

INTERNATIONAL ASSOCIATION FOR STATISTICAL EDUCATION

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**Editor:** Chris Wild, Department of Statistics, The University of Auckland, Private Bag 92019, Auckland, New Zealand, Email: [c.wild@auckland.ac.nz](mailto:c.wild@auckland.ac.nz)

## 1. IASE Executive 2003-2005

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From left to right:

Lisbeth Cordani, Chris Wild, Carmen Batanero, Chris Reading, Carol J. Blumberg, Larry Weldon, Gilberte Schuyten, Susan Starkings.

(Andrej Blejec and Daniel Berze absent)

<b>President</b>	<a href="#">Chris Wild</a>	Finance, IASE sessions at ISI-55, Sydney, 2005, IASE editor in International Statistical Review, Associate Editor SERJ, Editor IASE Review 2004
<b>President-Elect</b>	<a href="#">Gilberte Schuyten</a>	Editor IASE Matters in Teaching Statistics
<b>Past-President</b>	<a href="#">Carmen Batanero</a>	Chair IPC for ICOTS-7, Associate Editor of SERJ
<b>Vice-Presidents</b>	<a href="#">Carol Joyce Blumberg</a>	Internal Statistical Literacy Project, (ISLP), IASE Publications Officer, IASE rep. on ISI Publications Committee
	<a href="#">Lisbeth Cordani</a>	Member of ICOTS-7 LOC, LOC representative in the IPC
	<a href="#">Chris Reading</a>	Associate and Assistant Editor SERJ
	<a href="#">Susan Starkings</a>	IASE section of ISI Newsletter, Programme Chair for ICOTS-7
	<a href="#">Larry Weldon</a>	
Co-opted	<a href="#">Andrej Blejec</a>	Conferences Officer
Ex-Officio	<a href="#">Daniel Berze</a>	ISI Executive Director

## 2. Inside IASE Review 2004

A highlight of this issue is an account of what is happening in statistics and statistics education in China by Yuan Wei. As with much else in China what is happening is rapid growth! The biggest event for IASE in 2004 was the IASE Round Table held in Lund. We have impressions and memories from Anthony Harradine and Rob Gould, photos, and a full report on the scientific sessions and discussions from Gail Burrill. We also have reports about IASE sessions at other conferences in 2004 from Carol Joyce Blumberg and Joe Wisenbaker. So much for the past. What is coming up? Well for IASE in 2005 it is all happening in Sydney in April. Of course you have all been heeding my emailed messages. You have lined up teaching cover from the friendly colleagues you have been so supportive of in the past – or, if it's too late for that, are promising to be supportive of in the future. You have your airline tickets booked and are looking forward to sampling the joys of Sydney. Most of us still have many great images in our heads of Sydney (and Australia more generally) from the TV coverage of the 2000 Olympics that it'd be great to check out in person. And if that doesn't do it for you, we have more details of the IASE Satellite Conference on Statistics Education and the Communication of Statistics as part of a general article on Satellite conferences from Brian Phillips and also about talks and speakers at the IASE Invited Sessions at ISI 55. That brings us to 2006 and ICOTS – the most important event on the statistics education calendar. ICOTS-7 will be held in Salvador, Bahia, Brazil. Carmen Batanero has some interesting background for us about Salvador, Bahia and also on how to get involved at ICOTS. Then there are all the regular Review features about matters such as publications.

*Chris Wild, December 2004*

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## 3. Education is everybody's responsibility

*by IASE President Chris Wild*

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*On August 30th and 31st, 2004, the ISI co-sponsored a Special Conference in Daejeon, Korea, on "The Vital Role of Statistical Science in Assuring National Prosperity". The Conference was co-organized by the Korean Statistical Society and the Korea National Statistical Office and was timed to follow a meeting of the ISI Council. There were thirty-one invited participants, many of them members of the ISI Council. The following is an abbreviated version of an opening statement for a panel discussion on statistics education at the Conference.*

Statistics education should be a vital concern of anyone who cares about the future of statistics or statisticians, or who employs statisticians. Who should be educated and for what purposes? There is statistics education for those who will become professional statisticians, for those in other areas or professions who will use statistics fairly seriously, and statistics education to provide general life skills and enable an educated citizenry to participate in societal debates which involve arguments based upon data. Every section of ISI has vital interests in at least one of these areas.

Statistics education provides a training ground, a recruiting ground and a selling ground. It is to the advantage of us all if more of the best and brightest come into statistics education systems and leave it better educated, with better developed thinking skills, and a greater appreciation for the power of statistics. Better and better-educated people have a greater impact, both practical and intellectual, and increase the demand for the perceived sources of their success. But statistics is not just for an elite. Society at large will benefit if a broad cross section of students emerge statistically literate and with an appreciation for the power of statistics and the desirability of decisions being made on the basis of solid data.

There is a place in this for everyone. There is a place for employers in making known the skills that they desire in recruits. There is a place for statistical professionals in making known what statistical and related skills are most marketable or otherwise valuable. This is the goal-setting and goal-prioritising aspect of statistics education, an aspect which should be driven by answers to the critically important question, "Of all that statistics education might potentially deliver, what matters most in the real world?" And, most obviously, there is a place for teachers.

Educational goals must be realistic. They are only useful in the here and now if real students can reach them in realistic timeframes with proven pedagogy. Where goals are desirable but not yet realistic, they

should fuel experimentation and research in search of pedagogies that might make them realistic. We must respect each other's professional expertise. Statistical practice is the area of expertise of the statistical professional. Pedagogy is the area of expertise of the teacher. Statistical professionals must tread carefully in the minefield of pedagogy. Lacking a detailed knowledge of the capabilities of students at various ages and stages of development and educational background, they may not even realise that they have strayed into a minefield. But it is imperative that statistical professionals be welcomed into pedagogical debates as potential sources of new mould-breaking ideas from minds that have not been conditioned to walk down established pathways and consequently, perhaps, blinded to other possibilities. The resulting ideas, however, then need to be tested in the fire of real students in real classrooms with real teachers before being widely advocated, or worse still, enshrined untested in educational policy. There are significant numbers of people doing important research to inform goals and pedagogy for statistics education, many if not most of them IASE members, but many more are needed if much teaching practice is truly to be well informed by solid research.

Statistics is both valued and undervalued. It is valued to the extent that it is a central and even compulsory part of curricula with huge numbers of students studying statistics at some level and in some form in large numbers of countries. It is undervalued in that its full potential is not encapsulated in the teaching that is being done and in that it is mostly taught by teachers who themselves have, at best, minimal education or experience in the subject. There may be a silver lining to this cloud. Overworked, under-resourced teachers may be desperate for materials that can increase relevance and interest for their students while saving the teachers work. If, for example, statistical agencies who want to create an appreciation for their work can deliver materials in the form of complete off-the-shelf lessons that are well integrated with official curricula and assessments, there should be a good chance of their being widely adopted. Most students who end up coming into statistics thought they were heading somewhere else so we are usually in the business of selling students something they do not know they want. To do this teaching has to be speaking to things students really care about. Teachers need ammunition.

The capabilities of a voluntary organisation are defined by what the membership is willing and able to donate time and effort to. That in turn is driven by what members feel is interesting and important. Personal perception, and a scanning of the institutions that members work in for countries that I know well, suggests that most members of IASE are primarily teachers. Others are teacher-researchers. Some are official statisticians. We should have a better handle on the profile of the membership and must move to correct this. What can IASE and the rest of ISI do to expand the educational capability we now have? Currently, the ways that we address the educational needs of other sections come about largely through the actions of small numbers of people who are active in both areas and often dual members. We co-sponsor sessions of mutual interest at the main ISI conferences and put on specialised sessions at ICOTS and publish papers. Are there other approaches that might allow us to make progress on educational imperatives of other Sections or even just make progress on determining what they might be? This meeting provides us with an excellent opportunity to explore possibilities. IASE is open to any ideas. And ideas, we realise, are just a start. They need champions who can take ownership of them and enthuse others into making them happen.

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#### **4. Statistics and Statistics Education in China**

*By Yuan Wei, Vice-President, Renmin University of China, Beijing and Vice-President of the Society of Statistics Education of China*

The Chinese people came to know the word "statistics" from many sources and understand the meaning of "statistics" from different points of view. The Chinese character translating the word "Statistics" means "sum up" and "count."

Statistics education is growing rapidly in China. There are now 130 universities which in total enrol 5000 undergraduate students majoring in statistics. Of these, 105 provide M.A. and M.S. programs in statistics and 51 universities offer Ph.D programs in statistics. During the last 5 years, the number of institutions offering B.A. and B.S. degrees in statistics increased steadily. In the year 2000, there were 83 universities offering B.A. and B.S. degrees in statistics. The number increased to 93 in 2001, 105 in 2002, 118 in 2003 and 130 in 2004, which shows the increasing demand from society. There are more than 300 secondary technical schools offering statistical specialty training from which nearly 10,000 students graduate each year. Vocational middle schools also play an important role in the statistical specialties training process. At the same time, exams for professional statisticians and exams for senior statisticians are organized by the Ministry of Personnel each year.

There are four statistical societies currently in China:

- 1) The **Society of Probability and Statistics** mainly consists of researchers of the Institute of Mathematics in the Chinese Academy of Science and faculty members in universities. The journal of the society is *Applied Probability and Statistics*.
- 2) The **National Statistical Society of China**, the largest statistical society, is organized mainly by the official statistics system (which has over 100,000 employees) and faculty members in the field of social and economic statistics. Their journal is *Statistical Research*.
- 3) The **Society of Applied Statistics** has a membership made up of professional statisticians of companies, institutions, faculty members and so on. Their journal is *Mathematical Statistics and Management*.
- 4) The **Society of Statistics Education** has a membership made up of faculty members, teachers and officials for different educational levels. Their journal is *Statistics Education*. This society, of which I am currently Vice-President and Chairman of the Higher Education Section, has 3 sections. They are the Higher Education Section, the Secondary Technical Education Section and the Vocational Education Section. In the Higher Education Section, there are approximately 100 unit members and hundreds of individual members.

