



IAMG

Newsletter

No. 58 May 1999

Official Newsletter of the International Association for Mathematical Geology

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CALL FOR PROPOSALS: IAMG2002

Although the year 2002 seems to be distant in the next millennium, it is not too late to start looking for individuals interested in organizing the IAMG2002 Annual Conference.

Proposals need to specify the names of the organizers and institutions supporting the event, place and time of the conference, tentative technical programs, mechanism for distribution of eventual profits, and a budget to justify the registration fee and provide reasonable assurance that the conference will be a success both technically and financially. For more details, please read the guidelines in the Internet.

The deadline to submit proposals is February 15, 2000. The conference is expected to take place some time between June and November, 2002. From past experience, in general the first year is spent in consolidation of financial support once the organizers receive official confirmation from IAMG that they indeed have the site. Posters and a first circular should be distributed no later than one year before the conference. The most critical time is the reception of abstracts, traditionally set for the end of January of the year of the conference, January 2002 in this case, as the number of abstracts pretty much defines the number of participants, which historically has been approximately 1.3 times the number of abstracts received. The Organizing Committee reviews the abstracts, and about 45 days later sends notices of acceptance or rejection to corresponding authors, who must send an extended abstract during May.

The extended abstracts are put together to make the proceedings of the conference, which have been ready for distribution when the participants arrive at the conference. The IAMG conferences traditionally have had three main parts: short

Changes, moves, promotions. Jef Caers has moved to California. M. T. Schafmeister has a new position at the Uni Greifswald, T. Shoji is back at a different institute..... This is a fast changing world, and for us oldsters it appears to be rotating faster. It seems that geomathematicians or mathematical geologists are no less movable than petroleum geologists who used to have the most unsteady profession of all.

Note the origin of our award winners this year (p. 9) — not one has stayed in the country where s/he was born. Bonham-Carter moved from Britain to Canada, Armstrong from Australia to France,

Goovaert from Belgium to the U.S. and Rollinson spent several years in Africa. And look at John Harbaugh's students at Stanford (p. 10), they came from all over the world — China, Germany, France, Brazil, Mexico, to name just a few. There has been plenty of transatlantic traffic and lately even more transpacific as scientists seek employment in places better suited for their skills or interests.

The IAMG membership roster is continuously changing as Dan Tetzlaff, our treasurer, can testify. As Newsletter editor, having to ship out each new issue, I can see some of these changes. Looking over the last four years, approximately twenty percent of our members have changed addresses. Provided they have let Dan know in time, they got Newsletter at their new address; of course some folks didn't and had to be tracked by Dan. There are at least half a dozen Newsletters that get returned to me for lack of a valid address each time. So let us know when you move (and share with the Newsletter readers if you got a new, exciting job).

Harald S. Poelchau

courses, presentation of papers, and excursions. The conference is also used to schedule Council meetings, committee meetings, and presentation of awards during a banquet. Costs are almost equally divided into preparation of the event and technical facilities, preparation of the proceedings, and cost of the banquet.

Nothing is written in stone, however. Council will consider any reasonable variants that bidders may want to include in their proposals. The description above is only for reference, although the model has been followed without significant variants since 1997. Please discuss with your colleagues the possibility and challenge to host an IAMG conference. All IAMG conferences have been profitable and the organizers have been keeping an average of 70% of the surplus.

Please send bids to President Ricardo Olea



International Association for Mathematical Geology

Officers

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PRESIDENT'S FORUM

Nothing is perfect, everything can be improved.

I consider that although the 1996-2000 Council members have been extraordinarily active, primarily we have been consolidating the numerous activities already in existence. We have not made novel contributions to expand the opportunities offered by the Association. I believe that the IAMG will better serve its members and fulfill its mission by starting a Lecture Series and Student Grant Program. Given the relevance of the initiatives, I consider that an open discussion is appropriate, for which I am first presenting the initiatives in this column instead of going directly to Council.

Let me start with some history to put things in perspective and highlight past accomplishments that make it possible that today we can even think about continuing to expand our activities. After a start from scratch in 1968, in retrospect, the most transcendental achievements of the first Council were to start a newsletter and to approve the launching of the Journal of the *International Association for Mathematical Geology* in 1969, which, for easier reference, simply changed to *Mathematical Geology* in 1986.

In the early 1970s Pergamon decided to take advantage of the proliferation of computers to start several "Computers & ..." journals. **Daniel F. Merriam**, our second Secretary General at the time, was contacted to start *Computers & Geosciences*, which finally went into circulation in 1975, while Dan was still in charge of our oldest journal, of which he is also its founding editor. He also started informal annual meetings called Geochautauquas in October of 1972. The second Council is responsible for beginning our system of awards proposing the William Christian Krumbein Medal, which was approved by the General Assembly in 1976. The third Council expanded the system of awards by instituting the President's Prize, approved by the 1980 General Assembly and renamed in 1996 as the Andrei Vistelius Prize, as originally intended. Regulations in Vistelius's native Soviet Union forbade him to receive honors while still alive.

By the time the fifth Council took power in 1984, *Computers & Geosciences* was in its tenth year, yet the Association had never received any royalties from Pergamon Press. It took President **John Davis** almost his entire term of five years to resolve with the publishers issues dealing primarily with who owned the journal. A memorandum of agreement was finally signed in January of 1989 in almost identical terms to those at the time in effect with Plenum for *Mathematical Geology*. Considering that financially *Computers & Geosciences* has always done better than *Mathematical Geology*, royalties received from *Computers & Geosciences* immediately turned into an important new source of revenue, a situation that continues to this day. When the Association celebrated its 20 years in 1988, its total assets were US\$85,000. It took a little over two years to double our equity and almost 11 years later it has increased approximately by a factor of six.

In 1987 fifth Secretary General **Richard "Dick" McCammon** became founding editor of the monograph series *Studies in Mathematical Geology* that the Association has been publishing through Oxford University Press. In 1992, as President of the Sixth Council, Dick became the founding editor of our youngest journal, *Nonrenewable Resources*, relabeled this year as *Natural Resources Research*.

It goes to the credit of the 1992-1996 Council to upgrade the Geochautauquas into the more formal Annual Conferences of today started in 1994 at Mont Tremblant, Canada. The previous Council also expanded the award system to include the Felix Chayes Prize and the John Griffiths Award, which the General Assembly approved in 1996.

