



Newsletter

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1. A Message from the President

Peter Guttorp (peter@stat.washington.edu)

It is always daunting to take over someone else's job. Our thanks go to our former President Sylvia Esterby for all the work she has done (and continues to do) for

our Society. I also want to thank our past Treasurer, Francis Philbert, past Secretary, Jari Walden, and past Regional Director Carlos Pereira.

The new Board of Directors is already very active (all discussions are of course using email). While there is a variety of short-term issues that we have to deal with, we also hope to be able to discuss the long-term strategy of the Society. Issues such as the structure and frequency of our meetings, growth of the membership of the Society, and our relationship to other societies, will be important to think about.

I think it is extremely important to involve as many members as possible in the running of the Society (in particular in order to avoid burnout of the elected officials). We do that using a variety of committees, which I describe later in this column. There is also a brief description of some of the highlights from the Genova meeting last summer, and a tally of the environmetric events next summer.

Environmetrics 2002

The Genova meeting of TIES was a great success, with 141 participants from 17 countries. About two thirds of the participants came from Europe; just over half of the Europeans from Italy. Local organizers were Vincenzo Dovi and Daniela Cocchi, helped by several graduate students from the universities of Genova and Bologna. They richly deserve our heartfelt thanks. The meeting

resulted in 57 new members. In addition, we have had 14 new members not associated with the meeting registration. The list of new members is elsewhere in the newsletter.

TIES President Sylvia Esterby invited Lennart Bengtsson from the Max Planck Institute of Meteorology in Hamburg, Germany to give the President's Invited Address. Professor Bengtsson outlined some of the complexities of climate change assessment in a splendid presentation.

The Hunter lecturer was Noel Cressie, Ohio State University, USA, who took us through a world of massive datasets to look for spatial trend over limited time intervals, exemplified by looking for the stratospheric ozone hole.

Hans Pasman of the Netherlands Organisation for Applied Research gave a special invited lecture on structuring quantitative risk assessment for toxic substances. There were 19 additional invited sessions, as well as several contributed sessions. I want to congratulate Claudia Libiseller of Linköpings Universitet, Sweden, who won the Best Student Paper Award (see separate story).

President Esterby also organized a panel discussion on the perspective of quantitative science in the debate about environmental degradation. The panelists contributions can be found elsewhere in this newsletter.

The TIES Board of Directors met several times during the meeting. A board decision, which I hope will have some long-term influence on our membership, was to make student membership without *Environmetrics* free of charge. We think this will encourage more young environmetricians to be interested in the organization and its activities.

Committees

One of the biggest jobs for an incoming TIES president is to make sure that members get involved with the various committees by which our organization operates. Some of these committees are mandated in our bylaws, while others are ad hoc committees (or permanent ones that just have not yet made it into the bylaws...).

Here is the list of those I have asked (or who are required) to serve on the committees, together with a brief explanation of what their tasks are.

Election committee

Since we do not need elections until next year, this

committee is not active this year.

Executive committee

Day-to-day decisions are made by the executive committee, whose membership is specified in the bylaws:

- Teresa Alpuim, Universidade de Lisboa, Portugal (Publications Officer)
- Anders Grimvall, Linköpings Universitet, Sweden (President-Elect)
- Peter Guttorp, University of Washington, USA (President)
- Bronwyn Harch, CSIRO Cleveland, Australia (Treasurer)
- Richard Katz, NCAR, USA (Secretary)

Membership committee

The recruitment of new members is a crucial task for the Society. The membership committee is chaired and chosen by the President-Elect.

Program committee

This committee deals with the important issue of where the annual Environmetrics meetings will be located. It also is charged to think about our long-term meeting policy, new forms of meetings, etc. Its members are chosen from the Board of Directors, and are:

- Ray Correll, CSIRO Glen Osmond, Australia
- Jacky Galpin, University of Witwatersrand, South Africa
- Anders Grimvall, Linköpings Universitet, Sweden
- Gudmund Høst, NRC Oslo, Norway
- Tony Olsen, EPA Corvallis, USA

If you have ideas about TIES meetings, please contact the chair, Anders Grimvall (angri@mai.liu.se).

Publications committee

Issues of TIES publications, such as editorial policy for our official journal *Environmetrics*, the newsletter, the web page etc., are discussed in this committee. The members are:

- Teresa Alpuim, Universidade de Lisboa, Portugal (Publications Officer)
- Bronwyn Harch, CSIRO Cleveland, Australia (Treasurer)
- Richard Katz, NCAR, USA (Secretary)

The chair is Teresa Alpuim, talpuim@fc.ul.pt or

alpuimt@math.mcmaster.ca. Let her know what ideas you may have about TIES publications.

Awards committee

This group of members has the responsibility of obtaining nominations and choosing the winner of the El-Shaarawi award for young environmetricians. The committee consists of:

- Loveday Conquest, University of Washington, USA
- Lelys Guenni, Universidad Simon Bolivar, Venezuela
- Louise Ryan, Harvard University, USA
- Werner Stahel, ETH, Zürich, Switzerland.

The chair is Loveday Conquest, who can be reached at conquest@u.washington.edu.

Committee on government communication

This committee resulted from some conversations after the panel discussion at the Genova meeting mentioned above and elsewhere in this newsletter. The task of the committee is to think about scientific approaches towards developing tools for communicating science results, with their relevant uncertainty, to decision-makers.

- David Fox, CSIRO Wembley, Australia
- Jan Holst, Lunds Universitet, Sweden
- Dan Mckenzie, EPA Corvallis, USA
- Jim Zidek, University of British Columbia, Canada

The chair is Jan Holst, janh@maths.lth.se Please contact him if you have any contributions to this important area.

Meetings next summer

There are three environmetrics-related meetings next summer: the SPRUCE meeting in Lund, Sweden, in June; the ISI satellite meeting in Santiago de Compostela, Spain, in July; and the TIES meeting in Beijing, China, in August. There are separate articles about these meetings elsewhere in the newsletter. In addition, the Joint Statistical Meetings in San Francisco, USA, in August, will have several sessions on environmental statistics (including a panel discussion organized by TIES). The ISI meeting in Berlin, Germany, also in August, has the President's Invited Session focusing on environmental statistics, as well as several other sessions related to statistics and the environment. Our field is growing! I will be giving the opening lecture at the meeting in Lund on future directions of environmetrics, and will be sharing some thoughts on that topic with you in the next newsletter.

2. TIES News

2.1. New Members

Richard Katz

Welcome to the 71 new members who have joined since May 2002. From these 57 joined through registration at TIES 2002 conference in Genoa, Italy. 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.

Barry, Mieke W.	South Africa
Bilancia, Massimo	Italy
Bellone, Enrica	UK
Bengtsson, Thomas	USA
Bertino, Laurent	Norway
Bordignon, Silvano A.	Italy
Cerisola, Davide	Italy
Challenor, Peter	UK
Chaseling, Janet	Australia
Chiogna, Monica	Italy
Cooke, William H.	USA
Creagh, Alex	Australia
D'Alessandro, Luana	Italy
De Michele, Carlo	Italy
Di Battista, Tonio	Italy
Erasmus, Louise	South Africa
Fabrizi, Enrico	Italy
Filar, Jerzy A.	Australia
Gaetan, Carlo	Italy
Graham, Petra	Australia
Greco, Fedele	Italy
Greco, Luigi	Italy
Grubb, Howard	UK
Hamm, Nick	UK
Holland, David M.	USA
Holst, Jan	Sweden
Huso, Manuela	USA
Hussian, Mohamed	Sweden
Kaprara, Athina	Greece
Kenter, Bernhard	Germany
Khorshiddoust, Ali Mohammad	Iran
King, Robert	Australia
Kodell, Ralph	USA
Kuchenhoff, Helmut	Germany
Lardjane, Salim	France
Lawson, Andrew B.	USA
Lovison, Gianfranco	Italy
Maitra, Ranjan	USA
Marker, David	USA
Mayer, Alvo	Canada

McKenzie, Daniel	USA
Mendola, Daria	Italy
Mole, Nils	UK
Naveau, Philippe	USA
Nissi, Eugenia	Italy
Nussbaum, Barry D.	USA
Orasi, Ariana	Italy
Pallini, Andrea	Italy
Pauli, Francesco	Italy
Pebesma, Edzer	The Netherlands
Picek, Jan	Czech Republic
Pissani, Caterina	Italy
Pollice, Alessio	Italy
Porcu, Emilio	Italy
Raggi, Meri	Italy
Romanowicz, Renata	UK
Sarno, Emma	Italy
Schopflocher, Tom	Canada
Singh, Ravi	India
Sinha, Bimal	USA
Slini, Theodora	Greece
Smith, Rognvald	UK
Taberski, Karen	USA
Tomppo, Erikki	Finland
Vallebona, Andrea	Italy
Verdonck, Frederik	Belgium
Vieu, Philippe	France
Voigt, Kristina	Germany
Wackernagel, Hans J.	France
Whitcher, Brandon	UK
Zhen, Luo	USA

2.2. Member's News

- **David R. Brillinger**, member of TIES and Professor of Statistics at University of California, Berkeley, received *the 2002 Emanuel and Carol Parzen Prize for Statistical Innovation* for outstanding distinction and eminence in research on the theory of statistical time series and data analysis, in applications of statistical methods in diverse fields. Also, he provided international leadership and continuing impact through his vision and effectiveness as an applied statistician. The prize is awarded by Texas A&M University Department of Statistics.
- **Alessandro Fassò** is the Webmaster of the new web site of GRASPA, the Italian group for environmental statistics established in 1995 and composed of seven local research units. A number of GRASPA members are also TIES members. Its renewed web site is available at www.graspa.org.

The main objective of this initiative is to help the circulation of information about environmental statistics and related topics, both inside and outside the environmental statistics community, through the dissemination of information on: 1) international activities and conferences, and 2) GRASPA activities.

Besides publishing working papers, bibliographic lists and events, it is intended to introduce the topic "teaching and learning environmental statistics through the web" as an experimental issue. The site is intended to be a forum for sharing data and knowledge among GRASPA members and registered guest visitors.

