statistical Association, 2003. **Lance A. Waller**, Associate Professor of Biostatistics, Emory University: For innovative contributions to the statistics of spatial epidemiology, disease mapping, cluster detection, and environmental justice; and for service to the profession.

- Fellow of the American Statistical Association, 2003. **Geert Molenberghs**, Professor of Biostatistics, Limburgs University Centrum, Belgium: For seminal contributions to methodological research on longitudinal data, clustered data, categorical data, and missing data methods in clinical trials; for wide-ranging educational and consulting efforts; and for exceptional editorial and administrative services to the profession.

- Section on Statistics and the Environment (ENVR), American Statistical Association 2003 Student Paper Award. **Rebecca A. Buchanan**, Quantitative Ecology and Resource Management Program, University of Washington: For the paper "A Cost Analysis of Ranked Set Sampling to Estimate a Population Mean", co-authored by Loveday L. Conquest and Jean-Yves Courbois.

- **CSIRO Mathematical and Information Sciences - Awards 2003 (Australia)**

  Recently the CSIRO Division of Mathematical and Information Sciences (CMIS) recognised the work of two TIES member statisticians through it inaugural awards program. The aims of the awards were to provide members of the Division with a formal opportunity to participate in the success of their colleagues and to share their achievements and learnings. The awards were recognised with celebrations at all CMIS locations throughout Australia and a monetary reward for each award recipient (individual or team).

  The following Awards were received by TIES members of CMIS:

  Chief's Scientific Excellence Award - To recognise and encourage scientific excellence.

  Dr. Geoff Laslett (Victoria) for his work in developing methods for accurately predicting growth curves for stock assessment.

  (www.cmis.csiro.au/Geoff.Laslett/)
  (www.cmis.csiro.au/envir/Capabilities/FishManagement.htm)

  Partnership Excellence Award - To generate the building of strategic alliances with other Research & Development providers external to CSIRO

  Dr. Bronwyn Harch (Queensland) for her work in developing an active network of scientific collaborators and utilising these contacts to initiate and maintain strategic engagement.

  (www.cmis.csiro.au/Bronwyn.Harch/)

- **Dale Zimmerman**, Professor, Department of Statistics, University of Iowa, is the new Program Chair-Elect of Section on Statistics and the Environment (ENVR), American Statistical Association (term beginning January 2004).

- **Abdel El-Shaarawi** organized an invited paper session on Environmetrics at the Canadian Statistical Society meeting at Dalhousie University, Halifax, Nova Scotia, from June 8 to 11, 2003. Papers were: Sylvia R. Esterby, Okanagan University College, "Models for biological productivity in lakes"; Montserrat Fuentes, North Carolina State University, "Statistical assessment of geographic areas of compliance with air quality standards; Lawrence H. Cox, National Center for Health Statistics, "On properties of multi-dimensional statistical tables".

- **Reinhard Viertl**, Professor, Department of Statistics and Probability Theory, Vienna University of Technology, visited the Department of Applied Psychology at the University of Calgary at the invitation of Professor W. Zwirner. Professor

Viertl gave a 6 weeks course on "Statistical Methods in Applied Psychology" which included description and analysis of non-precise data using fuzzy models. He also gave a visiting lecture at the Department of Statistics, entitled "Fuzzy Information and Statistics". The talk generated interest among statisticians and gave important hints for further work in the field of statistics and fuzzy information.

- The Executive Board of the International Environmental Modelling and Software Society (iEMSs) announced in October the three elected iEMSs Fellows for 2003. They are Professor Achim Sydow (Natural Systems), Dr. Dora Marinova (Socioeconomic Systems), Dr. Andrea Rizzoli (Software Systems). The awards ceremony will be held during iEMSs 2004

  (www.iemss.org/iemss2004/),

  where Professor **Anthony J. Jakeman**, President of the iEMSs and member of TIES, will be given the inaugural iEMSs Fellow award.

2.3. Society News

TIES Election Committee

In accordance with the TIES by-laws, the election committee for the 2004 elections has been formed, and consists of Peter Guttorp, USA, Rognvald Smith, UK, and David Fox, Australia. The committee task is to nominate candidates for the following posts: President-elect, Secretary, Treasurer, Publications officer and one regional director for each of the three regions (North America, Europe, and Other Regions).

The committee hopes to have a full slate of candidates by the end of the calendar year, after which the nominations will open up to the general members.

Peter Guttorp

TIES 2003 Student Paper Competition

Peter Guttorp

At the TIES 2003 meeting in Johannesburg, the usual Student Paper Competition took place. The awards committee consisted of Ray Correll, Australia, Gudmund Høst, Norway, and Peter Guttorp and Paul Sampson, USA. There were four papers in the competition:

- Jiri Neubauer, University of Ostrava, Czech Republic, “Crossing problems”;
- Zuzana Hrdlicková, Masaryk University, Czech Republic, “The power of the test in analysis of variance of Poisson distributed variables”;
- Nina Fefferman, Tufts University, USA, “Modeling waterborn infectious outbreaks: when, where, and how bad will they be?”;
- Minglei Liu, University of Maryland Baltimore County, USA, “Probability modeling of water-quality: assessment of Mid-Atlantic region”.

The committee ranked the contribution by Zuzana Hrdlicková first, and she received a certificate and a check for USD 500.

Presentation of 2003 Best Student Paper Award to Zuzana Hrdlicková by Ray Correll in Johannesburg, November 6 2003.

Travel Award For Johannesburg Meeting

A National Science Foundation grant allowed young US TIES members to attend the 2003 meeting in Johannesburg. The awards committee consisted of TIES President Peter Guttorp and Secretary Rick Katz. Originally seven awards were made, but circumstances forced two potential attendees to cancel. The final awardees were:

- Neela Akhouri, Lake Erie Center, Oregon, Ohio;
- Nina Fefferman, Tufts University, Massachusetts;
- Byron Gajewski, University of Kansas Medical Center, Kansas;
- Shaleen Jain, NOAA-CIRES Climate Diagnostics Center, Colorado;

- Minglei Liu, University of Maryland Baltimore County, Maryland.

Peter Guttorp

Abdel El-Shaarawi Young Researcher's Awards Presented

The creation of the award and the announcement of the first two recipients of the award have been reported previously. Both awards have now been presented, as captured below. Young researchers, under 41 years of age, who have made outstanding contributions to Environmetrics are eligible for the award.

The first two awards were :

2002 to Bradley P. Carlin, University of Minnesota, USA with citation as follows: In recognition of outstanding contributions to environmetric research, in particular for significant developments in Bayesian modeling and Monte Carlo implementation, with applications to spatial disease mapping, environmental equity, longitudinal studies, and models for HIV/AIDS.

Loveday Conquest, Chair of TIES Awards Committee, presenting the 2002 Abdel El-Shaarawi Young Researcher's Award to Bradley Carlin at the meeting of Section on Statistics and the Environment, ASA during the JSM 2003.

2003 to Montserrat Fuentes, North Carolina State University, USA with citation as follows: In recognition of outstanding contributions to environmetric research, in particular for significant developments in modeling and prediction for spatial-temporal processes and Bayesian spatial statistics; with applications in climate and air quality modeling, oceanography, atmospheric and environmental sciences.

Peter Guttorp, TIES president, with the 2003 Abdel El-Shaarawi Young Researcher's Awardee, Montserrat Fuentes, and Abdel El-Shaarawi. Presentation of the award in Johannesburg 2003.

Environmetrics Participates In AGORA Program

Sian Jones
Executive Commissioning Editor, J. Wiley & Sons

On 14th October, at the FAO Headquarters, Rome, two days before World Hunger Day, a new initiative was launched to bring essential agricultural information to the world's poorest countries. The new scheme will allow free access to agriculture related journals, including the TIES official journal, Environmetrics, to developing countries.

AGORA - Access to Global Online Research in Agriculture - (www.aginternetwork.org) will enable a list of poor countries (as defined by the Food and Agriculture Organization of the United Nations (FAO)) to access research in agriculture, food and nutrition, as part of the solution of poverty to improve the effective utilisation of resources.

A group of the main journal publishers - Blackwell Publishing, CABI, Elsevier, Kluwer Academic, Lippincott, Williams & Wilkins, Oxford University Press, Springer Verlag, and John Wiley - have agreed to provide over 400 titles for free online access, in partnership with the FAO, the Rockefeller Foundation and Cornell University.

