

# Bernoulli NEWS

Newsletter of the Bernoulli Society for Mathematical Statistics and Probability

## SOME HIGHLIGHTS FROM THIS ISSUE:

*Changing Presidents*

*Bernoulli Society 2000*

*News from BS-Members*

*The Georgian Statistical Association*

*Report on Recent Activities*

*Forthcoming BS Events*

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# 1. Changing Presidents

During the last two years, from August 1993 – August 1995, **Jef Teugels** served as President of the Bernoulli Society. At the 52nd ISI Session in Istanbul the new President, **Louis Chen**, succeeded in office. He held his Inaugural Speech at the General Assembly of the Bernoulli Society in Istanbul on August 25, 1997.

Friends and Colleagues,

It fills me with a sense of awe and honour to be here today as President of the Bernoulli Society. Honour because I am aware that this is the first time an Asian, albeit from a very small country, has been chosen to be the President. Awe because I am also aware that this historic city of Istanbul, with its rich cultural and intellectual heritage, stands at a meeting-point between Europe and Asia. This coincidence in timing and geography, whether it is planned or not, should augur well for the Bernoulli Society as it approaches the 21st century.

It also fills me with a heavy responsibility to realize that the Bernoulli Society has made vast strides under the presidencies of my two predecessors, Ole Barndorff-Nielsen and Jef Teugels. Since 1993, many beneficial changes for the Society have taken place. Among them I mention the following:

(i) The formation of the post of Membership Secretary, which has not only boosted the Society's membership but also improved the quality of contact between the Society and its members;

(ii) the creation of the journal **BERNOULLI** and the newsletter *Bernoulli News*, both of which the Society can rightfully call its own;

(iii) a new level of ISI-Bernoulli Society relationship, which has improved the financial standing of the Society;

(iv) the initiative to promote and contribute to environmental studies - a move both timely and in the right direction;

(v) the initiative to revive the East Asian and Pacific Regional Committee (EAPRC) to strengthen the links between the Bernoulli Society and probabilists and statisticians in the East Asia-Pacific region; and last but not least,

(vi) the introduction of an outreach programme by which the publications of the Society are able to reach places where members would ordinarily have no access to these materials.

It will not be an easy task for any president to match the achievements of any of my two predecessors. It is both a privilege and a challenge that I am given an opportunity to try to do something for the Society. I will continue with the policies and initiatives made before me. In particular, I will pay special attention to the strengthening of links between the Bernoulli Society and the East Asia-Pacific region. I will try to consolidate what we have achieved in the revival of EAPRC and its ac-

tivities in the region.

The Society's renewed interest in the East Asia-Pacific region at this time is significant because the region is experiencing one of the world's fastest growth in economy. Many countries in the region are expected to achieve developed status in the 21st century, and undoubtedly, statistics and probability can provide the scientific tools for the process of nation building and development. The role which the Bernoulli Society can play is limited only by the imagination.

At this moment of history, we are also witnessing spectacular advances in molecular biology towards the understanding of the mysteries of life and the elimination of pain and suffering caused by diseases. You are probably aware that the tremendous amount of data and information amassed by molecular biologists are beginning to be analysed. Computational biology is an emerging field in which probabilistic and statistical techniques are being applied to analyse these biological data.

Although applications of probability and statistics to genetics and evolutionary theory date back to the early 1900's, what we are witnessing now is a new era in biological sciences. This is therefore an opportune time for the Society to pay special attention to promoting inter-disciplinary work between molecular biologists on the one hand and probabilists and statisticians on the other.

There are two possible ways to do this. One way is to enlarge the scope of the Committee for Conferences on Stochastic Processes (CCSP) or of the Committee for Probability and Statistics in Physical Sciences (C(PS)<sup>2</sup>). The other is to set up a new standing committee which we may call *Committee for Probability and Statistics in Biological Sciences* (CPSBS). I am inclined to favour the second option as this effort would be more focused and would give greater impetus to the inter-disciplinary initiative. I have discussed this matter with a number of people, including the outgoing President, the incoming President-Elect, the Scientific Secretary and the Chairpersons of CCSP and C(PS)<sup>2</sup>, and have also brought it up for discussion during the CCSP meeting in Viña del Mar in June this year. The responses I have received are in favour of setting up a new standing committee. In the Council Meeting held last week, I received further support for my proposal to set up the committee.

With your help and support, I hope that the committee could be formed and conferences with cross-disciplinary emphases in biological sciences planned within the next two years. I invite all of you to come forward and give your suggestions on how we can achieve this.

The Bernoulli Society should lead in promoting

activities in new and emerging fields. If we succeed in our efforts in promoting applications of probability and statistics to biological sciences, thereby contributing to the development of the field, we could pride ourselves that we have played our part in meeting the challenges of the 21st century.

Thank you.

*The photo shows (from left to right): Jef Teugels (Past President), Claudia Klüppelberg (Editor of this Newsletter), Louis Chen (President), David Siegmund (Incoming President) and Wilfrid Kendall (Scientific Secretary).*

### **New Incoming President**

When Louis Chen became President of the BS, at the same time **David Siegmund** was elected the new Incoming President.

David Siegmund received his Ph.D. from Columbia University, New York, in 1966. For about 10 years he seems to have been alternatively attracted by two American extremes, namely Stanford and Columbia. In 1976 finally Stanford won. David has been a supporting pillar of the excellent Department of Mathematics of Stanford University.

His very broad scientific interests are reflected in about 80 articles and, of course, his books, who

are well-known to everybody:

*Great Expectations: The Theory of Optimal Stopping* (with Y.S.Chow and H.Robbins) and

*Sequential Analysis: Tests and Confidence Intervals.*

He has served our scientific community in many ways. To mention just three, for more than a decade, he was Associate Editor of the Annals of Statistics and the Annals of Probability and he served as President of the Institute of Mathematical Statistics in 1990-91.

## 2. Bernoulli Society 2000

In 1995 the Bernoulli Society set up a Committee, termed the BS 2000 Committee. The purpose of the Committee is, on the occasion of the turn of the century, to mark the progress in the science of stochastics (i.e. mathematical statistics and probability) through a number of events.

In particular, it is planned to organize several meetings, around the world, on topics that are of major current interest both in terms of basic research and because of their impact on society, be it in medicine, technology, finance, or some other major field. It is intended that each of these meetings should comprise both a traditional scientific component, in the form of a workshop, and an activity of general public interest. The latter could be in the form of a day or half-day meeting, open to the public, with some overview lectures, demonstrations by electronic or other media, etc. The overall goal is to give general citizens a fair impression of the role and impact of stochastics on matters of direct interest in day-to-day life. Efforts will be made to have these events well reported in the press and in television. The present concrete plans for these **Bernoulli Society Year 2000 Conferences** are outlined below.

A major Bernoulli Society event in 2000 will be the Society's **Fifth World Congress** which will take place in Guanajuato, Mexico, 15-21 May.

It is also planned that the year 2000 volume of the Bernoulli Society official journal **Bernoulli** will comprise a number of special invited papers that should take stock of the developments in mathematical statistics and probability in the Twentieth Century and perhaps speculate about stochastics and its applications in the next century.

The activities of the BS2000 Committee will be in unison with those of the World Mathematical Year 2000 that take place under the auspices of the International Mathematical Union.

The members of the BS2000 Committee are:

L. Accardi (Rome)  
S.-I. Amari (Tokyo)  
O.E. Barndorff-Nielsen (Aarhus) Chairman  
D.R. Cox (Oxford)  
H. Föllmer (Berlin)  
J.K. Ghosh (Calcutta)  
R.D. Gill (Utrecht)  
C.C. Heyde (Canberra)  
K. Krickeberg (Paris)  
R. Rebolledo (Santiago) Scientific Secretary  
N. Reid (Toronto)  
A. Shiryaev (Moscow)

The Committee's World Wide Web site can be accessed at:

<http://www.mat.puc.cl/bs2000/bs2000.html>

Suggestions for additional Year 2000 BS activities are welcome and may be directed to any of the Committee members.

### **Bernoulli Society Year 2000 Conferences**

It is planned to hold the following five Year 2000 Conferences (titles tentative; location and main organizer in parentheses):

**Causality** (Harvard; James Robins)  
**Ecology and Environmetrics**  
(Calcutta; Jayanta Ghosh)  
**Financial Mathematics**  
(Sydney; Eckhard Platen)  
**Neural Networks and Learning**  
(Tokyo; Shun-Ichi Amari)  
**Quantum Stochastics** (Utrecht; Richard Gill)  
**Stochastic Geometry and Imaging**  
(New York; Chris Heyde)

Participation in the Conferences will be by invitation. However, anyone interested in attending one of the Conferences is welcome to contact the organizer.

*Ole E. Barndorff-Nielsen*

### 3. News from BS-Members

#### Highly Structured Stochastic Systems

is a new initiative in European Statistics. The European Science Foundation (ESF) is funding a Scientific Programme on Highly Structured Stochastic Systems. This follows the earlier, very successful, ESF Scientific Network with the same title. The Programme will run from 1997 to 2000.

Highly Structured Stochastic Systems (HSSS) combine simple local relations to build — via conditional independence — stochastic models that exhibit great complexity. Such complex stochastic models have found applications in areas as diverse as expert systems, genetics, and statistical mechanics. The needs of these areas have in turn stimulated important theoretical developments. By emphasizing common ideas and structures, such as graphical, hierarchical and spatial models, and techniques, such as Markov Chain Monte Carlo methods and local exact computation, the Network has already succeeded in stimulating cross-disciplinary work in stochastic systems. The new Scientific Programme is funded at a higher level to build on this success.

New challenges for research include developing diagnostic and analytic tools for model criticism; understanding sensitivity of models to local specifications; designing new MCMC algorithms, identifying limits of causal interpretation in networks representing observational studies; introducing non-parametric elements into graphical models; extending the theory and methodology to systems that develop over time.

To help meet these and other challenges, the programme will arrange focused workshops, summer schools (see p. 18), open conferences, and support for research visits.

Anyone interested in HSSS and in the new ESF Scientific Programme may join the HSSS email discussion list. Simply send a message to

mailbase@mailbase.ac.uk

and put in the body of your message the words “join hsss” followed by your name. You will then receive information about how to use the list. The list is open for any discussion of matters relating to Highly Structured Stochastic Systems, and will be a way that the Programme’s management committee will publicise HSSS activities.

There is also the Programme’s web page:

<http://www.maths.nott.ac.uk/hsss/>

which contains a growing amount of information about the Programme, its activities and how interested researchers might participate.

*John Kornak  
(HSSS information assistant)*

#### Willem Rutger van Zwet

Professor of Statistics of the University of Leiden and William Newman Professor of the University of North Carolina at Chapel Hill, was awarded a Honorary Doctorate by the Charles University in Prague, Czech Republic, on May 29, 1997, in recognition of his outstanding contributions to the mathematical statistics and, in his many capacities (IMS: Member Council, Editor of the Annals of Statistics, President; ISI: Vice-President and President-Elect; Bernoulli Society: Chair of the European Regional Committee, Member of Council and President, among many others), but also personally, to the permanent development of the international statistical community and the international scientific contacts.

The Prague statisticians have been happy to enjoy the personal scientific contacts with Professor van Zwet since the seventies, still under the life of Jaroslav Hájek. They have always appreciated his interest and support for their research, particularly during the difficult political régime in their country. We have learnt and still are learning a lot from him and we shall always consider it as a honor and as a privilege. The ceremony, in the presence of the Chancellors of several Czech and Slovak Universities, following the original protocol of the oldest university in the Central Europe, celebrating its 650th anniversary in 1998, was an expression of our profound appreciation for his work and personal qualities.

*Jana Jureckova, Prague*

#### Nordic-Math-Job

was founded on the 14th of February this year. It is an on-line service collecting information on vacant academic positions in the Nordic departments of Mathematics and Statistics.

<http://www.maths.lth.se/nordic/index.html>

Nordic-Math-Job is now run in cooperation with the Mathematical Society of all Scandinavian countries.

To make this new opening of the Nordic market as successful as possible the aim of Nordic-Math-Job is to collect information on ALL vacant positions.