TIES members are invited to submit new conferences, courses, activities etc., relevant to environmental statistics and environmetrics to: alessandro.fasso@unibg.it. Any suggestion is welcome.

- **Abdel H. El-Shaarawi** is currently spending his sabbatical year at University of Genoa, Italy. During his stay he will conduct research on modeling the dispersion of atmospheric pollutants from commercial boats in Italian harbours with special emphasis on the ports in Liguria.
- As of August 16th 2002, **Andrew Lawson** has moved to a position of full Professor in the Department of Epidemiology and Biostatistics, University of South Carolina, Columbia USA.; email: alawson@gwm.sc.edu
- Fellow of the American Statistical Association, 2002. **Carol A. Gotway Crawford**, Senior Mathematical Statistician, National Center for Environmental Health: For influential collaborative research and innovative applications of statistical methodology across a spectrum of scientific disciplines and for key research contributions in spatial modeling, geostatistics, and environmental statistics.
- Fellow of Modelling and Simulation Society of Australia and New Zealand, 2002, Natural Systems. **Karan Singh**, Professor and Chair, Department of Biostatistics, and Director, Biostatistical Consulting Center, School of Public Health, University of North Texas: for unselfish dedication to the aims of the society and for contributions to modeling and simulation. Professor Singh's areas of study include survival methodology, cancer modeling, environmental risk assessment, longitudinal data analysis and statistical computing.

- Statistics in Chemistry Award, 2002, sponsored by the Chemometrics Committee of the American Statistical Association Section on Physical and Engineering Sciences in recognition of outstanding collaborative endeavors between statisticians and chemists. **Clifford H. Spiegelman**, John Wikander, and Gerard L. Cote, Texas A&M University, and D. Patrick O'Neal, Lycos, "A Simple Method for Linearizing Nonlinear Spectra for Calibration", *Chemometrics and Intelligent Laboratory Systems Journal*, Vol. 60 (January 2002): pp. 197-209

2.3. Society News

Summary of the 12th Annual General Meeting of TIES

Richard W. Katz, Secretary of TIES

The 12th Annual General Meeting of the International Environmetrics Society was held on Wednesday, June 19, 2002 in conjunction with the TIES annual conference at the University of Genoa, Genoa, Italy. Sylvia Esterby, President of the society, opened the meeting and welcomed all the members. She reported that the major initiative being undertaken has the goal of increasing the membership and visibility of TIES.

The Handbook of TIES is under preparation. It includes information on how the society operates, what are the objectives of TIES, who are the personnel, content of the By-laws, etc. Board members Ray Correll and Bronwyn Harch have updated their recently produced "Manual for the Organization of TIES Annual Conferences." It contains all the relevant information on how to organize a TIES conference.

Francis Philbert, Treasurer, reported on the financial state of the society, stating that it is fiscally sound. The main source of revenue is the membership dues, with the main expenses of the society arising in connection with membership subscriptions to the journal *Environmetrics*. He also gave the status of the membership of TIES, with 233 members as of December 31, 2001.

Peter Guttorp, Chair, presented the report of the Membership Committee (other members: Bronwyn Harch, Thomas Poldfelt, Eric Smith). During the past year, the *committee* has worked on trying to increase institutional membership but, unfortunately, this attempt has been unsuccessful so far. The committee also formulated a proposal, approved by the Board of Directors, that would make contact information for society members available (i.e., name, email address,

and institution). It would permit access only by query (i.e., allowing wildcards), and members could opt out if so desired. The membership list would be accessible by non-TIES members as well. This proposal was approved by a vote of the members present.

Sylvia Esterby, Chair, gave the report of the Elections Committee (other members: Ray Correll, Marian Scott). The new officers of the society are: Anders Grimvall, President-Elect; Richard Katz, Secretary; Bronwyn Harch, Treasurer; Teresa Alpuim, Publications Officer; Jeanette O'Hara Hines, Regional Representative (North America); Gudmund Host, Regional Representative (Europe); and Jacky Galpin, Regional Representative (Other Regions).

Sylvia Esterby presented the report of the Awards Committee (Loveday Conquest, Chair; other members: Anders Grimvall, Tony Jakeman, Francis Philbert, Sylvia Esterby). As announced at the Portland meeting, an award to honor Abdel El-Shaarawi has been created, the Abdel El-Shaarawi Young Researcher's Award. Young researchers, under 41 years of age, who have made outstanding contributions to environmetrics would be eligible for this award. The committee voted to give the 2002 award to Bradley Carlin, Division of Biostatistics, University of Minnesota, and it is hoped to present this award at TIES 2003. Abdel El-Shaarawi expressed thanks for the action of the Board of Directors in creating this award.

Teresa Alpuim, Newsletter Editor (with Bronwyn Harch), stated that the newsletter is going well and thanked the members for their contributions. She also thanked Sylvia Esterby for handling the printing process. In September, Bronwyn Harch becomes TIES Treasurer, with Sylvia Esterby joining Teresa as newsletter Editors. Abdel El-Shaarawi, Editor-in-Chief of *Environmetrics*, reported that the submission rate is healthy, a number of special issues are planned, and an adequate backlog of papers exists.

Paul Sampson took over management of the TIES web site during the past year and has made a number of improvements. He stated that a discussion board is likely to soon be added to the TIES web page. Also a members only section of the web site will be created.

Written reports on past conferences have been submitted by: (1) Philip Chatwin, organizer of TIES 2000/SPRUCE in Sheffield, UK, with the number of registrants being 130 and the conference breaking even financially; and (2) Tony Olsen, organizer of TIES 2001 in Portland, OR, USA. with the number of registrants being 133 and a revenue surplus being

produced.

Daniela Cocchi, conference co-organizer (with Vincenzo Dovi and Sylvia Esterby) of TIES 2002, stated that the number of registrants is 125 so far, with 113 papers and 12 posters. The conference organizers were thanked for an excellent job.

Discussion of future meetings included: (1) Ray Correll, conference organizer of TIES 2003, 21-25 August in Beijing, who distributed a draft brochure. The conference will be held in conjunction with the Third International Conference on Contaminants in the Soil Environment in the Australasia-Pacific Region; and (2) Ron McRoberts who proposed a joint meeting of TIES with the next Spatial Accuracy Symposium, with this symposium to be held in the U.S. in 2004.

Peter Guttorp proposed thanks for the work of Sylvia Esterby, President, and Francis Philbert, Treasurer.

TIES 2002 Student Paper Competition

Richard Katz

At TIES 2002 Conference, 18-22 June, Genova, Italy, another Student Paper Competition took place. The Committee members were: Rick Katz, National Center for Atmospheric Research, USA (Chair); Mohammed El-Saidi, Ferris State University, USA; Harry Pavlopoulos, Athens University of Economics and Business, Greece.

There were six competitors, namely:

Mieke Barry, University of Pretoria, South Africa, "Human encroachment in National Parks in South Africa"

Francesca Bruno, University of Bologna, Italy, "A simple nonseparable space-time covariance model for ozone"

Louise Erasmus, University of Pretoria, South Africa, "Pointing in the right direction: Using indicators of system behaviour to assess sustainability"

Arminda Manuela Gonçalves, University of Minho, Portugal, "Statistical modeling of pollutants concentration in the surface waters of the River Ave Basin"

Claudia Libiseller, Linköping University, Sweden, "Variance reduction for trend analysis of hydrochemical data in brackish waters"

Frederik Verdonck, Ghent University, Belgium, "Added value of a (hierarchical) bootstrap model in environmental standard setting"

The papers were evaluated on the basis of presentation, research content, and environmental relevance. The committee agreed unanimously that the TIES 2002 student paper prize should be awarded to Claudia Libiseller.

Nominations for the Abdel El-Shaarawi Young Researcher's Award

Loveday Conquest

Nominations are now being solicited for the Abdel El-Shaarawi Young Researcher's Award [AE-SYRA]. The award is given "in recognition of outstanding contributions to environmetric research" and is not restricted to TIES members. Candidates for the award must not have reached their 41st birthday at the time of nomination. The award includes a certificate, free TIES conference registration, one year of TIES regular membership (including the *Environmetrics* journal), and a cash award of \$500.

The 2002 recipient was Professor Bradley P. Carlin, Division of Biostatistics, School of Public Health, University of Minnesota, Minneapolis, Minnesota, U.S.A.

Send nominations to the Chair, Prof. Loveday Conquest, conquest@u.washington.edu. (FAX 206-616-8689. Mailing address: Campus Box 355020, Univ. of Washington, Seattle WA 98195-5020, U.S.A.) Your nomination should include an email letter of nomination, and a Word document, pdf document, or website that gives the committee access to the candidate's CV and list of achievements. Up to two other letters of reference are allowed; email transmission is preferable. It is sincerely hoped (but not absolutely necessary) that the winner would attend the 2003 TIES meeting in Beijing, China. Nominations are due by January 15, 2003.

3. Environmetrics Conferences

3.1. Report on TIES 2002 Conference

Ray Correl and Teresa Alpuim

The 12th conference of TIES, was held at Genova 18 to 22 June, 2002. Genova is a historic city situated on the Northwest coast of Italy. It is part of the Riviera and the natural beauty of the surrounding coastal area is astonishing.

Ray's first impression of Italy was in Rome Airport. Unfortunately, the Automatic Teller Machines were

not functioning, so a fellow Italian traveller on the plane bought him some breakfast. A very kind gesture. After the short plane trip from Rome to Genova, Ray's bad luck with ATMs continued. This time the taxi driver could cope with American dollars, so he was soon at Hotel Brignole where both authors stayed. There, the staff was very cooperative and helpful. Like many Europeans in the tourism industry, they were fluent in several languages. Their helpfulness extended to allowing the TIES board free use of their breakfast rooms for a board meeting, despite having to have it cleared up ready for breakfast next morning.