As you can see, the Association has been successfully expanding in incremental steps as the opportunities arose. So, what are the unfulfilled needs by 1999?

From my experience as President of the organization, I think that the desire for live interaction among geomathematicians is one of the most pressing problems affecting the most individuals, both members and non-members of IAMG. Attending conferences remains the primary way to interact and exchange ideas personally with leading mathematical geologists and other colleagues sharing common interests. Realistically, at the constantly increasing prices of today, it is difficult to attend any international conference without spending at least the equivalent of about US\$1,500. Several geomathematicians still have the luxury of being able to travel to technical meetings with all expenses covered by their employers. Increasingly, however, we hear of budget cuts and restrictions, which contribute to make traveling more difficult to finance.

There are at least three groups of geomathematicians for whom traveling has been perennially close to impossible. One group is the hundreds of geomathematicians in countries going through economic hardships or having inconvertible currencies, which usually occurs simultaneously. Then

we have self-employed geomathematicians or consultants, who despite some help from the tax laws in some countries, have to pay from their own pockets to attend conferences and on top of that, they are devoid of income during the time that they are not working. Finally, we have those numerous students, full of dreams, but commonly short of cash to go anywhere without support. Year after year, organizers of our conferences are confronted with requests from geomathematicians from around the world who would like to present accepted papers, but have to withdraw because of lack of domestic support or support from IAMG. The reader can realize that it is not feasible for the Association financially to assist everyone who would like to participate in our conferences without going bankrupt in a short time.

A person must be really interested in mathematical geology to travel thousands of miles and expend money to attend one of our conferences. Thirty years after the foundation of an association especially devoted to promote mathematical geology, IAMG is far from finished to convince earth scientists about the advantages to learn and apply mathematical geology. Bringing experts to the job site instead of continuing with the unilateral practice to attend conferences to meet distinguished speakers should have the benefit to increase the interest in mathematical geology of those who are not willing to travel halfway around the globe to know more about mathematical geology, but who may be willing to go across the street to hear what has been announced as an interesting and challenging speech.

I believe that to solve the isolation of some geomathematicians, better promote mathematical geology, and provide the means to attract new members, it is time to start a **Lecture Series**. Despite advances in electronic communication, there is the understandable interest from many colleagues to interact live with leaders in their fields. Full financing for just, say, 10 individuals from around the world to attend our conferences may cost as much as US\$15,000. While that is a large amount of money, helping only 10 individuals is not very significant. Conceivably US\$15,000 can be used more fairly and efficiently to finance lectures that could be attended by hundreds of colleagues. US\$15,000 is by no means a magical number, but one that, if approved, as shown in page 5, the Association could add to the budget and still show an excess of revenue over expenses.

Several other organizations have different formats or mixtures of formats for Lecture Series that are basically variants of two extreme cases: 1) a centralized system in which the parent organization — IAMG in our case — selects speakers, sites, and dates, or 2) the parent organization prepares a list of potential speakers and the host group selects the speaker and schedules the lecture. Financing is also quite variable, ranging from all direct costs paid by the parent organization to free lectures for the host group. If the 1996-2000 Council approves this initiative to have an IAMG Lecture Series, it will be either up to the Council or to the committee that will have to be appointed to make it a reality, to decide these fundamental aspects and other equally important details.

A second pressing need relates to the students. A common problem of professional organizations these days is to attract students and keep them as members. Apparently, some students join IAMG under the influence of an adviser, but once they go into professional life, they do not feel the need to continue membership. A simpler way to promote mathematical geology and to increase loyalty to the Association among young members would be to start a **Student Grant Program** to support the work of graduate students. IAMG may create a Student Grant Committee that once a year receives applications, selects the best two or three proposals, and awards the winners in the order of US\$2,000 each that would be used toward completion of research.

Both initiatives have pros and cons and eventual implementation will be demanding, particularly the Lecture Series. Yet, if the Association is willing to better serve its members and fulfill its mission, it is my honest impression that the creation of a Lecture Series and a Student Grant Program are among the activities that best address real needs in an organization already extraordinarily active for its size that is reaching the limit of its capacity to offer new programs without a significant growth in membership. Equally important is the fact that we have the funds to support such expansion of our activities.

On page 2 of this Newsletter you will find addresses for all members of Council. Please write to your favorite Council members—preferably by e-mail—to express your mixed feelings or opinions against or in favor of start a Lectures Series and Student Grant Program, so that when Council starts discussing these two initiatives this month, Council members will not only speak for themselves but also for the membership at large. Approval of any of the initiatives will require creation of a committee to implement and administer each new program. If you are willing to be part of any of the two or both, please let Council know of your willingness to serve as member of these new committees.

Ricardo Olea

Association Business

Membership Committee

Chairman **Jan Harff** has now put together a powerful team to help him increase IAMG membership and promote the Association at meetings and conferences. The members of his team are:

Managers:

Advertisement: Graeme Bonham-Carter, Canada
 Allies: Maria-Theresia Schafmeister, Germany
 IGC: Hernani Chaves, Brazil
 Industry: Olivier Dubrulle, France, and Mario Rossi, USA
 Youth: Gert Weltje, Netherlands

National Representatives:

Australia:	Cedric Griffiths
Austria:	Eckart Wallbrecher
Canada:	Eric Grunsky
China:	Yongzhang Zhou
Czech Republic:	Vaclav Nemecek
France:	Margaret Armstrong
Germany:	Heinz Burger
Israel:	Dan Gill
Italy:	Antonella Buccianti
Japan:	Niichi Nishiwaki
Netherlands:	Gert Weltje
Portugal:	Enrique Pereira
Russia:	Nina Gorelikova
South Africa:	Isobel Clark
Spain:	Vera Pawlowsky
Sweden:	Ulf Nordlund
Switzerland:	Oliver Jaquet
UK:	John Cubitt
USA:	Carol Gotway Crawford

◇

New IAMG brochure

A new brochure describing IAMG has been developed. It is in color on an eight-page foldout. It has sections about our publications (three journals, newsletter, monograph series), our awards program, and our conference series. On the front section is a color image showing output from a basin modelling program. This image was kindly supplied by Dr. Gilles Grandjean and his colleagues at BRGM, Orleans, France, and was originally submitted as an entry in the Computers & Geosciences cover contest. The brochure is available electronically on the IAMG Home Page (www.iamg.org) in pdf format. Note that this pdf version has only low-resolution versions of the images. The printed brochure looks much better. Members wishing to use the brochures to promote the interests of the Association should contact Jan Harff or Ricardo Olea.