The Chinese Statistical Union, currently made up of the Presidents and Secretaries of the four societies, unifies these four societies and successfully organized the 50<sup>th</sup> Session of the International Statistical Institute in Beijing in 1995.

With a population of 1.3 billion and the rapid economic growth, China needs wider international collaboration in all aspects of statistics. Since the 50<sup>th</sup> Session of the ISI in Beijing in 1995, there have been more and more readers of ISI publications and browsers of the ISI website. In Asia, the Sino-Japan Statistics Symposium has been successfully organized since the 1980's. In October 2004, the 8<sup>th</sup> symposium was held in Guilin, the capital city of Guangxi province, China. Academic and official exchanges between China and Korea in statistics are frequent and fruitful. Still there is a big potential for further international collaboration which includes the exchanges of students and scholars, international conferences, and joint research. We in the Society of Statistics Education look forward, in particular, to forming close relationships with IASE and its members.

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## 5. Memories of Lund

*The 2004 IASE Round Table conference was held in Lund, Sweden, 28 June to 3 July 2004*

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Lund in the northern hemisphere summer - it was just idyllic.

Who could forget:

- breakfast at Hotel Sparta, where for some early morning mental stimulation you made sure you sat with the cultured Rosemary Callingham and Chris Reading or if you wanted to be reminded that boiled eggs could 'kill you' you sat with Nick Broers (who ate a boiled egg most mornings).
- the lovely walks from central Lund to Hotel Sparta and the many problems of the world solved along the way.
- how cold it was on the boat to Hven Island.
- the 'Tour de Hven Island'

- the red faces and heads after the tour - measured so nicely by the Bakker and Harradine lobster index.
- the very sensible hat of Jane that so many wished they had.
- Bakker's and Harradine's data collectors on the bikes that showed the women were better at everything!
- the 'all class' riding style of Gilberte, the royal style of Roxy and Carol, the fearless style of Beth, the variable style of Allan, the leadership of the human GPS George (even though we did get lost), the tumbles taken, the mountains (well small hills) climbed.
- the masterful skills of ringleader Gail, who had the whole show on track from start to end.
- the 'used look' of those who lost their luggage on day one.
- the classy dress style of all at the dinner in that most beautiful hotel - especially Bill's classic shirt.
- Jack wearing the waitresses tray of drinks in the restaurant that served lettuce pizzas.
- the loudest and most unruly table at the dinner - lead by MacGillivray, Ridgeway and co.
- the Texan twins sitting high in the lofts always ready with some insightful comment.
- the continual flashing of James (camera flashes that is).
- the most wonderful hosts we could have wished for – Lars, Lena and George.
- Lars' connection with the most important people – it rained on every day except for the Tour day.
- the extra helpers Anna, James and Pia who were so delightful.
- Milo's raw passion for confounders and Statistical Literacy in general. (There were even confounders in the data from the bikes!)
- Rob Gould's 007 love for a good martini

*Anthony Harradine (Australia)*

My strongest memory of the IASE Round Table will be that, somehow, those Swedish statisticians appear to have mastered weather prediction to the point where it seems eerily as if they have control over the rain. It rained every day. Sometimes all day. The rain was spotty enough that we could sometimes walk to dinner, and sometimes complete a meal outside, but these would be temporary and brief respites. On some days it felt as if a paddle would be more useful than an umbrella when we went out to lunch. To this Southern Californian's mind, this strange water-falling-from-the-sky phenomenon made the planned mid-week outing to ride bikes on the Isle of Hven seem misguided. But I went along with it anyways. Miraculously, the clouds parted. The sky was a glorious blue without a cloud in sight. The sun was warm -- many of us got sunburned, and a sunburn was the last thing I expected to bring home from a trip to Sweden. Perhaps I was too quick to judge the weather here, I thought, as we biked on our bright-yellow bikes through beautiful farms, past thatched-roof cottages and a medieval church, under a flawless blue sky. The next day the rain returned. It rained continuously (to my memory) for the rest of the week and all through the ICME in Copenhagen. But somehow, when it mattered, our hosts managed to predict the perfect day for biking.

*Rob Gould, UCLA, USA*

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For (many, many) more photographs from the Round Table, see <http://www.maths.lth.se/matstat/tmp/iase/> .

## **6. Overview of the 2004 IASE Roundtable: Curricular Development in Statistics**

**Education** *Report by Gail Burrill, Michigan State University, USA*

[Note: A list of all of the papers referred to in this Report is given at the end of the Report.]

The IASE Roundtable on Curricular Development in Statistics Education held in Lund, Sweden on 28 June to 3 July 2004 provided a forum for 26 participants from nine countries to consider aspects of the statistics curriculum from primary school to the university level and across courses in statistics, mathematics, teacher preparation, and stochastic processes. The discussion ranged from the development of a statistics curriculum, common issues, and promising solutions to questions of how to best construct learning trajectories that will enable all students to make sense of data and to apply statistical reasoning to make decisions based on data. The discussion was framed by questions such as: How do we help the world understand that statistics education is vital in a world where social policy, technology, environment and so on all depend strongly on careful design of investigations and very fine analysis of data? What is important to teach, when should it be taught and how? How do we carefully structure the curriculum? What do we know about when concepts should be taught and how? How can we make statistics education more inviting? What do we know about teaching and learning statistics and what do we need to know? How does research link to practice? Who is responsible for developing and putting in place the curriculum?

### **Frameworks**

One theme that emerged in the papers and was discussed from several perspectives was the role of frameworks as a guide to thinking about curriculum development in statistics, assessment, conceptual understanding, and teachers' practice. Begg offered a general framework for curriculum development and cautioned that developers should be mindful of the fact that learning is not linear. He suggested it might be more appropriate to think about curriculum as a set of cycles. Watson and Callingham used the Wild and Pfannkuch framework for theoretical statistical thinking in their work on assessing statistical literacy, created six levels of understanding for key content strands: recognition of the need for data; transnumeration (changing representations to engender understanding); consideration of variation; reasoning with statistical models; and integrating the statistical and contextual. Reading and Read also used this curricular framework in their work with minute papers. Schield laid out principles or key elements to guide the design of a statistical literacy curriculum for an introductory course for non-majors at the post-secondary level. He advocated that using these principles would lead to new ways more in touch with the students' needs and futures to teach concepts such as association, confounding, and statistical significance.

Pfannkuch reported on her joint research with Horning centred on how the framework affected teachers' practice, with the goal of starting teachers on a pathway to gradually change their teaching to an approach that fosters statistical thinking. The statistical thinking framework is made concrete by the teachers in their instruction and conversely the framework is used by the teachers and researcher to analyze their instruction. Harradine described six phases of teaching and learning in the progression towards the goal of reasoned decision making based on sound statistical thinking. In each of these settings, as well in several other papers, the case was made for beginning with a clear and well-articulated framework that could inform the development and analysis of how the development unfolds.

### **Statistical Thinking and Reasoning**

A second theme in the papers was that students seem to be mastering statistical procedures and vocabulary but are not able to use statistical reasoning in a meaningful way. This lack of students' ability to reason and think statistically was evident at all levels from elementary students to those at the post-secondary level. MacGillivray comments that an over-emphasis in school syllabi on answering questions rather than posing them, and making decisions based only on data displays produces an approach based on absoluteness of data that stifles development of statistical thinking. Ridgway, McCusker and Nicholson identified this as an issue for students aged 9 to 13 years after examining assessment results and finding top students unable to interpret data and to apply their statistical ideas in practical situations. They claimed that current specifications in statistical education often focus on a rather narrow range of techniques applicable only to univariate and bivariate analyses with the main emphasis on the mechanical skills of constructing specified graphs correctly or 'reading the graph' to extract detailed information rather than on equipping students to become informed citizens in a society where they will be required to deal with complex data sets. As an intervention they designed a series of technology-based problem solving tasks to integrate into the

curriculum. They reported on the design principles for such tasks that seem to be emerging from their work and on evidence showing that students – some as young as 9 years – can work with such data to reason about realistic situations and produce sensible conclusions

Matis, Riley, and Matis observed that the curriculum of many introductory courses at the collegiate level is frequently centred solely on the theoretical underpinnings of the subject with limited exposure to its use as a modelling and analysis tool. They observed that the subject is often illustrated with simple mathematical exercises that have no practical application or with projects that do not actively involve the students. As a consequence, they found students unable to transfer their knowledge to real contexts. To counteract this, they designed laboratory modules via digital video media that present real-world applications of stochastic processes that can be integrated into coursework. The modules engage the students in problem solving in an applied context and ask them to deliver a comprehensive oral and written report directed towards a non-technical audience as part of completing each module.

From a very different perspective, Rossman and Chance suggest that the “mathematical statistics” sequence that often presents a full semester of probability before proceeding to statistics, where the statistics covered is often abstract in nature and does not give students a modern and balanced view of the applied as well as the theoretical aspects of the discipline of statistics. They argue that, in fact, students often leave this course with less intuition and conceptual understanding than students who have taken a lower level course (e.g., data collection issues, statistical vs. practical significance, association vs. causation, robustness, diagnostics). They have developed a course to support a data-centred, active learning pedagogical style at the post-calculus level. Key features of these materials include

- Student conducted investigations of statistical concepts and properties.
- Probability models introduced in the context of statistical ideas, applied to real data.
- Technology used as a tool for such techniques as simulation and to assist with graphical displays and investigating effects of parameter changes.
- Explorations of data from scientific studies, popular media, or student-collected

### **Assessing Understanding**

Several of the papers addressed ways to explore and measure student understanding of statistical concepts and tied these to the curriculum. Broers, Mur, and Budé focused on self-explanation as a way to bring out important statistical ideas and outlined a method to direct students in their self-explanation activity. Working with struggling second year university students, they compared the use of concept maps where the student has to deconstruct the learning material of a given knowledge domain into a finite number of elementary propositions, which together cover all the relevant concepts and principles with a more conventional test for assessing conceptual understanding and found some positive results. Watson and Callingham used a statistical literacy survey and code book to monitor the progress of students in grades 6 to 10 in their development of the skills required for statistical literacy. They argue that their findings that most students remained at a level characterized by appropriate, but unquestioning, engagement with context, and straightforward application of statistical skills associated with the calculation of simple probabilities and means and graph reading suggest that more opportunities need to be created for students to question critically statistical claims from media sources or other real-world contexts in order to develop the analytical habits of mind that are needed to respond critically to quantitative claims.