By featuring in **AGORA**, Environmetrics will create a higher profile for the society and the journal worldwide.

Senior Vice President, Scientific, Technical, and Medical Publishing, John Wiley & Sons, and Chairman of the International Association of Scientific, Technical and Medical Publishers (www.stm-assoc.org), Eric Swanson emphasized the real and substantial impact the initiative will have for the people of those nations to be served by **AGORA**. "**AGORA** will make a world of difference to the tens of thousands of students in developing nations who need to access current research information to advance their studies. It will benefit researchers and academics, opening new pathways for research, publication, and funding information. And in the long term, it will benefit local communities with better agricultural practices and knowledge. In satiating a hunger for knowledge and information, we hope to take a step towards building a world without hunger in its more literal sense."

The long-term goal of the **AGORA** program is to increase the quality and effectiveness of agricultural research and training in low-income countries, and in turn, to improve food security. To contribute to achieving this goal, **AGORA** will provide access over the world-wide-web to a research level collection of key journals in agriculture and related biological, environmental and social sciences to the poorest countries in the world. It will offer to researchers, policy-makers, educators, students, technical workers and extension specialists, a collection of literature comparable to that available to their counterparts in the developed world.

Readers are reminded that TIES members are entitled to a discounted print and/or online subscription to Environmetrics. For further information, please visit the TIES society website at:

www.nrcse.washington.edu/ties

TIES-L Updates In Progress

Ties e-mail list (TIES-L@cornell.edu) has been generating too many error messages due to old, no-longer valid addresses. Accordingly, any address which generates a "permanent error" message has been deleted. To ensure that all TIES members continue to receive announcements sent to TIES-L, a test message was sent to the list just prior to the mailing of this newsletter. If you did not receive this message, it means that your e-mail address is not on the list. If so, please send a note to Ali Hadi at ahadi@aucegypt.edu.

Ali Hadi

3. Environmetrics Conferences

3.1. TIES Forthcoming Conferences

TIES 2004/SPATIAL ACCURACY 2004

Portland, Maine, USA

Ronald McRoberts

For the first time, the annual TIES conference and the biennial Spatial Accuracy Symposium will hold a joint meeting reflecting their mutual interest in the quantification of environmental and natural resources processes and the uncertainty associated with them. Recent international meetings have been very successful with TIES meeting in the UK, the USA, and South Africa and the Spatial Accuracy Symposium meeting in Canada, the Netherlands, and Australia. The joint meeting will be held June 28 – July 1, 2004, at the Holiday Inn By The Bay in Portland, Maine, USA. The program will consist of presentations by invited plenary speakers and invited paper, contributed paper, and poster sessions. The website is still under construction, but additional meeting details may be found at

www.ncrs2.fs.fed.us/4801/meetings/ties/default.asp

Abstracts for presentations and posters are solicited on important quantitative aspects of environmental and natural resources problems with emphasis on spatial data, spatial analyses, and spatial accuracy assessments. A detailed list of conference topics appears on the meeting website. Presentations and posters on these and any aspect of environmental, natural resources, and spatial assessments will be considered.

Abstracts of not more than 200 words that include title, 3 to 5 keywords, and names, affiliations, and contact information for the contact author should be sent via regular mail, fax, or e-mail (preferably) by 21 November 2003 to:

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1 October 2003:	Initial Call for Papers
21 November 2003:	Abstracts due
5 December 2003:	Authors notified of acceptance
1 March 2004:	Invited and Contributed manuscripts for publication due

3.2. Report On TIES 2003 Conference

Anders Nordgaard

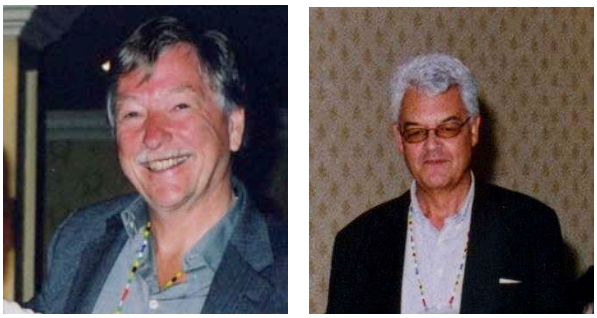
The annual conference of TIES, 2003 was held in Johannesburg, South Africa on November 3-7 at Caesar's Palace, co-arranged with the 50th anniversary conference of the South African Statistical Association (SASA). The theme of the conference was "Quantifying how our environment affects us". A total of 38 registered and attended the conference and attendees came from many countries (at least 14 to my knowledge). This fairly small number was expected and acceptable due to the late rescheduling of this conference. As a funny coincidence this happened to be a large meeting of Statisticians in a Casino, whatever that would mean.

Hon. Trevor Manuel, Minister of Finance of South Africa, Pali Lehola, Statistician General of Statistics South Africa, Jackie Galpin (TIES 2003 organizer) and Peter Guttorp (left to right) at the official opening .

The conference started with a workshop on spatio-temporal modelling, coordinated by TIES president Peter Guttorp. I was a bit late and therefore missed what I've heard to be the spectacular opening, including songs by the Statistical choir of South Africa, i.e. the SASA choir. Fortunately I was lucky to hear them on the official opening on Wednesday, which was a great experience. So, all of you, it is now time to form the TIES choir to keep this a tradition for the future. Any volunteers?

More scientifically, the workshop was very successful, with interesting and well-prepared talks (a total of 6) covering a wide range from the concept of wavelet transforms to practical aspects of measuring herring populations. From the talks it became clear that the concept of detecting trends both in time and space would benefit from a careful coordination of data with different support and different classes of models, each suitable in its separate step of the analysis. This was especially apparent in the presentation given by Montserrat Fuentes, North Carolina State Univ., USA, who is this year's El-Shaarawi Young Researchers Prize recipient. My personal feeling is that this concept of starting the TIES meeting with a workshop on a current problem area sets a good tone for the rest of the conference, as there is time to reflect about the contributions and the discussions around them.

The official opening of the conference was on Wednesday, November 5, a co-arrangement with the opening of the SASA conference. SASA's plenary speaker was Sir David Cox, and his lecture was followed by TIES J.S. Hunter lecture given by Jim Zidek, University of British Columbia, with the title "Modelling Environmental Space-Time Series". Jim gave a very interesting historical background to the emergence of environmental studies, starting with the extreme 1952 fog in London, and ending with today's organisations for environmental research and dissemination of important proceedings. Further, Jim gave his picture of the current directions, which include extreme-value analysis, separability of space and time and big space-time domains. As an example of the third he discussed the field of climatology, where it is especially important to bridge the big gulf between the land of physics-based models and the land of statistical models.



2003 J. Stuart Hunter Lecturer, Jim Zidek, (left) and President's Invited Lecturer, Thomas Polfeldt (right).

TIES President's invited lecture was given on Nov 6, by Thomas Polfeldt, Statistics Sweden, with the title "Making Environmental Statistics Useful: A Third World Perspective". Thomas has a long experience of developing Statistical offices around the world and gave interesting reflections based on different examples from these activities. Some of his observations follow. More useful environment statistics would be obtained by analysing policies with respect to their numerical goals and the kind of data that is actually needed. Further, adaptation of classifications is a very important step and the training of environmental statisticians should lead to skills in information structure and data quality, and to experience in environmental analysis.

An interesting panel discussion about the routes by which individuals become Environmetricians followed in the afternoon. Most of the discussants gave their opinions about what a future program of study for a Master's degree in Environmental Statistics would look like. One very interesting challenge for TIES would be to coordinate the attempts that actually have emerged today to form a kind of "virtual university" for courses in Environmental Statistics.

The other invited and contributed papers covered a wide range of interesting applications as usual and in spite of the relatively low number of participants the discussions around the papers were fruitful and also continued during the more social activities. Some papers were given in organized sessions for Environmental Data Analysis and Rainfall Atlases respectively, while the majority were in general sessions of TIES. The best student paper's award was given to Zuzana Hrdlicková, Masaryk University, Brno, Czech Republic for a very good talk on the power of ANOVA tests with Poisson data.