◇

Membership numbers are up!

Treasurer Daniel Tetzlaff reports the following statistics:

Members renewed as of March 15, 1999: 464

Members renewed as of March 15, 1998: 398

In other words, we are about 66 members above last year.

"I mailed 284 forms to members who had not renewed the previous year. Of those, 25 rejoined, 20 were returned with bad addresses, and 3 replied they were not joining. So this effort only accounts for 25 additional members. All the other efforts to increase membership must be working!"

◇

From the Allies Manager — Help Needed!

Dear members of IAMG

As Allies Manager of IAMG, I am responsible for coordinating a program to promote IAMG, taking advantage of the infrastructure of other professional organizations. Our Association is attempting to increase the level of interest and participation of scientists and practitioners in IAMG activities. In particular, young scientists, individuals working in industry and researchers specializing in computer science and related disciplines have been targeted for their potential to benefit from the IAMG's long experience and infuse fresh ideas into our Association.

In order to communicate this message to as many potentially interested scientists as possible, the Association is planning to have exhibit booths at a selected number of international meetings. These booths will contain information on

our journals, meetings, and other activities aimed at communicating the vibrant nature of our Association. At present I am coordinating the installation IAMG booths are the following meetings:

1. American Geophysical Union (AGU), Spring Meeting, Boston, Massachusetts, May 31 - June 4, 1999.

or American Geophysical Union (AGU), Fall Meeting, San Francisco, California, December 13-17, 1999.

2. European Association of Geoscientists and Engineers (EAGE) Annual Meeting, Helsinki, Finland, June 7-11, 1999.

3. Geological Society of America (GSA) Annual Meeting, Denver, Colorado, October 25-28, 2000.

4. American Association of Petroleum Geologists Annual Convention and Exhibition, New Orleans, Louisiana, April 16-19, 2000.

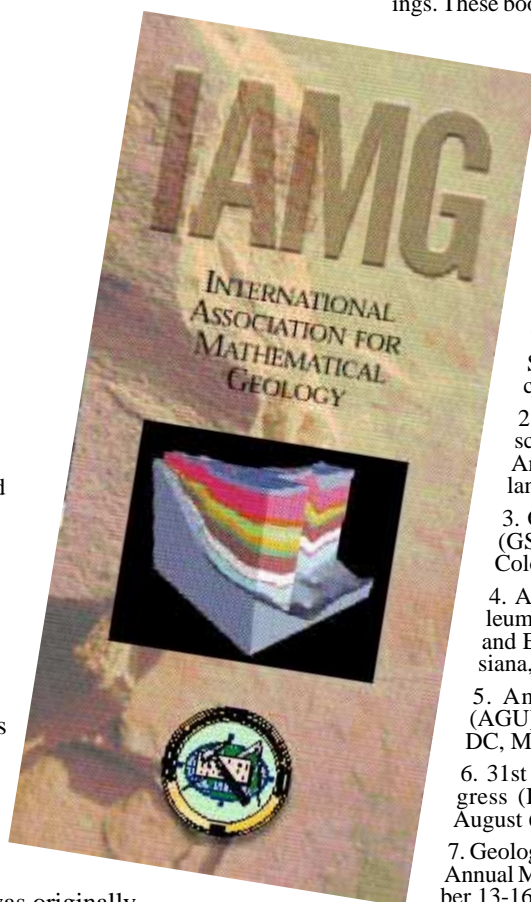
5. American Geophysical Union (AGU), Spring Meeting, Washington, DC, May 30 - June 3, 2000.

6. 31st International Geological Congress (IGC), Rio de Janeiro, Brazil, August 6-17, 2000.

7. Geological Society of America (GSA) Annual Meeting, Reno, Nevada, November 13-16, 2000.

In order to be successful in this enterprise, I will need your help. If you are attending one of the above meetings, I request that you support IAMG by helping to organize a booth, volunteering to acting as an IAMG representative at the booth during the meeting, or suggesting contacts who could help. Here, I would like to thank Mike Hohn who was in charge of the IAMG booth at the AAPG meeting in San Antonio, Texas in April 1999, as well as Hernani Chaves who is putting much effort in organizing the booth at the IGC in Rio de Janeiro, Brazil, August 2000. Please contact me if you can offer help, need further information, or have suggestions on how to improve our initiative.

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INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY

Preliminary Balance Sheets - Cash Basis *

Years Ended Dec 31, 1997, and Dec. 31, 1998

	Jan-Dec 1997	Jan-Dec 1998
CASH ASSETS		
Cash in checking	\$74,803	\$30,441
Cash in other accts.	\$19,301	\$5,256
OTHER ASSETS		
(Investments @ market value)		
Unit Invest. Trust - Corp. (Nat. Securities)	\$7,477	\$6,784
Unit Invest. trust - US Treas. (S. Barney)	\$70,396	\$68,054
FNMA bond (Nations Securities)	\$10,238	\$10,188
US Treas. notes (Nations Securities)	\$76,385	\$50,209
US Treas. bonds (Nations Securities)	\$91,973	\$102,988
Floating Rate acc. (Nations Securities)	\$0	\$199,322
Mutual funds (Smith Barney)	\$16,728	\$16,436
Money funds (Smith Barney)	\$0	\$5,778
Common stock (Nations Securities)	\$68,467	\$0
GNMA fund (Bank of NY)	\$4,265	\$4,594
Prague account	\$1,220	\$0
TOTAL ASSETS	\$441,253	\$500,050
LIABILITIES	\$0	\$0
FUND BALANCE		
Balance at beginning of period	\$365,758	\$441,253
Net unrealized gain on invest.	\$10,455	\$15,006
Transfer	\$3,853	\$0
Excess of revenue over expenses	\$61,187	\$43,791
Balance at end of period	\$441,253	\$500,050
TOTAL LIABILITIES & FUND BALANCE	\$441,253	\$500,050

* Note: This statement has not been reviewed by a certified public accountant. Final figures may differ.