If you have information on a vacant academic job in a Nordic department of Mathematics or Statistics, not included in the list above, please send it (in the standard form) to [nordic@maths.lth.se](mailto:nordic@maths.lth.se)

*Sigmundur Gudmundsson, Lund  
Communicated by Hermann Thorisson,  
Reykjavik*

## 4. News from our Membership Secretary

### Membership Statistics

On July 1, 1997 the Bernoulli Society counted 1679 members in 72 countries:

USA (300), Germany (149), UK (106), Italy (90), Japan(90), The Netherlands (72), France (71), Sweden (68), Poland (56), Canada (55), Spain (52), Denmark (46), Czech Republic (38), Switzerland (37), Australia (35), Finland (34), Belgium (29), Mexico (28), Hungary (23), and Norway (22). There were less than 20 members in each of the remaining 52 countries.

List of the colleagues who joined the Society in 1996.

Accardi L.	Gervini Daniel	Nikitin Yakov
Adrover Jorge G.	Gharib M.	Nordström Kenneth
Andersen Mette H.	Gijbels Irene	Nussbaum Michael
Avila Fernando	Gim Dongha	Overbeck Ludger
Baddeley A.J.	Gomez Corral Antonio	Paparoditis Efsthios
Bandler Derek	Gracia-Medrano V. Leticia	Parna Kalev
Beibel Martin	Grize Yves-L.	Parthasarathy P.R.
Belitsky Vladimir	Guerrero Guzman Victor M.	Peixoto Claudia
Bell John F.	Hakulinen Pasi	Penenberg Darryl
Berkes Istvan	Helmerts R.	Pintacuda Nicolo
Bhattacharya R.N.	Henze Norbert	Podgorski Krzysztof
Bianco Ana	Houdre Christian	Pollak Moshe
Biscay Lirio Rolando	Ireland David	Radoslav Galic
Bjørnstad J.	Iribarren Ileana	Rodrigues Eliane R.
Boente Graciela L	Jakubowski Adam	Rodriguez Munoz Jose E.
Bosq D.	Jayakumar K.	Romero Mares Patricia I
Bouza Carlos	Jensen Asger	Rosinski Jan
Bulinski Alexander	Jeon Jongwoo	Roualt Alain
Burton Robert	Jonasson Johan	Ruiz-Velasco Silvia
Carenne Ludena	Kanta Ravi	Rydberg Tina H.
Casas Jerome	Kimmel John	Schäl Manfred
Cervera Flores Miguel	Klenke Achim	Seeber G.U.H.
Chiu S.N.	Kollo Tõnu	Seleznev Oleg
Christen J. Andres	Koopman S.J.	Shevlyakov Georgiy
Chung Dong Myung	Kozubowski Tomasz J.	Shi Dao Ji
Cont Rama	Kutsyy Vadim	Spieksma F.M.
Correa Carmona Sara J.	Laakkonen Eero	Stadlober Ernst
Cortinez Pontoni Alvaro	Lahiri S.N.	Stryhn Henrik
Costa Lopes Silvia R.	Last Gunter	Szabados Tamas
Darbella Georges	Lo Violet	Szyszkowicz Barbara
Darling Richard	Loh Wei-Liem	Toth Balint
Dasgupta Anirban	Lopez de Ipina Javier	Tusnady Gabor
Dominguez-Molina Armando	Low Mark G.	van der Vaart A.W.
Doukhan Paul	Major Peter	Villa Enrique
Eddahbi M'hamed	Marek Musiela	Wedlin Attilio
Ferrante Marco	Maris Salvatierra Stelle	Weron Alexander
Ferretti Nelida	Mitwalli Saleh M.	Weron Rafal
Fierro Raul	Molinas Fernandez Carlos	Yao Jian-Feng
Fritz Jozsef	Nakamura Miguel	Young J.E.
Gamboa Fabrice	Nerman Olle	Zhang Kinsheng

## BERNOULLI – how to purchase it

There has been some confusion about the conditions of purchasing the journal BERNOULLI. In order to clarify that point, we have to distinguish between two categories of BS members:

I. Regular BS members who are not members of ISI (including those with reduced membership rates as student members, retired persons, couples, or members from developing countries).

II. ISI members who elect to belong to the BS-section as members of ISI and BS members with extraordinary status.

Members in category I will automatically receive the journal free of cost, and the price is included in their membership dues. Members in category II who want to receive the journal may subscribe to it (e.g. by indicating this on the annual ISI dues bill) at special rates, at present 20 UK £. Unfortunately, the journal cannot be given free of charge to those members as they pay only very little to BS (presently 10 Dutch Guilders per annum via ISI, or no dues at all).

The subscription rate for non-members of BS in 1997 is as follows: EU 132 UK£; USA/Canada 222 US\$; rest of the world 150 UK£.

## Georgian Statistical Association The First Affiliated Society of BS

The regulations of the Bernoulli Society provide that any scientific society, whether national or international, created for the advancement of probability and statistics may be affiliated to the Bernoulli Society. At the Istanbul ISI Session in August 1997, the Council of the Bernoulli Society has approved the affiliation of the Georgian Statistical Association. The Council also approved the appointment of **Dr. Michael Mania** as liaison person. We are looking forward to the prospect of scientific cooperation between the two societies. An introduction to the society's history and activities can be found on p. 7.

The society may be contacted via the following address:

Georgian Statistical Association  
A. Razmadze Math. Institute  
1, M. Alexidze st.  
Tbilisi 380093  
Republic of Georgia  
email: GSA@imath.acnet.ge

*Volker Mammitzsch, Marburg  
(Membership Secretary)*

*Sitting from left to right: Volker Mammitzsch (Membership Secretary), Jens L. Jensen (Managing Editor of BERNOULLI), Ole E. Barndorff-Nielsen (Editor of BERNOULLI and Chair of the BS2000 Committee). Allan Gut (Treasurer) is walking behind them.*



## 5. The Georgian Statistical Association

Since the foundation of Tbilisi State University in 1918 Georgian mathematicians have been taking great care to maintain a high level in teaching probability theory and mathematical statistics. In particular, the well-known mathematician A. Razmadze, one of the founders of our university, was concerned with this matter (see [1]). The organized research in this field began in the late fifties.

Quite a large community of mathematicians has gathered around G. Mania, A. Toronjadze and N. Vakhania in the 70–80ies, who work in various areas of probability theory and mathematical statistics (limit theorems, probability distributions in functional (and other general) spaces, stochastic analysis and control, parametric and nonparametric inference, statistics of random processes, etc.). This community also includes researchers who jointly with these mathematicians work on applications of stochastic methods in national economy, demography, biology, medicine, hydrology, linguistics, etc. Many representatives of this community were students of the leading Russian scientists and collaborated fruitfully with researchers in Russia and other republics of the former Soviet Union. As vivid token of this collaboration, Colloquia on Probability Theory and Mathematical Statistics were held in the picturesque Georgian ski-resort of Bakuriani (see [2] for proceedings of the 23rd and last one). Georgian specialists regularly participated in the Vilnius conferences, they took also part in the First World Congress of BS in Tashkent.

The idea to legalize this community arose long ago, but it became possible only after the democratization process had started in Georgia. The non-governmental organization *Georgian Statistical Association (GSA)* was registered on May 30, 1991. Its aim is to promote mathematical statistics and probability theory and their applications. A. Toronjadze was elected President of the GSA. Its founders include the well-known scientists R. Chitashvili

(see[3]), E. Khmaladze, E. Nadaraya, N. Vakhania.

The prominent Russian scientists Professors Yu. V. Prokhorov and A. N. Shiryaev are honorary members of the GSA.

Continuing the activities that had been going on for years, the GSA has played a significant role in the training of specialists in market economy and privatization procedures. It has also helped to send several young specialists as PhD students to other countries.

The GSA organises seminars on theoretical, educational and applied problems. The GSA's sociological research bureau, bureau on securities and insurance, and econometry bureau are also engaged in practical activities.

In 1995, as an attempt to re-establish traditional Colloquia, a GSA Colloquium on Probability and Statistics was held in Tbilisi attended by one foreign visitor (Nils L. Hjort from Norway).

In recent time, the Eurasia Foundation has twice supported the GSA in the realization of projects connected with financial analysis.

The GSA has prepared a collection of papers on probability theory and mathematical statistics which is dedicated to the memory of R. Chitashvili and which will form vol. 115 of the Proceedings of the A. Razmadze Mathematical Institute to be published in 1997. In 1998 we plan a conference dedicated to the 80 birthday anniversary of Professor Gvanji Mania (1918–1985).

### *References*

[1] A. Razmadze's Lectures in Probability Theory (in Georgian, with Russian and English Summaries). Tbilisi, Metsniereba, 1991.

[2] Proc. Bakuriani Colloquium in Honor of Yu.V. Prokhorov. New Trends in Probability and Statistics, vol.1. Mokslas, Vilnius and VSP, Utrecht, 1991.

[3] R. Chitashvili (obituary note). ISI Newsletter, vol.20 (1997), No.1, p.8.

*Michael Mania  
Guram Mirzashvili  
Tengiz Shervashidze*

## 6. Committee Work

### EAPRC

#### East-Asian and Pacific Regional Committee

After more than ten years of lying dormant, the East Asian and Pacific Regional Committee (EAPRC) finally came to life. At the 51st ISI Session held in Istanbul in August 1997, the Working Committee for the Revival of EAPRC put together the following new EAPRC:

*Honorary Advisor:*

David Vere-Jones (New Zealand)

David.Vere-Jones@isor.vuw.ac.nz

*Chairman:*

Chii-Ruey Hwang (Taiwan)

MAHWANG@ccvax.sinica.edu.tw

*Members: 1997-1999*

Tim Brown (Australia)

tim@mugga.stats.mu.oz.au

Bong Dae Choi (Korea)

bdchoi@math.kaist.ac.kr

Masatoshi Fukushima (Japan)

fuku@sigmath.osaka-u.ac.jp

Tran Manh Tuan (Vietnam)

tuan@nghiado.ac.vn

*Members: 1997-2001*

Jia-Ding Chen (China)

jdchen@sxx0.math.pku.edu.cn

Wei-Liem Loh (Singapore)

matlohwl@math.nus.edu.sg

David Scott (New Zealand)

d.scott@auckland.ac.nz

Ana Tabunda (Philippines)

stat@nicole.upd.edu.ph

Choon-Peng Tan (Malaysia)

tcp@mmt.math.um.edu.my

The Working Committee also formulated the following working rules:

The East Asian and Pacific Regional Committee (EAPRC) will organize international meetings on probability and statistics and from time to time sponsor or support other meetings in the East Asia-Pacific Region.

It shall comprise the committee chair, the past committee chair, and eight to ten ordinary members selected to ensure broad geographical representation. The term of office of an ordinary member shall be four years, with approximately one-half elected every two years. No ordinary member shall serve more than two consecutive terms. The term of office of the chair shall be two years. The chair is eligible for re-election and shall serve no more than two consecutive terms. The term of office of the past committee chair shall be two years.

The Working Committee did not quite resolve the issue of nomination and election, but it is hoped that the new EAPRC will come up with a solution in the near future.

As the first project under the new EAPRC, a meeting entitled "International Conference on Probability and Its Applications" will take place in Taejon, Korea, in February 24–26, 1998. The Conference will be held under the auspices of EAPRC. More information about the Conference can be found on p. 17.

In our next issue we shall introduce the members of EAPRC in more details (including their CV and Photo).

*Louis Chen, Singapore*

*From left to right: Shun-Ichi Amari (Council Member), David Vere-Jones (Honorary Advisor of the EAPRC) and Bee-Geok Leow (Director of Household, Population and Manpower Statistics, Singapore)*

## CCSP

### Committee for Conferences on Stochastic Processes

CCSP sponsors the (almost) annual Conference on Stochastic Processes and their Applications. These week-long meetings typically feature lectures by 15-20 invited speakers and a large number of contributed talks. Featured topics include both theoretical developments in probability and stochastic processes and important areas of application. For a report on the 1997 meeting (the 24th in the series) held in Viña del Mar, Chile, see p. 11.

The 25th Conference will be held at Oregon State University in Corvallis, Oregon, USA, July 5-11, 1998. For more information see p. 17 and

<http://www.orst.edu/dept/math/docs/spa98.html>

Since this meeting will be the 25th in the series, CCSP is interested in hearing from people who attended the first meeting in Rochester in 1971. Please send comments and/or anecdotes to

[maejima@math.keio.ac.jp](mailto:maejima@math.keio.ac.jp).

The 26th Conference will be held in Beijing, China, June 14-18, 1999. For more information see p. 29.

There will be no meeting in 2000, because of the World Congress which will be held in Guanajuato, Mexico, and the Year 2000 activities, see p. 3.