The scientific program closed with a plenary session for TIES and SASA given by Trevor Hastie, Stanford University, USA. His talk was about Support Vector Machines, Logistic Regression and Boosting. His comparison of these three concepts of which the middle one is "traditional", gave many of us a good clarification about what all these modern concepts really stand for.

The social program was very generous with a lot of good food and drinking. Tuesday's excursion to the excavation site Drimolen, situated within a Lion and Rhinoceros park, was something very special. We were transported in Land Rovers through a farming area that is protected as an animal reserve. Among the animals we met, there were a smaller number of brown rhinoceros (white rhinos in the habit of rolling in the red-brown soil) that were actually standing a few metres from the cars. According to the guide, this species is very gentle and of no danger for the people and cars that pass through the area. We could also spot some gnus, wild pigs, antelopes and ostriches. The lions were however in a special area, which we did not pass. At the excavation site we were given an interesting lecture about human evolution and the importance of fossils by Dr. Colin Menter (see National Geographic May 2000), followed by a visit to the place where the excavation was going on. Among the discoveries we could see was the skull from a baboon, about to come out from the stone (in some weeks or so). A nice lunch was served and we also listened to an environmentalist talking about the importance of the kinds of areas we were visiting.

The conference banquet was an elegant introduction to the African kitchen, where we were served smoked kudu filet, rack of lamb and a smashing dessert together with excellent South African wine.

A table at the banquet: (left to right front) Abdel El-Shaarawi, Sylvia Esterby, Jackie and Richard Galpin, Peter Guttorp, Elena Naumova, (back) Mounir Mesbah, Thomas Polfeldt, Ian MacNeill.

Many thanks to Jacky Galpin for organising this very pleasant TIES meeting, in which I think most of us had the opportunity not only to meet and greet, but to meet, understand and enjoy. Jacky has done an enormous amount of work to put things together in such a short while, and the result was a success. It is also my feeling that the SASA participants found it interesting to have an extra component of Environmental Statistics added to their program. Many of their participants attended our talks and posed interesting questions. In addition we had the possibility to give PR for TIES and maybe extend our group.

Xuebin Zhang, Grace Chiu, Anders Nordgaard, Alessandro Fasso, Enrica Bellone and Jackie Galpin at a meet and greet.

3.3. Deputy Minister's Address To TIES 2003

Address by Hon. Rejoice Mabudafhasi, MP, Deputy Minister of Environmental Affairs & Tourism, Republic of South Africa at the 14th International Conference on Quantitative Methods for Environmental Sciences, Johannesburg, Nov 3-7 2003.

Hon. Rejoice Mabudafhasi, Deputy Minister of Environmental Affairs & Tourism of South Africa (front left), Hilary Southall, Chair South African Statistical Council (front centre), and some workshop attendees enjoying Statistics South Africa Choir at the opening of the TIES Workshop on November 3, 2003.

Distinguished guests, ladies and gentlemen: It is a pleasure for me to deliver a few remarks this morning and open this conference.

Programme Director, there are many things that tie and determine human destiny. Amongst them, are human beings desire to communicate, their survival instinct, their production systems, their disposition to posterity, norms, customs, culture, etc. The world is increasingly becoming smaller, and we know we are a global village, with a latent convergence on concerns and anxieties. These social concerns are captured in literature, on how we interact as human beings, as countries and as economies. Nothing however ties human destiny as environmental concerns.

Throughout history, we can trace divergent social movements, ideological positions, and development patterns followed by different national states. We know of socialist, communist, mixed economies and capitalist paths to development. We also know that there are left wing and right wing movements that influence development. These approaches to development are underpinned by means of production, which consist of labour, land and capital. However, throughout history, the biggest contestants in the course of production have been labour and capital, and less so, the passive element of land. To a large extent, the development debate and agenda have been determined by this conflict of labour and capital. The course of human history has largely, hitherto, been centered around the production relations between labour and capital, and in the equation, land or environment has been of less concern.

The Chinese have a saying that we are the custodians of the world we live in, and our obligation is, at worst, to leave it as it is or in an improved condition for future generations. My challenge to this conference would be, to what extent have we respected this important condition of custodianship or position of trust.

Our human history, in socialist, communist, developing and capitalist worlds, demonstrates that, without exception, we have violated this important custodianship principle. Instead, the planet is under threat of adverse effects of pollution, global warming, the green house effect, endangered species, deforestation, erosion and many undesirable consequences, which can be traced to direct and rapacious human interaction with the environment. As we meet today, nothing ties the destiny of humanity as the environment. For the first time, we see in the equation of means of production, a deliberate and explicit factoring of land, as represented by the environment. Here, the effects of our interaction with nature for survival and/or development are explicitly expressed and anticipated in respect of their impact on the environment. However differential the resilience between rich and poor nations can be, in the long run, the effects of environmental degradation on these remain largely similar. Take for instance the heat wave that hit Europe in August this year, despite their technological advancement, such a heat wave could not be mediated. This shows how fragile human beings are in relation to adverse effects of the environment. Furthermore, we could also reflect on the floods that washed parts of Europe, further exposing our fragile position as human beings in relation to our environment. In developing countries, the effects of the environment on life are also well known; the consequences of drought almost spell malnutrition and death.

We are therefore encouraged by your tenacity as scientists meeting together in South Africa to discuss issues of the environment. I am informed that the founding meeting of 1989 was held in Cairo on the African continent and, that this conference has come back to Africa after fourteen years, makes the

continent proud of its contribution to this global debate and seeking of solutions to environment. It comes shortly after the Johannesburg World Summit on Sustainable Development held here in South Africa in 2002.

I am also pleased by your objectives of applying scientific evidence such as statistical and other quantitative methods in the environmental sciences, environmental engineering and environmental monitoring and protection, to advance courses of action for addressing these matters of concern to all of us.

The multidisciplinary approach to the study of environmental change, can amplify our understanding of our destiny as human beings. Therefore the participation of statisticians, mathematicians, scientists and engineers in the solution of environmental problems, and the emphasis on the need for collaboration and for clear communication between individuals from different disciplines, and between researchers and practitioner, is well received by ourselves as policy makes. I am aware that the South African Statistics Association is hosting its 50th conference here on the same venue and I trust we will benefit from these added dimensions as a country. A challenge we face on the continent and frankly globally is to harmonize scientific knowledge and indigenous knowledge to expand the knowledge base, which will ultimately capacitate us to come up with better solutions. This is a message I would like you to carry forward in your deliberations as it represents the interests of the historically marginalized communities.

Having inspected the programme, I am pleased by the scope of coverage and depth of enquiry, for instance the paper by Neela M. Akhouri and others on Lake Erie, which demonstrates the need for inter-country collaboration, a suitable legislative environment, good management practices, and the role of research in restoring one of the largest fresh water lakes in the world, which was moribund in the early 1970s and thereby bringing back the ecosystem and as a consequence seeing the resurgence of fish and wildlife. A paper by Alexander illustrates the importance of collating data over a period of time in order to make inferences such as he makes that "It was also established that there was a corresponding increase in open water surface evaporation during the period under review. It is postulated that the concurrent increase in these two processes is due to naturally occurring global warming." Marius Claassen and others identify the gap in data whilst recognizing the significance of a legislative environment on water management.

A. Fasso and O. Nicolis emphasize the gap and paucity of data and monitoring in the past as they argue that in many countries, particulate matter are being monitored only recently. Since these monitoring networks are often sparsely distributed over the land, it is of interest to assess spatio-temporal correlation between particulate matter and other quantities. I am sure they will give us guidelines and insights as to how we should catch up.

Nina H. Fefferman and Elena N. Naumova possibly in their paper will give us insights into cholera outbreaks, which is one of the waterborne diseases that often attack parts of South Africa. They argue that they offer mathematically rigorous definitions of previously ambiguous epidemiological concepts of waterborne infections. These definitions include notions of environmental exposure, disease temporal patterns and outbreak signatures.

Ferris and others remind us of the recently held World Summit on Sustainable Development and recall that one of the key challenges for sustainable intensification of agricultural production is to ensure sufficient, safe and nutritious food production for an ever growing population on limited land and water resources, while promoting natural resource conservation. The World Summit on Sustainable Development reaffirmed land degradation as one of the major global environmental and sustainable development challenges of the 21st century. Agricultural lands have been more severely affected by degradation processes. About one third of agricultural land has been degraded during the last 50 years. Land degradation affects soil quality through several processes including water or wind erosion, waterlogging, salinization, acidification, soil compaction, nutrient mining and soil organic matter (organic carbon) depletion.