Our first day in Genova was spent walking around the city. The Cathedral (S. Lorenzo) is very impressive, with its black and white striped façade. It combines Romanesque, Gothic and Renaissance styles. A feature is a 15" naval shell that penetrated the fabric of the cathedral during World War II but failed to explode. It was emptied and is now a focus of interest. Not far from the Cathedral is the beautiful *Palazzo Ducale* where a nice welcome cocktail party was given by the Conference organization to all TIES 2002 participants, on Tuesday evening. Beside the *Palazzo Ducale* is the *Chiesa del Gesù* with its wonderful interiors, including marvellous religious paintings, some of which are by Rubens.

We also walked through the historical Middle Ages quarters, with all its many old palaces, towers and lovely small churches. In one of those, a Dominican friar kindly came to show us, in detail, the artistic treasures of his church, sacristy and even a wonderful 15th century fresco painted on the wall of a hidden balcony by an artist whose name we forgot. This good luck compensated for Ray's persistent bad luck with ATMs which Teresa compounded by having equally bad luck with the same terrible machines. We ended our tourist day with a very interesting visit to Genova Aquarium - a place worthwhile to visit for any environmentalist.

The main conference venue was Villa Cambiaso. It was a little bit of a challenge to find the venue the first time, especially as the weather was warm and quite humid. It stands in a very nice area with impressive villas built along the hills. Villa Cambiaso has elegant architecture, with very high ceilings and excellent views over Genova. All these hills and stairs made us learn quickly how to use the local bus system.

We were welcomed by Professor Squarzoni, Dean of the Faculty of Engineering at the University of Genova. The opening address was given by Mr

Levaggi, Environment Minister for the Liguria Region of Italy. This was followed by the Presidents Invited Lecture – 'Is the Earth's Climate Changing?' delivered by Lennart Bengtsson of the Max Plank Institute for Meteorology, Hamburg, Germany and Environmental Science Systems Centre, University of Reading, UK.



▲ The President's Invited Lecturer, Lennart Bengtsson, on the right, with TIES President, Sylvia Esterby, on the left.

The next session was a plenary, and concentrated on remote sensing, particularly in its application to forestry. These papers were very interesting, and gave useful summaries of how these problems are being addressed in USA and in Europe.

The second morning started with the J. Stuart Hunter Lecture. This was delivered by Noel Cressie on "The Ozone Hole, Spatial Trend in a Massive Data Set". It was interesting to see how Noel handled the geometry required to reduce the massive amounts of satellite data to a form that could be tractable. We Australians and Portuguese are going to have to be careful with our sunblock.

The contributed and invited papers were all of a good standard, and generated the constructive conversations that have become characteristic of the TIES conferences. Details of the talks are available on the website at:

<http://www2.stat.unibo.it/ties2002/>.

However we would like to add a few comments.

A very useful session was one on extreme values in meteorology. In many cases it is the extreme events that have the dominant effects on the environment. Already, sessions on both statistics in meteorology and extreme value distributions are being planned for TIES 2003 in Beijing.

As mentioned above, the welcoming address was given by the Dean of the Faculty of Engineering. Some of

the papers had a strong engineering flavour – particularly about road runoff. It is pleasing to see the coming together of Environmetrics, that quantifies problems, and an Engineering approach that can address the problems.

We also would like to outline the Panel Session under the title “The Perspective of Quantitative Science in the Debate about Environmental Degradation”, organized by Sylvia Esterby and chaired by Ian MacNeill. The panelists were Noel Cressie, Vincenzo Dovi, Peter Guttorp, Anthony Jakeman and Paul Sullivan who provided us with interesting and insightful views about this important topic. A more detailed description of this session may be seen in the Environmetrics Forum section of this Newsletter.

A perennial problem of such conferences is the attendance to the last talks. Ray had to leave the conference a little early to keep an appointment in Canberra and as well, a few other participants had to leave early, some because of the train strike. We felt badly about those people who had spent much time preparing talks only to find that many people did not stay for them.

The conference organisers were able to provide us with lunches as a bonus. These not only enabled us to sample excellent Italian cuisine, but also kept the conference together. This latter point, I believe, is very important in generating a good conference spirit. We were all very grateful for this extra.

The boat trip down the Liguria coast was a highlight of the conference and enabled us to mix socially. The trip provided beautiful scenery, especially the contorted layering of the volcanic rocks that could be seen in the cliff faces. We were also able to enjoy some picturesque little ports: San Fruttuoso, with its lovely old monastery, and the charming, fancy village of Portofino that we found a most fascinating place.

There were 131 registrants at the conference, who came from 16 countries. Six presentations competed for the student prize award. It was awarded to Claudia Libiseller, for her paper on “Variance reduction for trend analysis of hydrochemical data in brackish waters”, who received a \$US500 prize. (See the Society News section in this issue.)

All together it was a very successful, informative and enjoyable conference that carries on and enhances the spirit of TIES conferences.

3.2. Forthcoming TIES Conferences

TIES 2003, Beijing

Ray Correll



Our annual conference – the Thirteenth International Conference on Quantitative Methods for the Environmental Sciences is to be held at the Friendship Hotel in Beijing on August 21 to 24, 2003. Details are available on the website at

<http://www.cmis.csiro.au/ties2003/>.

The main theme for that conference is “Quantifying How Our Environment Affects Us”.

The conference will overlap with the conference, Soil Contamination and Remediation in the Australasia Pacific Region (SCRAP). This has potential benefits to us by providing useful contacts in some important environmental problems. The SCRAP registrants can potentially benefit from our collaboration. The theme of that conference is “Risk Based Land Management: a cost effective tool for contaminated land”. (<http://www.conference.ac.cn/scrap.html>).

Another feature is the incorporation of a field trip as part of the program. The itinerary of this trip will include the Great Wall, so we can mix business with pleasure.

The scientific program is shaping up. Thomas Polfeldt of Statistics Sweden will be the Presidential Address speaker and Jim Zidek of the University of British Columbia will present the J. Stuart Hunter Lecture. There are a number of sessions being organized. These include the topics: Statistical Indeterminacies in Water Resources by Jun Xia, Climatology by Rick Katz, Water Quality Guidelines by Ray Correll and several

topics by Abdel El-Shaarawi. Abstracts are already being received and refereed.

Registrations for the conference will be available soon - we are finalizing the budget. We expect the registration fee to be less than \$400, including working lunches, morning and afternoon teas and a welcome event (but excluding the field trip and the conference banquet). We look forward to seeing you in Beijing.

3.3. Other Forthcoming Conferences

The Biennial Congress of the Modelling and Simulation Society of Australia and New Zealand, **MODSIM 2003** will be held in Townsville, Queensland, Australia at the Jupiter's Hotel and Casino from 14 to 17 July 2003. The main theme will be "Integrative Modelling of Biophysical, Social, and Economic Systems for Resource Management Solutions".

Papers are invited in all areas of modelling and simulation. Selected papers will be published in international journals. The keynote speakers will be:

- **Professor Peter Phillips**, Cowles Foundation for Research in Economics, Yale University, USA. *Laws and Limits of Econometrics*.
- **Professor John Norton**, University of Birmingham, UK. *Prediction for decision making under uncertainty*.
- **Claudia Pahl-Wostl**, Professor for Resource Flow Management, Institute for Environmental Systems Research, University of Osnabrück, Germany. *The importance of the human dimension in integrated assessment models and processes: Actor based analysis and modelling approaches*.
- **Dr Graham Harris**, Chair CSIRO Flagship Programs. *Ethics, biodiversity and complexity: An ecologist's view of catchment modelling and management*.

The MODSIM 2003 Program will cover a broad range of topics within the theme including:

Water Resources, Oceanography, Climate and the Atmosphere; Global Change, Ecology, Agriculture, Forestry, and Fisheries; Socio-Economic Systems, Demography, Business and Tourism; Econometrics, Economics, Statistics, Finance, Risk and Uncertainty; Information Systems, Decision Analysis and Computing; Industrial, Mining and Operation Research; Medical Research, Public Health and

Epidemiology; General Aspects of Modelling and Simulation.

Call For Papers:

Abstracts (300 words) by 29 November, 2002
 Acceptance of abstracts by 20 December, 2002
 Final papers (6 X A4) by 28 February, 2003

MODSIM 2003 Entitlements:

Registration entitles participants to Congress icebreakers, bound proceedings or abstract volume and CD, lunches, morning and afternoon teas, a Congress bag with pen and notepad, access to all sessions and the Congress dinner.

For further details, see the Congress website

<http://mssanz.cres.anu.edu.au/modsim2003.html>
 or contact the Convenor, Dr David Post, CSIRO Land & Water, david.post@csiro.au.

The **SPRUCE VI Conference** will be held in Lund, Sweden, June 15-19, 2003. Detailed information about this conference is available on the conference web site:

<http://www.maths.lth.se/conferences/spruceVI/>.

The conference deals with Statistics for the analysis of risks and benefits from the environment and the instrument for this is Statistical models and methods for environmental issues. The conference will include sessions on:

Application areas

Air and soil pollution; Climate change; Energy planning and supply; Health effects; Impact of human activities in the presence of natural variation; Ocean transportation and marine environment; Official statistics, legal aspects, rules; Water resource planning; Waste managing; Toxicology;

Methodological themes

Databased mechanistic models; Dose-response type models; Environmental sampling and monitoring; Extremes; Nonlinear modeling; Spatio-temporal models; Time series.

The Scientific Program committee is planning the conference program of invited and contributed sessions. The following speakers were invited:

- Mark Berliner, Ohio State University
- Nicky Best, Imperial College, School of Medicine
- Anders Grimvall, Linköping University
- Nils Gustafsson, SMHI, Sweden
- Peter Guttorp, University of Washington

- Gudmund Höst, Norwegian Computing Center
- Georg Lindgren, Lund University
- Gianfranco Lovison, University of Palermo
- Antti Penttinen, University of Jyväskylä
- Marian Scott, University of Glasgow
- Richard Smith, UNC Chapel Hill
- Jonathan Tawn, Lancaster University
- Hans Wackernagel, Ecole des Mines de Paris

TIES is one of the sponsors of the Conference and will organize two sessions. There will be an IMPACT session organized by Anders Grimvall and a session dealing with construction and evaluation of environmental models by Marian Scott.