Results of the biennial CCSP election were reported to the Committee at its meeting in Viña del Mar. The new CCSP chair is Makoto Maejima, Yokohama, ([maejima@math.keio.ac.jp](mailto:maejima@math.keio.ac.jp)), following Thomas G. Kurtz. New members include Timothy Brown (Melbourne), Mike Keane (Amsterdam), Sylvie Meleard (Paris), Claudia Neuhauser (Minneapolis), Edwin Perkins (Vancouver), and Tokuzo Shiga (Tokyo).

The Committee would like to express its appreciation for the service provided by Professor Kurtz and the other outgoing members, Onna Boxma, Louis Chen, Anatole Joffe, Eugene Seneta, Richard Weber, and Ruth Williams. (We are pleased that Louis Chen will be continuing as an ex-officio member of the Committee in his capacity as President of the Bernoulli Society.)

*Makoto Maejima, Yokohama*

## ERC

### European Regional Committee

The members of the ERC had their 1997 meeting both at the ISI Session in Istanbul and at the ISI satellite meeting in Rostock.

The most important decisions were the nomination of members of ERC. According to its constitution, the ERC has nominated the following candidates to be elected for the period 1998-2002:

Arnoldo Frigessi (Italy)  
Wenceslao Gonzalez-Manteiga (Spain)  
Yakov Nikitin (Russia)  
Pascal Massart (France)  
Ursula Gather (Germany)  
David Firth (United Kingdom)  
Lars Holst (Sweden)  
Tina Rydberg (Denmark).

Jacek Koronacki (Poland) was proposed and appointed as new chairman of ERC. His term of office will be 1998-2000.

Future meetings were discussed, especially the 22nd European Meeting of Statisticians in Vilnius, 1998.

It was also decided that the 23rd European Meeting of Statisticians will be organized in the year 2001. Portugal was suggested as a possible country to host this conference.

*Noel Veraverbeke, Diepenbeek*

**C(PS)<sup>2</sup>  
Committee on Probability and Statistics  
in the Physical Sciences**

The Committee on Probability and Statistics in the Physical Sciences initiated an introspective look at our status in *modern research and education* in a joint panel with the International Association of Statistical Education (IASE) at the ISI meeting in Istanbul. While the panel did not seek to solve any problems, it was the intention to raise issues with regard to the role of probability and statistics in the physical sciences. One has only to mention Brownian motion to easily illustrate the impact that the physical sciences have had on our subject area. It is natural to inquire about our role in the general research and education in the physical sciences. The panel consisted of discussants Colleen Cutler, Erhan Cinlar, and David Vere-Jones (IASE), with Ed Waymire as moderator. This was a well attended session which the committee felt to be very productive in its consciousness raising purpose. A written report of the presentations by this panel together with an edited summary of comments from the floor and from C(PS)<sup>2</sup> committee members will be published in the ISI proceedings for the record. We hope that this is only the start of dialogue on this important issue.

Interdisciplinary conferences are a major vehicle for communication between probabilists and statisticians and physical scientists. The following are some conferences which explicitly seek to foster such communication:

(i) C(PS)<sup>2</sup> plans to conduct a satellite meeting to the Helsinki ISI meeting in 1999 which will mark ten years since the first such meeting in Leuven 1989 on the theme *Earth and Space Sciences*. The 1999 meeting will be held in Athens (Greece) with Harry Pavlopoulos the principal local organizer and Abdul El-Shaarawi the chair of the scientific program committee. The proposed date is the week after Helsinki.

(ii) The 7th International Conference on *Statistical Climatology* (with Peter Guttorp as the Scientific Program Chair) will take place in Whistler, BC, May 25-29, 1998. Consult the web page at: <http://www.stat.washington.edu/peter/7IMSC/>

(iii) An AGU Chapman Conference in *Hydrology* will take place May 5-8, 1998, on the campus of Clemson University in South Carolina. The conference seeks to assess and explore modern theory and methods from Com-

plexity Theory/Self-Organization, Non-Linear Dynamics/Chaos, Scaling/Self-Similarity etc in diverse hydrologic applications. Email to [fmabs@earth.agu.org](mailto:fmabs@earth.agu.org) for more information.

(iv) The 25th Conference on *Stochastic Processes and their Applications* (SPA'98) will be held in Corvallis on the campus of OSU July 5-11, 1998. Bernoulli members are encouraged to make this conference known to colleagues in the physical sciences who are interested in the applications of stochastic processes. Check the web page at <http://www.orst.edu/dept/math/docs/spa98.html> for abstract submission and registration information. This web site is the most complete source of information about SPA'98.

(v) A one day workshop on *Random Media* is to be held in Dallas (Texas), on Sunday, August 9, 1998, from 9:30am-5:00pm, as a prelude to the IMS Annual Meeting. The organizers are Stan Molchanov of the University of North Carolina-Charlotte, and Wojbor Woyczynski of Case Western Reserve University, Cleveland, Ohio. The talks will address major areas of current research with particular attention paid to applications in the physical sciences and engineering. The speakers will be: Rene Carmona (Princeton), Shinichi Kotani (Osaka), Stan Molchanov (UNC-Charlotte), George Papanicolaou (Stanford), Alain-Sol Sznitman (ETH Zurich), Wojbor Woyczynski, CWRU (Cleveland),

(vi) The 6th International Conference on *Precipitation: Predictability of Rainfall at all Scales* will be held June 29 - July 1, 1998, Mauna Lani Bay, Hawaii. This meeting aims at fostering interdisciplinary interaction between meteorologists, hydrologists, mathematicians, and statisticians. The central theme of this conference will be research related to rainfall predictability at various scales of space and time. Papers are invited on all aspects of rainfall predictability, with the following topics being of particular interest: Modern Observation Techniques; Dynamics of Clouds and Precipitation; Limits of Predictability. Information is available on the web at <http://www.envsci.rutgers.edu/precip> or by email to [melissa@gaia.rutgers.edu](mailto:melissa@gaia.rutgers.edu). The deadline for submission of abstracts is November 15, 1997.

*Ed Waymire, Oregon*

## 7. Report on Recent Activities

### **International Symposium on Contemporary Multivariate Analysis and Its Applications May 19–22, 1997 Hong Kong**

The Symposium was hosted by the Hong Kong Baptist University (HKBU) and sponsored by the Bernoulli Society and other academic societies. Over 200 statisticians and scholars from 25 countries and regions participated in the four-day program, which included two keynote lectures, 32 invited talks and 114 contributed papers.

After opening remarks by the President of HKBU and a welcome address by the Chairman of the International Program Committee, Kai-Tai Fang, there was a speech by the President-Elect of the Bernoulli Society, Louis H. Y. Chen (National University of Singapore) at the opening ceremony. T. W. Anderson (Stanford University) and C. R. Rao (Pennsylvania State University) gave keynote addresses.

Most of the invited talks were grouped under the following themes: Bayesian computation, business applications, dimension reduction, graphical models, model selection, non-normal inference, non-parametric models, resampling, and semi-parametric models.

Many distinguished statisticians attended the Symposium, including three members of the National Academy of Sciences, USA, 27 ISI members, 22 Fellows of the IMS, 15 Fellows of the ASA and three recipients of the COPSS Award. Also, many younger statisticians participated, including 29 students.

### **EYSM'97 10th European Young Statisticians Meeting August 18–22, 1997 Warsaw (Poland)**

The European Young Statisticians Meetings are patronized by the Bernoulli Society. They are held every two years and are attended by young researchers from Europe working in probability theory and statistics.

The last meeting took place in Warsaw (Poland) from August 18–22, 1997. It gathered 39 participants from 18 countries. Each participant gave a 20 minute talk. The subjects of the talks were diverse and ranged from probability theory to applied statistics.

The Symposium was strongly supported by the local Hong Kong community. The Local Organizing Committee was composed of academics from six local universities, Hong Kong's Commissioner of Census & Statistics, and members of the Hong Kong Statistical Society. Eighty-seven local statisticians participated in the Symposium. Moreover, several Hong Kong charitable foundations provided generous donations to support the invited speakers as well as 25 participants from Mainland China.

The Symposium was followed by a *Workshop on Experimental Design* organized by F. J. Hickernell (HKBU) on May 24. This gathering of 47 statisticians heard talks by Ching-Shui Cheng (University of California, Berkeley) and others on recent developments in optimal, orthogonal and uniform designs. Three invited talks, nine contributed papers and four posters were presented at the Workshop.

In conclusion, the Symposium brought together many scholars from all over the world to discuss the latest developments in contemporary multivariate analysis. On behalf of the organizers, we wish to thank the Bernoulli Society for lending its support and to all participants for making the Symposium a success.

*Kai-Tai Fang, Hongkong*

The social program of the meeting included a visit of Wilanow palace and a conference dinner. The meeting went on in a friendly atmosphere. It was successful and allowed the participants to present their work and to meet each other.

The next European Young Statisticians Meeting will take place in France in 1999. The main organisers are Olivier David (david@versailles.inra.fr), Christine Cierco and Sophie Schbat.

*Olivier David, Versailles*

## SPA'97

### 24th International Conference on Stochastic Processes and their Applications

June 16 - 20, 1997

Viña del Mar, Chile

The 24th Conference on Stochastic Processes and their Applications took place at the Convention Center "Gala" in Viña del Mar. It was organized by the Department of Mathematics, Catholic University of Chile, in conjunction with the University of Chile and the Catholic University of Valparaíso. It was held under the auspices of the Committee for Conferences on Stochastic Processes (CCSP) of the Bernoulli Society and the Chilean Mathematical Society.

The programme consisted of 13 invited lectures and 79 fifteen-minute contributed talks. The invited speakers were:

G. Ben Arous (Paris), V. Bogachev (Moscow), F. Fagnola (Genova), C. Fernández (Santiago), P. Ferrari (São Paulo), P. Imkeller (Berlin), S. Martínez (Santiago), P. Ney (Madison), E. Olivieri (Roma), M. Sanz (Barcelona), R. Williams (San Diego), J.A. Yan (Beijing).

P. Ney delivered the inaugural Special Invited SPA Lecture (which was supported by Elsevier Science B.V., publisher of the journal *Stochastic Processes and their Applications*). Moreover, the conference benefitted of an additional lecture delivered by T. Kurtz replacing D. Talay, invited speaker who could not attend the meeting.

Main fields covered at the Conference were Stochastic Particle Systems, Quantum Stochastic Analysis, Large Deviations, Stochastic Networks, Measure-valued processes, Branching Processes, Stein Identities, Quasi Stationary Distributions, Inference on Stochastic Processes, Infinite Dimensional Analysis, Random Fields and Stochastic Partial Differential Equations.

For full details, interested readers could browse the LaTeX abstract files of both, invited and contributed talks at the address

<http://www.mat.puc.cl/~spa24/abstracts.html>

The meeting provided a highly interesting occasion for fruitful exchanges among participants.

All probabilists willing to keep in contact with the Chilean research group on Stochastic Analysis and Mathematical Physics (ANESTOC), involved in preparing SPA24, are kindly invited to visit the web page

<http://www.mat.puc.cl/~anestoc1/anestoc.html>

where periodic international workshops and meetings in Chile are to be announced.

*Rolando Rebolledo, Santiago*

### *The araucaria tree.*

*The name of the trees is derived from Arauco, the name of a district in southern Chile where they were first discovered. "Araucaria araucana", the Chile pine was introduced into Europe in the late 18th century and is extensively cultivated there. Now it can be found as well in Australia, Brasil, California and the Phoenix Islands. The tree grows to the height of 50m. in the cordilleras of Chile.*

**Rolando Rebolledo** held the following opening speech at the SPA'97 in Viña del Mar.

On behalf of the Organising Committee of the 24th International Conference on Stochastic Processes and their Applications, I wish to welcome all participants of this meeting. In particular, we appreciate the interest of those participants coming from our antipodes who have spent more than 24 hours flying-time to reach Chile.

Jef Teugels, Thomas Kurtz and former members of the CCSP, Luis Gorostiza, Luigi Accardi, Takeyuki Hida, Anatole Joffe, among others, are responsible for choosing our country and this city as a venue for the Conference. We are very grateful to them for their support to our scientific activities.

Perhaps the first research papers in Measure Theory and Probability produced in our continent, were those of Beppo Lévi, who emigrated from Italy to Argentina during the thirties, and González Domínguez, also from Argentina, who published several articles in the *Comptes Rendus de l'Académie des Sciences de Paris*, 1936, dealing with limit theorems discovered by Glivenko. He also wrote a monograph on the representation of functions by means of Fourier Integrals, published in *Duke Mathematical Journal*, 1940. These scholars could be considered as predecessors of research

activities in Probability Theory and Stochastic Processes in our continent, even though a well established Theory of Stochastic Processes did not exist in the world before the forties.