Preliminary Statement of Revenue and Expenses

- Cash Basis * (Dec 31, 1997, and Dec 31, 1998)

	Jan-Dec 1997	Jan-Dec 1998
GROSS REVENUE		
Member dues & Monog. orders	\$38,962	\$37,281
Royalties (MG, NR)	\$13,842	\$14,462
Royalties (CG)	\$44,237	\$46,375
Royalties (Monographs)	\$161	\$106
IAMG conference reimbursements	\$0	\$0
Share of revenue from IAMG conf.	\$0	\$0
Donations of IAMG conf. Surplus	\$0	\$3,188
Interest income:		
Checking & corporate & return on ppal.	\$1,681	\$571
GNMA (Bank of NY)	\$412	\$329
Govmt. securities	\$10,186	\$4,872
Dividends:		
Nations Securities bonds, notes & mut.	\$1,037	\$2,563
Smith Barney mut. & money funds	\$797	\$1,293
Unit Investment trusts	\$640	\$499
Gain on sale of stock	\$0	\$29,738
Other gifts received	\$14,400	\$0
Other income	\$525	\$25
TOTAL REVENUE	\$126,880	\$141,302
EXPENSES:		
Journal subscriptions	\$37,384	\$35,779
Monograph orders	\$2,076	\$1,647
Travel expenses	\$1,227	\$13,488
IAMG conferences	\$7,809	\$15,000
Joint meetings	\$2,700	\$5,715
Grants & prizes	\$0	\$5,000
Computer expenses & web site	\$5,686	\$2,521
IAMG booths at other meetings	\$803	\$1,826
Postage & postal fees	\$1,095	\$1,561
Supplies and printing	\$711	\$1,673
Newsletter	\$2,464	\$5,731
Legal and accounting	\$1,200	\$1,200
Investment expense & bank charges	\$1,481	\$3,669
Contract labor	\$0	\$827
Refunds	\$608	\$118
Prague account expenses	\$0	\$1,220
Miscellaneous	\$449	\$536
TOTAL EXPENSES	\$65,693	\$97,510
EXCESS OF REVENUE OVER EXPENSES	\$61,187	\$43,791

* Note: This statement has not been reviewed by a certified public accountant. Final figures may differ.

IAMG'99 Trondheim — August 6-11, 1999

Tentative Program

Friday 6 - Saturday 7 August 1999: Workshops

Sunday 8: Morning and afternoon: Excursions

18:00 Reception

Monday 9: 9:00-9:20 Opening

Keynote Lectures:

09:20-10:00 Hardy

10:00-10:40 MacDonald

10:40-11:20 P. Goovaerts, 1999 Vistelius Award winner

11:30-13:25 Lunch break and poster exhibition

13:25-14:50 Parallel technical session G1, G2, P3

14:50-15:10 Coffee break

15:10-16:30 Parallel technical sessions G1, G2, P3

17:00-18:00 IAMG AGM, and Awards

Tuesday 10: 8:25-9:50 Parallel technical sessions G2, G3, P2

9:50-10:10 Coffee break

10:10-11:30 Parallel technical sessions G2, G3, P2

11:30-13:25 Lunch break and poster exhibition

13:25-14:50 Parallel technical session G2, G3, P4

14:50-15:10 Coffee break

15:10-16:30 Parallel technical sessions G2, G3, P4

20:00 Conference dinner

Wednesday 11: 8:25-9:50 Parallel technical sessions G3, P1, P6

9:50-10:10 Coffee break

10:10-11:30 Parallel technical sessions G3, P1, P6

11:30-13:00 Lunch break and poster exhibition

Keynote Lectures:

13:00-13:40 G. Bonham-Carter 1998 Krumbein medalist

13:40-14:20 M. Armstrong 1998 J. Griffiths Award winner

14:20-15:00 H. Rollinson 1999 Chayes Prize winner

15:00-15:30 Closing

TECHNICAL SESSIONS

P 1 Mathematical and statistical data analysis in the appraisal of fossil fuels (Richard Sinding-Larsen)

P 2 Petroleum and Hydro Geostatistics: A perspective (André Journel)

P 3 Numerical modelling of basin formation and development (Stephen Lippard and Cedric Griffiths)

P 4 Modelling of petroleum reservoir architecture (Arve Næss and Oddvar Lia)

P 6 Methods for evaluating the scale-dependence of permeability (upscaling) (Philip Ringrose and Jerry Jensen)

G 1 Time-space systems in the earth sciences (George Christakos)

G 2 Statistical Methods for earth science data analysis (John C. Davis)

G 3 General mathematical geology (Carol Gotway)

Please take note!

IAMG'99 Change of programme and departure on the afternoon of August 11th:

The conference is now rescheduled to end at 14.00. This gives ample time to reach the afternoon SAS flights to Copenhagen and Oslo (airport bus departs hotel 75 minutes before flight time) with connections to most European destinations. Other airlines (Braatens, Color Air) also have afternoon flights to Oslo and other Norwegian destinations.

For those who cannot leave on this day, we have managed to reserve some rooms in another hotel in Trondheim. Please note, however, that there are only a limited number of places available, so would those who have booked accommodation for the night after the conference please reconfirm as soon as possible. If there is still insufficient accommodation, we may have to arrange transport to another town 1.5 hours drive from Trondheim, but only 1 hour away from the airport."

IAMG Journal Report



With the start of the new year, **Daniel F. Merriam** officially took over as the new Editor-in-Chief of what starting this year will go by the name *Natural Resources*

Research. He replaces **Richard B. McCammon**, founding editor of the journal *Nonrenewable Resources*, as it was called until now. On behalf of the Association we wish Dick a happy retirement in the state of Washington and express our appreciation for all his long and productive service to IAMG.

Below we reprint Dan Merriam's introduction to the first issue of the renamed journal.



The new *Natural Resources Research*: an Editorial

Natural resources are extremely important in a modern society, whether these resources are petroleum, metals, nonmetals, geothermal, or water, their exploration and exploitation are a high priority. It also is important to protect the environment during the location and extraction of these resources. Because resources are becoming more difficult to locate, more sophisticated concepts and techniques are required in the hunt for the elusive quarry. Herein then lies the purpose of this journal: to bring the seekers, extractors, users, and regulators up-to-date information, new ideas, and the latest quantitative methods appropriate to their interests.