Scientific committee: Clive Anderson, Vic Barnett, Georg Lindgren and Gianfranco Lovison.

Local organizing committee: Ulla Holst (chair), Mona Forsler, Jan Holst, Jan Lanke, Georg Lindgren, Anders Malmberg och Lena Zetterqvist. Information: ulla@maths.lth.se, mona@maths.lth.se.

The **International Conference on Environmental Statistics and Health** will be held July 16-18, 2003, on the campus of the Universidad de Santiago de Compostela, Spain. Montserrat Fuentes (North Carolina State University) will chair the Scientific Committee, and Wenceslao Gonzalez Manteiga (ISI-Spain) will chair the Local Arrangements Committee. The conference web address is: <http://isi-eh.usc.es>

The members of the scientific committee are Lawrence Cox, Noel Cressie, Abdel El-Shaarawi, Wenceslao Gonzalez-Manteiga, Peter Guttorp, Dave Holland, Jorge Mateu, Doug Nychka, Louise Ryan, Richard Smith, Cliff Spiegelman, Michael Stein and Jim Zidek. Preceding the conference there will be a short course in environmental statistics and Bayesian methods, including a geoBUGS tutorial.

There will be two invited lectures (1 hour technical talks), one given by Doug Nychka as opening for the conference and another by Louise Ryan as closure. Both lectures will serve as an introduction to environmental and health statistical research for graduate students and young researchers. There will be nine invited sessions organized by Zidek, Nychka, Cressie, Ryan, Spiegelman, Stein, Holland and McRoberts, Mateu and Guttorp, and a contributed poster session. We will have a student paper award. Selected papers will be published in a special journal issue of *Environmetrics*. The proceedings for the conference will be also published.

The **sponsors** of this Conference are: The ISI Statistics and the Environment Committee; The International Environmetrics Society; The Center for Integrating Statistical and Environmental Science at the University of Chicago; The American Statistical Association Section on Statistics and the Environment; The National Center for Atmospheric Research (NCAR); The US Environmental Protection Agency; The National Center for Health and Statistics (NCHS) - Centers for Disease Control and Prevention.

There is funding to cover the travel expenses of young researchers. Preference will be given to graduate students who are presenting their research at the contributed poster session. Deadline for applications is April 15, 2003. To apply, please send: 1. A letter of recommendation; 2. A copy of the paper or an extended abstract for the proposed poster; 3. A CV; to:

Dr. Montserrat Fuentes

Statistics Department. Box 8203 North Carolina State University Raleigh, North Carolina 27695-8203

4. Environmetrics Forum

The Perspective of Quantitative Science in the Debate about Environmental Degradation

During TIES 2002 Conference, held at Genova Italy, a panel session took place on the 21st June with the aim of debating how the results on the current status of environmental quality, obtained by Environmetricians, influences decision makers and how the latter use scientific information to formulate adequate environmental policies. This also addressed the question of what position Environmental Scientists should take in the political questions of environmental protection. The session was organized by Sylvia Esterby and chaired by Ian MacNeill. Below are summaries provided by the panellists: Noel Cressie, Vincenzo Dovi, Anthony Jakeman, Peter Guttorp and Paul Sullivan.

Noel Cressie:

The hierarchical statistical model is an enormously powerful way to describe complex environmental phenomena. Its three generic components are: the data model, where a probability distribution is given for data given process and parameters; the process model, where a probability distribution is given for process given parameters; and a prior model, where a probability distribution is given for all parameters. The probability modeling of the parameters is optional, but regardless of this, the hierarchical approach allows one

to model locally and infer globally. In practice, the inference is carried out via Markov chain Monte Carlo (or some other computational scheme), which allows relatively straightforward sampling from the posterior distribution of all unknowns given the data.

During my brief panel discussion, I showed how we (Berliner, Wikle, and Cressie, 2002, Journal of Climate) had implemented hierarchical statistical modeling in a complex problem of long-lead forecasting of sea-surface temperatures in the tropical Eastern Pacific (El Nino phenomenon). I went on to show that our forecasts had done extremely well over time, and wondered why our approach had not generated more interest in the climate community. My answer: We need to do more than just publish statistics papers if we want to improve the way (environmental) scientific data are analyzed. The web is a powerful delivery medium and our interdisciplinary papers should be accompanied by tutorial-like expositions with attractive graphics. We need to polish our shoes, pack our merchandise, and take it to the scientists. We need to sell our statistics profession as a part of information technology that uses mathematics, computing, visualization, and above all, our science of uncertainty.

It is this last component that differentiates us from the other information technologists, and we should exploit it. During my presentation, I made the case that a statistician is able to produce measures of uncertainty associated with an estimate. These are easily expressed through interval estimates and interval forecasts, and I recommended that we emphasize this as a strength of our approach. Joe Public understands what it means for the probability of rain to be 0.1 on a day he is planning a family picnic. Climate scientists should be able to appreciate what it means to have a 95% (posterior) probability interval forecast of (-.2 deg.C, 3.8 deg.C), for the 'Nino 3.4 anomaly' in December 2002. This can be accompanied by a point forecast, here the posterior median of 2.2 deg.C.

Vincenzo Dovi:

The identification of major environmental problems, such as acid rain, ozone layer depletion, global warming, desertification, etc., has given rise, in the past, to debates which have followed a typical and constant pattern.

First, the scientific community splits up into "Technological optimists", "Doomsday scientists" and supporters of the "no-regret policy (precautionary principle)".

The public opinion tends to adhere to the most radical theories and this gives the necessary momentum for decision makers to sign Protocols and Conventions, of which there is at least one for every major environmental issue (e.g. Basel, Geneva, Cartagena, Aarhus, Vienna, Montreal, Kyoto Conventions).

Moving from (generally vague) declarations of intentions (the signing of Protocols) to their enforcements (typically the establishment of international secretariats, such as the Bonn based secretariat on climate change or the Nairobi based secretariat on ozone layer depletion) generally implies a substantial moderation of the most far-reaching measures. Frequently, this procedure is further magnified when the international directives are enforced into national legislation.

In this phase there is a modest contribution of the scientific community as a whole. Frequently scientists are employed by national and international administrations on an individual basis. Sometimes their involvement is the consequence of their opinions, so that their scientific expertise can be used to support predetermined decisions.

Until now this procedure has proved surprisingly effective. The gloomiest predictions have not hit the mark. Why?

The lengthy, bureaucratic procedure described was able, after all, to devise the right solution?

The models on which the worst predictions had been made were inadequate? The worst is still to come?

I suspect nobody can tell with a sufficient degree of confidence.

But this is not the main point in this panel. Rather, we should wonder why the role of environmental scientists is so modest and scattered in the overall decision making procedure, at a time when there is a strong tendency to apply "scientific methods" to a wide range of problems.

May I ask a provocative question? Are we developing "scientific" models? Environmental models are

- approximate (sometimes grossly approximate. Think for instance of the (unreasonable) exponential curves used in the model developed by the Club of Rome, instead of the obvious S-shaped curves)
- incomplete (e.g. the kinetics of CO₂ sinks is completely unknown)

(To be continued on page 14)

TIES 2002 Conference: Genova, ITALY

1. ▶ The Organizers at the registration desk, who should indeed be smiling since all that hard work produced a great conference: Daniela Cocchi, Vincenzo Dovì and Carlo Trevisano.
2. ▼ Noel Cressie presenting the J. Stuart Hunter Lecture.



3. ▶ Francis Philbert, the treasurer of TIES, at the charming village of Portofino.

4. ▼ Peter Guttorp (left), Sylvia Esterby (right) and the students who competed for the Best Student Presentation Award in the middle: Manuela Gonçalves, Francesca Bruno, Mieke Barry, Claudia Libiseller, Louise Erasmus and Frederik Verdonck.



5. ▶ The panel session on "The Perspective of Quantitative Science in the Debate about Environmental Degradation. From left to right: Anthony Jakeman, Vincenzo Dovì, Paul Sullivan, Noel Cressie, Peter Guttorp and Ian MacNeill.



TIES 2002 Conference: 18-22 June



6. ◀ A group of local fisherman at San Fruttuoso that promptly joined the Environmetrics Society. From left to right: Claudia Libiseller, Renata Romanowicz, Wilhelm Petersen, Elena Naumova, Teresa Alpuim, Mayer Alvo and Helen Alvo.

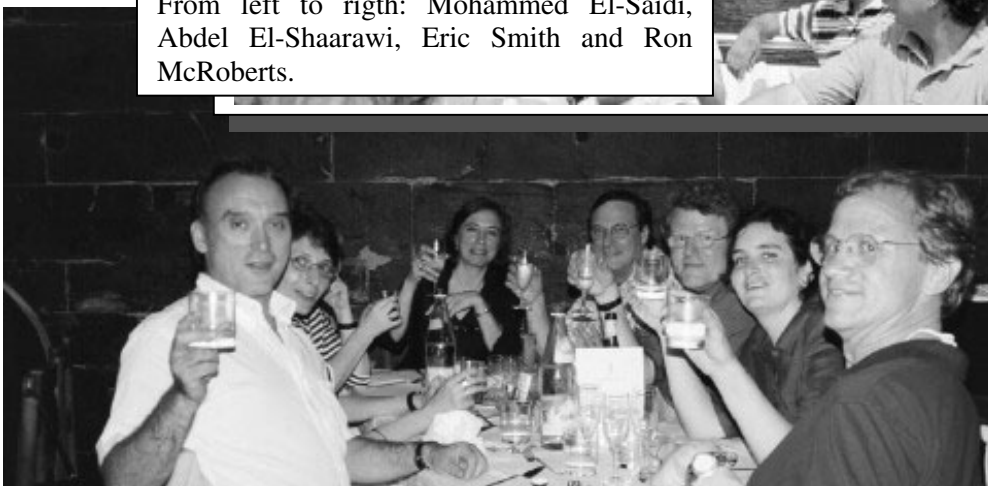
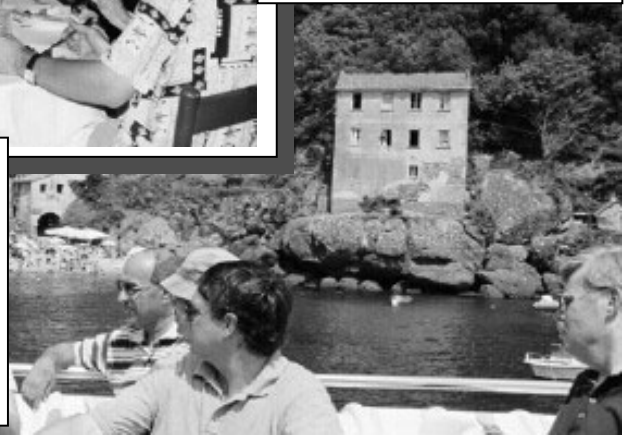


7. ▲ A group of young members of TIES: in the front, Manuela Gonçalves, Abdel El-Shaarawi, Mariagrazia D'Emilio. In the back, Francesca Bruno and Arianna Orasi.