At present, there is no branch of Mathematics which could escape to the influence of Stochastic Processes. Perhaps the key point to understand this success, is that Stochastic represents a new approach to mathematical modeling of reality, which allows to keep track of highly complex dependencies and interactions within natural phenomena.

So it is not surprising that Stochastic Processes, or better, Stochastic Analysis is having an important worldwide development, including the Latin American continent. At present, well established research groups in Stochastic Analysis exist in Mexico, Brazil, Uruguay, Venezuela and Chile. Statistics of Stochastic Processes, Quasi-stationary distributions, Ergodic Theory, Limit Theorems, Stochastic Particle Systems, Infinite Dimensional Analysis, Quantum Probability, Quantum Dynamical Semigroups, Stochastic Differential Equations, applications to Finance, Electrical Engineering, Quantum Optics, are among the research subjects cultivated within the continent.

Step by step a tradition of scientific meetings on Stochastic Processes and related fields is being established in Latin America. Starting with Congresses on Probability Theory and Statistics (CLAPEM) which have been held in Venezuela, Uruguay, Brazil, Chile; continuing with the Brazilian National Symposia on Probability and Statistics (SINAPE), the Mexican Symposia in Probability, the Chilean Winter Schools in Probability Theory and Mathematical Statistics (EIPES), and, since 1995, the series of International Workshops on Stochastic Analysis and Mathematical Physics (ANESTOC), the flow of stochastic activities is increasing very fast.

This meeting is another step in the evolution of Stochastic Analysis in Latin America. It has been organized by the Committee for Conferences on Stochastic Processes of the Bernoulli Society, who established both, the Programme Commit-

tee and the Local Organising Committee. The Programme Committee consists of Luigi Accardi, Takeyuki Hida, Luis Gorostiza, Thomas Kurtz, Philip Protter, Chris Heyde, Claude Dellacherie, Antonio Galves, Ludwig Arnold, Albert Shiryaev, Rolando Rebolledo. The Organising Committee includes Eugenio Saavedra, Renato Allende, Fernando Quintana, Raúl Fierro, Gladys Bobadilla, Jaime San Martín and Rolando Rebolledo.

We followed the standard structure of other SPA conferences: a number of invited lectures and a broad place offered to contributed papers. Moreover, a special invited lecture has been scheduled, supported by the Bernoulli Society under the sponsorship of Elsevier. This is the Opening Lecture which will be delivered by Professor Peter Ney. It is a great honour for us to have Professor Ney inaugurating the scientific work of this conference.

The conference benefited from the support provided by several institutions: the International Mathematical Union (IMU), the Chilean National Council of Scientific Research (CONICYT), the Direction of Research and Graduate Studies of the Catholic University of Chile (DIPUC), the National Science Foundation (NSF) who granted US participants, the "Universidad de Chile", the "Universidad Católica de Valparaíso", the "Facultad de Matemáticas" of the "Universidad Católica de Chile", where most of the organization was carried out before the conference. Last, but not least, we have to mention the kind collaboration of the staff of "Gala Hotel" and Mr. Sergio Solís who are hosting this conference. We are gratefully indebted to all of them.

We wish you a fruitful and pleasant stay in Viña del Mar, if you need assistance, please do not hesitate to contact the members of the Organising Committee through the secretary office.

We also hope you will have some time left to begin discovering a part of our country which is the beginning of the world in the south-north direction.

Thank you.

**Mathematical Statistics and Its  
Applications to Biosciences  
August 31–September 4, 1997  
Rostock (Germany)**

The conference took place under the auspices of the European Regional Committee of the Bernoulli Society and the Institute of Mathematical Statistics.

The town Rostock and its University provided a pleasant venue of the event. The conference was supported by several companies and institutions. In particular, the Deutsche Forschungsgemeinschaft (German Research Foundation) provided the opportunity to support researchers from East European countries.

The conference was attended by 200 statisticians from 26 countries from all continents. The *Opening Lecture* (Point Process Methods in Forest Statistics) was given by Dietrich Stoyan. The *Forum Lectures* (Inference with Missing Data: Recent Developments and Open Questions I,II) were held by Andrea Rotnitzky. *Special Invited Papers* were given by: Viatcheslav B. Melas : Nonlinear Models, Simon Tavaré : Ancestral Inference in Population Genetics, Noel Cressie : Spatial Analysis and Inference for Extremes in Disease. The *Closing Lecture* (Smoothing) was given by Theo Gasser. A round table discussion on the interpretation of statistical inferences was organized for Sunday evening and chaired by Shanti S. Gupta and Dieter Rasch. The core of the conference consisted of 18 invited paper sessions. Contributed papers were presented in 23 sessions and at the poster session. All in all about 150 participants covered a wide spectrum of topics in their contributions both in mathematical statistics and its applications.

A computer demonstration was held by a sponsoring company. BIORAT demonstrated “Sample Size Determination for ANOVA and Construction of Experimental Designs with CADEMO” and “Construction and Analysis of Sequential Designs with TRIQ”. Several publishing houses provided an interesting book exhibition.

The social programme started with the reception by the mayor of the city of Rostock. Participants of the excursions on Tuesday afternoon could choose between three different routes. The day ended with a classical concert. The conference dinner proved to be a golden opportunity to meet old friends and to make new ones from all around the world.

The material of the conference is available at <ftp://likeli.math.uni-rostock.de/www/biostat/home.html>

*Friedrich Liese, Rostock*

**Conference on Environmetrics in Austria  
8th International Conference on Quantitative  
Methods for the Environmental Sciences  
August 4–8, 1997  
Innsbruck (Austria)**

The 8th International Conference on Quantitative Methods for Environmental Sciences featured the presentation and discussion of 107 invited and contributed papers. Approximately 220 participants from 27 nations attended the conference.

The Keynote Address and the John Stuart Hunter Lecture, “A Unified Approach to Multivariate Outliers, Multivariate Transformations and Discriminant Analysis” was delivered by A. C. Atkinson of the London School of Economics.

Six special plenary lectures were presented on: Spatial Data Analysis, Risk Assessment, Large Scale Ecological Monitoring, The mission of the newly established US National Centre for Environmental Statistics, Policy and Data-Driven Water Resources Systems Modelling, and the Analysis of Non-Precise Data. Three parallel invited and contributed sessions were held each day. Topics covered in the invited sessions were: Expert Systems, Health and Environment, Bootstrap: Environmental Applications, Issues in Wildlife Monitoring, Assessment and Control of Urban and Agricultural Diffuse Pollution, Environmental Time Series, Soil Biodiversity, Extreme Value Theory and Related Topics and Eco-Sustainability.

There was also a General Meeting of The International Environmetrics Society.

The qualities of the presented scientific papers were high and the sessions were well attended with ample time for discussion.

The social program consisted of two receptions (one by the Mayor of Innsbruck) and the conference banquet dinner.

The organizers are planning to publish the proceedings in two issues, one to appear in Environmetrics and the other in the Austrian Journal of Statistics.

The Bernoulli Society was a major sponsor of the meeting with strong representation on the Scientific Committee of the conference. The two societies (BS and TIES) are planning to work together in promoting the role and applications of statistics to environmental science.

*Abdel El-Shaarawi  
Burlington, Ontario*



**ISI'97**  
**51st Biennial Session of the ISI**  
**August 18–27, 1997**  
**Istanbul (Turkey)**

Venue of the meeting was the Lütfi Kırdar Istanbul Congress Center, where well above one thousand participants attended the session. The scientific programme consisted in total of 85 scheduled invited paper sessions, 83 contributed paper sessions with about 850 papers presented, and 4 round table meetings. Under the auspices of the Bernoulli Society 12 invited paper sessions have been arranged, among them Stochastic models in finance (a still rapidly growing research field that will perhaps get an extra impetus by the recent awarding of the Nobel Prize in Economics to Myron Scholes and Robert Merton), Statistics in geophysics and astronomy, and Coupling. The complete list of these topics can be found in Bernoulli News, vol. 4 (no. 1) 1997.

As is always the case with the ISI Sessions the programme was very broad and covered almost all aspects of Statistics. Hence there were lectures of a strong mathematical flavour on one side of the spectrum and lectures on official statistics at the other side.

Four volumes of the ISI Bulletins, two volumes for each of the invited papers and contributed papers, were ready to distribute at the Session. The late volume that will consist of some more papers and minutes of the administrative meetings will be issued in about March, 1998.

On the other hand, the conference offered participants the opportunity to select both an interesting academic programme and to spend a fair amount of time in the town with its vivid street life, splendid cultural sites and delicious food.

The social programme included a welcoming reception in the garden of the beautiful Dolmabahce Palace, a performance of traditional Turkish folk music and an indoor farewell diner in the Marmara hotel. Originally the farewell diner was planned to be organized in the garden of the Beyerbei Palace, but the atypical weather (too cold and too much rain for the time of the year) in those days made this option too risky.

The 52nd Session of the ISI will be held in Helsinki, August 11-18, 1999, see p. 29.

*Peter Spreij, Amsterdam*

**Water and Statistics**  
**August 28–30, 1997**  
**Ankara (Turkey)**

The international meeting on *Water and Statistics*, a satellite meeting to 51st ISI Session, was held in Ankara, Turkey, at the premises of Ankara University between August 28-30, 1997.

The Meeting was organized by the Bernoulli Society, the Turkish Statistical Association, Ankara University, and Istanbul Technical University with the sponsoring supports of the State Hydraulic Works of Turkey, the Scientific and Technological Research Council of Turkey, and the Istanbul Water and Sewerage Administration.

Abdel H. El-Sharaawi from Canada and Andras Bardossy from Germany were the key-note speakers of the Meeting. Omer L. Gebizlioglu, Ismihan G. Bairamov, Zekai Sen, H. Dogan Altinbilek and Taylan Ula presented their papers as the key speakers of the six half-day long sessions. There were 26 papers altogether that were presented and discussed with a high level of discussional contributions from the floor. In this regard, the meeting had a character of a workshop that gave the participants an opportunity of active learning in many aspects of water and statistics.

The Sessions of the Meeting were devoted to the following subjects: Surface flow modelling, rainfall models, water statistics and information systems, water resources planning and development, water related stochastic modelling and water related optimization problems.

The Meeting attracted 110 participants, mostly from Turkish Universities and Water Related Public Institutions. Other participants were from Canada, Germany, Belgium, England, Sweden, Italy, Czech Republic, Azarbaijan and Russia.

The papers submitted to the Meeting will be as a proceedings volume by the Ankara University published soon with the editorial support of the Bernoulli Society.

*Omer L. Gebizlioglu*  
*Ankara University*

## 8. Conferences 1997

**Recent Advances  
in Statistics and Probability  
December 29, 1997–January 1, 1998  
Calcutta (India)**

The Indian Statistical Institute and the Bernoulli Society will jointly host the international conference *Recent Advances in Statistics and Probability* at the Calcutta centre of the Indian Statistical Institute between December 29, 1997 and January 1, 1998.

There will be 27 invited paper sessions in the conference with approximately 90 speakers. In addition there will be six special invited lectures (by D.R. Cox, Peter Hall, K.R. Parthasarathy, G. Kallianpur, S.R.S. Varadhan and C.R. Rao). Additionally there will be about 70 contributed pa-

pers, and a large number of local attendees.

The conference is spread over four days, with a half day break in the afternoon of the 31st of December. This is the largest international conference in statistics and probability in India in several years.

For further information please contact:

Ayanendranath Basu  
Computer Science Unit  
Indian Statistical Institute  
203 B. T. Road                      fax: +91 33 556 6680  
Calcutta 700 035                    fax: +91 33 556 6925  
India                                    email: isibern@isical.ernet.in

*Three female Dutch PhDs: Constance van Eeden, Sara van de Geer and Mathisca de Gunst  
(from left to right).*

## 9. Conferences 1998

### **International Conference on Probability and Its Applications February 24–26, 1998 Taejon (Korea)**

The venue of the conference is the Korea Advanced Institute of Science and Technology (KAIST) in Taejon. It is organized by the Center for Applied Mathematics of KAIST in conjunction with the Korean Mathematical Society, supported by the Korea Science and Engineering Foundation and the Korea Research Foundation. The conference will be held under the auspices of the EAPRC.