On the masthead of the redesigned journal is a succinct byline defining the object of *Natural Resources Research*: 'An international journal devoted to promoting quantitative approaches to mineral resource exploration, assessment, extraction, and utilization.' All mineral resources will be covered and this first issue is a partial sample of things to come. There is a good representation of subject matter in this first issue: basin analysis and petroleum generation; mineral potential mapping; oil and gas field size distribution; estimating petroleum resources; investigating geochemical anomalies; and petroleum exploration in a cratonic environment—all of the papers stress the quantitative aspects. Papers for future issues include: mineral favorability mapping; risk in mineral exploration; maturation of organic matter from recent sediments; crystalline rock fracture patterns and groundwater yield; and uncertainty in ore-reserve estimation. Some exciting and interesting applied subjects are on the horizon and scheduled for forthcoming issues.

This journal was the brain-child of **Richard B. McCammon**, and he nurtured it and watched it develop through 7 years through all or parts of three administrations of the International Association for Mathematical Geology (IAMG), the original sponsoring organization. With Richard's retirement, it was time to pass on the reins to another—I am the other. I take on the chore with humility and some trepidation; it will be difficult to follow in Dick's footsteps. In the first issue he laid out the goals of the journal [we] '...construe the field to include mineral and energy exploration, resource assessment, and the economics of resource supply, recovery, restoration, and conservation. Bringing together significant research on all aspects of the fields, the journal will be broad based and cover empirical and theoretical approaches.' Dick will continue to be involved with the journal as the Founding Editor and as a valued advisor.

All of Dick's good objectives will be continued and some new innovations will be instituted, as is the prerogative of any new editor. You will note, too, the newly constituted board of Associate Editors. Most of the previous board had served since founding of the journal and has done more than their share; they deserve much thanks from the editors and authors; a few of them, for a variety of reasons, have been asked to continue and contribute their expertise.

The IAMG welcomes the **Energy Minerals Division (EMD)** of the **American Association of Petroleum Geologists (AAPG)** as a co-sponsor from volume 8 onwards. The EMD serves as an international

forum for those working in the exploration, development, and production of energy sources and promotes remote-sensing studies and economic analysis of energy resources. With support of NRR, the EMD now has a publication outlet for their contributions in addition to their forum. The Deputy Editor and several of the Assistant Editors represent the interests of the AAPG/EMD. We look forward to this cooperative effort and know that members of both organizations will benefit*.

The IAMG also sponsors two other journals—*Mathematical Geology* (founded in 1969; Plenum Press) and *Computers & Geosciences* (founded in 1975; Pergamon Press). All of the IAMG sponsored journals operate under the watchful eye of the Publication Committee (**Frits P. Agterberg**, chairman), which is responsible for the overall direction of publications. Also, under the aegis of the IAMG/PC is the Association's monograph series, which is published by Oxford University Press.

So, here we start a new and second era of the journal, and the international Editorial Advisory Board will help direct and focus this effort.

Dan Merriam

Lawrence, Kansas, 15 April 1999

*Only pending detail at this stage is confirmation by Kluwer, which recently purchased Plenum Publishers, that EMD members will be able to subscribe to the joint journal at the same rate as IAMG members.



IAMG Monograph 4, "Techniques for Determining Probabilities of Geologic Events and Processes - A Review" by R. L. Hunter and C. J. Mann is **out of print**. Oxford Press has, at this date, no plans to reprint it.



Mathematical Geology is now online through institutions. This means that if you are affiliated with an institution which chooses to subscribe electronically, you get electronic access.

Starting in 2000, both *Natural Resources Research* and *Mathematical Geology* will be available electronically not only to institutions but also to individual members of the IAMG. This service should be quite attractive, as the subscriber will be able to choose print only, electronic only, or both print and electronic versions of the journal. If the electronic version is selected at an institution, it will be available from a number of terminals at that institution.

More information will be available towards the end of 1999. All journals are being placed on the Kluwer Academic website (www.wkap.nl).



GIVE YOUR OPINION AND YOU MAY WIN A BOOK !

"The editor and I are interested in your thoughts about special issues. Have you read the recent special issues dealing with the Internet (Volume 23/5 and 24/7) and how different groups are using the Internet in teaching, research, and public service? Are such issues important to you and your colleagues? Do they "belong" in *Computers & Geosciences*? What other topics would you like to see featured in the future?"

Please send your comments to jbutler@uh.edu."

You will be automatically entered into our FREE prize draw for the book *Structural Geology and Personal Computers* by Declan DePaor. The winner will be informed via e-mail.

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MATHEMATICAL GEOLOGY**Volume 31, Number 3 (1999)**

Updating of Population Parameters and Credibility of Discriminant Analysis — Haiyu Gao, Pengda Zhao, Jiahua Wang, and A. Galli

Quantitative Control of Migration: a Geostatistical Attempt — M. Touati, B. Iooss, and A. Galli

Auto-oscillation in Agate Crystallization — N. A. Bryxina and V. S. Sheplev

Improvements in Grade Tonnage Curve Prediction via Sequential Gaussian Fractal Simulation — D. J. Kentwell, L. M. Bloom, and G. A. Comber

Generation of Aquifer Heterogeneity Maps Using Two Dimensional Spectral Texture Segmentation Techniques — M. G. Eramian, R. A. Schincariol, L. Mansinha, and R.G. Stockwell

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Geostatistics for Natural Resources Evaluation by Pierre Goovaerts — Reviewed by R. A. Olea

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Permeability Tensors of Anisotropic Fracture Networks — M. Chen, M. Bai, and J.-C. Roegiers

An Experimental Comparison of Ordinary and Universal Kriging and Inverse Distance Weighting — D. Zimmerman, C. Pavlik, A. Ruggles, and M. P. Armstrong

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Statistics for Modeling Heavy Tailed Distributions in Geology: Part II. Applications — J. Caers, J. Beirlant, M. A. Maes

The Uncertainty in the True End Point of a Fossil's Stratigraphic Range when Stratigraphic Sections are Sampled Discretely — R. E. Weiss and C. R. Marshall

Markov Processes and Discrete Multifractals — Q. Cheng

Bootstrapping: a Fast Way to Simulate QTz Curves — A. Berckmans and M. Armstrong

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Radiogenic Isotope Geology by Alan P. Dickin — Reviewed by Willard S. Moore

MG Volume 31, Number 5 (1999)

Spurious Clusters in Granulometric Data Caused by Logratio Transformation — F. Tauber

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Using Indicator Simulation as a Tool in Reservoir Description: Issues and Uncertainties — D. Seifert and J. L. Jensen

Analysing Censored Spatial Data — A. F. Militino, M. D. Ugarte

Log-ratios and Natural Laws in Compositional Data Analysis — J. Aitchison

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Improvement of Fourier-Based Unconditional and Conditional Simulations for Band Limited Fractal (von Kármán) Statistical Methods — J. A. Goff and J. W. Jennings, Jr.