8. ▲ A table at the Conference Dinner. From left to right: Ivana Horova, Jaroslav Michalek, Jana Jureckova, Jan Picek and Jiri Neubauer

9. ▶ The boat trip: arrival at San Fruttuoso. From left to righth: Mohammed El-Saidi, Abdel El-Shaarawi, Eric Smith and Ron McRoberts.



10. ◀ Another table at the Conference Dinner: Gianfranco Lovison, Monica Chiogna, Claire Saint-Rossy, Eric Smith, Andrew Lawson, Daria Mendola and Steve Rathbun

The Perspective of Quantitative Science in the Debate about Environmental Degradation

(Continued from page 11)

- partial (typically the (in)famous “ceteris paribus” assumption in a world dominated by feedback loops)

Where does this leave us? I am afraid this impairs the “scientific” character of environmental theories. “Scientific” theories should, according to widely accepted definitions (K.Popper, Conjectures and Refutations,1963),

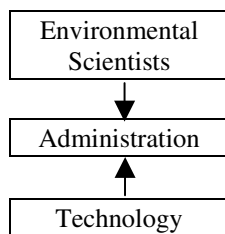
- be subject to falsifiability tests (available at the time of decision making)
- possess a “truth content” (number of verified propositions logically derived from them) greater than that derived from other assumptions.

Both aspects are dubious for (necessarily) long term environmental models. Any way of “scientizing” them? Tentative actions:

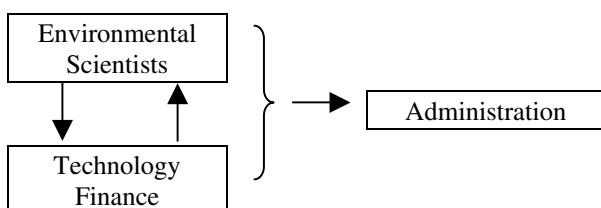
- Develop short time quantitative predictions that can be tested (e.g. trend detections)
- Define meaningful indexes whose variations in time can be quantitatively analysed

One final consideration on the role of environmental scientists with respect to other research areas in the decision making procedure.

Frequently it is the decision making authority itself that mediates between environmental scientists (generally favourable to bold measures) and representatives of the technological and financial areas (less inclined to costly, and sometimes very costly, measures). Typically:



It doesn't have to be this way. A better approach might be:



Anthony Jakeman:

In my talk I aimed to illustrate how Integrated Scenario Modelling (ISM) was a useful tool for scientists and other stakeholders to perform integrated assessment in catchments for improved sustainability outcomes. ISM applies scenarios as model inputs which take into account achievable policy/management drivers and socioeconomic capacity for change, as well as uncontrollable system shocks. It computes, as model outputs, indicators covering a spectrum of biophysical and socioeconomic impacts for each scenario. Given the complex nature of natural resource management, and in particular catchment problems, it is realistic to assume that the broad objectives of ISM should in the first instance only be to understand the directions and magnitudes of change in relation to management interventions, so as to compare associated outcomes. Central to this objective is the need for improved techniques of uncertainty and sensitivity analysis, to provide a measure of confidence in the ability to choose between different management decisions. An example of problems treated with an ISM approach was discussed.

Integrated modelling for natural-resource management and ISM commonly must face several key issues. Climate variability and extreme episodes can affect the returns on investment in production as well as ecosystem response, while episodes such as floods can have a profound effect on outputs. Both raise issues of appropriate time periods and time steps over which to model.

Scenarios beyond the business-as-usual may be essential as environmental or social change may require substantial changes to the current situation as input controls. Public and private investments, policy incentives and new institutional arrangements may need to be model input drivers. Long lags may need to be incorporated as the timeframes for investment returns and for ecosystem response to changes constrain the period and temporal resolution of the model runs and indicator monitoring.

Choice of model complexity is important once the basic processes and causal relations are decided upon. There is then still much scope for selecting the level of detail, including the spatial and temporal discretization intervals. Data paucity should limit model complexity, because it limits ability to validate the model.

In addition to keeping the types of models, scales, system boundaries etc., as simple as practicable, it is critical to narrow modelling objectives and keep the

level of integration of issues and disciplines manageable. Related to this is the need to strike a balance between the capacity to characterise feedbacks and interactions while keeping model components and linkages effective but efficient.

Integrated models for resource management are subject to many uncertainties, due to measurement and sampling errors in inputs and calibration data, parameter uncertainty and model-structure assumptions. Errors can accumulate in the course of simulation, especially when integration or unstable behaviour occurs. They may also cascade, as submodel outputs become inputs to successive ones, e.g. progressing down a catchment, and may add through interaction between submodels.

Little useable technique yet exists for assessing the evolution of uncertainty in integrated models, essential if reliable conclusions are to be drawn from them. A large additional benefit of assessing the sensitivity of outputs to uncertainty in inputs, parameters and model structure features is that it can point to how the model can be simplified. Conventional sensitivity assessment, based on perturbation and Monte Carlo trials, incurs very heavy computing to discover which combinations of uncertain items are most important and how far they can vary before the model output changes significantly. A new approach being investigated by the author and colleagues is to pose sensitivity analysis as *selective* exploration of the *feasible set* of parameters, inputs or model structure indices giving a specified range of output behaviour. This range is expressed as a set, defined by a collection of constraints on realistic, acceptable behaviour or the boundaries of behaviour leading to a given qualitative outcome. The focus on sets removes any need to assume linearity between cause and effect, continuity of the output or even quantification of the output. The new approach will be adaptive, combining searches, Monte Carlo trials and feature extraction by methods suggested by descriptive multivariate analysis.

Largely, ISM is still a poorly practised exercise. I believe that considerations encompassing the above need to become a transparent part of modelling for improved natural resource management. If we do not make progress on the quality and communication of the current practice then we will not be listened to by the decision makers and policy advisors. On the positive side there is much scope for improvement. We need to find ways to encourage researchers to seek these interdisciplinary improvements.

Expansion of these issues can be found in Jakeman and Letcher (2001), in the Proceedings of MODSIM 2001, Canberra, the Australian National University.

Peter Guttorp:

I will try to make the case that environmetricians, and more generally environmental scientists, can have a substantial influence on government decisions, provided that we take the opportunity to participate in the procedural protocol necessary in political decision-making. Furthermore, we need to treat the issue of communication with decision makers as an important research problem. I will illustrate this with a couple of examples from my experience.

Biological monitoring

During the 1980s, a large intergovernmental project aimed at assessing the effect of acid rain in the United States on forests, lakes and streams. I participated in a 1985 review of the research. My particular group dealt with biological effects of acid rain. It consisted of ecologists, aquatic biologists and a token statistician. The review indicated that most monitoring program had focused on “biologically relevant chemistry”, a concept that the biological scientists very much doubted the validity of. Rather, our recommendation to the intergovernmental organization was to develop biological monitoring programs, where composition changes of aquatic populations were studied directly and related to changes in water chemistry.

We all thought this would be it, but about a year later I was invited to a joint Canadian-US workshop on biological monitoring. During this workshop, I was asked how to model time series of compositional data, a question that has since led to two PhD dissertations and a variety of papers. In addition, the workshop recommendations were essential in the setup of the US environmental monitoring program EMAP, which has a substantial biological monitoring component.

Setting air quality standards

In the United States, the main air pollution law (called the Clean Air Act) requires the Environmental Protection Agency (EPA) to set ambient air quality standards for criteria pollutants (currently sulfuric oxides, nitrous oxides, lead, carbon monoxide, ozone,

and particulate matter or PM). The latest revision of the standards for PM were set by the Clinton administration in 1997, but were rejected by the courts. The process of setting these standards is fairly lengthy. EPA scientists together with outside experts first review the scientific literature (usually over the previous five years). This review is made public (it is

called a *criteria document*). The first draft of the current PM criteria document was published in 2001. The draft is subject to public comment, and is then revised. The science in the criteria document is part of the basis of the next step in the process: the EPA staff recommendations (the *staff paper*). The staff paper is also subject to public comment. An independent committee of scientific and technical experts then makes a recommendation to the Administrator of the EPA, who finally promulgates the new standard. Almost always it is subject to many lawsuits...

The 2001 PM criteria document was, in my opinion a very biased literature review. (in fact, I wrote about that in the *Newsletter* last spring). For example, the reviewers ignored the December 2000 special issue of *Environmetrics*, which focused on statistical methods for particulate matter air pollution, in spite of efforts both by the journal editor and by EPA staff members to ascertain the inclusion of the special issue in the review. It was clear that it would be scientifically irresponsible not to participate in the public review of this document. At the same time, the EPA was considering a large proposal from my university for the continuation of our environmetric research center. However, a strongly critical comment was submitted by myself, Lianne Sheppard, Thomas Lumley (all University of Washington) and Richard Smith (University of North Carolina). The revised criteria document, which appeared in May of this year, took into account much of the criticism we had levied (and the *Environmetrics* special issue is now included in the review). But we did not get our center funding renewed...