Reading and Reid considered the degree of understanding of variation that is evident as students engage in a university-level introductory service statistics course with ‘consideration of variation’ as a core for the curriculum. Their work seems to suggest that the use of ‘minute papers’ focusing on students’ understanding and reasoning rather than merely their ability to perform calculations can be a means of evaluating how successfully the consideration of variation thread has been used to structure the integrated curriculum. Ottaviani and Rigatti Luchini described research in Italy that demonstrated better results may be obtained in elementary school if teachers adopt a concept net approach, use class interviews as tools to highlight both the individual’s and group’s knowledge, and build cognitive maps to check the progress of concept acquisition by pupils. Jun described the relation between the curriculum and assessment in Shanghai when only four out of 150 marks were allotted to probability and none to statistics on the University Entrance Examinations in 1998 and 1999 and how this should be changing with the adoption of a new curriculum that includes statistics and probability.



## Scaffolding the Development of Statistical Concepts

An approach with potentially significant implications for the curriculum is an emerging perspective that key statistical concepts such as measures of centre or certain graphical representations might be introduced in ways that promote the development of understanding rather than initially beginning with definitions and instruction on routine procedures. Bakker, Biehler, and Konold described research on promising strategies for helping students come to understand measures of centre and for interpreting box plots, recommending that early instruction in statistics focus primarily, if not exclusively, on plots in which individual cases are visible. When aggregate plots are introduced, based on their research, they recommend that the plots initially be accompanied with representations that still allow students to see individual cases, for example, where box plots are overlaid on top of stacked dot plots.

In his paper, Harradine suggests that problems are traditionally posed in ways that require students to read within, between and beyond the data. That is, the student has to make comparisons between two sample data sets and then hypothesize about what that may mean about the population from which the data were drawn. He claims this is too much to ask initially for many students and argues that prior to teaching standard statistical tools and procedures, students should be taught the art of "distribution division" where distributions are sliced into chunks and each chunking is considered to see what information that particular slicing configuration conveys, the application of the skills of comparing and contrasting, and forming arguments that support a conclusion or conjecture.

## Technology

The use of technology in teaching statistics has created new opportunities to present ideas dynamically and interactively to students, rather than in more conventional, 'static' environments and can support the development of robust models of new sorts of conceptual learning and understanding, which can underpin teaching in IT-rich environments. This was evident in the work by Ridgway, McCusker and Nicholson; Matis, Riley, and Matis; Harradine; Bakker, Biehler, and Konold; and Rossman and Chance. From another perspective, technology is used both to deliver key elements of a course and as a tool for analysis in the course. For example, Peck and Gould developed an online course for the professional development of teachers of upper-level secondary school statistics that uses real data, active learning, and technology to teach statistics. Finzer and Erickson designed a statistical unit using census data obtained from a large data base, where students analyze the data using Fathom Dynamic Statistics® software.

Abstracts of the papers and the roundtable agenda are available on the website [http://hobbes.lite.msu.edu/~IASE\\_2004\\_Roundtable/](http://hobbes.lite.msu.edu/~IASE_2004_Roundtable/). The proceedings, which will include the recommendations of working groups on technology and its relation to the curriculum, research and the statistics curriculum, teacher education, and curriculum frameworks should be available through the IASE website in early 2005.

## Papers:

- Bakker, Arthur, Freudenthal Institute, Utrecht University, The Netherlands, Rolf Biehler, University of Kassel, Germany, & Cliff Konold, SRRI, University of Massachusetts, USA. "*Should Young Students Learn About Box Plots?*"
- Begg, Andy. University of Auckland, New Zealand. "*Statistics Curriculum and Development: New ways of working.*"
- Broers, Nick J., Marieke C. Mur, & Luc Budé, Dept of Methodology and Statistics, Maastricht University, The Netherlands. "*Directed Self-explanation in the Study of Statistics.*"
- Finzer, William. KCP Technologies & Tim Erickson, Epistemological Engineering, Berkeley CA, USA. "*Fathoming, Census Microdata: A Meeting of Statistics, Mathematics and Social Sciences.*"
- Harradine, Anthony, Noel Baker Centre for School Mathematics, Kent Town, SA, Australia. "*Within, Between, and Beyond.*"
- Jun, Li. East China Normal University, China. "*Statistics Education for Junior High School in China.*"
- Matis, Timothy; Linda Ann Riley, New Mexico State University, & James H. Matis, Texas A&M University, USA. "*Integrating Technologically-Based Laboratory Modules into the Stochastic Processes Curriculum.*"
- MacGillivray, Helen. University of Technology, Queensland, Australia. "*Coherent and Purposeful Development in Statistics across the Educational Spectrum.*"

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- Ottaviani, Maria Gabriella, University of Rome “La Sapienza,” & Silio Rigatti Luchini, University of Padua, Italy. “*Dati e Previsioni*” *Emerging as one of the Basic Themes in Mathematical Curriculum of the First Cycle School Level in Italy (6-14).*”
- Peck, Roxy, California Polytechnic State University, San Luis Obispo, & Rob Gould, University of California at Los Angeles, USA. “*Innovative Curricular Practices and Teacher Preparation at the In-service Level.*”
- Pfannkuch, Maxine, The University of Auckland, & Julia Horring, Auckland Girls’ Grammar School, New Zealand. “*Developing Statistical Thinking in a Secondary School: A Collaborative Curriculum Development.*”
- Reading, Chris & Jackie Reid, University of New England, Australia. “*Consideration of Variation: What can Minute Papers Reveal?*”
- Ridgway, James, University of Durham, Sean McCusker, University of Durham, & James Nicholson, Belfast Royal Academy, UK. “*Uncovering Student Statistical Competences via New Interfaces.*”
- Rossmann, Allan, & Beth L. Chance. California Polytechnic State University, San Luis Obispo, CA, USA. “*A Data Oriented Active Learning, Post-Calculus Introduction to Statistical Concepts, Methods and Theory.*”
- Schild, Milo, Augsburg College, Minneapolis, MN, USA. “*Statistical Literacy Curriculum Design.*”
- Watson, Jane, University of Tasmania, & Rosemary A. Callingham, University of New England, Australia. “*Statistical Literacy: From Idiosyncratic to Critical Thinking*”
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## 7. Report of the “Curriculum: Content and Framing” Working Group

by Andy Begg (New Zealand), Timothy Erickson (USA), Helen MacGillivray (Australia) and Timothy Matis (USA)

*In addition to formal papers, the 2004 IASE Round Table had four Working Groups discussing and reaching consensus on such matters as on technology and its relation to the curriculum, research and the statistics curriculum, teacher education, and curriculum frameworks. The “Curriculum: Content and Framing” group was the first group to finalise their Report.*

### 7.1 Multiple perspectives on the content of the statistics curriculum

#### 7.1.1 Knowing

Teachers and curriculum developers working at all levels are concerned with the content of courses, which has usually been described in terms of what students should know. Traditionally this has been listed in terms of factual and conceptual knowledge, and operational knowledge and procedural skills.

#### 7.1.2 Doing

More recently, some statistics (and mathematics) curricula have been structured in terms of both knowing and doing, with the emphasis on doing being related to holistic approaches and large-scale issues. Within this emphasis what students “do” might be thought of in terms of problem solving (doing statistical investigations and statistical modelling), reasoning with uncertainty, communicating, and making connections.

#### 7.1.3 Thinking

We believe that there are other important perspectives that can be also used in considering the statistics curriculum. The first of these is statistical thinking; what is known and done is only meaningful if underpinned by thinking; this includes thinking about data, investigations and modelling, variation, multiple representations, sampling, inference, and so on.

#### 7.1.4 Learning activities

For teachers a key concern is learning activities—what range of learning activities help students develop their ability to know, do and think statistically?

#### 7.1.5 Summary

We acknowledge that a curriculum may be written using a framework involving only one or two of these perspectives, but all four of them should be considered and ideally all four will be made explicit either within a curriculum or within supporting documentation and integrated in a coherent learning sequence.

## **7.2. Some considerations relating to curriculum framing**

### *7.2.1 Aims*

The aims of any statistics curriculum need to be stated explicitly. The aims need to be coherent within the general aims of the educational programmes, the discipline itself (statistics), and those of stakeholder groups when the curriculum is for a service subject. In schools the statistics curriculum aims need to be coherent with the aims of the mathematics curriculum when statistics is taught as part of mathematics.

### *7.2.2 Principles*

The principles guiding the construction of the curriculum will ideally be made explicit. These principles, together with the aims of the subject, will provide the rationale for the curriculum and help people with alternative views understand the basis of the curriculum.

### *7.2.3 Assumptions*

Any assumptions that are made should be made explicit so that those with alternative views can argue critically for their alternatives. Such assumptions might relate to the nature of statistics, the nature of knowledge (separated or connected, surface or deep, relative or absolute), pedagogy, the proposed audience, the historical development of preceding courses, available resources, the degree of choice left to the instructor, the assessment regimes (school and external), and the teachers' responsibility to empower learners to continue their exploration of the subject after any formal courses are finished.