Holding the two conferences i.e., the TIES and SASA back to back is a sign that there is convergence and unity in action for change as environmental concerns pull us, more and more together. The use of information as the basis for decision-making is very critical. I am aware that the Honourable Minister of Finance, Trevor Manuel, will be opening SASA conference later in the week, thus putting South Africa's political systems in good stead as it relates to thirst and appetite for statistical information.

I also see on your programme that you will visit the site of the Cradle of Humankind, including the tour of the rhino and lion park. You will enjoy the hospitality, proudly South African and truly global.

I wish to thank Professor Jacky Galpin, local organizer of the conference, co-chair of the scientific programme and a member of the TIES board, and Pali Lehohla, the Statistician General, Statistics South Africa, for making a bold move and agreeing to South Africa hosting this conference.

Programme Director, I want to urge all of us here today to continue to assess our status in terms of our achievements with the view of identifying gaps and weaknesses, in order to make appropriate the timely interventions. The recommendations emanating from this conference must certainly influence the global agenda for Quantitative Methods for Environmental Sciences.

We must emerge from here with a clear plan of action, with appropriate time frames, together with implementation mechanisms to translate our deliberations into concrete achievable deliverables. This plan of action must identify the specific roles each and every stakeholder and role player will play with appropriate monitoring mechanisms. This would be in line with the outcomes of the World Summit on Sustainable Development, which gave us proper guidelines to achieve successful outcomes.

I now declare this the 14th International Conference on Quantitative Methods for Environmental Sciences held in Johannesburg from 3-7 November 2003 officially opened. I look forward to receive a report on the deliberations.

Good luck with your deliberations.

I thank you.

3.4. Other Forthcoming Conferences

The **17th Conference on Probability and Statistics in the Atmospheric Sciences**, sponsored by the American Meteorological Society and organized by the AMS Committee on Probability and Statistics in the Atmospheric Sciences, will be held 11-15 January 2004 as part of the 84th AMS Annual Meeting in Seattle, Washington.

Papers are solicited on all aspects of probability and statistics, in particular papers dealing with prediction, the theme of the 84th Annual Meeting. Possible topics include hypotheses testing; use of ensembles and especially their postprocessing in prediction; methods of conveying probability forecasts to sophisticated users and the general public on all time scales; use of probability forecasts with gridded products now being emphasized; methods of improving and manipulating grids of probability forecasts as new information arrives; forecast evaluation especially of gridded forecasts; data assimilation; and objective forecasting of atmospheric phenomena such as air pollution, precipitation amount and type, and weather elements of importance to aviation. For information see:

http://www.ametsoc.org/AMS/

or

http://www.esig.ucar.edu/ams/ams_ps.html

The **3rd WSEAS International Conference on ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING, AND DATA BASES (AIKED)** will take place in Salzburg, Austria, from February 13 to15 2004. The Conference will focus on some topics which are of concern to Environmental Scientists, like Data Bases. Especially the representation of Fuzzy Data in Environmental Data Bases is a serious problem. Moreover this is related to a second topic of the conference, Knowledge Engineering. Knowledge Engineering could help to represent Fuzzy Knowledge in Environmental Information Systems.

More detailed information may be seen at:

http://www.worldses.org/conferences/2004/austria/aiked/index.html

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The **Ninth International Meeting on Statistical Climatology** (9IMSC) will be held in Cape Town, South Africa during 25-28 May 2004. These meetings have been organized by a group of independent climatologists and statisticians since 1979.

The purpose of the IMSC meetings is to bring together climatologists and statisticians to exchange concepts and problems. Climatologists present statistical problems in climatology (including meteorology and related fields) and consider the methods that are currently used to deal with these problems. Techniques tailored by climatologists for the specific needs of climatology are also presented. Statisticians, on the other hand, present new, state-of-the art techniques developed within mathematical statistics and other scientific fields. By discussing the needs of climatology and the possibilities offered by modern

statistics, synergetic effects are obtained, advancing the methodological basis of climatology and helping statistics to focus on relevant problems.

For information see: http://www.csag.uct.ac.za/IMSC/

The **XXIInd International Biometric Conference**, IBC2004, sponsored by the International Biometric Society, will be held in parallel with the Australian Statistical Conference from 11 to 16 July 2004 in Cairns, Queensland, Australia.

It is expected that the joint conference will attract over 700 delegates and include eminent international speakers, leading researchers and participants from both Australia and overseas. Delegates will be able to attend sessions of either conference, ensuring a rich and varied scientific program.

An array of social events and tours are also being planned, to take advantage of beautiful North Queensland. For further information, to submit an abstract for presentation or to register for the conference, please visit

www.ozaccom.com.au/cairns2004

3.5. Reports on Related Events

How To Tell The President The Facts

A panel discussion at **JSM 2003,** San Francisco.

Co-sponsored by ASA Section on Statistics and the Environment, ASA Section on Statistical Consulting, and the International Environmetrics Society.

Chair: Peter Guttorp, University of Washington

Panelists: Sally Morton, RAND
Gerald Van Belle, Univ. of Washington
Thomas Permutt, US FDA
Haiganoush Preisler, USDA Forest Service
Adrián Fernández, Inst. Nac. de Ecología, Mexico.

After a brief introduction by the chair, the panelists each gave short presentations. Some of these presentations are available on the web at

www.stat.washington.edu/peter/Panel_discussion.html

Sally Morton described how she told the Secretary of Health and Human Services the facts about Ephedra. Ephedra is a naturopathic substance, and not classified as a drug. Rand performed a meta-analysis of the literature. The result of presenting the study to the Secretary was a ban on advertising the drug, and a warning label requirement.

Sally's advice:

- Focus on a small number of conclusions, and support with strong analyses
- Anticipate who will focus on which conclusions
- THERE IS ONLY ONE CHANCE
- Beware of–yet accept–better yet, use the anecdote

Gerald Van Belle gave a short (fictitious) presentation intended for the US President on air pollution issues related to ships. There were no numbers on the slides, just in the spoken presentation. He then continued to discuss the concept of "mandated science", i.e. the intersection of science, policy, and values. In the example, the science was the effect of air pollution, the policy dealt with the Latino population, and the values had to do with social justice. The US EPA uses the risk assessment paradigm: hazard identification, dose-response, and risk assessment combine to produce risk management. There is a hierarchy consisting of data, information, knowledge and finally wisdom. Wisdom is to know the truth and act accordingly.

Thomas Permutt emphasized that we cannot duck the science quality questions: that is our responsibility. All science is wrong. The question is really how wrong. In order to communicate results we must understand not only the client's language, but also the client's job. It is important to have opinions. There are scientific opinions, and opinions on value and policy. We must be able to distinguish them, but we need to have both kinds. Influential colleagues work in the center of the mandated science Venn diagram.

Haiganoush Preisler advocated whenever possible to say it with pictures. GAM output is graphical, thus easy to explain, even though the model may be complicated both to write down and to fit. Standard errors on a graph really can help. Color graphs are

useful, but use at most three colors. Detailed interpretation of variables are not always very important.

Adrián Fernández described a major policy issue in Mexico, where serious problems with ozone and particulate matter were caused by lax automobile exhaust standards. The 1994 Mexico standards were similar to the 1981 US standards, and Mexico City today is similar to Los Angeles 30 years ago. The key issue was to deal with new automobiles, but the industry was opposed to stringent standards. In order to get around the opposition, two strategies were used: the ministry proposed a two year exemption to emission inspections in return for adherence to standards later, and the message was sent to the auto manufacturers through newspaper channels (leaks). The responsibility of advocacy is important.

After the presentations, the panelists each got to respond to each other.

Sally: Where do you draw the line for the responsibility of advocacy?

Gerald: Passion is important. We need advocacy with objectivity.

Thomas: The mandated science intersection is a tremendously exciting place to be. It is important to understand the things about which we are objective and those about which we are passionate. To play the game well, we need to be seriously involved.

Haiganoush: Keep it simple. We are well equipped to do this. Not one of us used the word "uncertainty".