An additional problem with the current draft of the criteria document is the recent realization that default convergence parameters in the S-Plus GAM routine are insufficient to ascertain convergence when dealing with small relative risk increases, leading to overestimated effect values, and standard errors that remain somewhat doubtful. All studies included in the current draft will now be reviewed for statistical software issues, which undoubtedly will delay the new particulate matter standards substantially.

Scientific communication

As scientists we are trained to communicate technical information in precise and accurate forms. Typically, such information is not the most appropriate vehicle for communicating scientific findings to non-scientists. A few years ago, I participated in a conference at Statistics Sweden. During the discussions I heard repeatedly statisticians complain about the inaccurate

newspaper coverage of their work. It so happens that Statistics Sweden is located next door to the Stockholm University Department of Journalism. Yet, it had not occurred to anyone at the Swedish main statistical organization that it would pay off to help the journalism students understand statistical concepts. Going next door and proposing some short courses could reap substantial benefits both for the journalists and for the statisticians.

Conclusions

Environmental decision-making is based on administrative rules, and it is important that environmetricians participate in the procedures that are necessary to ascertain that our scientific knowledge is taken into account and used in the decision-making process. In particular, we need to work out ways of telling decision makers about papers and technical reports. Rather, we need to view scientific communication to decision makers as a scientific problem, which requires research to be properly understood and executed.

Paul Sullivan:

As a first approximation, one assumes that in a democratic society policies are adopted on the basis of broad-spread public opinion. The communication of quantitative scientific ideas to the public at large would normally flow through a press release to the media. The tendency of media is to reduce ideas to evocative and overstated sound bites, particularly in television, and to economize on the funds required for in-depth, investigative journalism. Hence the usually dramatic "sky is falling" scenarios receive a great deal of attention but their value to the advancement of science and public appreciation thereof is somewhat dubious. Politicians respond to public opinion and, at best, attempt to lead by helping to form that opinion. They may, however, have an agenda that is not publicly appreciated in the context in which they operate governing the state.

Sensational journalism need not be the norm and a reasonably educated populace could and should demand more. A very good example is found in the debate over the Kyoto agreement and global warming. The controversy over this issue was very clearly exposed in the excellent opening plenary session by Lennart Bengtsson. An article that appeared in *The Globe and Mail* - which is Canada's national newspaper - on May 23, 2002, entitled "Global warming: a heretics view" appears to capture and communicate fairly to a general audience the issues and evidence at hand. The author of this article,

Margaret Wentz, does not have a background in science.

In this article Ms. Wentz captured the fact that there remains a considerable amount of controversy regarding the extent of global warming and its consequence, and the fact that it has become a political football where the arguments are colored by emotion and regional economic consequence as far as the implementation of the Kyoto accord. Further, and somewhat more problematic, is the allegation that the very peer reviewed journals the public should rely upon to be in place and contain objective, critical, scientific discussion have been less than even handed if not prejudiced towards the work of Bjorn Lomborg. She also quotes Lomborg in stating that “the cure is worse than the ailment” and to “Let’s not focus on phantom problems at the expense of real problems”. In all, she has produced a reasoned, common sense, article from information that is available to the “man-in-the-street”. The point is that with responsible journalism quantitative science can indeed be presented to and digested by ordinary citizens.

Perhaps of more concern is the lack of enthusiasm of students entering university for courses and programs in quantitative science. I do not know how general a dilemma this is but clearly progress with debates about environmental degradation will directly depend on developing a more educated populace. Alas, I cannot offer solutions to these issues but wish to table the above thoughts for discussion.

Summary of Floor discussion (Sylvia Esterby):

This summary is based on notes, since we did not ask for written comments, and is necessarily abbreviated.

Most presentations raised the issue of communication, primarily with regard to reaching decision-makers. What can we do and what can our institutions do? (Kristina Voigt).

Panel members replied, covering different aspects: 1) we can write more popular science articles, do a better job with our web sites, be more upfront about our strengths, and use measures of uncertainty, eg., give an interval when a newspaper reporter asks for the single number answer (Noel); 2) consider the need to educate journalists to understand statistics, currently they are given no training, do more with communications groups in institutions, and go out to the schools (Peter); 3) educational television programs offer an opportunity to get our messages out (Paul); 4) address the current shortcomings regarding reliability of models and verifiability of predictions (Vincenzo).

With reference to Noel’s experience of having useful work ignored by the intended audience, Dan McKenzie suggested that we have to be clearer about what we want to accomplish. His experience with an integrated assessment model was that training courses may be needed in cases of complexity, we must remain decision neutral, and the time required must be spent with the people involved, because that is how real problems will be solved.

Another way in which work is ignored is the good statistical paper that criticizes other papers but receives no attention. Building trust is another aspect. (Elena Naumova)

Interest may be sparked when results are presented in a different arena, for example in popular science publication. As well, we can work towards giving good confidence intervals and use this to our advantage. (Noel) The public is ready to hear about the level of confidence. (Paul) We need to be more aggressive about education. (Tony)

Why rely on journalists? Financial constraints at institutions may have meant that money has not gone towards promoting what scientists can offer, but a good science writer working for an institution could function at a number of levels (Tom Schopflocher)

With respect to Tony’s discussion of integrated assessment in catchments, Ron Smith raised the issue that the stakeholders were really the people in the village and not the government. In Integrated Assessment modelling, acceptance of the economist’s paradigm of everything in dollars or euros is not appropriate. Modellers must accept to optimize something else and not emulate the economic models and their failures.

The villagers were considered. A whole range of indicators are used as well as household income. (Tony) At the University of Washington a large interdisciplinary project involved an integrated assessment model of Puget Sound. There were many disciplines represented; hydrology, meteorology, planning, demography,....but only one statistician with too little time. More uncertainty assessment is needed (Peter).

Uncertainty assessment is central to Environmental Risk Assessment but agencies want simple statements such as little risk, some risk, no risk. They do not want probabilities. For example, in the case of the Chernobyl nuclear accident, what individuals wanted to be told was: yes, it is okay to go outside or no it is not, because they are experiencing the risk personally.

Statisticians are viewed as equivocators. (Andrew Lawson)

In cases of less personal risk we can give probabilities. (Noel) Risk can be expressed in terms that people understand by making comparisons with a concept that is understood. (Paul)

Tony raised the question of how we take this topic forward. Peter suggested that having someone dealing with public policy give the President's Invited Lecture in the future would be one avenue. Further, Peter raised the issue of the precautionary principle adopted in Europe, and the idea of taking the discussion forward with a TIES committee on communication.

The last comment went to Dan McKenzie, who gave an example of the use of the ideas of conflict resolution, but we do not expect this to be the last comment on the topic addressed by the panel session, either in this Newsletter or at TIES conferences.

5. Research Projects and Programmes,

Teresa Alpuim, Editor

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

Statistical modelling of pollutant concentration in the surface waters of River Ave basin

Teresa Alpuim

University of Lisbon, Portugal

Armanda Manuela Gonçalves

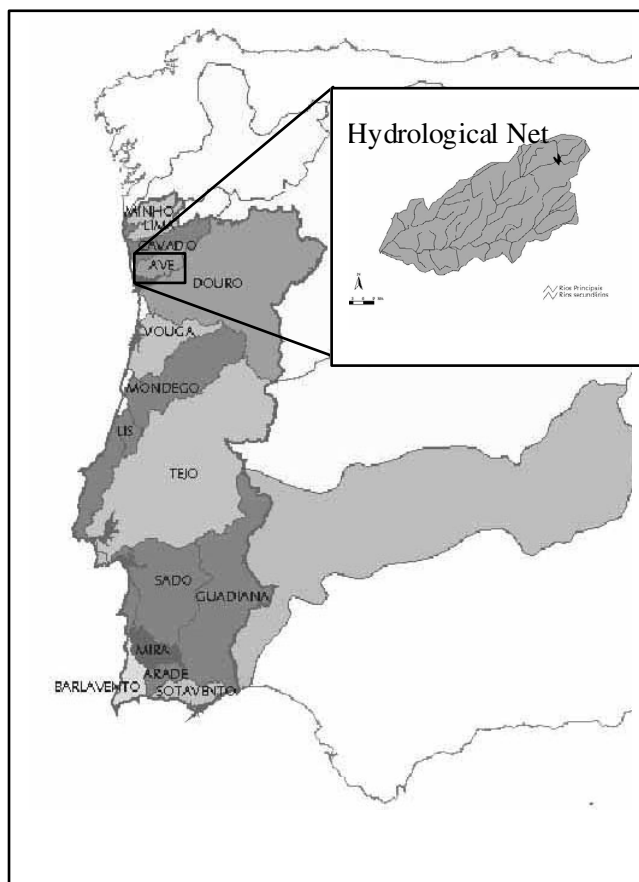
University of Minho, Portugal

The hydrological basin of the Ave River is located in the north of Portugal and has an approximate area of 1390 km². Its main route is the Ave River, which runs 93,5 km, from its source to its mouth.

Very dispersed but densely populated settlements are characteristic of the valley Ave region which has a total of 700 000 inhabitants. It includes 14

municipalities. This is a fertile area in agriculture and forests and is also an important industrial centre especially for textile manufacturing.

The majority of the population (approximately 50%) and a large number of industries of the Ave basin are concentrated in three of its municipalities: Guimarães, Santo Tirso and Vila Nova de Famalicão. There are about 340 registered industrial units, 230 of these are of the textile and garment sector.



Many discharges in these municipalities go into the waters with no previous treatment, especially those related to industrial effluents from the textile industries. The consequences are: bad quality of the water for public consumption, for supporting aquatic life forms, for irrigation and for recreation with direct contact. Therefore, these municipalities are considered the “most polluted area” of the region.