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Reconstruction of Non-Linear Geochemical Dynamics of Elemental Sedimentation Based on Power Spectral Analysis of Time Sequence — Yongzhang Zhou

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Geostatistics Wollongong '96: Volumes 1 and 2 — by E. Y. Baafi and N. A. Schofield (eds.) — Reviewed by James Russell Carr

Mathematische Geologie — Hannes Thiergärtner (ed.) — Reviewed by Daniel F. Merriam

**Computers & Geosciences****Volume 24, number 10 (1998)**

Specism: A Fortran-77 program for conditional spectral simulation in 3D — T Yao

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Gravity measurements and terrain corrections using a digital terrain model in the Himalaya — P Banerjee

SIMOCF: a modeling fractional crystallization using a Monte Carlo approach — SP Verma, R Ciriaco-Villanueva, IS Torres-Alvarado

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Fundamentals of engineering programming with C and FORTRAN — G Bonham-Carter

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Cellular neural networks for real-time monitoring of volcanic activity — L Bertuccio, M Coltelli, G Nunnari, L Occhipinti

An alternative algorithm for one-dimensional magnetotelluric response calculation — H Grandis

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TwoLiq.for: a Fortran77 program for simulating immiscibility in silicate liquids — H Ma, Y Hu, T Fang

Calculation of the normal scores variogram used for truncated Gaussian lithofacies simulation: Theory and FORTRAN code — PC Kyriakidis, CV Deutsch, ML Grant

Towards automated 3D analysis of fission tracks in external mica detectors — G Davidson, JA Miller

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Euler rotations in plate-tectonic reconstructions — B Greiner

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Member News

Eevaliisa Laine of the Laboratory of Engineering Geology and Geophysics at Helsinki University of Technology has successfully completed her Ph.D. in December 1998. Her examiners were professors **Vera Pawlowsky Glahn** (Universitat Politècnica de Catalunya, Spain) and Carl Ehlers (Åbo Akademi University, Finland). As to her future plans she says: "I am going to use geostatistical methods to model the geological structures of the Finnish gold deposits by using geological and geophysical data - especially geological history of these deposits. This work will be financed by the Outokumpu Oy Foundation".

The abstract of her dissertation:

Geostatistical, geological and geophysical modelling of subsurface structures of the Precambrian bedrock in Finland

Geophysical measurements and geological data were used in the statistical analysis and in the simulations. Subsurface visualizations were produced and model-dependent uncertainty maps were created. Finally, the Bouguer profiles were used in checking the simulated lithology in the western Uusimaa area. The case studies constituted geostatistical analyses of the geological and geophysical data from the western Uusimaa, Olkiluoto, Ryytimaa and Oitti areas in Finland. In these locations, the folding of the rock formations has produced complicated structures. Therefore, the spatial modelling of the rock types of the western Uusimaa area was based on the orientation map extracted from the aeromagnetic map. It was assumed that the orientations of the magnetic anomalies are parallel with the rock formations. Linear features, such as fractures, were studied using indicator transforms of petrophysical properties. The decile values, obtained from the cumulative histograms, were used as thresholds. Longest ranges of correlation were usually observed for the largest thresholds, in particular for the magnetic susceptibility values from the western Uusimaa area. For the Olkiluoto case, the complicated folding and fracturing of the Precambrian terrains could not be successfully studied using data from the sparse parallel boreholes. A different sampling and drilling scheme, following more than one orientation in the study sites is needed in order to detect the spatial correlation of the variables in different directions. In the case of the densely drilled Palmottu analogue site, the geostatistical study revealed the fracture pattern breaking the geological formations, especially, the uranium mineralization. Geostatistical methods combined with the geological interpretations, geophysical data and, in future, geophysical inversion methods, will give excellent possibilities for visualization of geological structures of the Precambrian bedrock in Finland.



Honors for John Harbaugh

On April 29, at the meeting of the Pacific Section of the AAPG in Monterey, California, John Harbaugh (Stanford University) received the Pacific Sections's "Distinguished Educator Award" for 1999. Dan Merriam gave the citation.



Andre Journal reports that **Jef Caers** has joined the Department of Geological and Environmental Sciences as Asst. Professor in Petroleum Geostatistics. He left Katholieke Universiteit Leuven in his native Belgium. ".....I look forward working with Jef as a colleague and I am elated at the prospect of gracefully becoming the old man of geostatistat bemused by all these new ideas and bright people sparkling around."



Good news from the **Qiuming Chengs** — their family is growing. Qiuming writes: "The new baby, Cathy H. Cheng, was born at about 9:00pm in Toronto on Dec. 21. She was 8.8 lbs and 55 cm when she was born. This is our second child. First is a boy, Tony H. Cheng. He is almost 12 now."