Adrián: Without stretching the facts we need to help policymakers by being very clear. Be courageous, take chances, participate in public debates!

The floor was now opened to questions and discussion.

What do you do when decisionmakers want a particular answer from you?

Sally: You need to be precise about what you know.

Thomas: You need to build up a relationship over time. Then you can use it in such situations.

How are you passionate?

Adrian: Be passionate about not letting the government twist the facts. Work with media (leaks), NGOs etc.

What do you do when there is alot of uncertainty, but the issue is still one that needs action?

Gerald: That is when you need wisdom.

Peter: There are different philosophies in different countries. For example, in Sweden one tends to follow the precautionary principle, while in the US actions tend to require proof.

Adrián: One needs to develop cost-effective ways to reduce risk.

Is it our job to lay out options, or to lay out options and say that we prefer one?

Thomas: We need to lay out consequences of the options (with uncertainty).

Public comments can sometimes allow non-scientific findings the same weight as scientific comments. How do you reply to the non-scientific statements? Should public opinion be peer reviewed?

Gerald: In this country debated tends to be adversarial. We have a social contract with this country to do science, and have certain responsibilities associated with that, even when we feel it is a waste of our time.

Would it sometimes help to have different analyses of the same problem?

Thomas: We often operate in that mode. Both sides report to the same advisory committee. This can often make the issue clearer. It is not always adversarial–the statisticians on both sides can work together to make clear what there is agreement on.

Adrian: The PM health effect reanalysis issue in the US is a case in point. It is always useful to have more analyses.

Organizational climate has a lot to do with how much a statement is listened to.

Sally: In the Ephedrin case it was very important that the group that made the study did not have ties to alternative medicine.

Gerald: HEI was paid by EPA and the auomotive industry to create a scientific institute acceptable to both. It has an external review process that helps to solidify this acceptability.

Thomas: Yes, the reputation of a government group is very important. That is why it is so important to participate in the policy making.

4. Environmetrics Forum

It has been much discussed among TIES members and TIES Board the subject of TIES relating to other societies and creating liaisons with organizations that share some of our objectives. To reinforce this debate the Editors of TIES Newsletter invited Dr. Stuart Parkinson, to whom we would like to thank the prompt reply, to contribute with a text about the organisation he directs: Scientists For Global Responsibility (SGR) that aims to promote ethical science and technology.

Scientists for Global Responsibility - *SGR* - promoting ethical science and technology

Dr Stuart Parkinson

Director,
Scientists for Global Responsibility (SGR)

Scientists for Global Responsibility (SGR) is a UK-based membership organisation promoting ethical science and technology. It was formed in 1992 from the merger of Scientists Against Nuclear Arms (SANA), Electronics and Computing for Peace (ECP) and Psychologists for Peace (PfP). These organisations had originally been set up to provide professional scientific impetus to work to reduce the widespread use of science and technology for military purposes: in particular, they sought elimination of Weapons of Mass Destruction. However, with the break-up of the Soviet Union and the end of the Cold War, together with the growing realisation of the threat of Climate Change and other environmental problems, the organisations decided to merge and widen their focus.

SGR's aims now cover general concerns about the possible misuse of science and technology, including war, environmental damage, threats and opportunities of new technologies, and the growing influence of large corporations and the military on the direction of science and technology. We carry out research, education, and lobbying, most of the focus being on five main issues:

- *Arms and arms control* - especially weapons of mass destruction; space weapons; and conflict prevention;
- *Climate change and energy* - especially climate science and policy; renewable energy; nuclear power; and 'climate engineering';
- *GM crops* - including alternatives such as organic agriculture;
- *Science policy* - especially corporate and military influences on science; and open science;
- *Population, consumption and values* - focusing on three of the most critical factors in the move towards a society with low overall environmental impact.

Our current projects are given in the Box.

SGR's current research and education projects

- *Thinking about an ethical career in science and technology*

SGR is currently producing a series of educational materials intended to give young scientists and engineers a deeper understanding of the wider ethical dimensions of various careers in science and technology. The publications include an introductory booklet and a series of in-depth briefings.

- *Understanding the military influence on science and technology*

The aim of this research project is to carry out a broad assessment of how scientific research and development is influenced by military interests, and recommend the changes needed so that this research and development better contributes to peace, social justice and environmental sustainability.

- *The role of vested interests in science and technology*

This research project is documenting the way in which vested interests, especially large corporations, influence scientific research and technological development. The main focus at the moment is on biotechnology.

SGR's other activities include organising conferences on current controversies in science and technology, and acting as a support network for ethically-concerned scientists. Previous activities have included the 'The Climate Train to Kyoto' (which lobbied for a strong Kyoto Protocol at the 1997 climate negotiations) and the 'Science for the Earth' conferences (1992-1996).

At an international level, SGR carries out its work as part of the International Network of Engineers and

Scientists for global responsibility (INES), whose head-office is in Germany. This network consists of over 90 member organizations in 40 countries, and was founded in 1991. For further information, please see the INES web-site at http://www.inesglobal.org/

Currently, SGR has about 600 scientist members, including some of the UK's top scientists, for example, Prof. Stephen Hawking (author of 'A Brief History of Time'), Prof. Maurice Wilkins (Nobel Prize winner for his role in the discovery of DNA) and Prof. Sir Martin Rees (Astronomer Royal). Unlike many scientific bodies it is our policy to refuse funding from the military or large corporations involved in controversial science and technology - which means we depend for most of our finance on our members and supporters. I would like to invite members of TIES to join also SGR and help us encourage more scientific work to contribute to peace and sustainable development. Our members come from many disciplines spanning physical and natural sciences, social sciences, engineering and computing, and interdisciplinary areas. They work in research and development, manufacturing, teaching, science writing, or are students. Non-scientists are welcome to join SGR as associate members.

For more information about SGR and how to join, please contact us or go to our web-site:

Scientists for Global Responsibility
PO Box 473.
Folkestone. CT20 1GS
United Kingdom
Tel: +44 (0) 7 771 883 696
Email: info@sgr.org.uk
Web: http://www.sgr.org.uk/

5. Research Projects and Programmes

Teresa Alpuim, Editor

In this section of TIES Newsletter members are invited to describe the Environmetrics research projects they are involved with. It is our aim, not only to show the many different ways quantitative methods are being applied to Environmental Sciences, but also to give knowledge about who is working on what problems. We believe that this will contribute to increased scientific interchange between TIES members. Contributions should be sent to Teresa Alpuim, email: talpuim@fc.ul.pt. Academic programmes related to environmental problems are welcome, too.

El Niño Forecasting using Hierarchical Dynamic (HiDyn) Models: A Web-Based Product

Noel Cressie

Director, Program in Spatial Statistics and Environmental Sciences
The Ohio State University

The inter-annual variation of tropical Pacific sea surface temperature (SST) is an important factor in the variability of the global climate system. The dominant feature of this field is the episodic warming and cooling of ocean waters with periods of approximately 3-5 years, namely, the El Nino Southern Oscillation (ENSO) phenomenon. In recent years, long-lead predictions of tropical Pacific SSTs have improved greatly in light of better observational networks, analysis schemes, and understanding of the processes that govern the interaction of the atmosphere and ocean.

The spatial HiDyn model that we have developed in "Long-Lead Prediction of Pacific SSTs via Bayesian Dynamic Modeling" by L.M. Berliner, C.K. Wikle, and N. Cressie (2000), Journal of Climate, 13, 3953-3968, forecasts monthly tropical Pacific SST anomalies at a seven-month lead time. This lead time was chosen to demonstrate how the methodology could be applied to produce operational forecasts at least six months in advance, with the consideration that time is required to acquire new data for the new forecast. The methodology can be readily adapted to different lead times.

A web-based product now exists as part of the web site of the Program in Spatial Statistics and Environmental Sciences. The URL is: http://www.stat.ohio-state.edu/~sses/collab_enso.php This page contains both current SST forecasts as well as animation of any forecast period specified by the user. (The web browser has to be Java-enabled to see the animation-part of the product.)

Key to our HiDyn model for forecasting SSTs is incorporation of the following features:

- For each time (month), we consider a spectral model for the data, focusing on a reduced empirical orthogonal function (EOF) basis set.
- We assume that the spectral coefficients of the model are stochastic and time-varying. That is, they are assumed to follow a multivariate time series model.