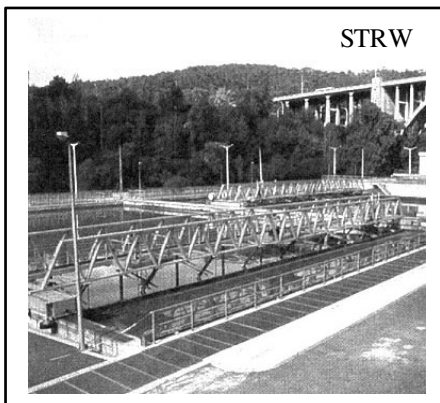
One of the main reasons for the extreme pollution of the waters is the fact that the socio-economical development of the region and the construction of infrastructure are out of phase. Consequently, the industries are actually affected by the bad quality of the water they use and which they themselves pollute. This is a vicious circle, which must be interrupted,

otherwise they will be confronted with an unbearable situation.

In the mid seventies, the steady increase of the pollution of the waters of the Ave River hydrological basin became a concern. Groups were organized with the aim of studying this basin, it having been chosen as a first case for the test of a model of integrated management of hydrological resources in Portugal.

However, not until 1990, was a solution approved for this “most polluted area”. This solution is being carried out. The financial planning for the task has been accomplished by the Association of the Municipalities of Ave Valley (AMAVE) and the Central Administration, through the Ministry of the Environment, mainly the Regional Directory for the Environment and Natural Resources North, (DRARN). Funds given to Portugal under the Support System of the European Union were used for this purpose.

The Integrated System for Cleaning the Ave Valley has been established and is made up of three subsystems, which include interceptors along the Ave River and its main streams flowing into drainage points and Stations for Treatment of Residuary Waters (STRW). These stations are located in each of the three municipalities considered to be “most polluted”. The construction work began in December of 1993 and was concluded in the end of 1998 and the beginning of 1999.



DRARN, through a special network for monitoring the quality of water, has been able to control the quality of the water of this basin since 1978. The monitoring is based on samples collected in 20 different stations. As a general rule, these samples are observed monthly and give information on analytical, physical, chemical and bacteriological parameters. Some of these stations are also hydrometric and register monthly drainage. However, this control program has several flaws with

respect to the determination of the parameters and the frequency of which they are obtained. The data set collected by these 20 stations, monthly, since 1988, is the support for the research work we are developing.

Our research program has the following aims:

- To develop methods for the statistical modelling of the concentration of pollutants in the surface water of this basin
- To organize and summarize the large quantity of data available, in particular, to try to obtain indexes which inform, in a quick and clear way, the general population on the quality of this water
- To study and evaluate the performance of the STRW's recently installed

The statistical methodologies employed include linear models, time series, spatial statistics and multivariate data analysis. They will be applied to identify, explain and model spatial and temporal patterns, taking also into account the effect of different covariates.

In very general terms, the statistical treatment of the data includes three phases:

1. Classification of the several stations into regional groups according to the level of pollution, with the help of cluster analysis.
2. Estimation of mean values, for each parameter, corresponding to each region and taking into account the pollutants spatial pattern.
3. Linear modelling of these mean values using covariates like time, seasonality and rainfall measurements in order to perform trend tests and assess the performance of the treatment stations. Multivariate nonparametric trend tests will be tried also.

This research program is the result of a collaboration between the University of Minho at Guimarães, the University of Lisbon, AMAVE, DRARN, mentioned earlier and INAG, the Institute of Water. The latter three institutions supplied the data from several networks of measurement such as meteorological, hydrometric and water quality of this basin. This collaboration takes advantage of a wide background of knowledge, connecting this to a real problem with the aim of contributing to the discussion and understanding of an environmental problem, which is so important to the surrounding community.

6. Job Opportunities in Environmetrics

Postdoctoral Level Appointments: Collaborative Research in Geophysical and Environmental Sciences

The National Center for Atmospheric Research in Boulder, Colorado, USA, announces openings for one or more postdoctoral level, visiting statistical scientists. Visiting scientists will work as part of a group of statistical, atmospheric and ocean scientists developing methods to analyze, compare, and to interpret large data sets. Some research areas include time series analysis, multivariate analysis, spatial modeling, modern regression methods, data mining, high performance scientific computing and stochastic modeling. For details see: www.cgd.ucar.edu/stats.

Interested scientists just receiving a Ph.D. and scientists with no more than four years applicable experience beyond a Ph.D. are eligible. Ph.D. in statistics or a related field (e.g., probability or stochastic processes) is required. Background in applying statistics to the geophysical or environmental sciences is preferred but is not a prerequisite.

Positions typically last for at least two years and are structured with an initial appointment for one year and the strong possibility of renewal for a second year. Initial consideration will be given to applications received prior to January 1, 2003. For details see: www.cgd.ucar.edu/stats/postdoc.shtml.

University of Washington Research Associate at the Department of Atmospheric Sciences

A research associate appointment is available for a scientist interested in developing practical wavelet-based statistical methodology for addressing some commonly occurring problems in characterization of space-time variability in geophysical applications.

The project is a collaborative effort involving investigators at the Applied Physics Laboratory, the Department of Statistics and the Department of Atmospheric Sciences, University of Washington. The post-doctoral research associate will work closely with other investigators in the project in helping to develop the statistical methodology and will be primarily responsible for analyzing the data for the problems in study. Expertise in atmospheric science, wavelets and data analysis will be useful. The position is for an initial period of one year, renewable on an annual basis for up to three years, and is a full-time, temporary appointment.

To be considered for this position, applicants must have a Ph.D. by the start of the appointment. The University of Washington is building a culturally diverse faculty and strongly encourages applications from women and minority candidates. AA/EOE. Applications, including curriculum vitae, a statement of research interests, and the names of at least four references should be sent to Ms. Shirley Joaquin, Department of Atmospheric Sciences, Box 351640, University of Washington, Seattle, WA 98195. Priority will be given to applications received before 1 Jan 2003.

UofW is building a culturally diverse faculty and strongly encourages applications from women and minority candidates. AA/EOE.

Faculty Position at the Department of Statistics, Oregon State University

The Department of Statistics at Oregon State University invites applications for a tenure-track position, subject to available funding, beginning in September 2003. The position will be at the level of Assistant Professor. Requirements include a Ph.D. in statistics and evidence of strong research and teaching potential. Candidates should have an interest in applications of statistical methods to problems of environmental statistics. The Department has 13 faculty members and about 45 graduate students. Current research interests of the faculty include environmental statistics, linear models, statistical ecology, wildlife survey methodology, biostatistics, generalized regression models, asymptotics, longitudinal data, Bayesian methods, and optimization. The department offers the M.S. degree in statistics and in operations research and the Ph.D. in statistics. More information on the department is available at the web address given below.

For full consideration applications should be received by January 31, 2003. Applicants should submit a letter describing their interest in the position, a curriculum vitae, and copies of graduate transcripts, and have three letters of recommendation sent to:

Search Committee, Department of Statistics, 44 Kidder Hall, Oregon State University, Corvallis, OR 97331-4606. Telephone: (541) 737-3366 Fax: (541) 737-3489 E-mail: search@stat.orst.edu

Web: <http://www.orst.edu/dept/statistics>

OSU is an AA/EOE and has a policy of being responsive to the needs of dual-career couples.

7. Forthcoming papers in Environmetrics

Abdel El-Shaarawi, Editor-in-Chief

- E. Kestens and J. L. Teugels, "Challenges in modeling stochasticity in wind".
- C. Tebaldi, D. Nychka, B. G. Brown and R. Sharman, "Flexible discriminant techniques for forecasting clear-air turbulence".
- Ryan DAJ and Heyward A, "Improving the precision of longitudinal ecological surveys using precisely defined observational units".
- Corrado Lagazio, Annibale Biggeri and Emanuela Dreassi, "Age-period-cohort models and disease mapping".
- Jack Lewis, "Stemflow estimation in a redwood forest using model based stratified random sampling".
- Marina Silva Paez and Dani Gamerman, "Study of the space-time effects in the concentration of airborne pollutants in Metropolitan Region of Rio de Janeiro".
- Jaeyong Lee and James O. Berger, "Space-time modeling of vertical ozone profiles".
- W. Scott Street, IV, Don Edwards, Robert J. Feller, Bruce C. Coull and Stephen E. Stancyk, "Mixed-model splines for environmental time series".
- Paul A. Murtaugh, "On Detecting hump-shaped relationships in ecology: A bootstrap test for monotonicity".

8. Recently Published Books

TIES Newsletter members are invited to provide the editors with details of any newly published books that they deem relevant for the readership.

- **Davison, A.C.** (2003) *Statistical Models*. Cambridge University Press.
- **Everitt, Brian.** *The Cambridge Dictionary of Statistics*. Cambridge University Press, 2002.
- **Maindonald, John & Braun, John** (2003) *Data Analysis and Graphics Using R*. Cambridge University Press.
- **Lawson, A. and Williams, F.** *An Introductory Guide to Disease Mapping*. Wiley, 2001.
- **Lawson, A. and Denison, D.** (eds.) *Spatial Cluster Modelling*. Chapman & Hall, 2002.

- **Van Belle, Gerald.** *Statistical Rules of Thumb*. Wiley, 2002.
- **Venables, W.N. and Ripley, B.D.** *Modern Applied Statistics with Splus, 4th edition*. Springer Verlag, 2002.

9. Book Reviews

Liliana Gonzalez, Editor

Many thanks to Caryn Thompson and Hans Lundberg for providing the thoughtful book reviews given below.