Programme Committee:

L.H.Y. Chen (Co-chairman), B.D. Choi (Co-chairman), T. Brown, M. Fukushima, T. Hida, C.R. Hwang, C.E.M. Pearce, J.A. Yan.

Local Organizing Committee:

K.S. Chang, B.D. Choi (Chairman), C.S. Choi (Secretary), D.M. Chung, J.W. Jeon, J.H. Kim, T.S. Kim, I.S. Wee.

Topics for the conference include: Limit Theorems for Stochastic Processes. Stochastic Analysis. Markov processes. Diffusions. Dirichlet Forms. Queueing Theory. Modelling of Telecommunication Systems. White Noise Analysis. Quantum Stochastic Analysis. Stochastic Models in Finance. Applied Probability Approximation. Long Range Dependence. Self-similar Processes. Statistics of Stochastic Processes. Stochastic Control. Random Sets and Fuzzy Processes.

The programme consists of invited lectures and twenty-minute contributed talks.

Invited speakers:

J.R. Artalejo, J.H. Dshalalow, T. Hida, T. Hsing, D.M. Chung, G. Kallianpur, N. Jain, Y.J. Lee, Y.M. Park, P. Pollett, S. Watanabe, J.A. Yan.

Abstracts for invited lectures and contributed talks should not contain more than 200 words each, and should contain author's affiliation and email address. They should be submitted (preferable by email) to the Organizing Secretary no later than December 1, 1997.

For the registration form, the abstract format and further information please check:

<http://math.kaist.ac.kr/~cam>

If you wish to attend the Conference, please complete the registration form and return it before January 1, 1998 to the Organizing Secretary:

C.S. Choi (Secretary)

Department of Mathematics  
Korea Advanced Institute  
of Science and Technology fax: +82-42-869-8194  
Taejon 305-701, Korea phone: +82-42-869-2717  
[cam@queue.kaist.ac.kr](mailto:cam@queue.kaist.ac.kr), [cam@math.kaist.ac.kr](mailto:cam@math.kaist.ac.kr)

### **Workshop in Mathematical Population Dynamics May 11-15, 1998 Gothenburg (Sweden)**

The newly established Gothenburg Stochastic Centre is organizing a guest programme in Population Dynamics during April and May 1998. It will culminate in the announced workshop.

Topics emphasise on general properties of population growth, but special populations will also be discussed. Particular themes that have been mentioned include

- Dependence/interaction in population dynamics and branching processes.
- The process of extinction in a historical perspective: how gradual is "natural" extinction, as opposed to catastrophies?
- Quasi-stationarity and its role in the evolution of populations now extinct.
- Branching within branching and mitochondrial dynamics.
- Cell and molecular population dynamics more generally; the cell cycle.
- Meta-populations.

Participants will have a background in probability and statistics, in mathematical population dynamics and/or various branches of biology. The workshop is planned to consist of three days at the Gothenburg Mathematical Centre, and two at the Tjrn Marine Biological Laboratory, in the beautiful archipelago of the Swedish West Coast.

Programme committee:

Peter Jagers (Gothenburg), Mats Gyllenberg (Turku), Hans Metz (Leiden), Marek Kimmel (Houston), Ziad Taib (Gothenburg).

Local organizing committee:

Peter Jagers, Ziad Taib, Inga-Lill Sandman, Marina Alexandersson.

Email addresses:

Peter Jagers: [jagers@math.chalmers.se](mailto:jagers@math.chalmers.se)

Ziad Taib: [ziad@math.chalmers.se](mailto:ziad@math.chalmers.se)

Marina Alexandersson: [malex@math.chalmers.se](mailto:malex@math.chalmers.se)

Inga-Lill Sandman: [ingalill@math.chalmers.se](mailto:ingalill@math.chalmers.se)

*Ziad Taib, Gothenburg*

## SPA'98

### 25th International Conference on Stochastic Processes and their Applications

July 5–11, 1998

Corvallis, Oregon (USA)

The World Wide Web page for the Conference which will be held on the campus of Oregon State University in Corvallis Oregon, has been updated: <http://www.orst.edu/dept/math/docs/spa98.html> Check it out! Visitors to this web site will find information about housing, registration, abstract submission and travel to Corvallis. Abstract submission, some lodging, and registration may be completed electronically. There is an APRIL 1, 1998 deadline, so don't delay!

Oregon and the Pacific Northwest offer diverse family vacation opportunities before and after the conference from mountains, rivers, lakes, oceans to sand dunes and the high plains desert. Links to vacation information are provided at the web site.

**SO BOOKMARK THE SITE AND CHECK IT REGULARLY FOR NEW LINKS!**

Our web site is the most complete source of information for SPA98. However, more limited information is available via email or by ftp to:

<ftp.math.orst.edu>

At login prompt type anonymous, use your full email address as password, and go to the directory /conferences/spa98 to get files.

For further information please contact

SPA'98

Department of Mathematics

Oregon State University fax: +1 503 737 0515

Corvallis, OR 97331

USA email: [spa98@math.orst.edu](mailto:spa98@math.orst.edu)

## Prague Stochastics'98

### 6th Prague Symposium on Asymptotic Statistics &

### 13th Prague Conference on Information Theory, Statistical Decision Functions and Random Processes (joint session)

August 23–28, 1998

Prague (Czech Republic)

For the programme see the last issue of Bernoulli News or check the www site of the Conference.

For more information please contact:

Martin Janžura

ÚTIA AVČR phones: +420 2 6605 2572

P.O.B. 18, +420 2 6605 2426

182 08 Prague fax: +420 2 688 4702

Czech Republic email: [stoch98@utia.cas.cz](mailto:stoch98@utia.cas.cz)

<http://www.utia.cas.cz/stoch98.html>

## European Summer School

### Markov Chain Monte Carlo Methods

August 7–10, 1998

Rebild (Denmark)

The scientific scope is to offer an advanced course on MCMC for bright and ambitious young postdocs and PhD students with backgrounds in statistics and probability.

Invited experts will introduce and exposit six topics within the area:

- Probabilistic aspects of MCMC
- Bayesian statistics and MCMC
- Complex models and MCMC
- BUGS/Graphical models
- New advances/special topics
- Perfect simulation.

The summer school web page can be found at:

<http://www.maths.nott.ac.uk/hsss/Workshops/summerschool.html>

The web page will be updated as a principal source of information.

For further information please contact:

Lisbeth Grubbe Nielsen

Department of Mathematics

Aalborg University

fax: +45 98 15 81 29

Denmark

email: [grubbe@math.auc.dk](mailto:grubbe@math.auc.dk)

## ICM'98

### International Congress of Mathematicians

August 18–27, 1998

Berlin (Germany)

Responsibility for the scientific programme lies with the Programme Committee appointed by the International Mathematical Union. There will be about twenty one-hour Plenary Lectures covering recent developments in the major areas of mathematics and about 170 forty-five-minutes Invited Lectures in nineteen sections. There is one section on Probability and Statistics reflecting the importance of our field within mathematics nowadays. This was not always the case, at least not in the beginning years of the ICMs. On the next pages *Ulrich Krengel* from Göttingen provides a history of probability and statistics at the ICMs from the very beginning up to now.

For more information please check

<http://elib.zib.de/ICM98>

or write to

ICM'98

c/o Prof. Dr. J. Winkler

Technische Universität Berlin, MA 8-2

Fachbereich Mathematik fax: +49 30 314 21604

D-10623 Berlin, Germany email: [icm98@zib.de](mailto:icm98@zib.de)

**EMS'98**  
**22nd European Meeting of Statisticians**  
**August 12–18, 1998**  
**Vilnius (Lithuania)**

The meeting is also the 7th Vilnius Conference on Probability Theory and Mathematical Statistics, and will reflect the traditions of those meetings as well as those of the European Meetings of Statisticians. It will take place on the Vilnius University Campus, 11 Sauletekio av., Vilnius.

Organizing Committee:

Vytautas Statulevicius (Chairman), Volker Mammitzsch, Eugenijus Manstavicius, Henrikas Pragarauskas, Mifodijus Sapagovas, Leonas Saulis.

Secretariat: M. Bloznelis, A. Plikusas.

Programme Committee:

Peter Jagers, Sweden (Chairman); Peter Diggle, United Kingdom; Bronius Grigelionis, Lithuania; Il-dar Ibragimov, Russia; Enno Mammen, Germany; Juni Palmgren, Sweden; Vygantas Paulauskas, Lithuania; and Elvezio Ronchetti, Switzerland.

The traditional special invited lectures at European Meetings of Statisticians will be given by

- Opening Lecture: Richard Gill, Utrecht
- Forum Lectures: Nancy Reid, Toronto
- Closing Lecture: Jean-Francois Le Gall, Paris
- Special Vilnius Lecture:  
Vidmantas Bentkus, Bielefeld.
- IMS Special Invited Paper:  
Colleen Cutler, Waterloo, Ontario.

There will be a special session in collaboration with the *International Association of Official Statistics* and a round table discussion on the role of statistics in transition countries. Among the participants are T. Toczyński, President of the Polish National Bureau of Statistics, Sten Johansson, Professor of Sociology and former Director General of Statistics Sweden, Willem de Vries, Deputy Director of

Statistics Netherlands and P. Adlys, Acting Director, Lithuanian Statistics Bureau. The organizers are Petras Adlys and Rimantas Rudzkis.

In connection with the meeting there will be a *Workshop on Stochastic Analysis*, organized by David Elworthy.

Some ninety scientists from all over the world have already accepted invitations to speak at the ordinary sessions. The sessions have been listed in the last issue of Bernoulli News.

Persons wishing to present a contributed paper are requested to present the abstract of the paper (no more than two pages) written in English. Please indicate the title of the session which is closest. Abstracts of contributed papers, papers and registration forms are to be sent to the Organizing Committee by January 15, 1998. Registration forms will appear in the first bulletin, to be distributed soon.

The registration fee is 150 USD. It is intended to reduce the fee for participants from developing countries.

Accommodation will be available in the hotels *Lietuva and Zaliasis Tiltas*, which are located in the center of the city, at hotel *Draugyste* and at budget prices at the Hotel and Student Dormitory of the Technical University on the University campus (the conference site).

The Organizing Committee intends to arrange a special conference bus from the hotels to the conference site.

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# History of Probability and Statistics at the International Congresses of Mathematicians

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The first International Congress of Mathematicians (ICM) was organized in 1897 in Zurich. Therefore, the 1994 ICM, again in Zurich, was almost a centennial. For this reason, an International Congress on the History of Mathematics was organized by Prof. Dr. E. Neuenschwander (Univ. Zurich) at the same time and location as the 94 ICM. Five mathematicians were asked to speak on the history of the ICMs in five different mathematical fields. The present article is a slightly modified version of the lecture on probability and statistics given by the author.

We ask which important developments in probability and statistics have been represented at the ICMs, and in which way ICMs can serve other aims than special conferences. We hope to offer constructive criticism. Some of the findings concerning certain classical results and notions in probability do not seem to be common knowledge yet.

We start with a very general question:

*what are the legitimate aims of the International Congresses? Have these aims been pursued and achieved in the fields of probability and statistics?*

There are three aims of scientific congresses which apply to all congresses:

(1) *gathering of information and stimulation in one's own field,*

(2) *presentation of one's own results,*

(3) *establishment of personal contacts and personal discussions.*

These first three aims can certainly be achieved best by specialised conferences, for example, by conferences devoted only to probability and/or statistics or even to subfields of these. Aims more specific to the ICMs may be the following.

(4) *Improvement of the knowledge of mathematicians about developments in mathematics outside their own field.*

This is a basic cultural aim. More practically, it can contribute to a fair evaluation of the importance of other fields, and it can also help to give new directions to one's own work.

(5) *Improvement of public relations.*

The public and also the funding institutions should be convinced of the relevance of mathematical research including the importance of purely theoretical work.

(6) *Hero-worship, and recognition of merit.*

This aim has been rather dominant in practice. (In my view, hero-worship may be a legitimate aim to some extent as a way of achieving (4) and (5)).

The role played by probability and statistics at the ICMs has changed a lot in the course of the last century. If we want to form a judgement on whether the above aims were met we must differentiate between different time periods. After looking at the Proceedings of all the ICMs, I felt that they divided naturally into three markedly distinct periods, namely:

1897–1924 (Zürich – Toronto)  
the formative years

1928–1936 (Bologna – Oslo)  
the foundational years

1950–now (Cambridge/Mass. – Zürich)  
the flourishing years.