- The parameters of that time series model are themselves time-varying, yielding a methodology that is inherently nonlinear. Models reflecting warm, normal, and cool regimes are considered.
- Prognostic variables that indicate possible future transitions among regimes are modeled as random with probabilities that depend upon the behavior of surface-wind anomalies in the western Pacific, which is a qualitative expression of physical processes associated with tropical Pacific SSTs.

Variabilities inherent in the various processes are included in the HiDyn model, and the SST forecasts are obtained with these variabilities properly accounted for. Furthermore, we note that since the HiDyn is a desktop workstation model, achieving even comparable results to deterministic models run on supercomputers represents a significant advance relative to computational effort.

Forum
On Statistical Ecology, Environmental Statistics, Advanced Raster Map Analysis And Surveillance Geoinformatics

G. P. Patil

Distinguished Professor of Mathematical Statistics
Director, Center for Statistical Ecology and Environmental Statistics
Editor-in-Chief, Environmental and Ecological Statistics

As we are all aware, effective cross-disciplinarity of statistics, ecology, environment, and society is crucial in the twenty-first century in response to the toxic legacy of the twentieth. It is important that we strengthen our efforts for constructive dialogues and productive outcomes, using old forums we have and new forums we can form.

Your active participation and involvement in the following activities and initiatives will be mutually helpful indeed. These include:

1) Multiscale Advanced Raster Map Analysis Program

2) Surveillance Geoinformatics and Digital Governance Program

3) *Environmental and Ecological Statistics*—An International Journal

4) Environmental and Ecological Statistics—A Monograph Series.

1) **Multiscale Advanced Raster Map Analysis Program:** The Center for Statistical Ecology and Environmental Statistics has an initiative on advanced raster map analysis using advanced mathematical, statistical, computational, and visualization approaches for sustainable environment and development.

Feel free to visit http://www.stat.psu.edu/~gpp and enjoy the surf! Particularly the Raster Map Analysis link http://www.stat.psu.edu/~gpp/newpage11.htm found at this site.

2) **Surveillance Geoinformatics and Digital Governance Program:** Geoinformatic surveillance for spatial and temporal hotspot detection and prioritization is a critical need for the 21st century Digital Governance. A hotspot can mean an unusual phenomenon, anomaly, aberration, outbreak, elevated cluster, or critical area. The declared need may be for monitoring, etiology, management, or early warning. The responsible factors may be natural, accidental or intentional, with relevance to both infrastructure and security. This involves critical societal issues, such as carbon budgets, water resources, ecosystem health, public health, drinking water distribution system, persistent poverty, environmental justice, crop pathogens, invasive species, biosecurity, biosurveillance, remote sensor networks, early warning and security. The geosurveillance provides an excellent opportunity, challenge, and vehicle for synergistic collaboration of computational, technical, and social scientists. The Center for Statistical Ecology and Environmental Statistics now has an initiative with a five year NSF grant from its Digital Government Program. You are invited to participate.

Feel free to visit:

1. http://www.stat.psu.edu/~gpp/PDFfiles/YouAreInvited.pdf
2. http://www.stat.psu.edu/~gpp/PDFfiles/keystone alliance.pdf
3. http://www.stat.psu.edu/~gpp/PDFfiles/RTI 2.pdf
4. http://www.stat.psu.edu/~gpp/PDFfiles/RTI 1.pdf

3) ***Environmental and Ecological Statistics*—An International Journal**: It has been simply wonderful that we conceptualized and initiated the Journal when we did. It is now ten years. And we will be entering

the eleventh year pretty soon with a special institutional thematic issue guest-edited by Peter Guttorp, the TIES President, in recognition of the National Center for Statistics and the Environment at the University of Washington. You may visit the Journal websites:

http://www.stat.psu.edu/~gpp/cross-di.htm,
http://www.kluweronline.com/issn/1352-8505,

http://www.stat.psu.edu/%7Egpp/PDFfiles/2001-0201.pdf

The Journal is published by Kluwer Academic Publishers. For more information and important action on subscription, contact Melinda Paul, Editor, Environmental Science, at melinda.paul@wkap.com .

4) **Environmental and Ecological Statistics—An International Monograph Series**: You may visit the monograph series website

http://www.stat.psu.edu/~gpp/monograp.htm.

Please do not hesitate to send me your comments and suggestions on potential topics and authors/co-authors for timely books.

I look forward to working with you on these initiatives and more that you may have on your mind.

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Web address: http://www.stat.psu.edu/~gpp

New Professorial Fellow, David Fox, Has A Wide Environmental Brief

Willing to wade through wastewater, newly appointed Civil and Environmental Engineering Professorial Fellow David Fox is hardly your average desk-bound statistician.

Professor Fox, seconded from CSIRO for up to three years, is here to help identify, develop and conduct multi-disciplinary, multi-agency environmental projects of joint interest and benefit to the University of Melbourne and CSIRO.

His appointment is sponsored by CSIRO's Division of Land and Water, the University of Melbourne departments of Civil and Environmental Engineering and Anthropology, Geography and Environmental Studies, and Melbourne University Private.

Professor Fox's expertise is in Environmetrics, a statistical discipline devoted to environmental monitoring, sampling and assessment.

He is also outspoken on where the problem of declining interest in statistics as a discipline lies, believing it is not entirely due to lack of funding. He suggests the profession needs to take greater responsibility for and ownership of its own destiny.

"The enormity and pervasiveness of environmental issues confronting Australia should have mathematicians and statisticians overwhelmed by work associated with environmental measurement, modelling and monitoring. Unfortunately, this is not the case," he says.

"It is disturbing that much of this country's critical statistical analyses underpinning major natural resource management decisions is being compromised by a lack of access to robust and contemporary statistical methodology.

"To overcome this, statisticians need to improve coordination, communication and collaboration between themselves and environmental scientists. For their part, the statisticians need to adopt a more 'hands-on' approach.

"It is possible to sit in an office and run computer software to help design a water quality monitoring program, but the broader appreciation and understanding of an environmental problem comes from actually getting out there in the field," he says.

Professor Fox can attest to the value of this type of fieldwork having flown down river gorges in Papua New Guinea, snorkelled in seagrass meadows in Western Australia and waded in the murky waters around the Boags Rocks sewage outfall on Victoria's Mornington Peninsula to achieve the understanding necessary to deliver a robust statistical analysis of the problem.

"Statistics has a bright future as long as we start communicating better with other scientists, industry, government and the public about the role we can play in managing the environment," he says.

During his secondment, Professor Fox will help develop a Masters stream in Environmetrics as part of the University's Graduate Environmental Program, the first such course of its kind in Australia. He will also offer undergraduate courses in Environmetrics and supervise graduate students.

Professor Fox is Director of the new Adelaide Coastal Waters Study, for which most of the research and

technical services will be provided by South Australian universities and research organisations, although he is seeking to use expertise from the University of Melbourne.

"These activities give immediate effect to the recently signed Memorandum of Understanding between CSIRO and Melbourne University," he says.

6. Forthcoming Papers in Environmetrics

Abdel El-Shaarawi, Editor-in-Chief

- Barbara A. Bailey and Scott C. Doney: "Quantifying the Effects of Dynamical Noise on the Predictability of a Simple Ecosystem Model".
- Jinheum Kim, Chung Mo Nam and Dae Ryong Kang: "Controlling the Healthy Worker Effect in the Presence of an Intermediate Variable".
- Robert Noble and Eric P. Smith: "Model Selection in Canonical Correlation Analysis (CCA) Using Bayesian Model Averaging".
- Peter F. Craigmile, Peter Guttorp and Donald B. Percival: "Trend Assessment in a Long Memory Dependence Model using the Discrete Wavelet Transform".
- Abou El-Makarim A. Aboueissa and Michael R. Stoline: "Estimation Of The Mean and Standard Deviation from Normally Distributed Singly-Censored Samples".
- Jochen Einbeck, Carmen D. S. Andre and Julio M. Singer: "Local Smoothing with Robustness against Outlying Predictors".
- J.Gani and L. Stals: "The Spread of a Viral Infection in a Plantation ".
- Ludwig A. Hothorn: "A robust statistical procedure for evaluating genotoxicity data".
- Kristina Voigt, Gerhard Welzl, Rainer Brüggemann: "Data Analysis of Environmental Air Pollutant Monitoring Systems in Europe".
- A.L. Amaral, M. da Motta, M.N. Pons, H. Vivier, N. Roche, M. Mota and E.C.Ferreira: "Survey of Protozoa and Metazoa Populations in Wastewater Treatment Plants by Image Analysis and Discriminant Analysis".
- Sung Eun Kim: "Nonlinear Estimation for PM2.5 Transmission Effects in Jefferson Co., Texas".