In the last issue of the newsletter I asked members of the society to contact me to request titles of books they like to review for this section ... well, I was not very successful! ... I decided then to take the offer a step forward and give you some ideas of recent titles that could be reviewed for this section of the newsletter:

- *Sampling*, 2nd Ed. (2002) by Steven K. Thompson;
- *Categorical Data Analysis*, 2nd Ed. (2002) by Alan Agresti;
- *Statistical Methods in Spatial Epidemiology* (2001) by Andrew B. Lawson;
- *Bioinformatics* (2001) by Andreas D. Baxevasis, and B. F. Francis Ouellette;
- *Regression models for Time Series Analysis* (2002), by Benjamin Kedem and Konstantinos Fokianos;
- *Statistical Analysis with Missing Data*, 2nd Ed. (2002) by Roderick J.A. Little and Donald B. Rubin;
- *Statistical Rules of Thumb* (2002) by Gerald Van Belle;
- *Bayesian Methods for Nonlinear Classification and Regression* (2002) by D.G.T. Denison, C.C. Holmes, B.K. Mallick and A.F.M. Smith
- *Statistics in Ecotoxicology* (2000) by T. Sparks
- *Statistical Methods for Detection and Quantification of Environmental Contamination* (2001) by Robert D. Gibbons, and David E. Coleman
- *Environmental Statistics with S-Plus* (2000) by Steven Millard and Nagaraj Neerchal
- *The Elements of Statistical Learning: Data Mining, Inference and Prediction* (2001) by Trevor Hastie, Robert Tibshirani and Jerome Friedman
- *Statistical Methods in Bioinformatics*, an

Introduction (2001) by Warren J. Ewens and Gregory R. Grant

If you are interested in reviewing any of the titles above, or any other recent title, please contact me sooner than later at liliana@cs.uri.edu, so that I can arrange for a complementary copy to be sent to you in time for the review to appear in the next issue of the Newsletter (May 2003).

Statistics for Environmental Science and Management,

by Bryan F. J. Manly

Chapman and Hall/CRC Press, 2001, pp326, Paper, US\$54.95, ISBN 1-58488-029-5.

Reviewer: Caryn M. Thompson

Department of Computer Science and Applied Statistics, University of New Brunswick (Saint John), Saint John, New Brunswick, Canada, E2L 4L5.

Email: cthompso@unbsj.ca

This book was written with an intended audience of environmental scientists, managers and students in mind, and therefore emphasizes the practical application of statistical methods rather than focusing on theoretical details. However, the text will also be of interest to statisticians keen to learn more about environmental applications of statistics, since it offers a comprehensive overview of current methodology in this field, together with up-to-date references.

The text is laid out in a logical fashion. In Chapter 1, the reader's interest is immediately captured when Manly describes the three main types of studies likely to be encountered by environmental scientists. He then introduces a series of seven examples for illustration and motivation, to which he refers in subsequent chapters. Additional examples are presented in each of the chapters that follow, and in some cases, data sets are included. Chapters 2 through 4 deal with the more general topics of sampling, statistical models, and inference. Most of the remainder of the book (Chapters 5 through 11) covers specialized topics in statistics relevant to environmental science and management: environmental monitoring, impact assessment, site reclamation, time series analysis, spatial data analysis, censored data, and Monte Carlo risk assessment. Manly makes some final remarks in the very short Chapter 12. A point-form summary is provided at the end of each chapter. Two appendices are also included: a review of basic statistical methods, and a collection of relevant statistical tables.

Manly clearly and concisely addresses the issues surrounding the application of each of the methods he discusses, minimizing theoretical details in his explanation of the rationale behind each method. As such, the book should be accessible to those having only a limited background in statistics. The review of basic statistics given in the first appendix offers a convenient refresher to the reader whose familiarity with statistics may have grown stale.

In the preface, Manly states that a secondary objective in writing the book was to produce a text for graduate students in environmental science. Indeed, the book should be suitable as the text for a graduate course, although it might be necessary to pick and choose from the specialized topics described in Chapters 5 through 11 if the course was to be taught over a single semester. The text might also be appropriate for an upper-level course in applied statistics if the instructor provided supplementary material on the more theoretical aspects of each topic.

The text is balanced in its consideration of both the study design and data analysis and interpretation phases of environmental studies. At points throughout the text, Manly stresses the importance of applying common sense at all stages of a study, from data collection through to drawing conclusions. The assumptions, limitations, and potential pitfalls of competing study designs and methods are outlined.

In providing an overview of the statistical methods most frequently encountered in environmental science, Manly sacrifices depth in favour of breadth of topic coverage. Some topics are of necessity covered only superficially. However, the text is supplemented with an extensive list of current references to both journal articles and other textbooks, as well as internet sources of information and software. The text thus serves as an excellent starting point for the reader interested in gaining an understanding of any of the topics covered.

In my opinion, the greatest strength of this book is Manly's writing style. Through carefully worded explanations, he is able to convey the essence of even the more difficult statistical concepts and techniques he describes. He seems to anticipate the questions the reader might have, and discusses the issues influencing the choice of appropriate methods. The inclusion of a large number of relatively recent examples from around the world and across the spectrum of environmental science also adds flavor to the book. My only criticism is of a very minor nature. I didn't find the typesetting of the book particularly pleasing, and in fact, some of the formulae were rather difficult to read.

In summary, I believe Manly has been successful in producing a text that provides a practical, affordable and highly useful introduction to relevant statistical methods for environmental scientists and managers.

Encyclopedia of Life Support Systems

EOLSS Publishers Co. Ltd. and UNESCO

Reviewer: Hans Lundberg

Swedish Environmental Research Institute (IVL);
Member UNESCO-EOLSS Joint Committee

The forthcoming *Encyclopedia of Life Support Systems* (EOLSS) is dedicated to the health, maintenance, and future of the web of life on planet Earth with focus on sustainable development in all its myriad aspects - ecological issues, global stability, peace, equity and security. Modern sciences, due to the linear thinking on which they have grown in isolation, are often inadequate for approaches to the resolution of major contemporary issues that require holistic knowledge of the complex behavior of systems ranging from individual organisms to the largest economic, technical, social, and political organizations. The prevailing trends toward increasing fragmentation, compartmentalization, and specialization in most academic disciplines run counter to the major need for knowledge integration for sustainable development. The challenge is to transform piles of building materials stored in a host of isolated disciplinary warehouses into a coherent edifice of understanding, such that we can move from piecemeal insights about individual components and processes to a coherent vision of the system as a whole. This is what this *Encyclopedia of Life Support Systems* (EOLSS) has attempted to do. Thus, the EOLSS is not merely a source of current information and expert opinion on virtually every aspect of the life support systems on our planet; it also attempts to forge pathways between disciplines in order to help foster integration of knowledge as it is essential for guidance towards sustainable development.

The EOLSS is an Encyclopedia with a difference. Unlike traditional Encyclopedias presenting an alphabetically organized set of articles, the EOLSS is thematic and is shaped to be the literary equivalent of an expert advisor, a sophisticated expert system, which can be used to obtain the state-of-the-art in subject domains, identify formal knowledge principles, relevant knowledge practices and likely future perspectives, and suggest additional sources of relevant material. In this way, the EOLSS may be regarded as a source of carefully organized knowledge and not just a

provider of raw information and data. It is one of the most exciting scientific projects ever undertaken with regard to its vision, complexity, the human potential involved, and the anticipated results.

The EOLSS is a valuable guide and references for: Natural Scientists, Social and Behavioral Scientists, Engineers and Technologists, Economists, Professional Practitioners, Educators, Researchers, Students, Conservationists, Industrialists, Managers, Law and Policy Makers, Policy Analysts, Planners in the Public and Private Sectors, Development Officials in Government and Non-Government Organizations.

This unique project was launched in response to the concerns expressed at the Earth Summit in Rio in 1992 and at other related world conferences. The concept of the EOLSS has received an unprecedented intellectual support from a great number of scholars worldwide. In May 1996, 450 scientists, engineers, and policy makers from many countries were invited to the Bahamas to participate in defining the scope of the EOLSS body of knowledge. The Bahamas Workshop was the culmination of international collaborative efforts to generate a detailed list of contents and achieve a global consensus and acceptance of its structure. The Bahamas Workshop followed several smaller workshops that had been held earlier in 1996, in Washington DC, Tokyo, Moscow, Mexico City, and Beijing. A team of scientists from the French Academy of Sciences provided assessments and recommendations. The proposals from the Bahamas Workshop were reviewed by invited specialist teams in USA, Japan, Russia and China, in collaboration with additional meetings: August 1996 Panama (Regional Committee for South and Central America), September 1996 Abu Sultan, Egypt (Regional Committee for Africa and the Middle East), and March 1997 Kuala Lumpur (Asian Regional Committee), to complete and unify the list of contents.

The EOLSS Body of Knowledge is in about 20 major subject categories and spanned by about 200 subject themes. Each Theme is on average equivalent to one print volume of 500 standard pages. Some Themes are so large and elaborate that they may be regarded as encyclopedias on the respective Theme subjects. The EOLSS has been developed under the expert direction of hundreds of subject editors with contributions from thousands of authors in over 100 countries. It is the culmination of an unprecedented global effort organized under the auspices of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and brings together the work of many of the world's foremost scholars, experts, and policy-

makers in all major fields. The UNESCO-EOLSS committee has been supervising the development of the Encyclopedia.

The Inaugural Edition of the Encyclopedia is set for release during the World Summit on Sustainable Development in Johannesburg, South Africa during 26 August-04 September 2002. Each category covers subjects in units called Themes. The web based Encyclopedia will start with about 150 Themes and will mature to its full size through regular updates. The online encyclopedia is designed with user friendly features for navigation and search. The integration of the body of knowledge that includes about 50,000 illustrations and about 20,000 data tables is achieved through about 200,000 cross reference links within the body of knowledge.

A set of three print volumes “ Knowledge for Sustainable Development- An Insight into the Encyclopedia of Life Support Systems” each of about 1000 pages will also be released at the Johannesburg. It presents the major subject perspectives of the Encyclopedia at a level suitable for a broad readership.

In accordance with UNESCO’s commitment for transfer and sharing of knowledge, free access to the Online Encyclopedia will be provided for those universities in the least developed countries which have a demonstrated commitment to sustainable development and for disadvantaged individuals worldwide. Further information is available at: www.eolss.net .

10. TIES Board of Directors

Terms are from September 1, 2002, to August 31, 2004, except the 4-year terms of the regional directors.

- President:** Peter Guttorp
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Contact Peter Guttorp, (peter@stat.washington.edu) or Bronwyn Harch, (Bronwyn.Harch@csiro.au) for questions regarding membership and other benefits. Communications, (e.g., contributions, comments and suggestions) regarding this publication should be addressed to the TIES Newsletter editors: Teresa Alpuim (talpuim@fc.ul.pt) or Sylvia Esterby (sresterby@ouc.bc.ca).

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>