(Because of the world war, there were no ICMs between 1936 and 1950.)

1897–1924 The formative years

During the first quarter of this century, probability and statistics had a very bad reputation among general scientists as well as mathematicians due to the lack of rigorous foundations. Usually, there were sections on probability, statistics and actuarial mathematics at the ICMs, largely devoted to special problems in actuarial mathematics that left no traces in the field. At **Zürich** (1897) there was not a single talk in probability. (E. Borel, F. Hausdorff and E. Czuber were among the participants.)

In 1890, at **Paris**, the most remarkable event related to probability was the fact that *Hilbert* posed the problem of specifying axiomatic foundations of probability. This was the main part of the sixth of his famous 23 problems. It is not unlikely that the

idea of treating probability axiomatically first occurred to Georg Bohlmann (1869 - 1928). He was a Privatdozent in Göttingen since 1894, and he taught actuarial mathematics. He wrote a long article [B] on life insurance in the *Enzyklopädie der Mathematischen Wissenschaften*, and this article started with an axiomatics of probability. This material has been first presented in Paris (1900) during an actuarial congress. Hilbert referred to an announcement of this work when he posed the problem to axiomatize probability. It is well known that Hilbert consulted with various colleagues prior to his Paris talk. Bohlmann himself asserted that Hilbert's axiomatic treatment of geometry inspired him, but not that Hilbert posed the problem. Bohlmann introduced the probability  $p(E)$  of an event  $E$  as a nonnegative number such that the certain event has probability 1 and such that (finite) additivity holds. He made a point that he tried an approach which was basically different from that of Laplace. His axioms turned out to be unsatisfactory since he did not have a rigorous definition of an event and he was aware of this deficiency. Yet, the spirit of his approach certainly resembles the present axiomatics of Kolmogorov more than the ideas which had been used in the previous century. (It seems that Kolmogorov was never told about Bohlmann though he repeatedly visited Göttingen prior to publishing his "Grundbegriffe" in 1933. We remark that Ugo Broggi (1880 - 1965), in a thesis written under the direction of Hilbert, defined events as subsets of a fixed set in 1907. Broggi also introduced  $\sigma$ -additivity, but gave a wrong proof of its (supposed) equivalence to finite additivity.

It seems that the colleagues of Bohlmann did not appreciate his ideas and ridiculed his attempts to make probability rigorous. According to Kamke [Ka] the following sentence circulated in Göttingen at the beginning of this century: "A probability is a number between 0 and 1 about which nothing else is known." In 1902, Bohlmann accepted a position in an insurance company.

At **Heidelberg** (1904), there was a section on applied mathematics, but no talk on probability or statistics was given.

At **Rome** (1908) the section on probability, statistics and actuarial mathematics was resumed. There were eleven talks on special subjects in actuarial mathematics. *E. Borel* gave a talk "Sur les applications du calcul des probabilités aux sciences biologiques". *G. Bohlmann* talked about applications of probability to actuarial mathematics. In his article for the Rome ICM, Bohlmann gave the present formal definition of independence of  $n$  events: "The events  $A_1, \dots, A_n$  are called independent if for any subset of them the probability of their joint occurrence is the product of their prob-

abilities." Of course, the "product formula" had been used for a long time, but it had been considered a provable result, not a definition (Multiplication theorem of probabilities). Moreover, it was not obvious that one had to require the validity of the product formula for all subfamilies of the considered family of events. Bohlmann showed by example that pairwise independence did not imply independence. Kolmogorov, in his "Grundbegriffe", gave credit to Khinchine for the formal definition of independence, quoting an article of 1927. In most probability books, the example showing that pairwise independence does not imply independence is still attributed to Khinchine. Apparently, nobody looked at the proceedings of the ICM of 1908.

Among the other speakers at Rome, I mention the statistician *C. Gini* who spoke on "rare events".

As *A.M. Ljapounov* was a member of the international committee organizing the ICM in **Cambridge/UK** (1912), it is surprising that the remarkable progress of the Russian probabilists still found no way into the program. In *F.Y. Edgeworth's* opening address for the section on probability and statistics there was a remark "Calculus of probability has been described as opprobrium (shame) of mathematics". (This was a quotation of a statement of John Stuart Mill (1846), who had only referred to the application of probability to social science topics like the testimony of witnesses (see [S1], p. 195.)). Edgeworth expressed his hope that the talks, and the recent creation of the position of a lecturer of statistics in Cambridge might help to overcome this disapproval of probability. Again, many talks on actuarial mathematics were presented. *F.Y. Edgeworth* gave a talk "A method of representing statistics by analytic geometry".

During the first world war, there was no ICM.

At **Strasbourg** (1920), the only talk related to probability or statistics was given by *A. Guldberg*. He spoke on "Une application des polynômes d'Hermite à un problème de statistique."

*J.C. Fields*, the president of the **Toronto** ICM (1924) (who initiated the creation of the medals, later named after him against his his own wish) wanted to accentuate, more than at previous congresses, the role of applied mathematics. He hoped that the Congress would not be without influence on the layman "to whom science must ultimately look for its material support". Therefore, he organized sections on electrical, mechanical, civil, and mining engineering as well as on aeronautics, naval architecture, ballistics and radiotelegraphy. It is therefore not surprising that there was also a large section on statistics and actuarial science. The talk by *R.A. Fisher* "On a distribution yielding the error functions of several well-known statistics" may

be the first ICM talk giving results of historical significance in statistics. He discussed many topics appearing a year later in his well-known monograph “Statistical Methods for Research Workers”: the  $F$ -distribution, analysis of variance and multiple correlations.

One paper in the Toronto Proceedings shows how the lack of foundations of probability made it impossible to identify ill-defined problems.

*E.B. Wilson* discussed a problem from Keynes’s “Treatise on Probability”: If  $k$  successes have been observed in  $n$  trials, what is the probability that  $k'$  successes shall be observed in the next  $n'$  trials? (The problem is, in fact, much older, see [S2].)

We conclude: During the period 1897–1924, probability and statistics were still in rather bad shape. The main contributions by Ljapounov, Markov, Khintchine, Borel, Pólya, Lindeberg, Wiener, Lévy, K. Pearson, and others were not presented at the ICMs.

#### 1928–1936: The foundational years

The 1928 ICM at **Bologna** was the first at which a plenary lecture dealt with probability. *E. Borel* announced a talk “Le Calcul des Probabilités et les Sciences Exactes”. (As Borel was unable to appear, his manuscript was read by E. Cartan.) His point was that probability and statistics were no less important in the exact sciences than in biology and the social sciences. He named important applications: the theory of errors, actuarial mathematics, the kinetic theory of gas, astronomy, and radioactive phenomena. Certainly, the fact that an eminent mathematician like Borel devoted his plenary lecture to emphasize the importance of probability and statistics must have made quite an impression. On the other hand, the talk did not report any mathematical results. This may have appeared like a confirmation of the existing prejudices.

*De Finetti* presented the first systematic study of exchangeability at Bologna. *Hadamard* spoke on card shuffling and statistical mechanics (in addition to his invited talk on functional analysis). [For lack of space, further contributed talks must remain unmentioned.]

Among the shorter talks, that of *J. Neyman*, who explained the idea of likelihood ratio tests developed jointly with E. Pearson, and a talk by *R.A. Fisher* on maximum likelihood and  $\chi^2$ -tests seems particularly important.

One event at the Bologna ICM has recently been discussed in *Historia Mathematica* by E. Seneta [Se]: There was a heated discussion between *F.P. Cantelli* and his followers on one side and *E.E. Slutsky* on the other. Slutsky was attacked

since, in one of his articles, he had written that the first mathematician who *investigated* the strong law of large numbers was Emile Borel, and that it was then studied by Cantelli, Khinchine and others. The italians insisted that the first strong law was proved in 1917 by Cantelli [Ca].

Perhaps, one reason for the controversy was the fact that, in 1909, Borel [Bo] had studied dyadic expansions and not coin tossing, and the equivalence of the two problems was not clear at that time. More significantly, Borel’s proof contained two nontrivial gaps. He had proved the Borel-Cantelli lemma for independent events, but applied it to dependent events. His proof used the normal approximation of the binomial distribution as an exact formula, ignoring the need to estimate the difference between the binomial distribution and the normal distribution. Cantelli gave a correct argument which applied to general random variables with finite fourth moments. (As he did not assume  $\sigma$ -additivity, he could not assert almost sure convergence, but his result implied almost sure convergence in the presence of  $\sigma$ -additivity.)

Seneta regrets that Barone and Novikov [BN], in an important historical article on the history of the axiomatic foundation of probability, attribute almost all of the credit for the strong law to Borel and Hausdorff. However, he does not inform his readers what Hausdorff did. The fact is that Hausdorff, in 1914, in his famous book on “Mengenlehre” [H], gave the first rigorous proof of the theorem stated by Borel. Like Cantelli’s proof, given three years later, his argument was based on an estimate of the fourth moments and a Chebyshev-Markov type inequality, but it was restricted to dyadic expansions. Implicitly, it contained a proof of the dependent half of the Borel-Cantelli lemma in the special case he needed. Though he worked in the dyadic expansion setting, he called the theorem “a plausible extension of the law of large numbers to the infinite case”. It therefore seems clear that he was aware of the fact that the theorem had a probabilistic interpretation. Hausdorff, apparently a generous gentleman, did not mention the gaps in the proof of Borel and the fact that he gave an entirely different argument. He used the term “theorem of Borel”. In my view, the term “theorem of Borel-Hausdorff” would be better justified.

Cantelli quoted neither Borel nor Hausdorff. Perhaps, Slutsky and Cantelli would have avoided their dispute if they had been aware of the work of Hausdorff.

At **Zurich** (1932), *Serge Bernstein* gave a plenary talk “Sur les liaisons entre quantités aléatoires”. He reported about numerous new results both by himself and by other Russian probabilists. For example, he presented a central



limit theorem under asymptotic independence conditions, and he discussed exchangeable sequences of events, Markov chains and Brownian motion. He also spoke on Kolmogorov's results concerning continuous time Markov processes and the Fokker-Planck equation.

*Richard von Mises* gave an invited talk in the section on probability, statistics and actuarial mathematics. He first discussed his axiomatics, admitting that he might not yet have found the final formulation. Then he, too, dealt with several of the recent results of Khintchine, Kolmogorov and others such as the law of the iterated logarithm and the strong law of large numbers.

In **Oslo** (1936) *Maurice Fréchet* devoted a portion of his plenary lecture "Mélanges mathématiques" to topics in probability. In addition to his own work, he discussed progress by Hadamard, Hostinský, Doeblin and Kolmogorov. He also stressed the fact that by now probability was equally exact as other branches of mathematics, and that many mathematical subjects (integral equations, group theory, etc.) were used as tools in probability. Another important talk in Oslo was the one given by *W. Feller* on stochastic processes. He discussed his well-known existence and uniqueness theorems for Markov processes with jumps. *Harald Cramér* announced his asymptotic expansions and estimates related to the central limit theorem.

Perhaps one can characterize the period between the ICMs at Bologna and Oslo as follows: The growing importance and increased rigor of probability and statistics became obvious. On the other hand, probability was not yet fully accepted. Some of the principal contributors were ignored. For example, the important work of Paul Lévy on the central limit problem and on characteristic functions found no mention. We know from the autobiography of Paul Lévy, that he had a very different point of view from that of Borel. He felt that probability had to be based on rigorous analysis, while Borel felt that it should be studied from the point of view of applications. Thus, Borel may actually have delayed the acknowledgement of probability as a proper mathematical discipline. The work of Kolmogorov and Khintchine was only reported by others. Other names that I missed are Steinhaus, Pollaczek, Marcinkiewicz, and Zygmund.

#### 1950–now The flourishing years

Due to the second world war, it took fourteen years before the next ICM took place in **Cambridge, Massachusetts** in 1950. During this time there had been tremendous progress in probability, statistics and related fields, and the organizers managed to present an impressive overview of this develop-

ment. In spite of the fact that – because of the cold war – the Russian mathematicians were not allowed to go to America, the list of speakers reads like a "Who's Who in Probability and Statistics".

There were three pertinent plenary lectures, including the first one devoted to mathematical statistics. *Abraham Wald* spoke on: "Basic ideas of a general theory of statistical decision rules". Statistics was presented as the theory which had to compare decision functions and to select those for which the risk function was minimal in a suitable sense. This theory certainly appealed to mathematicians in that clear optimization questions were asked. It unified testing and estimation problems. Wald discussed also the sequential probability ratio test, which had been kept secret during the war because of its practical value in quality control. Since Wald died in December 1950, this must have been one of his last talks.