Bernd Haupt has moved from Kiel Univ./SFB 313 (Germany) to ESSC of Penn State (USA). His new address is:

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bjhaupt@essc.psu.edu
http://www.essc.psu.edu/~bjhaupt

Maria-Theresia Schafmeister, formerly at the Freie Universität Berlin, is now a professor at the University of Greifswald in NE Germany. Being now in the close reach of Jan Harff (Warnemünde) she has been recruited to the membership committee as "Allies Manager" (see her call for help on p. 4). Her new address is:

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Fax: (49) 3834 86457

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- An algorithm and program in C-language for computation of standard free energy of formation of clay minerals — M Kudrat, KP Sharma, C Varadachari, K Ghosh
- VARFIT: a Fortran-77 program for fitting variogram models by weighted least squares — E Pardo-Iguzquiza
- A fractional step finite element method for the Navier-Stokes equations applied to magma chamber withdrawal — A Folch, M Vazquez, R Codina, J Marti
- Algorithm to calculate equal-area grid cells in irregular estuarine cross-sections — GME Perillo, MC Piccolo, J Mosquera, S Aggio
- Computer modelling and visualisation of the structural deformation caused by movement along geological faults — SS Egan, S Kane, TS Buddin, GD Williams, D Hodgetts
- Correction to "Deformation produced by a rectangular dipping fault in a viscoelastic-gravitational layered earth model. Part I: Thrust fault - fltrg and fltrgh FORTRAN programs." — J Fernandez, TT Yu, JB Rundle
- Book reviews:
GSLIB: Geostatistical software library and user's guide, second edition. — DE Myers
- Numerical modelling in applied geodynamics — XS Yang



NATURAL RESOURCES RESEARCH (formerly Nonrenewable Resources)

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- Merriam, D.F., Editorial: The new Natural Resources Research
- Brynes, A.P., and Lawyer, G., Burial, maturation, and petroleum generation history of the Arkoma Basin and Ouachita Foldbelt, Oklahoma and Arkansas
- Cheng, Q., and Agterberg, F.P., Fuzzy weights of evidence method and its application in mineral potential mapping
- Schuenemeyer, J.H., and Drew, L.J., Uncovering influences on the form of oil and gas field size distributions
- Chen, Z., and Sinding-Larsen, R., Estimating petroleum resources using geo-anchored method - a sensitivity study
- Costa, J.F., and Koppe, J.C., Assessing uncertainty associated with the delineation of geochemical anomalies
- Merriam, D.F., Herzfeld, U.C., and Fuhr, B.A. - An integrated mapping approach to petroleum exploration on the Pratt Anticline, Pratt County, Kansas



AWARD WINNERS ANNOUNCED

The Awards Committee, consisting of H. Burger, J. Cubbit, J. C. Davis, J. Harbaugh and chair V. Pawlowsky-Glahn, has completed selection of award recipients for 1998 and 1999. They are:

- 1998 Krumbein Medal: Graeme Bonham-Carter, Canada**
- 1998 Griffiths Award: Margaret Armstrong, France**
- 1999 Chayes Prize: Hugh Rollinson, United Kingdom**
- 1999 Vistelius Award: Pierre Goovaerts, USA**

Only Hugh Rollinson is still living in the country he was born in. Graeme was also born in the United Kingdom, Margaret in Australia, and Pierre in Belgium. Rollinson, however, served for three years in Sierra Leone as field geologist, and from 1993-1995 was chairman of the Department of Geology of the University of Zimbabwe. Hard to think of a more meritorious and international group!



Graeme Bonham-Carter

Graeme Bonham-Carter was elected from a field of 10 candidates, Margaret Armstrong had 4 competitors, Hugh Rollinson 2, and Pierre Goovaerts 3. Following the new By-Laws and guidelines, evaluation of all nominees was based on resumes and accompanying statements distributed mostly by e-mail among all members of the Committee (despite occasional frustration trying to format the information to be readable by all).

According to the guidelines, Committee members assigned numerical scores from 0 to 10 to all candidates in relevant categories that vary from award to award, rather than voting for a single candidate, which would be equivalent to a binary system in which one nominee gets 1 point and all other 0 points. Such scores allow for more differentiated evaluations, making ties less likely, which is important in a committee of 5 with some members sometimes away from the office and not being able to vote.



Margaret Armstrong

All nominees who did not make it in this round will be automatically considered for the next selection (as long as they satisfy the requirements established in the guidelines), but fresh nominations are always welcome. Please look at the call for nominations for 2000 (see this page). If you do not nominate your favorite geomathematicians, they may never receive the recognition they deserve.

I would like to thank the following persons for their active support of the Awards Committee during the 1998 and 1999 selection process, either as members and/or submitters of nominations and/or writers of laudatios. It makes our work much more pleasant. I hope the next list will be too long to fit into the Newsletter!



Pierre Goovaerts



Hugh Rollinson

1998 winners will be the last ones to receive the award in the year following their award, as has been the practice. On the other hand, the 1999 recipients will be the first ones in a long time to receive the award in the year of their nomination. Now that all changes and transitions are over, starting next year, the Association will indeed present only two awards per year.

The Awards Committee, in collaboration with Webmaster Grunsky, organizers of IAMG Conferences, and Editors Bonham-Carter and Hohn, are doing an unprecedented job for properly honoring the recipients. The reader may have noticed that for the first time in the history of IAMG, the recipients appear in the proceedings of our conferences and are on the Association's website in the Internet. Besides, the Committee continues to publish Krumbein medalist citations in *Mathematical Geology* and has started a tradition to publish equally extensive citations for the other winners in *Mathematical Geology* (31(3) p. 351-353) and *Computers & Geosciences*.

*Vera Pawlowsky-Glahn
Chair, Awards Committee*

- Frits Agterberg
- Heinz Burger
- John Cubitt
- John C. Davis
- Alexandre J. Desbarats
- John Doveton
- Jaime Gómez-Hernández
- John Harbaugh
- André Journel
- Sean A. McKenna
- Dan Merriam
- Roberto Potenza
- Richard Sinding-Larsen
- Karl Statterger
- Daniel Tetzlaff
- Hans Wackernagel
- Richard Webster

Presentation of all four awards is scheduled to take place during the coming IAMG conference in Trondheim. The

CALL FOR AWARD NOMINATIONS

The Association invites all members to submit nominations for the Krumbein Medal 2000 and the Griffiths Award 2000.

Deadline: January 15th, 2000

Documents which should accompany the proposal:

- a short statement summarizing the relevant qualifications of the nominee;
- a curriculum vitae of the nominee.

The guidelines for the awards can be found at the web-site of our association: www.iamg.org.

The Awards Committee is working through electronic mail. Therefore, please use:

- e-mail or diskette;
- in rtf format or as simple text files (ASCII code).