### *7.2.4 Alignment and linkages*

Each statistics course or statistical component of a course needs to be aligned with associated courses, be they other statistical courses, mathematics courses, courses in other subjects (formal or informal) in which statistics plays a service role; and between courses taught at different levels (primary, secondary, undergraduate and graduate levels). Part of this alignment is making links between the subjects, seeing commonalities as well as differences, and considering how the balance of importance can swing from one to the other as particular topics are considered. As part of this alignment, teachers of statistics need to acknowledge their responsibilities as teachers in the general sense as well as teachers of statistics and realize how societal values can be incidentally learnt because of the way the subject is taught and the activities used in the teaching.

In statistics (and mathematics) knowledge and understanding of the backgrounds and entry knowledge and skills of the student cohort are important including knowledge and understanding of the diversity of backgrounds. What students bring to a course in statistics is shaped by many influences. Each statistics curriculum needs to acknowledge the importance of an awareness of the cohort's backgrounds, and how the curriculum will link with, build on, and, where necessary, re-align, existing knowledge, skills, understandings and misunderstandings.

### *7.2.5 Technology*

Technology has a number of roles in the teaching and practice of statistics. It has changed, and continues to change, many aspects of the discipline. Its roles can be summarized by:

- some statistics becomes more important because technology requires it;
- some statistics becomes less important because technology replaces it;
- some statistics becomes possible because technology allows it; and
- some statistics can be taught using technology .

Technology use has enhanced the earlier accessibility of complex investigations, exploratory data analysis and visualization, simulation, and re-sampling.

## **7.3 Further considerations with respect to curriculum design**

### *7.3.1 Introduction*

While there are many similarities between primary, secondary and post-secondary education in statistics, there are also some differences; consequently, at each level of education there are specific matters that deserve consideration.

### *7.3.2 Primary/elementary school statistics within mathematics*

In some countries statistics is part of the school (mathematics) curriculum from the first years of schooling. In these circumstances notions of categorisation within mathematical reasoning provide some initial opportunities to discuss categorical data. Primary school teachers are usually teachers of all subjects and statistics need not be seen as a separate subject but rather as a tool to be used in any/every subject, and thought of as numbers and data in context.

### *7.3.3 Secondary school statistics within mathematics*

In some countries statistics is taught throughout secondary school as part of a mathematics course, while in others it is a stand-alone statistics courses in the senior years. In both circumstances the commonalities and the differences with mathematics need to be emphasised, and courses need to be structured with the aim of statistical literacy for citizenship for some, and the likelihood of further study in statistics for others, whether as part of study in another discipline or as study oriented to the statistical sciences.

### *7.3.4 Post-secondary introductory statistics courses*

Initial post-secondary courses designed for mathematics/statistics majors, and for future statisticians, are also taken by students who may not continue with statistics. Some courses have students from the above groups but are also service courses while, depending on the university and country, some courses may be specifically oriented to one population. We believe that all such courses should build on the students' backgrounds, be strongly related to data, contribute to the students' development in statistical thinking, take account of current educational and statistical practice, and provide a strong basis for future statistical learning in any context.

### *7.3.5 Statistics service courses*

Developing and implementing curriculum specifically for post-secondary service courses requires considerable understanding of statistical education, and expertise in helping the serviced area identify and articulate what they want for their students. In developing curriculum collaboratively with serviced areas, and in designing learning and assessment experiences, the statistician should ensure that the current and future learning interests of the students are kept to the fore.

### *7.3.6 Further statistics courses*

In developing curriculum for courses beyond those at the introductory post-secondary level it is important that each course be coherent within itself, structured around clear objectives, and that links with other subjects that the student may take are clear. As with service courses, the wishes of stakeholders must be interpreted and balanced with the educational development of the students, with the latter always to the fore.

### *7.3.7 Statistics as part of general adult numeracy courses*

We see a need to acknowledge statistics as an important strand of adult 'numeracy' when considering literacy and numeracy programmes for citizenship and work. Statistical numeracy can rarely be taught adequately by literacy specialists with a minimal level of statistics or mathematics; statistics educators need to work with adult educators to help them develop courses and learn themselves.

### *7.3.8 Special purpose short courses and workshops*

Statistical concepts taught in short courses targeted for professional development, such as certificate programs and training workshops for industry and government, should emphasize those aspects that are relevant to achieve the learning objectives of the particular program. These courses could focus on such topics as quality engineering control, modelling and simulation, control systems, or teacher development. The students at these courses may not have been exposed to statistics before, and while it is important that they be well trained in the use of statistics, it may be dangerous in the sense that they only get a partial picture and may try to extend this initial knowledge erroneously to other areas.

## **7.4 Other matters**

There are a number of other matters that relate to the curriculum and development that we did not discuss. These include: collaboration, assessment, resources, teachers' professional development (pre-service and in-service), and research.

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## **8. IASE Sponsored Sessions at The Joint Statistical Meetings**

*Report by the Organizer/Chair: Carol Joyce Blumberg (USA)*

In August 2004, IASE was the main sponsor (with ISI and the American Statistical Association (ASA) Section on Statistical Education as co-sponsors) of an Invited Session on "Training of Government Statisticians". Formal papers (using PowerPoint presentations) were given by Patrick Murphy of University College Dublin (Ireland) on "Teaching a Course on Government Statistics in a University Statistics Department", by Cynthia Z. F. Clark, US Census Bureau, Gia F. Donnalley, US Census Bureau and Roger Tourangeau, University of Maryland (USA) on "The Joint Program in Survey Methodology and Its Impact on the Federal Statistical Agency Workforce" and by Elizabeth Taylor of the Bureau of Labor Statistics (USA) on "The Challenges of Providing International Statistical Training to Government Statisticians". The Discussants were Ivan P. Fellegi, Chief Statistician at Statistics Canada, and Luigi Biggeri, President of the Italian National Statistics Office. The organiser/chair of the Session was Carol Joyce Blumberg (USA). Copies of the papers and PowerPoint presentations will be available soon at the IASE Publications page at <http://www.stat.auckland.ac.nz/~iase/publications.php>.

IASE has also recently had its proposal for an Invited Session on "Publishing in Statistics Education Journals: Views from the Editors" accepted for the 2005 Joint Statistical Meetings. This session will have the Editors (or their representatives) of Statistics Education Research Journal, Journal of Statistics Education and Teaching Statistics prepare and present papers on the mission of their journal, the types of articles they would like to receive, and some of the common errors they find in submitted manuscripts that result in rejection. Gilberte Schuyten (IASE President) will serve as Discussant. Following the presentations by the Editors and the Discussant, there will be 30 to 40 minutes of open discussion devoted to questions from the audience and discussion by the Editors and members of the audience of what the journals and the organizations that publish them can do in the future to fit the needs of the statistics education community. This session is also being organised by Carol Joyce Blumberg. The co-sponsors are ISI and the ASA Section on Statistical Education. Details on the 2005 Joint Statistical Meetings to be held in Minneapolis, Minnesota, USA from 7 to 11 August are at <http://www.amstat.org/meetings/jsm/2005/index.cfm>.

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## **9. Statistics Education at ICME-10:**

### **10<sup>th</sup> International Congress on Mathematical Education (ICME-10) - TSG 11 - Research and development in the teaching and learning of probability and statistics**

*Report by the Co-Organizer/Chair: Joe Wisenbaker (USA)*

The 10th International Congress on Mathematical Education was held this summer in Copenhagen, Denmark from July 4-11. As a part of the overall program, Topic Study Group 11 was organized around the theme of research and development in the teaching and learning of probability and statistics. TSG11 was organized by a representative team many of whose members have longstanding ties with the IASE. Its co-chairs were Jun Li from East China Normal University (China) and Joe Wisenbaker from the University of Georgia (USA). The other team members were Dani Ben-Zvi from the University of Haifa (Israel), Manfred Borovcnik from the University of Klagenfurt (Austria) and Maxine Pfannkuch from the University of Auckland (New Zealand).

The presentations made for TSG11 at the meeting in Copenhagen were organized into four sessions. The first session was entitled 'Exemplary Work in Statistics Education'. It began with opening remarks by the co-chairs, featured an invited address by Jane Watson, and presentations by Iddo Gal and Dani Ben-Zvi, and Susan Starkings. The second session was entitled 'Research on Reasoning about Variation and the Use of Technology in Statistics Education'. It featured an invited address by Mike Shaughnessy, presentations by Robert delMas and Yan Liu, Dor Abrahamson and Uri Wilensky, and a discussion by Maxine Pfannkuch and Dani Ben-Zvi. The third session was entitled 'Issues in Teaching Statistics from Multiple Perspectives'. It featured an invited address by Joan Garfield (delivered by Robert delMas in her absence), presentations by Robert Gould and Roxy Peck, Alejandra Sorto and Alexander White, and a discussion by Manfred Borovcnik. The last session, 'Exploring Issues of Reasoning about Distribution, Data and Graphs', began with an invited address by Koeno Gravemeijer, presentations by Yingkang Wu, Helen Chick, Carlos Monteiro and Janet Ainley, Maxine Pfannkuch, Stephanie Budgett, Ross Parsonage and Julia Horring, and closing remarks by the co-chairs. There were also several excellent papers chosen for presentation by distribution contributed by José Carmona, Christine Duller, Sibel Kazak and Jere Confrey, W. M. Luh, J. H. Guo, and J. M. Wisenbaker, Mike Perry and Gary Kader, Milo Schield, and Ödön Vancsó.

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Nearly all of the invited presentations and papers selected for presentation were posted to the conference website at [www.icme-organisers.dk/tsg11/](http://www.icme-organisers.dk/tsg11/). The ICME organizers intend for that site to remain available until ICME11 in the summer of 2008. The papers are also available from the Publications page of the IASE website <http://www.stat.auckland.ac.nz/~iase/publications.php>.