7. Recently Published Books

Liliana Gonzalez
(liliana@cs.uri.edu)

This section provides a list of recently published books likely of interest to members of our society. I encourage every one to send me information about recently published books they think should be listed in this section in future Newsletters.

- *Topics in Modelling of Clustered Data* (2002). Edited by M. Aerts, G. Molenberghs, H. Geyz and L.M.Ryan. Chapman and Hall / CRC.
- *Statistics for Environmental Engineers* (2002). P.M.Berthouex and L. C. Brown. Chapman and Hall / CRC.
- *Statistics with Applications in Biology and Geology* (2002). P. Blaesild and J. Granfeldt. Chapman and Hall / CRC.
- *Graphical Models, Methods for Data Analysis and Mining* (2002). C. Borgelt and R. Kruse. Wiley.
- *Collection and Treatment of Earth Science Data* (2003). G. Borradaile. Springer.
- *An Introduction to Statistical Modeling of Extreme Values* (2001). S. Coles. Springer.
- *Modelling Binary Data* (2002), 2nd Edition. D. Collett. Chapman and Hall / CRC.
- *Components of Variance* (2002). D. R. Cox and P. J. Solomon. Chapman and Hall / CRC.
- *Statistical Methods for the Analysis of Repeated Measurements* (2002). C. S. Davis. Springer.
- *An Introduction to the Theory of Point Processes, Volume I: Elementary Theory and Methods* (2003), 2nd Edition. D. J. Daley and D. Vere-Jones. Springer.
- *Nonlinear Estimation and Classification* (2002). D.D. Denison, M. Hansen, C. C. Holmes, B. Mallick and B. Yu (Eds.). Springer.
- *Analyzing Medical Data Using S-PLUS* (2001). B. Everitt and S. Rabe-Hesketh. Springer.
- *Concise Handbook of Experimental Methods for the Behavioral and Biological Sciences* (2002). J. E. Gould. Chapman and Hall / CRC.

- *Overdispersion, Models and Estimation* (2003). J. Hinde and C. Demetrio. Chapman and Hall / CRC.
- *Bayesian Survival Analysis* (2001). J. G. Ibrahim, M.-H. Chen and D. Sinha. Springer.
- *Mathematical and Statistical Methods for Genetic Analysis* (2002), 2nd Edition. K. Lange. Springer.
- Geostatistical Simulation, Models and Algorithms (2002). C. Lantuéjoul. Springer.
- Statistics of Random Processes I, General Theory (2001), 2nd Edition. R. S. Liptser and A. N. Shiryaev. Springer.
- Statistics of Random Processes II, Applications (2001), 2nd Edition. R. S. Liptser and A. N. Shiryaev. Springer.
- Statistical Methods in Agriculture and Experimental Biology (2002), 3rd Edition. R. Mead, R.M. Curnow and A. M. Hasted. Chapman and Hall / CRC.
- Analysis of Messy Data, Volume III: Analysis of Covariance (2002). G.A. Milliken and D. E. Johnson. Chapman and Hall / CRC.
- Small Area Estimation, Methods and Applications (2003). J. N. K. Rao. Wiley.
- Observational Studies (2002), 2nd Edition. P. R. Rosenbaum. Springer.
- Analysis of Failure and Survival Data (2002). P. J. Smith. Chapman and Hall / CRC.
- Applied Nonparametric Statistical Methods (2001). P. Sprent and N. C. Smeeton. Chapman and Hall / CRC.
- Mixed Models for Data Analysts (2003). A. P. Verbyla, B. Cullis, A. B. Smith, R. Thompson and S. J. Welham. Chapman and Hall / CRC.
- Multivariate Geostatistics, An Introduction with Applications (2003), 3rd Edition. H. Wackernagel. Springer.
- Image Analysis, Random Fields and Markov Chain Monte Carlo Methods, A Mathematical Introduction (2002), 2nd Edition. G. Winkler. Springer.

8. Book Reviews

Liliana Gonzalez, Editor

I wish to thank Howard Grubb for responding to my call for volunteers to review books for this section of the Newsletter. For this issue Howard kindly reviewed "Model Selection and Multi-Model Inference: A Practical Information-Theoretic Approach", by K. P. Burnham and D. R. Anderson. Philip Dixon also agreed to review "Spatial Statistics Trough Applications" by J. Mateu and F. Montes (Eds). His review will appear in the first issue of 2004 since I very much wanted to review "Geostatistics for Environmental Scientists" by R. Webster and M.A. Oliver. I personally used this book as the recommended text for my introductory class in "Spatial Data Analysis" at the University of Rhode Island and wanted to comment on my personal experience in using the book as a textbook for my class.

And once more, I like to thank John Kimmel, Executive Editor of Statistics of Springer-Verlag, for providing Howard with a complementary copy of one of the books reviewed in this issue and for his support of this section of the Newsletter. He continuously offers us books for review and here are three of his offerings.

- **Spatial Statistics and Computational Methods** (2003) by Møller, Jesper (Ed.), Springer-Verlag

  Table of contents: Theory and Practice of Markov chain Monte Carlo (MCMC) Methods; Model-based Geostatistics; Simulation-based Inference for Spatial Point Processes; Low and High Level Bayesian Image Analysis.

- **Estimating Animal Abundance**, Closed Populations (2002) by D. L. Borchers and S. T. Buckland. Springer-Verlag.

  Table of Contents: Part I Introduction. Using Likelihood for Estimation. Part II Simple Methods. Plot Sampling; Removal, Catch-Effort, and Change-in-Ratio; Simple Mark-Recapture; Distance Sampling. Part III Advanced Methods. Extended Building Blocks; Spatial Modeling; Mark-Recapture Revisited; Integrated Models; Open Population Methods. Part IV Overview Which Method?

- **Wildlife Study Design** (2001), Edited by M. L. Morrison, W. M. Block, M. D. Strickland and W. L. Kendall. Springer-Verlag.

Table of Contents: Concepts; Experimental Designs; Sampling Strategies: Fundamentals; Sampling Strategies: Applications; Impact Assessment; Inventory and Monitoring Studies; A Practical Guide to Study Design; Education in Design and Statistics for Students and Professionals; Synthesis: Advances in Wildlife Research Design.

Remember that your options are not restricted to the three books above, as you have a wide selection of titles to choose from. Please let me know what title you would like to review from the books in the list of "**Recently Published Books**" or any other you have in mind and I will make every effort to get you a complementary copy from the publisher.

Model Selection and Multi-Model Inference: A Practical Information-Theoretic Approach

by

K. P. Burnham and D. R. Anderson.

Springer-Verlag, New York, 2002, Second Edition, Hardcover, xxvi+488 pp, US$80, □80, £61.50, ISBN 0-387-95364-7

Reviewer: Howard Grubb, School of Applied Statistics, The University of Reading, UK. Email: h.j.grubb@reading.ac.uk

This book brings together many aspects of model selection, model uncertainty and information theory, and presents a thorough overview of statistical model specification and comparison. Chapter one in particular provides a wealth of sound advice on statistical modelling in general, but throughout the text, elements highlighted in bold, or in boxes, are always extremely pertinent and valuable, and there is much interesting historical background to the developments of information theory. At times, the notation can be hard going, particularly in the later, more theoretical, chapters, but this presentation is mainly used to elaborate the information theory ideas.

The preface of this second edition claims that it improves the presentation and flow of concepts and adds new technical material. Comparison with the first edition seems to bear this out. There are an additional 120 pages, including a new Chapter 6 on Advanced Issues and Deeper Insights (which merits the title) and an expanded Chapter 4, which has also been re-phrased from Model-Selection Uncertainty into Formal Multi-model Inference. It is also clear that a lot of other worthwhile re-organisations and revisions have been made throughout the text, including the bold or boxed comments.