*S. Kakutani* gave a plenary lecture on "Ergodic Theory". His talk was a survey starting with the ergodic theorems of von Neumann and Birkhoff, and continuing with the work of Yosida-Kakutani and with Wiener's multiparameter ergodic theorems. Moreover, he discussed the analogies with the martingale convergence theorems of Doob, Lévy, and Ville. In my view such a broad historical view must have been very attractive not only to specialists.

*N. Wiener* spoke on prediction theory, presenting his results obtained during the war independently of Kolmogorov. (He had given much attention to the practical problem of finding the prediction explicitly in a form useful for electrical engineering.)

In addition to these plenary lectures, there was a section on probability, statistics and related fields chaired by *Doob*, and a Conference on Applied Mathematics chaired by *J. von Neumann*, also offering some probability. In the Doob section the principal invited talks were:

- R.C. Bose*: Mathematics of factorial designs
- P. Lévy*: Processus à la fois stationnaires et Markoviens pour les systèmes ayant une infinité dénombrable d'états possibles
- S.N. Roy*: Some aspects of statistical inference.

But also the list of speakers for the contributed papers was very impressive. It included *Wolfowitz, Robbins, Shapley, Tukey, Chung, Yosida* and *ergström*.

In the Conference chaired by von Neumann, there were three talks related to probability:

*C.E. Shannon:* Some topics in information theory  
*S.M. Ulam:* Random processes and transformations  
*W. Feller:* Some recent trends in the mathematical theory of diffusion.

Certainly the last of these was a highlight. Feller explained the ties between classical boundary problems for the heat equation and diffusion processes. He also spoke on Ito's theory of stochastic integration. This was possibly the first time that these topics were presented to a broad mathematical public.

The ICM was preceded by the important *Second Berkeley Symposium on Probability and Statistics*. Within one summer the explosion of progress in probability and statistics was demonstrated at two major international conferences. After these events no serious mathematician could argue anymore that probability and statistics were not important branches of mathematics.

By 1954, at the time of the ICM in **Amsterdam**, *Kolmogorov* was a legend in probability, who had, for about thirty years, produced numerous works of historical significance. He was now for the first time invited to deliver a plenary address at an ICM: But at this time he was working primarily on dynamical systems, initiating his share of the Kolmogorov–Arnold–Moser–theory. He decided to speak on dynamical systems. Also, later, he never gave an ICM talk on probability.

But by now probability and, to a lesser degree, statistics had become a significant part of the ICM–programs. For this reason, I can give only kind of a list of the subsequent main contributors with some limited comments.

*Jerzy Neyman* gave a plenary address: “Current problems of mathematical statistics”. His aim was to give a general characterization of mathematical statistics understood as an independent mathematical discipline, to treat its contacts with the experimental sciences, and to indicate several directions of research. He discussed the Neyman–Pearson theory of testing hypothesis, models of clustering, identifiability of models, efficiency and superefficiency, sufficient statistics and uniformly most powerful tests.

*J.L. Doob* gave an address on “Interrelations between Brownian motion and potential theory” presenting the connections between diffusion processes and parabolic differential equations, martingales and submartingales, the material of his key paper in the 1954 AMS Transactions.

*David Blackwell* spoke on “Controlled random walks”. He explained his analog of the minimax

theorem for vector payoffs which now plays an important role in the theory of repeated games.

There was, again, a *Symposium on Stochastic Processes* linked to the ICM. Doob spoke on “Present state and future prospects of stochastic process theory”, indicating important directions of future research. R.M. Fortet spoke about joint work with E. Mourier on probability in Banach spaces. Paul Lévy presented the “Processus semi-Markoviens” introduced independently by W.L. Smith. Other well-known speakers included A. Rényi (on order statistics and on axiomatics), D.G. Kendall, G.E.H. Reuter, E. Hille, and D.V. Lindley.

In **Edinburgh** (1958), *Willy Feller* gave a plenary talk “Some new connections between probability and classical analysis”. Starting with an elementary classical setting he gave a scholarly motivation of Martin boundaries.

*B.V. Gnedenko* gave a survey on “Limit theorems in probability theory” including topics like fluctuation theory, local limit theorems, sums of functions of Markov chains, Berry–Esseen type estimates. In view of the broad scope of the talk few results were made explicit.

*K.L. Chung* spoke on “Continuous parameter Markov chains”, indicating many open problems. *A. Rényi* gave a talk on probabilistic methods in number theory, treating the normal approximation for the number of prime factors, the large sieve of Linnik, and continued fractions. On the statistics side, *Leonard J. Savage* spoke on “Recent tendencies in the foundations of statistics” stressing the economic point of view and the subjective point of view.

In **Stockholm** (1962) *E.B. Dynkin* presented a plenary lecture “Markov processes and problems in analysis”. He treated the characteristic operator of a Markov process, the notion of additive functional, and various transformations of Markov processes. Moreover he discussed problems related to the class of all nonnegative harmonic functions.

*G.A. Hunt* lectured on “Transformations of Markov processes”. He described a direct construction of the entrance boundary for a Markov process on a locally compact space. Ya.G. Sinai spoke on “Probabilistic ideas in ergodic theory”. He treated entropy of measure preserving transformations and  $K$ –systems. (The principal result, the weak isomorphism theorem for Bernoulli shifts remained unclear for many years.)

*K. Itô* spoke on Brownian motion on Riemannian manifolds. There were shorter communications by *Furstenberg*, *Hoeffding* and *Linnik*.

At **Moscow** (1966), there were two plenary lectures of interest to us: *Richard Bellman* talked on

“Dynamic programming and modern control theory”. He explained the basic idea of dynamic programming, and gave a brief outlook at the stochastic case hinting at sequential analysis and prediction theory. Most of his talk though, was not related to probability. *Charles M. Stein* lectured on “Some recent developments in mathematical statistics”. His talk treated admissible estimators (including his paradox), invariance of decision procedures, similar tests, and large sample theory.

The main talks in the probability section were given by *V. Strassen* (“The theorem of the iterated logarithm”) and by *A.A. Borovkov* (“On conditions of convergence of diffusion processes and asymptotic methods of queuing theory”). *Strassen* started with a historical survey on the work of Khintchine, Kolmogorov–Petrovsky–Erdős and reported his invariance principle and his precise studies about the instant of last exceedence of Brownian motion of suitable functions  $\varphi(t)$ , which he had recently presented at the 5<sup>th</sup> Berkeley Symposium.

At **Nice** (1970), the principal talks in the section on statistics were those by *J. Kiefer*, *Yu.V. Linnik*, *L.N. Bolshev* and *J. Wolfowitz*. *J. Kiefer* gave a survey on 20 years of work on optimum experimental designs starting with Mood, Elfving, Chernoff and leading to his own work. *Linnik* spoke on sequential estimation. The talk by *Bolshev* appears to me as a particularly good example of exposition to nonspecialists. He spoke on the empirical Bayes approach, starting with simple examples, motivating the background and illustrating the traps. *Wolfowitz* presented the theory of maximum probability estimators, which he had developed with *Lionel Weiss*.

The section on probability included talks by *D.L. Burkholder*, *R.V. Chacon*, *A. Dvoretzky*, *D. Ornstein*, *V.V. Sazonov* and *M. Sion*. *Burkholder* presented his inequalities for operators on martingales, a subject of great importance in martingale theory. *Chacon* spoke on “Representation of measure transformation”, a topic in ergodic theory. *Dvoretzky* discussed his work on the central limit theorem for dependent random variables. The results of *Ornstein* on “Entropy is enough to classify Bernoulli shifts but not  $K$ -automorphisms” remain a celebrated breakthrough in ergodic theory, now included in many books. *Sazonov* spoke on the speed of convergence in the central limit theorem in the multidimensional case.

In addition to the probability section, there was a section on potential theory and Markov processes. Many of these talks treated the boundary theory of Markov processes. The speakers included *K.L. Chung*, *E.B. Dynkin*, *B. Fuglede*, *R.K. Gettoor*, *H. Kesten*, *G. Mokobodski*, *A.N. Shiryayev* and *T.*

*Watanabe*. Surely, the talk by *Kesten* on “Hitting of sets by processes with stationary independent increments” was a highlight of the section in that it treated hard problems which were very concrete and could be understood by nonspecialists.

*Heinz Bauer’s* plenary talk at **Vancouver** (1974) on potential theory included some probabilistic aspects, but they were not the main theme. Compared to the preceding ICM, the section on probability and statistics was reduced. *R.V. Ambarzumian* spoke on “The solution of the Buffon–Sylvester problem and stereology”. It seems that this was the first ICM–talk on stochastic geometry, the study of random sets for which the law is invariant under certain groups of transformations. Stereology deals with inference on the size and shapes of bodies in 3–dimensional space, based on random plane sections. *R.M. Dudley* talked on Gaussian processes, giving conditions for sample continuity in terms of metric entropy. He also gave conditions for central limit theorems in  $B$ -spaces. *J. Neveu* presented results of Brunel, Revuz, Métivier and, last but not least, himself on potential theory for recurrent Markov processes. *C.R. Rao* discussed the characterization of distributions through properties of sample statistics. *Frank Spitzer* gave a survey of the work of Dobrushin, Harris, Holley, Liggett, himself and others on Markov random fields and infinite Gibbs states. This area of research has flourished since. *V. Statulevicius* spoke on limit theorems for dependent random variables, *B. Walsh* on harmonic spaces, and *J. Walsh* on stochastic integrals in the plane. Finally, *Peter J. Huber* gave a very well motivated introduction to basic questions in robust statistics, starting with qualitative requirements as introduced by F. Hampel, and leading to the generalized Neyman–Pearson lemma for capacities due to Huber and Strassen.

At **Helsinki** (1978), again, the organizers had to cope with political difficulties. Not all invited speakers from the Soviet union were allowed to attend the congress, see [A]. For example, *R. Dobrushin* did not give his announced plenary lecture on “Classical statistical mechanics as a branch of probability”. On the other hand, *A.N. Shiryayev* was able to present his plenary address on “Absolute continuity and singularity of probability measures in functional spaces”.

In the section on probability and statistics, *A.A. Borovkov*, *A.D. Wentzell* and *S.R. Varadhan* treated various problems on large deviations. Notably, Varadhan’s results have had a lot of impact. *C. Dellacherie* gave an overview of the theory of stochastic integrals. *M. Fukushima* spoke on Dirichlet spaces and additive functionals of finite energy. *P. Révész* presented his joint work with Erdős on limit theorems for the length of the longest head

run in coin tossing, and related problems. In the economics section, the talk of *Robert J. Aumann* on recent developments in the theory of Shapley value certainly was of interest to probabilists. It seems that there was no invited talk on statistics.

Two of the plenary lectures at **Warsaw** (1983) were related to probability. *Wendell H. Fleming* talked on “Optimal control of Markov processes”. He explained what optimal control theory is about and described the key methods. He also sketched some cases in which solutions exist, without, however, emphasizing particular results. *Aleksander Pelczyński* spoke on “Structural theory of Banach spaces and its interplay with analysis and probability”. He mainly explained what the modern theory of Banach spaces is about, just barely touching probability.

*David Brillinger* gave a talk on statistical inference for random processes, discussing the whole inferential process; from the data collection and the modelling, through the inferences themselves. This time, there was even a second talk on statistics. *D.M. Chibisov* discussed “Asymptotic expansions and deficiencies of tests”.

*H. Kesten* gave an introduction to bond percolation on the lattice and the determination of the critical percolation probability. *Paul Malliavin* spoke on his calculus, *Petr Mandl* on self-optimizing control of Markov processes and Markov potential theory, *Daniel W. Stroock* on stochastic analysis and certain partial differential operators, *S. Watanabe* on “Excursion point processes and diffusions”, and *J. Zabczyk* on stopping problems for continuous time Markov processes in stochastic control theory. On the whole, stochastic analysis played a rather dominant role.