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## 10. IASE Satellite Conferences

*By former IASE President Brian Phillips (Australia)*

The ISI Biennial Sessions bring together many academic, government and private sector statisticians and related experts from all over the world. These meetings attract over 2000 participants and cover a wide cross section of statistical fields. They have included regular presentations on statistics education, particularly since the formation of the ISI Education Committee in 1949 and more especially since the founding of the IASE in 1991. However these sessions were spread throughout the long ISI meeting, usually about 10 days long. This meant that people who were mainly interested in a specific topic such as statistical education, could be frustrated with the lack of sessions of specific interest to them during the long ISI meeting. To take advantage of the fact that people were already meeting at the ISI destination, for many years there have been a number of satellite meetings and workshops arranged by other sections of the ISI run either just before or just after these meetings. As well as having the benefit of providing people with the opportunity to meet and discuss their special interest topic in depth, they provided them with a support group to interact and network with during the main conference. When planning for ICOTS 6 in 2002, whose theme was Developing a Statistically Literate Society, some members of the IASE thought that a pilot session on the topic in the form of an ISI satellite meeting would be a worthwhile.

So for the Seoul ISI Session in 2001, the IASE decided to hold a satellite meeting leading into the main ISI conference. The theme of this meeting was Statistical Literacy. This satellite conference was jointly organised by the IASE and The Korean Statistical Education & Consulting Section of the Korean Statistical Society and immediately preceded the main ISI conference and was held in the Convention and Exhibition Centre, the same building as the ISI conference was held. The local organiser was Professor Yong Goo Lee from Chung Ang University, Seoul and Brian Phillips, Swinburne University, Australia was the Program Chair. It gave the opportunity for people to enjoy presentations given by people who had a special interest in statistical literacy. There were 15 invited talks given by authors from nine countries with over 60 participants, about half from Korea. The presentations included discussions of the main components in statistical literacy and the relevance of statistical literacy in the general education of citizens. The approach was non-technical, suitable for a non-specialist audience who would like to learn how to make better use of probability and statistical ideas in their everyday and working lives in areas in which chance and risk are involved. This meeting was mainly attended by statistics educators but was intended to be of interest to a wide cross section of society including teachers, educational administrators, researchers in statistical education and in probabilistic reasoning and others who wanted to gain a better grasp of statistics in general and who would like to broaden their knowledge of statistics applications. Details of the meeting and most of the papers can be found on the web page <http://www.swin.edu.au/math/iase/statlit.html>.

With the success of the first satellite meeting, a second Satellite Conference was held just before the 54th Biennial Session of the ISI in Berlin in August, 2003. The conference was organized by the IASE in cooperation with the International Statistical Institute, the Stochastics Section of the German Society for Mathematics Education, German Mathematical Association (special interest group on Probability and Statistics), the German Statistical Society and the Max-Planck-Institute for Human Development. The theme of the meeting was Statistics and the Internet and was held in the Max-Planck-Institute for Human Development, Berlin; see <http://www.ph-ludwigsburg.de/iase/> for details of the meeting. The Scientific Program Committee was jointly chaired by Joachim Engel (Germany) and Larry Weldon (Canada).

There were 17 invited talks and 77 registered participants from a wide range of countries. Following the interest shown in having papers refereed at ICOTS 6, it was decided to offer a refereeing option and most of the papers were accepted as refereed papers by a review of peers. Refereeing added an important dimension in improving the academic standing of the papers. The aim of the Satellite Conference was to discuss the implications of the Internet for teaching and learning statistics: web based teaching, learning, materials and resources. Topics included an overview of Internet resources for statistics education, the use of the Internet in statistics classes and in teaching and assessment, research on how students learn or about what they learn in teaching environments based on the web, and challenges for statistics education at the

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Internet age. A CD of the meeting contains all the invited papers and a summary of the posters. In addition, it contains a list of all registrants, a schedule of events, and a message from the Scientific Organizing Committee. These are also available from the web site.

The third IASE Satellite Conference is to be held on 4-5 April 2005 in Sydney, Australia and will immediately precede the 55th ISI Biennial Session in Sydney. It has the theme Statistics Education and the Communication of Statistics. This satellite meeting is jointly organised by the IASE and the Victorian Branch of the Statistical Society of Australia and is designed for people who have a special interest in communicating data-based results. The joint chairs are Brian Phillips and Kay Lipson, both from Australia. For more details see <http://www.stat.auckland.ac.nz/iasesat05>. [Note that registration for ISI 55 and the IASE Satellite conference are entirely separate processes. A registration application form for the IASE Satellite Conference is available from <http://www.stat.auckland.ac.nz/iasesat05> or directly at [http://www.swin.edu.au/math/iase/Satell\\_05\\_appform.doc](http://www.swin.edu.au/math/iase/Satell_05_appform.doc).]

The presentations are planned to include discussions of the main components in statistical communication and the relevance of statistical communication in the general education of citizens.

The approach at the satellite will be non-technical, suitable for both a specialist and non-specialist audience who would like to learn how to better communicate the statistical ideas which occur in their everyday and working lives. As with the other IASE satellites, this meeting is intended to be of interest to a wide cross section of society including teachers, educational administrators, researchers in statistical education and in probabilistic reasoning and others who want to gain a better grasp of how to communicate statistics in general. It should also be of interest to people concerned with interpreting sociological, economical, political, scientific or educational reports, predicting sports results, and policy makers, journalists, health professionals and others from the general population. Almost 30 abstracts have been submitted and it is expected there will be about 25 talks. The authors again have the option of having their papers refereed and it is planned they will be presented on a CD and also be made available from the IASE web site. The program will be run in the Sydney Convention Centre, the same site as the ISI meeting.

These short satellite meetings are proving very popular, giving participants the opportunity to spend up to two days focusing on a special interest topic and getting to know other statistics educators before immersing themselves in the sometimes overwhelming atmosphere of a very large ISI conference in which statistics education is only one of many strands. Each satellite meeting has been intended to be of interest to a wide cross section of society including teachers, educational administrators, and researchers in statistical education. It is hoped this activity is continued in the future.

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## **11. IASE Activities at the 55th Session of the International Statistical Institute, 5-12 April 2005, Sydney**

*Report by the programme Chair: Chris Wild (New Zealand)*

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In addition to the Invited Sessions at ISI 55 we expect to have a strong programme of Contributed papers which will include at least one themed session (on international experiences with CensusAtSchool).

The programme listed below is not quite complete. It omits some papers and discussants who were not registered on the ISI 55 website at the time the file was compiled.

## **IASE-only Sessions at ISI 55**

**IPM 45: Reasoning about variation** (Thurs 7th 15:30 - 17:45), Org: Chris Reading

Aloke Phatak: "Statistical Thinking From A Practitioner's Perspective"

Jackie Reid, Chris Reading, "From Acknowledging To Modelling: Tertiary Students' Consideration Of Variations"

Gail Burril: "Reasoning About Variation From A Secondary Student's Perspective"

Nye John (Discussant)

**IPM 46: The use of simulation in statistics education** (Wed 6th 9:00 - 11:15), Org: Andrej Blejec

Larry Weldon: "Modern Introductory Statistics Using Simulation And Data-Manipulation"

Rodney Carr: "How To Do Resampling Using Excel"

Juha Puranen: "Statistical Simulations and the Web"

Giuseppe Cicchitelli (Discussant)

**IPM 47: Teaching statistics online** (Tue 12th 9:00 - 11:15), Org: Larry Weldon

Neville Davies: "Learning Teaching Statistics In Higher Education Using Online And Distance Methods"

Roxy Peck, Robert Gould: "Preparing Secondary Teachers To Teach Statistics: A Distance Education Model"

Tae Rim Lee: "E-Learning For Statistics Education At Korea National Open University"

Irena Ograjenšek (Discussant)

**IPM 48: Statistics for life: what are the statistical ideas or skills that matter most and why?** (Fri 8th 9:00 - 11:15),

Org: Chris Wild

*Panelists:* Steven Stigler, Niels Kieding, Denise Lievesley, Nick Fisher, Milo Schield,

**IPM 49: Research in statistical education** (Wed 6th 15:30 - 17:45), Org: Kay Lipson, Maria Gabriella Ottaviani

Paul Fields: "An Assessment To Computer-Based Learning Methodology In Teaching In Undergraduate Statistics"

Sharleen Forbes: "Potential Uses Of Longitudinal Analyses To Investigate Statistics Education Outcomes"

Denis De Crombrughe, Sybrand Schin Van Der Loeff, Dirk Tempelaar: "Gender Effects In The SRA; Estimation By Truncated Selection"

Sashi Sharma: "Influence Of Culture On Statistics Reasoning: Implications For Teaching And Research"

Gilberte Schuyten (Discussant)

**IPM 50: Quality Assurance in Statistics Education** (Mon 11th 13:00 - 15:15), Org: Matthew Regan

Abbas Bazargan: "Quality Assurance In Statistics Education: From Departmental self-evaluation to accreditation"

Brenton Dansie: "The role of Statistical Education in Developing Graduate Qualities"

Helen MacGillivray: "Criteria, Standards and Assessment in Statistical Education"

Chris Wild (Discussant)

## **Shared Sessions at ISI 55**

**IPM 51: Promotion of statistical literacy among students** (IASE & IAOS) (Sat 9th 9:00 - 11:15), Org: Pilar Guzman

Reija Helenius: "Co-operation With Educational Institutions As A Strategic Challenge For Statistical Agencies"

Frederick Ho: "The Role Of Official Statistics Agencies In The Promotion Of Statistical Literacy Among Students"

Enrico Giovannini: TBA

**IPM 52: Using history of statistics to enhance the teaching of statistics** (IASE & Christiaan Huygens Com. on the History of Statistics)(Fri 8th 15:30 - 17:45), Org: Carol Joyce Blumberg

David Vere-Jones: "Teaching Probability Via Its History: Reflections On A Case Study"

Irena Ograjenšek: "Taking The Fear Out Of Data Analysis: Case For History Lessons In Statistics Courses"