The central idea of the (revised) book - multi-model inference - might be seen to be quite controversial, and not all readers will wish to fully subscribe to this, particularly since it is not yet fully-developed. It amounts to model averaging, within a frequentist, rather than the Bayesian framework, using weights derived from information criteria for each model. This is not without its problems when applied to model parameters, rather than to potential observables, although this point is only briefly touched upon in the context of non-linear parameters. The methods are presented assuming that prediction is required for a model parameter, but this will only be the case when these can be assigned physical interpretations.

The examples are biased towards the authors' interests in wildlife ecology, which can lead to small model dimensions, due to scientifically-based constraints and relationships. In these situations inference on specific structural parameters is clearly a key concern. More data-rich, but perhaps contextually less well understood problems, which require more flexible, descriptive, rather than explanatory, models, may not fit so naturally within the multi-model framework, partly since inference is on observables, and not linked to any specific parameterisation, but mainly because the model complexity is usually parameterised as a key element of the model-building. Readers who are interested in this general area may also like to see Hastie, Tibshirani and Friedman (2001), who give some other, though not necessarily contradictory, points about data-mining and primarily computationally-oriented, non-parametric inferential methods.

In summary, this is a substantial and worthwhile update of an interesting book. While not every problem will lend itself to the multi-model inference approach, and indeed, many statisticians may have questions about this approach, there is still much of interest for any statistician or modeller, perhaps most valuably, all of the practical, applied, as well as theoretical, insights into the process of statistical model building, criticism and information measures.

References

Hastie, T., Tibshirani, R. and Friedman, J (2001) *The Elements of Statistical Learning. Data Mining, Inference and Prediction* . New York: Springer

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Geostatistics for Environmental Scientists

by

R. Webster and M.A. Oliver

John Wiley & Sons, 2001, Hardcover, 271+xi pp, US$115.00, □90.00, £60.00, ISBN 0-471-96553-7

Reviewer: Liliana Gonzalez, Department of Computer Science and Statistics, University of Rhode Island, Kingston, RI, 02881. Email: liliana@cs.uri.edu

This book is a concise and readable presentation of the basics of linear geostatistics. It provides a wide range of examples drawn from the vast experiences of the authors working in the area of spatial data analysis applied to soil sciences. The presentation of topics can be regarded as arranged in three parts: Part I-Introduction, Part II-Spatial Modeling, and Part III-Spatial Interpolation. I focus in turn on each of these parts in my review below.

Part I-Introduction is comprised of three chapters. Here, the authors discuss "why geostatistics", present screening methods and briefly introduce some statistical concepts such as distributions (e.g., normal, t and chi-square), transformations (e.g., logarithmic, square root, angular and logit), basic sampling topics and confidence limits. The last of the introductory chapters reviews basic spatial interpolation techniques such as Thiessen polygons, triangulation, inverse distances, trend surfaces and splines.

Part II-Spatial modeling contains four chapters. Chapter 4 paves the way for the later chapters by introducing the concepts of random variables, random functions, stationarity, ergodicity and defining the covariance function as a function of distance. The relationship between covariance and variogram is also described and the geostatistical terminology defined (e.g., 'nugget effect', 'range of influence', 'sill value', 'hole effect', 'geometric and zonal anisotropy', 'drift'). The authors then proceed with the estimation of variograms and appropriately identify the variogram as the cornerstone of geostatistics. A considerable amount of attention is devoted to this topic in Chapter 5, with specific suggestions as to how to model the variogram correctly. In Chapter 6 the emphasis is on modelling the variogram and the "authorized" unbounded and bounded variogram models (linear, circular, spherical, pentaspherical, exponential, Gaussian and pure nugget) are defined. The authors recognize that variogram fitting, even after 20 years of the first geostatistics books appearing in the literature, is still a controversial issue. Their recommendation? Fitting of variograms encompasses two stages: visual inspection and statistical fitting and checking. In other words, select models visually, then fit every model in turn by using weighted least squares and lastly inspect the result graphically by plotting together the fitted model and the experimental variogram. The Akaike information criterion (AIC) is suggested as a way for selecting the "best" model among several suitable models. Alternatively, the authors recommend the use of cross-validation for judging "goodness of fit" of the different models. An interesting feature is the presentation in Chapter 7 of spectral analysis, to model patterns that fluctuate with periodicity as an alternative to using a variogram model with a periodic component. This complex topic is presented in a clear and concise manner and references to other literature given.

Part III, encompassing chapters eight to ten, deals with aspects of estimation. Chapter 8 introduces the general theory of Ordinary Kriging -point and block-. The Kriging equations are also presented in matrix form, which in turn leads naturally to the presentation of the Kriging weights and Kriging variances in matrix form. I have to confess that the majority of my students, mostly biologists, had difficulties with matrices at first, but once the basics of matrix notation/operations were introduced, they felt comfortable about their continuous use in the last part of the book. A rather nice example is presented in the earlier part of Chapter 8, illustrating the effects of changing parameters of an exponential variogram model on the Kriging weights. This example in particular, helps practitioners/students to develop an intuitive understanding of how Kriging works. A case study on exchangeable potassium (K), from a survey of Broom's Barn Farm (Broom's Barn is a division of Rothamsted Research), is used to illustrate the application of Kriging to mapping. A nice feature of this study is that it is fully reproducible (data available on

www.rothamsted.bbsrc.ac.uk/aen/statistics/).

The later part of the chapter briefly discusses simple, lognormal and universal Kriging and gives references to other kinds of Kriging, such as indicator, disjuntive, probability and Bayesian Kriging. Cross validation is presented at the end of this chapter. Chapter 9 introduces the concept of cross-correlation and coregionalization and their obvious use in predicting the spatial relationship between two or more variables, Co-kriging. The last chapter in the book addresses the additional question of what the likelihood is that the values at target points exceed some threshold, a question of considerable relevance for environmental

managers, decision makers and law enforcers. The authors cite several case studies dealing with this question but choose to discuss it in the framework of Gaussian Disjunctive Kriging. At the end of the book the authors include two appendices. Of particular interest to practitioners is the Appendix "Aide-mémoire for Spatial Analysis". It outlines the steps a scientist should take in a geo-statistical analysis.

In summary, I very much enjoyed reading the book and thought of it as an appropriate textbook for an introductory "Spatial Data Analysis" class, targeted to Environmental Scientists in general. Readings will have to be supplemented for a more technical audience. In particular, from the practitioner's point of view, I found the recommendations and practical advice provided by the authors very helpful. A copy of this book belongs on the desks of practitioners of geostatistics.

9. TIES Board of Directors

The following are the names of the elected members of TIES Board of Directors. All terms are from September 1, 2002, to August 31, 2004, except the 4-year terms of the regional directors.

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TIES Newsletter is a publication of the International Environmetrics Society (TIES). It is published semiannually, or whenever the need arises, by The International Environmetrics Society and distributed to TIES members as part of their annual dues.

Objectives of the Newsletter include (but are not limited to):

- To keep TIES members informed of what is happening within the Society;
- To cover news in latest developments in theory and applications of environmetrics;
- To be a forum for discussion of a broad range of issues which are of interest to members of TIES and are consistent with the objectives of the Society.
- To facilitate communication between environmental scientists and statisticians about research problems of mutual interest.
- To provide details about upcoming conferences and workshops related to Environmetrics;

- To announce members' news that are worthy of notice or recognition (e.g., awards, prizes and honors received, promotions, appointments, etc.)

Communications, (e.g., contributions, comments and suggestions) regarding this publication should be addressed to the TIES Newsletter editors:

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or

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The Editors would like to encourage TIES members to submit items for publication in the Newsletter. We would like to have a very comprehensive publication that is of interest to our members by including items such as members' and regional news, Environmetrics and related conferences, research projects and programmes, book reviews, letters to the editor and articles of general interest.

We would like to thank the members who responded to our call and contributed to this issue. It is our hope that the Newsletter will be a valuable platform for discussion and exchange of ideas among us. We will be happy to hear your views about the contents and style of this issue. We hope that you will be a reader as well as a contributor.

TIES Webpage:
http://www.nrcse.washington.edu/ties

TIES 2003: Johannesburg, SOUTH AFRICA. November 3-7.

TIES 2003 scientific tour on Tuesday at the Drimolen location of the World Heritage Site