In 1986, the ICM was organized in **Berkeley**. As a plenary speaker, *A.V. Skorohod* spoke on “Random processes in infinite dimensional spaces”. There were seven invited talks in probability/statistics sections. *T. Arak* described a class of Markov fields with finite range. *M.H.A. Davis* gave a careful survey on nonlinear filtering theory. *A.S. Holevo* spoke on quantum probability, and *H. Kunita* on stochastic flows and stochastic partial differential equations. The talk of *T.M. Liggett* was on “Spatial stochastic growth models – survival and critical behaviour”. In this area, the questions have a lot of intuitive appeal, so that also non-probabilists must have been able to get a good idea of the field. *G.C. Papanicolaou* dealt with “Wave propagation and heat conduction in random media”. The only statistics talk was presented by *C.J. Stone*. He spoke on a nonparametric setting with unknown smooth densities, giving an asymptotic theory on reducing the nonparametric setting to a

parametric one with finite-dimensional approximations.

The spectrum of the probability/statistics talks at the **Kyoto**–ICM in 1990 was quite broad: *Persi Diaconis* spoke on “Applications of group representations to statistical problems”. He discussed the handling of data related to a finite group acting on a finite set, employing a splitting of the space of functions on that set into components from invariant subspaces. Examples arise for instance in time series and the modern analysis of variance. The relevance for applications became quite clear from his exposition.

*Martin T. Barlow* introduced ideas on “Random walks and diffusions on fractals”. The background is heat conduction on fractal sets, and, more generally, second order partial differential equations on fractal spaces. One constructs random walks converging to a diffusion process on the set.

*Richard Durrett* gave a survey on stochastic models of growth and competition like the competition of plant species or the spread of an epidemic. Examples are contact processes, multiple contact processes and more hierarchical models like bushes and trees in the plane.

*Hillel Furstenberg* gave an overview of ergodic theoretic methods in Ramsey theory. He treated for example joint work with Katznelson on long arithmetic progressions (Szemerédi type theorems) and coloring theorems.

*Lucien Le Cam* contributed an article on “Recent results in the asymptotic theory of statistical estimation”, treating for example the Hájek–Le Cam asymptotic minimax theorem.

Other talks were given by *S. Kotani* on random Schrödinger operators, *S. Kusuoka* on “De Rham cohomology of Wiener–Riemannian manifolds”, *S.A. Molchanov* on “Localization and intermittency”. *Marc Yor* discussed the laws of some Brownian functionals such as Paul Lévy’s stochastic area of planar Brownian motion.

I think it is clear from these descriptions that probability and statistics regularly contributed in a rather profound and rich way to the programs of the ICMs since 1950. The mathematical level was very high. However, this does not necessarily imply that the aims proposed at the outset were well achieved.

First of all, it seems important to me to put more weight on applied work. One reason, of course, is that we need to explain to the public and to various institutions that there is some use for what we are doing. Another, possibly more important reason

is that we must make it clear to ourselves that good motivation is an essential ingredient of good mathematics. If a mathematical result is hard, this does not automatically imply that the result is worthwhile. I hope that I am not misunderstood: I am very much for fundamental research in pure mathematics. We must understand the structure of the leading notions. Routine applications of standard methods are not good applied mathematics. But surely a man like Claude Shannon, creating information theory, did more for mathematics than some of the Field's medalists. It seems to me that virtually all the Field's medalists view themselves as pure mathematicians. This exclusive admiration of pure mathematics is very questionable. Surely, it is not in the spirit of J.C. Fields, although he was a pure mathematician himself. The feeling of doing something which is ultimately useless is quite widespread among mathematicians. Therefore, we need examples of good applied work. We must re-examine our value system. Mathematical power is not the only ingredient needed to do good applied work. Creating the Neyman–Pearson work was not a question of mathematical power. However, it required careful analysis and sound judgement. The first difficulty was to ask the right question. In the end, their work led to an understanding of some of the principal mathematical notions affecting our daily life.

Another example: stochastic differential equations or martingales are now used in many applied fields, not just by mathematicians. Certain new notions and theories have more impact than the solution of some old hard problems. I gladly agree that the recent astounding progress with many classical problems deserves our highest admiration. But there should be an effort to recognize also other breakthroughs. Perhaps, more balance has been achieved recently in Zurich.

A second point I wish to make is that, even in the plenary talks, many speakers aim at impressing the audience rather than at explaining their problems, motivations and ideas. Reading the Proceedings of the ICMs, I sometimes had difficulties even with talks in probability. If I have a hard time, what will be the situation of mathematicians working in other fields? If I listen to a talk in another field, I am frequently lost quite rapidly. If the purpose of the ICMs is the communication between different branches of mathematics, the organizers must put great pressure on the speakers to make their talks simple to understand even for colleagues working in entirely different fields. They should also make it clear to the speakers that a survey including some historical background is preferable to an unpublished special new result, even if this result is a very good one. ICMs serve a different purpose

from specialized meetings. In view of this purpose, I would prefer a speaker who explains the work of some other mathematicians well to a speaker who solved a big problem but is unable to communicate his ideas. I admit that it may be a great experience to see a famous mathematician on the platform even if his talk is difficult to follow. But it is never nice to listen to a bad talk. All too often an extremely high proportion of an audience is lost very early into a talk. The selection of the speakers need not primarily be a method of naming the heroes of our field. The interest of the audience deserves priority.

A rather obvious observation is that statistics has been grossly underrepresented at the ICMs. It may not be possible to attract large numbers of mathematical statisticians to the ICMs. They find more stimulation valuable to them in statistics conferences. But mathematicians should learn something about fields in which many of their students finally work. If we want to preserve some unity of mathematics, we should strive to prevent branches like statistics, operations research, actuarial mathematics from drifting completely away from other branches of mathematics. Otherwise, they may soon not be served by us any more. A good way to attract more specialized groups periodically has been to organize satellite conferences.

Finally, it may be of interest to ask which topics in probability and statistics have been neglected. This is a very subjective matter. It seems to me that the coverage in probability has been quite broad. Perhaps, some topics like boundary theory or stochastic analysis received more than their fair share at some of the meetings. Other topics like renewal theory, branching processes, queuing, point processes, information theory, random search, ruin theory, game theory, multiparameter processes, strong approximations of random walks, or probabilistic algorithms received little attention. (Sometimes, special advanced results from some of these areas may have been treated, but a survey might have been more appropriate for a general audience.)

In statistics, topics like sequential analysis, non-parametric statistics, empirical processes, survey sampling, multivariate analysis, bootstrap, stochastic approximation have been largely absent. Perhaps, we will see some of these topics next time.

I would have liked to compare the results presented at the ICMs with those presented in some history of probability and statistics of this century. Unfortunately, this history has to be written yet. There are, however, some articles treating parts of the history and personal recollections, which I have consulted. The interested reader is referred to [C], [Do], [G], [L1], [L2], [S1], and [Sh].

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## 10. Conferences 1999

### ISI'99

**52nd Biennial Session ISI**  
**August 11–18, 1999**  
**Helsinki (Finland)**

Chair of the BS programme committee is Richard Gill. He provides first information:

Bernoulli Society has been allocated a quota of 12 of the 80+ scientific meetings during the 52 ISI SESSION at Helsinki 1999. As well as this we will be co-organising a number of meetings with sister sections of ISI, and with ISI itself; and finally many meetings proposed by ISI, its sections, and invited sister organisations, will be of great interest to Bernoulli Society members.

### Satellite Meetings

**Earth and Space Sciences**  
**C(PS)<sup>2</sup> Meeting**  
**Athens (Greece)**

Local Organizer:  
Harry Pavlopoulos

Chair of the Programme Committee:

Abdul El-Shaarawi  
National Water Research Institute  
Box 5050  
Burlington ONL7R 4A6                      fax: +905 336 4989  
Canada    email: u101@cs.cciw.ca

We promise meetings on data-mining, neural networks, Lévy processes, the central limit theorem into the 21st century, statistics and forestry, statistical advances in object recognition, non-linear time series in physics, statistical biomedical imaging, probability on trees, genetics, smoothing, measurement error, causality, ...

Put Helsinki in your diary NOW!  
And look out for satellite meetings too.

**6th Tartu Conference on**  
**Multivariate Statistics**  
**August 19-23, 1999**  
**Tartu (Estonia)**

For more information please contact:

Institute of Mathematical Statistics  
University of Tartu  
J. Liivi 2    phone: +372 7 465453  
Tartu EE2400    fax: +372 7 433509  
Estonia    email: etiit@ut.ee

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### SPA'99

**26th International Conference on Stochastic**  
**Processes and their Applications**  
**June 14–18, 1999**  
**Beijing (The People's Republic of China)**

SPA'99 will be organized by the Institute of Applied Mathematics, Academia Sinica, under the auspices of the Chinese Society for Probability and Statistics and the Bernoulli Society.

More information will be provided in a next issue of Bernoulli News.

Chair of the Programme Committee:

Zhi-Ming MA  
Institute of Applied Mathematics  
Academia Sinica  
P.O.Box 2734    Fax: +86-10-62541689  
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## 12. Summary of Forthcoming BS Events

- **Recent Advances in Statistics and Probability**  
**Calcutta (India), December 9, 1997– January, 1, 1998**  
**Venue:** Indian Statistical Institute, Calcutta  
**Information:** Ayanendranath Basu, Computer Science Unit, Indian Statistical Institute, 203 B. T. Road, Calcutta 700 035, India. Fax: +91 33 556 6680, +91 33 556 6925, email: isibern@isical.ernet.in
- **International Conference on Probability and Its Applications**  
**Taejon (Korea), February 24–26, 1998**  
**Venue:** Korea Advanced Institute of Science and Technology (KAIST) in Taejon  
**Information:** B. D. Choi, Department of Mathematics, Korea Advanced Institute of Science and Technology, Taejon. Fax: +82 42 869 8194, emails: cam@queue.kaist.ac.kr and cam@math.kaist.ac.kr
- **SPA'98**  
**25th International Conference on Stochastic Processes and their Applications**  
**Corvallis, Oregon (USA), July 5–11, 1998**  
**Venue:** Oregon State University, Corvallis  
**Information:** SPA'98, Department of Mathematics, Oregon State University, Corvallis, OR 97331, USA. Fax: +1 503 737 0515, email: spa98@math.orst.edu, <http://www.orst.edu/dept.math.docs/spa98.html>
- **22nd EMS and 7th Vilnius Conference**  
**Vilnius (Lithuania), August 12–18, 1998**  
**Information:** V. Statulevicius, Institute of Mathematics & Informatics, 4, Akademijos st., Vilnius 232600 Lithuania. Fax: +370 2 729209, email: conf@ktl.mii.lt
- **Prague Stochastics'98**  
**6th Prague Symposium on Asymptotic Statistics & 13th Prague Conference on Information Theory, Statistical Decision Functions and Random Processes**  
**Prague (Czech Republic), August 23–28, 1998.**  
**Information:** Martin Janžura, UTIA AVČR, P.O.Box 18, 182 08 Prague, Czech Republic. Fax: +420 2 688 4702, email: stoch98@utia.cas.cz, <http://www.utia.cas.cz/stoch98.html>.
- **VII CLAPEM**  
**7th Latin American Congress of Probability and Mathematical Statistics**  
**Cordoba (Argentina), Fall 1998**  
**Venue:** National University of Cordoba  
**Information:** Raul Martinez. Email: jmartine@mate.uncor.edu
- **ISI'99**  
**52nd Biennial Session ISI**  
**Helsinki (Finland), August 11–18, 1999**  
**Information:** ISI Permanent Office, 428 Prinses Beatrixlaan, P.O.Box 950, 2270 AZ Voorburg, The Netherlands. Fax: +31 70 386 0025, email: isi@cs.vu.nl  
**Chair of the Bernoulli Society Programme Committee:** Richard Gill, Department of Mathematics, University of Utrecht, Utrecht 3508, The Netherlands. Fax: +31 30 518394, email: gill@math.ruu.nl  
**Satellite meetings:**
  - **Earth and Space Sciences C(PS)<sup>2</sup> Meeting**  
**Athens (Greece).**  
**Chair of the Programme Committee:** Abdul El-Shaarawi, National Water Research Institute, Box 5050, Burlington ONL7R 4A6, Canada. Email: u101@cs.cciw.ca

- **6th Tartu Conference on Multivariate Analysis**  
**Tartu (Estonia), August 19–23, 1999**  
**Information:** Institute of Mathematical Statistics, University of Tartu, J.Liivi 2, Tartu EE2400, Estonia. Fax: +372 7 433509, email: etiit@ut.ee
  
- **SPA '99**  
**26th International Conference on Stochastic Processes and their Applications**  
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- **5th World Congress 2000**  
**Guanajuato (Mexico)**  
**May 15–21, 2000**  
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