David Bellhouse: "Probability And Statistics Ideas In The Classroom Lessons From History"

Maria Gabriella Ottaviani (Discussant)

Stephen Stigler (Discussant)

**IPM 63: Educating the media on how best to report statistics** (IASS, IASE, IAOS) (Fri 8th 13:00 - 15:15)

Org: Jacob Ryten

*Panelists:* Peter Harper, Ross Gittens, Tim Colebatch, Frederick W.H. Ho, Beat Hulliger

**IPM 81: Ethical Standards in statistics education** (IASE & ISI Committee on Professional Ethics) (Wed 6th 13:00 - 15:15), Org: Mary Gray

Brian Deer: "One Case Is A Tragedy, A Thousand Cases Are Just Statistics"

Nora Donaldson: "Ethical Considerations In Medical Research: Making Investigators Aware"

William Seltzer: "Issues In Statistical Ethics"

**IPM 82: Bayesian statistics** (Bernoulli & IASE)(Fri 8th 9:00 - 11:15), Org: Murray A Aitkin

Kerrie Mengersen: "Bayesian Model Selection: Review and Discussion"

Jose Bernardo: "An Integrated Mathematical Statistics Primer: Objective Bayesian Construction, Frequentist Evaluation"



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Murray Aitkin, Richard Boys, Tom Chadwick: "Bayesian Point Null Hypothesis Testing Via The Posterior Likelihood Ratio"

Dalene Stangel (Discussant)

Murray A Aitkin (Discussant)

[Note: Entries in grey are not statistics education talks]

**IPM 83: Challenges in the teaching of survey sampling** (IASS & IASE)( Tue 12th 13:00 - 15:15)

Org: Wilton De Oliveira Bussab

Risto Lehtonen: "A Dynamic Learning Environment In Survey Sampling Based On A Textbook And Its Web Extension"

Colm O'Muircheartaigh: TBA

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## 12. Getting Excited About ICOTS 7

by International Programme Committee Chair: Carmen Batanero (Spain)



### ICOTS-7: Working Cooperatively in Statistics Education Salvador (Bahia), Brazil, July 2-7, 2006

The International Association for Statistical Education (IASE) and the International Statistical Institute (ISI) are organizing the Seventh International Conference on Teaching Statistics (ICOTS-7) which will be hosted by the Brazilian Statistical Association (ABE) in Salvador (Bahia), Brazil, July 2-7, 2006.

2004 has been an important year of planning. The ICOTS web site has been in place since the beginning of the year, thanks to the work of John Shanks and John Harraway, who are continuously updating the information. By now the web site contains summaries of Topics and Sessions, and contact addresses for Session Organisers as well as a list of deadlines, first announcements and some guidelines. An ICOTS planning meeting was held in July, on the occasion of ICME-10 in Copenhagen, where members of the International Programme Committee met with some Topic Convenors, Session Organisers and potential participants. Other informal meetings of the International Planning Committee (IPC) and Local Committee members have taken place or are planned for 2005, and the first announcement was distributed to conferences, email lists, web sites and publications. The planning is accelerating now, since Session Organisers are receiving expressions of interest by researchers and teachers from all around the world. Please remember that there is still time to offer Invited papers. More information about the venue and activities is given below.

### 12.1. Salvador (Bahia), Brazil

*Bahia's* capital of *Salvador* sits on a spit of land sticking south south-west into the Atlantic Ocean), and the topography is mainly hills and valleys. *Salvador* sits on a vast bay which at 1,100 square kilometres, 70 kilometres from north to south, and 60 kilometres from east to west (at its widest point) is the largest in Brazil.

*A Bahia de Todos os Santos* (the Bay of All Saints) is fed by the Paraguaçu river (among numerous smaller sources), which opens into

the smaller bay of Iguape, which in turn gives way to the principal bay. Although it sits well within the tropics at a southern latitude of thirteen degrees, it receives a refreshing sea-breeze which seldom falters until the wee hours of the morning when things have generally cooled off anyway. The settlement was founded in 1549 by Thomé de Souza and quickly became the main Brazilian seaport and first capital of Portuguese

Brazil until 1763. The city still contains many colonial buildings, including the first cathedral in Brazil, over 350 churches and the nation's oldest medical college, but it has become more famous due to the strong influence of African culture on the city. Salvador is characterized by intense cultural and artistic activity with cheerful, hospitable and proud people. The city has several universities, including the Universidade Federal da Bahia, Universidade do Estado da Bahia, and Universidade Católica do Salvador. The majority of the population of the city are of African ancestry. The rich mixture of beliefs, traditions and races has led to the development of a vast culture that is manifest in its popular music, dance, art, and cuisine. It is the centre of Yoruba Candomblé and the martial dance art of capoeira.

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Salvador is famous for its traditions, including processions, coming-of-age celebrations and its carnival. Its historical precinct has been the cultural centre of the arts since 1985. It is a place of famous artists and writers who have gained international reputations. You can learn more about Salvador and Bahia, its history, attractions and people from <http://www.bahia-online.net/>

## 12.2. Call for Papers

Statistics educators, statisticians, teachers and educators at large are invited to contribute to the scientific programme. Types of contributions include *invited papers*, *contributed papers* and *posters*. No person may author more than one Invited Paper at the conference, although the same person can be co-author of more than one paper, provided each paper is presented by a different person.

Voluntary refereeing procedures will be implemented for ICOTS7. Details of how to prepare manuscripts, the refereeing process and final submission arrangements will be announced later.

### Invited Papers

Invited Paper Sessions are organized within 9 different Conference Topics. The list of Sessions themes, with email contact information for Session Organisers, is available at the ICOTS-7 web site at <http://www.maths.otago.ac.nz/icots7>, under "Scientific Programme". Although the deadline for invited papers was 1 December 2004 those interested in submitting an invited paper are still welcome to contact the appropriate Session Organiser since new speakers will be needed should other speakers withdraw.

### Contributed Papers

Contributed paper sessions will be arranged in a variety of areas. Those interested in submitting a contributed paper should contact either Joachim Engel ([Engel\\_Joachim@ph-ludwigsburg.de](mailto:Engel_Joachim@ph-ludwigsburg.de)) or Alan McLean ([alan.mclean@buseco.monash.edu.au](mailto:alan.mclean@buseco.monash.edu.au)) before 1 September 2005.

### Posters

Those interested in submitting a poster should contact Celi Lopes ([celilopes@uol.com.br](mailto:celilopes@uol.com.br)) before February 1, 2006.

## 12.3. Special Interest Group Meetings

There are meetings of Special Interest Groups of people who are interested in exchanging and discussing experiences and/or projects concerning a well-defined theme of common interest. *Proposals to hold a SIG Meeting specifically oriented to reinforce Latin American statistics education cooperation in a particular theme are especially welcome.* In this case the organisers may decide to hold the meeting in Portuguese and/or Spanish.

Normally, SIG Meetings will be held in the evenings and will be allotted up to two one and a half hour time slots. Please note that the number of SIG meetings is limited, so they are offered on a "first come first served" basis. The following SIG meetings have been recently organized:

- SIG1. *Training Mathematics Teachers to Teach Statistics in Spanish and Portuguese Speaking Countries*. Organisers: Margarida Cesar (Portugal), [macesar@fc.ul.pt](mailto:macesar@fc.ul.pt) and Teresita Terán (Argentina), [teresitateran@hotmail.com](mailto:teresitateran@hotmail.com) (Portuguese and Spanish).
- SIG2. *Young Latin American Researchers in Statistics Education*. Organisers: Cileda Coutinho (Brazil), [cileda@pucsp.br](mailto:cileda@pucsp.br) and Blanca Ruiz (Mexico), Blanca Ruiz, [bruiz@itesm.mx](mailto:bruiz@itesm.mx) (Portuguese and Spanish).
- SIG3. *International Research Forum on Statistical Reasoning, Thinking and Literacy*. Organisers: Dani Benzvi (Israel), [dbenzvi@univ.haifa.ac.il](mailto:dbenzvi@univ.haifa.ac.il) and Joan B. Garfield (USA), [jbg@umn.edu](mailto:jbg@umn.edu) (English).
- SIG4. *Curricular Development in Statistics Education in Latin America*. Organisers: Olga Leticia Escudero (México), [olgal@sep.gob.mx](mailto:olgal@sep.gob.mx) and Clayde Regina Mendes (Brazil) [clayde@uol.com.br](mailto:clayde@uol.com.br) (Portuguese and Spanish).

Individuals or groups may submit proposals to establish a Special Interest Group to Carmen Batanero ([batanero@ugr.es](mailto:batanero@ugr.es)). Only clearly non-commercial SIGs will be accepted in the scientific programme. The IPC is in charge of reviewing and accepting SIG proposals.

## 12.4. Organisers

### Local Organisers

Pedro Alberto Morettin, (Chair), Lisbeth K. Cordani, Clélia Maria C. Toloí, Wilton de Oliveira Bussab and Pedro Silva.

### IPC Executive

Carmen Batanero (Chair), Susan Starkings (Programme Chair), Allan Rossman and Beth Chance (Editors of Proceedings), John Harraway (Scientific Secretary) and Lisbeth Cordani (Local organisers' representative).

**More information** is available from the ICOTS-7 web site at <http://www.maths.otago.ac.nz/icots7> or from the ICOTS IPC Chair Carmen Batanero ([batanero@ugr.es](mailto:batanero@ugr.es)), the Programme Chair Susan Starkings ([starkisa@lsbu.ac.uk](mailto:starkisa@lsbu.ac.uk)) and the Scientific Secretary John Harraway ([jharraway@maths.otago.ac.nz](mailto:jharraway@maths.otago.ac.nz)).

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## 13. Statistics Education Research Journal (SERJ)

[www.stat.auckland.ac.nz/serj](http://www.stat.auckland.ac.nz/serj) or from the Publications page of the IASE website [www.stat.auckland.ac.nz/~iase/](http://www.stat.auckland.ac.nz/~iase/)  
*Report by Co-editor Iddo Gal*

The *Statistics Education Research Journal* (SERJ) is a peer-reviewed research journal of IASE and is published electronically twice a year. SERJ aims to advance research-based knowledge that can help to improve the teaching, learning, and understanding of statistics or probability at all educational levels and in both formal (classroom-based) and informal (out-of-classroom) contexts. Such research may examine, for example, cognitive, motivational, attitudinal, curricular, teaching-related, technology-based, organizational, or societal factors and processes that are related to the development and understanding of stochastic knowledge. In addition, research may focus on how people use or apply statistical and probabilistic information and ideas, broadly viewed.

The Journal encourages the submission of quality papers related to the above goals, such as reports of original research (both quantitative and qualitative), integrative and critical reviews of research literature, analyses of research-based theoretical and methodological models, and other types of papers described in full in the Guidelines for Authors. All papers are reviewed internally by an Associate Editor or Editor, and are blind-reviewed by at least two external referees. Contributions in English are recommended. Contributions in French and Spanish will also be considered. A submitted paper must not have been published before or be under consideration for publication elsewhere. SERJ is one of the ISI-sponsored journals and is freely accessible via the Internet.

**Current editorial board** members are: Flavia R. Jolliffe and Iddo Gal (Co-editors), Christine Reading (Assistant Editor), Carmen Batanero, Andrej Blejec, Joan Garfield, John Harraway, Annie Morin, M. Gabriella Ottaviani, Lionel Pereira-Mendoza, Maxine Pfannkuch, Victor M. Polaki, Dave Pratt, Richard Scheaffer, Jane Watson, Chris Wild (Associate Editors), Carol Joyce Blumberg (ex-officio).

### **Contents of Vol. 3, No. 1, May 2004:**

Jose Carmona Márquez (Paper in Spanish, English Abstract). *Una revisión de las evidencias de fiabilidad y validez de los cuestionarios de actitudes y ansiedad hacia la estadística / A review of research about reliability and validity of instruments for measuring attitudes towards statistics.*

Sonia Kafoussi. *Can kindergarten children be successfully involved in probabilistic tasks?*

Sue Gordon. *Understanding students' experiences of statistics in a service course.*

María Virginia López, María del Carmen Fabrizio, María Cristina Plencovich, and Hernan Giorgini. *Some issues about the status of statistics teaching in agricultural colleges in Argentina.*

Paula R. Williamson and Gillian A. Lancaster. *Statistical education for PhD students in UK medical schools.*

### **Contents of Vol. 3, No. 2 (Nov 2004): Special Issue on reasoning about variability**

(Guest editors: Dani Ben-Zvi and Joan Garfield)

Dani Ben-Zvi and Joan Garfield. *Research on reasoning about variability: A forward (invited).*

Robert Gould. *Variability: one statistician's view (invited).*

Jim Hammerman and Andee Rubin. *Strategies for managing statistical complexity with new software tools.*

Dani Ben-Zvi. *Reasoning about variability in comparing distributions.*

Arthur Bakker. *Reasoning about shape as a pattern in variability.*

Chris Reading. *Student description of variation while working with weather data.*

Both issues also contain information about past and future IASE conferences and announcements of other future conferences with a statistical education research strand.

**The next issue of SERJ**, planned for May 2005, will contain regular research papers as well as a Special section on reasoning about variability with research papers and invited discussion papers. This special section emerged out of the collaboration between SERJ and Dani Ben-Zvi and Joan Garfield, who organized the third Research Forum on Statistical Reasoning, Thinking and Literacy (STRL-3) held in 2003. The Editorial Board of SERJ is pleased to be co-operating with the STRL-3 organisers in this way.

SERJ's Editorial Board is most grateful to all the referees who have helped in reviewing papers and in contributing comments to improve the quality of SERJ, and of course thanks all authors who have submitted their papers for consideration.

**Inquiries and submissions** should be sent to co-editor Flavia R. Jolliffe (UK) at [F.Jolliffe@kent.ac.uk](mailto:F.Jolliffe@kent.ac.uk). Guidelines for authors and referees, a template for authors, and a copyright form, as well as prior and current issues of the journal, can be downloaded from the SERJ webpage: [www.stat.auckland.ac.nz/serj](http://www.stat.auckland.ac.nz/serj).

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## **14. Update on Other IASE Publications**

*From IASE Publications Officer, Carol Joyce Blumberg (USA)*

In the last year, the IASE publications available directly from the IASE website at <http://www.stat.auckland.ac.nz/~iase/publications.php> have been greatly expanded. It now contains: All issues of the *Statistics Education Research Journal* since its inception (as well as all issues of its predecessors — *Statistics Education Research Newsletter* and *Newsletter of the International Study Group for Research on Learning Probability and Statistics* since 1996); All past issues of *IASE Review*; Proceedings from ICOTS (International Conference on Teaching Statistics) 5 and 6; All papers (both invited and contributed) related to statistics education from the last three ISI Biennial Sessions in Helsinki, Seoul, and Berlin that appeared in the Proceedings volumes; Proceedings from the IASE Satellite Conferences on “Statistics and the Internet” (in 2003) and “Statistical Literacy” (in 2001); and Proceedings from the IASE Round Tables on Training of Researchers in the Use of Statistics (in 2000) and Research on the Role of Technology in Teaching and Learning Statistics (in 1996). The page also contains some non-IASE publications: An extensive collection of Dissertations since 2000 in the area of statistics education (with some

being available as Full Versions and some as abstracts only) and copies of papers related to statistics education from the International Congress on Mathematical Education 9 held in 2000. There is also a link to a regional publication in Spanish called *Hipótesis Alternativa* (which draws heavily on material from IASE publications).

Most recently the following have been added to the main IASE website: Copies of all issues of *IASE Matters* since its inception in 1992; Copies of almost all issues of the IASE Component in the *ISI Newsletter* since 1981 (when IASE was still the ISI Education Committee); copies of the *Newsletter of the International Study Group for Research on Learning Probability and Statistics* from 1987 to 1995; and Papers and PowerPoint presentations from the IASE-sponsored sessions at the Joint Statistical Meetings on "Using the History of Statistics to Enhance the Teaching of Statistics" (in 2003) and "Training of Government Statisticians" (in 2004).

When available the following will be added to the website: Proceedings from the 2004 IASE Round Table on "Curricular Development in Statistics Education", Proceedings of the 2005 IASE Satellite Conference on "Statistics Education and the Communication of Statistics"; Papers related to statistics education from the 2005 ISI Biennial Session in Sydney, Australia; and Papers related to statistics education from the International Congress on Mathematical Education (in 1996 and in 2004).

Thanks are due to Brian Phillips (Australia), Rachel Cunliffe and Stephen Cope (New Zealand), Nicole Machacek (USA), Robert Spencer (USA), Chris Wild (New Zealand), and Carol Joyce Blumberg (USA) for collecting and converting many of these publications to electronic formats. Thanks are also due to Joan Garfield (USA) and Mary Regier (USA) for providing paper copies of some older publications.

In addition, Susan Starkings prepared the IASE component for three issues of the *ISI Newsletter*. A copy of the latest *ISI Newsletter*, including the IASE Component is available at <http://www.cbs.nl/isi/newsletter.htm>. Further, Gilberte Schuyten prepared three issues of *IASE Matters*, which appears as an insert to the journal *Teaching Statistics*. Finally, two issues of *Statistics Education Research Journal* were published (edited by Iddo Gal (Israel) and Flavia Jolliffe (UK)) and this issue of *IASE Review* was edited by Chris Wild (New Zealand).

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## 15. 2004 Update on the International Statistical Literacy Project (ISLP)

*Report by Carol Joyce Blumberg (USA)*

Over the past 12 months there have been many new items added to the pages of the International Statistical Literacy Project. In addition, new webpages have been added on Assessment and on Recently Published Articles/Reports Useful for Teaching Statistics. A search engine has also been added. The best URL to use to start exploring the ISLP webpages is <http://course1.winona.edu/cblumberg/islplist.htm>.

The following people have served as page co-ordinators over the last year and all have agreed to remain for the coming year: General Resources and Definitions (Carol Joyce Blumberg, USA and Ken Shimabukuro, Bolivia); Assessment (Sara Finney, Kenn Barron, and S. Jeanne Horst, USA), Recently Published Articles/Report Useful for Teaching Statistics and Resources for Those Training Teachers (Eunice Goldberg, USA), Resources for Secondary School Teachers (Philip Boland, Ireland & Jerry Moreno, USA), Training Programs and Learning Materials from National and International Statistical Offices (Reija Helenius, Finland), Listing of Statistical Literacy Projects Around the World (Paola Giacché, Italy and Reija Helenius, Finland), Resources for Journalists (Warren Palmer, New Zealand), Resources for Adult Learners (Iddo Gal, Israel), Children's Censuses (Neville Davies, UK), and Useful Data Sets (Brant Deppa and Chris Malone, USA).

The ISLP has also been aided within the last year by advice from the ISLP Advisory Committee consisting of Beverley Carlson (USA/Chile), Vicki Crompton (Canada), Iddo Gal (Israel), John Harraway (New Zealand), Peter Holmes (UK), Maria A. Pannone (Italy), Martin Podehl (Canada), René Padiou (France), and René H. M. Smulders (The Netherlands) with Chris Wild (New Zealand, IASE President), Gilberte Schuyten (Belgium, IASE President-Elect) and Daniel Berze (Director, ISI Permanent Office) serving as Ex-Officio members of the committee. In addition, Nicole Machacek (a graduate of Winona State University) and Robert W. Spencer (a junior in Computer Science at Winona State University) assisted with the maintenance of the webpages and several other tasks over the last year.

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There are two very important needs for the ISLP webpages at the moment. First, in order to make the webpage on "Recently Published Articles/Reports Useful for Teaching Statistics" have publications from around the world, there is a need for people to send articles/reports that they see in their own country (both good and bad examples of uses of statistics) to Eunice Goldberg at [egoldberg@nl.edu](mailto:egoldberg@nl.edu). Second, a co-ordinator for webpages dealing with Resources for Primary School Teachers is needed.

Further, if you have other resources that you would like to see included on existing webpages, please send them to the appropriate page co-ordinators (see <http://course1.winona.edu/cblumberg/islpcoord.htm> for emails). If you have ideas for additional webpages or other projects that you would like to have the ISLP Advisory Committee consider, please contact Carol Joyce Blumberg, ISLP Coordinator, Department of Mathematics & Statistics, Winona State University, Winona MN 55987-5838; email: [cblumberg@winona.edu](mailto:cblumberg@winona.edu); Fax: ++1-507-457-5376.

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## **16. Meetings related to Statistics Education in 2004**

*From IASE Conferences Officer, Andrej Blejcek (Slovenia)*

**June, 21 – 25, 2004, SCAT Immersion Workshop: "A Data-Oriented, Active-Learning, Post-Calculus Introduction to Statistical Concepts, Applications, and Theory", San Luis Obispo, CA, USA**  
[www.rossmanchance.com/iscat/workshop.html](http://www.rossmanchance.com/iscat/workshop.html)

**June 26 – July 1, 2004, 7th International Conference of "The Mathematics Education into the 21st Century Project", Ciechocinek, Poland**  
[http://math.unipa.it/~grim/21\\_project/21\\_ciechocinek\\_04.htm](http://math.unipa.it/~grim/21_project/21_ciechocinek_04.htm)

**July 4 – 11, 2004, ICME 10 International Congress on Mathematics Education, Copenhagen, Denmark**  
[www.icme-10.dk/](http://www.icme-10.dk/)

**July 15 – 18, 2004, PME 28 The 28th International Conference of the International Group for the Psychology of Mathematics Education, Bergen, Norway**  
[www.pme28.org/](http://www.pme28.org/)

**August 1 – 4, 2004, ARTIST Roundtable Conference on Assessment in Statistics, Appleton, WI, USA**  
[www.rossmanchance.com/artist/roundtable.html](http://www.rossmanchance.com/artist/roundtable.html)

**August 5 – 6, 2004, "Beyond the Formula" Statistics Conference: "Constantly Improving Introductory Statistics: Updating A Crowded Curriculum", Rochester, NY, USA**  
[web.monroec.edu/beyond/tandabysession](http://web.monroec.edu/beyond/tandabysession) and <http://web.monroec.edu/beyond/archive#2004>

**August 8 – 12, 2004, Joint Statistical Meeting, ASA, Toronto, Canada**  
[www.amstat.org/meetings/jsm/2004/](http://www.amstat.org/meetings/jsm/2004/)

**October 4 – 6, 2004, Second National Conference on Graphing Calculators, Penang, Malaysia**  
[www.ict-education.com.my/Files/abstracts2.pdf](http://www.ict-education.com.my/Files/abstracts2.pdf)

**November 19 – 20, 2004, Statistics – Everybody's Matter, Bucharest, Romania**  
[www.conferintastatistica.ase.ro/link7.htm](http://www.conferintastatistica.ase.ro/link7.htm)

**December 29, 2004 – January 1, 2005, International Conference on "The Future of Statistical Theory, Practice and Education", Hyderabad, India**  
[www.stat.ohio-state.edu/~hnn/hydstatconf.html](http://www.stat.ohio-state.edu/~hnn/hydstatconf.html)

See the Conferences page of the IASE website <http://www.stat.auckland.ac.nz/~iase/> for upcoming conferences.

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## 17. National Correspondents

The IASE national correspondents help provide communication between local membership in their countries and the IASE. This includes passing on information about the IASE activities to those concerned with teaching and learning statistics as well as letting the IASE know about activities in their countries. Below is a list of the present national correspondents. If there is no National Correspondent for your country and you feel that you can help us, please contact Brian Phillips at [bphillips@swin.edu.au](mailto:bphillips@swin.edu.au).

*Argentina:* Ana Silvia Haedo <icazorla@uol.com.br >  
*Australia:* Brian R. Phillips <bphillips@swin.edu.au>  
*Bangladesh:* Kazi Saleh Ahmed <ksahmed@bangla.net>  
*Belgium:* Noel Veraverbeke  
 <noel.veraverbeke@luc.ac.be>  
*Benin:* F.D.E.T. Accrombessy <afdet\_accro@yahoo.fr>  
*Brazil:* Irene M. Cazorla <icazorla@uol.com.br>  
*Bulgaria:* N.T. Tsankova <nadats@mbox.infotel.bg>  
*Canada:* Larry Weldon <weldon@sfu.ca>  
 and Linda Gattuso <gattuso.linda@uqam.ca>  
*Chile:* Guido Del Pino <gdelpino@mat.puc.cl>  
*China:* Chi Ming Wong <davy.wong@ust.hk>  
*Colombia:* David Ospina  
 <dospina@matematicas.unal.edu.co>  
*Costa Rica:* Annia Espeleta <anespeleta@hotmail.com>  
*Croatia:* Ante Rozga <rozga@efst.hr>  
*Czech Republic:* Richard Hindls <hindls@vse.cz>  
*Egypt:* Fayez M. Mina <fmmina@link.com.eg>  
*Estonia:* Katrin Niglas <katrin@tpu.ee>  
*Fiji:* Parul Vera Deoki <DEOKI\_PV@USP.AC.FJ>  
*Finland:* Simo Puntanen <sjp@uta.fi>  
*France:* Annie Morin <annie.morin@irisa.fr>  
*Germany:* Joachim Engel <engel@math.uni-hannover.de>  
*Greece:* Theodore Chadjipadelis <chadji@polsci.auth.gr>  
*Honduras:* Alejandra Sorto  
 <Alejandra.Sorto@montgomerycollege.edu>  
*India:* C. Ravi Rangaswami <futnat@rediffmail.com>  
*Iran:* Abbas Bazargan <bazargan@rose.ipm.ac.ir>  
*Ireland:* Philip J. Boland <philip.j.boland@ucd.ie>  
*Israel:* Dani Ben-Zvi <dbenzvi@univ.haifa.ac.il>  
*Italy:* Enso Lombardo <enzo.lombardo@uniroma1.it>  
*Ivory Coast:* Ouagnina Hili <o\_hili@yahoo.fr>  
*Japan:* Michiko Watanabe  
 <watanabe\_michiko@nifty.com>  
*Kenya:* Parinbanu Kurji <parinkurji@yahoo.com>

*Korea:* Tae Rim Lee <trlee@mail.knou.ac.kr>  
*Lesotho:* Mokaeane V Polaki <mv.polaki@nul.ls>  
*Luxembourg:* Rudolf Teekens <rteekens@tes-institute.lu>  
*Malaysia:* Ann-Lee Wang <alwang88@streamyx.com>  
*Mexico:* Ernesto Sánchez <esanchez@mail.cinvestav.mx>  
*Morocco:* Mohamed Mahmoudi  
 <mahmoudi@insea.ac.ma>  
*New Zealand:* Maxine Pfannkuch  
 <m.pfannkuch@stat.auckland.ac.nz>  
*Nigeria:* Joseph S. Oke <jskttoke@infoweb.abs.net>  
*Norway:* Henrik Dahl <henrik.dahl@hia.no>  
*Oman:* Hana Ameen <hmameen@omantel.net.om>  
*Palestine:* Mahmoud K. Okasha <m.okasha@palnet.com>  
*Peru:* Luis Palomares <lpalomar@correo.ulima.edu.pe>  
*Philippines:* Gervacio G. Selda Jr. <srtres@srtc.gov.ph>  
*Poland:* Mirosław Szreder <mir@zamek.gda.pl>  
*Portugal:* Helena Bacelar Nicolau <hbacelar@fc.ul.pt>  
*Serbia and Montenegro:* Katarina Cobanovic  
 <katcob@polj.ns.ac.yu>  
*Singapore:* Lionel Pereira-Mendoza  
 <lpereira@nie.edu.sg>  
*Slovenia:* Andrej Blejec <andrej.blejec@uni-lj.si>  
*South Africa:* Delia North <delian@icon.co.za>  
*Spain:* Carmen Batanero <batanero@goliat.ugr.es>  
*Sweden:* Elisabeth Svensson  
 <elisabeth.svensson@esi.oru.se>  
*Tanzania:* Vitalis E. Muba <eastc@ud.co.tz>  
*The Netherlands:* Tjaart Imbos  
 <Tjaart@imbos@stat.rulimburg.nl>  
*Trinidad and Tobago:* Linda Hewitt <linhew@trinidad.net>  
*UK:* Susan A. Starkings <starkisa@lsbu.ac.uk>  
*Ukraine:* Ruslan Motoryn <motoryn@kneu.kiev.ua>  
*Uruguay:* Ramon Alvarez <ramon@chaja.edu.uy>  
*USA:* Gail Burrill <burrill@msu.edu> and  
 E. Jacquelin Dietz <dietzjac@meredith.edu>  
*Venezuela:* Audy Salcedo <audysalc@yahoo.com>

## 18. Becoming a Member of IASE

The most rewarding aspect of IASE membership is participating in an international community of people who believe in the value of statistics education and wish to advance it. Members also benefit from reduced registration fees at IASE conferences and the main ISI conferences. They receive the *ISI Newsletter* and the *IASE Review*. They may subscribe at a reduced rate to statistical journals, for example the ISI flagship journal, the *International Statistical Review*, and *Short Book Reviews*, *Teaching Statistics* (with includes the regular insert *IASE Matters*) and may purchase other IASE and ISI publications at a discounted price. An IASE membership application form is available from the IASE Members page at <http://www.stat.auckland.ac.nz/~iase/members.php>.