Send to: e-mail: pawlowsky@etsecpcb.upc.es

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Stanford's Geomath Program

by John W. Harbaugh

This is a condensation of a detailed history that John Harbaugh has compiled recalling the growth and life of the geomathematics curriculum at his Department at Stanford University, and showing the interaction with and influence on the "outside" world. John has shortened it so that we can bring it to you in two installments, to be continued in the next issue (no. 59) of this Newsletter. Ed.

Stanford's Geomath program is unique in academia. It began in 1961 shortly after computers arrived at Stanford and has exploited an academic niche ever since that has attracted students and visitors from thirteen countries, produced 18 master's degrees, 16 PhDs, one engineer's degree, nine books, a book-length monograph, and more than 50 contributions as journal articles, government bulletins, technical reports, and chapters in books. It has received financial and material support totalling more than two and half million dollars, and has been influential in spawning a new company.

The earliest applications in the Geomath program involved use of factor analysis and trend-surface analysis in analyzing point-count data of the Permian Americus Limestone of Kansas and Oklahoma. I wrote a trend-surface computer program in a version of Algol adapted for Stanford's Burroughs 220 computer, a physically huge vacuum-tube machine with 10,000 "words" of memory - a miniscule amount by today's standards. The program would fit first-, second-, and third-degree polynomial trend surfaces and used bands of letters and numbers to represent contour lines.

In February 1963, Dan Merriam of the Kansas Geological Survey came to Stanford to work a half-year in the then-new world of computers. He and I used the trend-surface program to analyze subsurface structures throughout much of Kansas. By then Stanford acquired a transistorized IBM 7090 computer that ran twenty times faster and we switched our work to it. We extended the trend-surface work to include four-dimensional trend surfaces or "hypersurfaces" and analyzed variations in oil gravity with depth and geographic location in southeastern Kansas, and variations in shale-oil yields of the Green River Formation in Utah and Wyoming. In 1964 the trend-surface ideas were extended to harmonic analysis of surfaces with Fourier series.

In those days, computer programs useful in geology were hard to come by. Users either wrote their own programs or scrounged them from others. Dan suggested that an exchange service would help. When he returned to Lawrence in mid-1963, he established the Kansas Survey's role in disbursing programs. Initially the Survey published descriptions of them in a "Special Distribution Series," and later in a "Computer Contributions Series." Many early programs were distributed in this manner, including the trend-surface programs that he and I used.

In 1964 and 1965 several students and I worked on 3-D simulations of marine sedimentation in which propagation of carbonate-secreting organisms such as calcareous algae and corals were represented by two-dimensional interactions controlled by transition matrices of Markov chains. Probabilities in the transition matrices were automatically adjusted to provide conditional responses to environmental factors such as water depths and proportions of clastic sediment supplied to the sea floor. Some of the experiments involved Pennsylvanian marine carbonate banks in southeastern Kansas.

By 1965, the Geomath program at Stanford began to be formalized, although we didn't call it by that name. Instead it was known as the program in "Computer Applications in Geology." It soon became part of the spectrum of established subdisciplines in the Department of Geology, where I had been associated ever since I arrived at Stanford in 1955.

The program began to attract students. Dennis Ojakangas was its first PhD. He finished in 1967 and focused on procedures for constructing subsurface sections from petrophysical logs. Other early students included Tony Inderbitzen who worked on statistical procedures for analyzing physical properties of modern marine sediments, Jim Howard who simulated salt dome intrusions, Gary Anttonen who simulated deposition of sulfide ore bodies, and Ferruh Demirmen who numerically classified biofacies relationships in Pennsylvanian limestones exposed at the Goosenecks in southeastern Utah. Later Luanne Vanderpool simulated evolution of canyonlands topography in Utah.

A succession of visitors added momentum. Bill Fox came on sabbatical leave from Williams College during the 1966-67 academic year. Bill worked on wave processes and encouraged us to focus on nearshore marine issues. Meanwhile, Dan Merriam and I continued to visit back and forth, and in 1966 we started work on an overview of computing applications in geology that culminated in the 1968 book entitled "Computer Applications in Stratigraphic Analysis."

A big push in the Geomath program began when Graeme Bonham-Carter came to Stanford in 1966 as a post-doctoral scholar supported by the Office of Naval Research. Initially, Graeme focused on deltas where rivers debouch into the sea and developed a rigorous, quasi-3-D simulation procedure that took about a year to devise and test. Although it had limitations, it was an eye-opener and showed what might lie ahead in a grander scheme for simulating a spectrum of marine sedimentation processes. In hindsight we were naive in thinking that a few years' work would yield an integrated marine sedimentation simulation system, but we were at the frontier and had few precedents to guide us.

With the big picture in mind, in 1968 Graeme and I started work on a book devoted to simulation applications in geology. Although we made an extensive literature search, most of the procedures in the book were devised by us. We had the field to ourselves at that time — a rare opportunity. The book included an extensive suite of Fortran programs, and was published in 1970 with the title "Computer Simulation in Geology."

We were proud of the book but were disappointed in that it provoked so little response. Although it received excellent reviews, we surmised that the geological community at that time had little interest in computing. In retrospect we were 10 or 15 years too early, but encouraged by the old adage that "it's better to be too early than too late."

The IAMG was founded in that era. The geomathematical spectrum was starting to grow and we perceived the need for an international geomathematical organization. Earlier, Richard Reymont and Dan Merriam had pressed for an organization to represent the field, and a meeting to discuss its creation was scheduled during the August 1968 meeting of the International Geological Congress, in Prague.

The Soviets invaded Czechoslovakia two days after the Congress began. Prague was the center of the invasion, which was very frightening to its residents and visitors, if not the entire world. Nevertheless, the IAMG was founded on the fifth day of the Congress, although many of its delegates had fled earlier. It was an exciting time. While my role in the founding of the IAMG was a modest one, I'm nevertheless one of its founders, a fact of which I am very proud.

In 1971, the Department of Applied Earth Sciences or "AES" was established at Stanford. I immediately moved the Geomath program to the new department. In AES each faculty member headed an individual academic program such as ore deposits, remote sensing, and so on. The "Geomathematics Program" was formalized as one of the new department's programs. Meanwhile Paul Switzer, who was later joined by Andre Journel, created a program in geostatistics. The history of geostatistics at Stanford is another story, however, and not part of the narrative here.

Putting mathematically focused programs in AES was a good arrangement because students in AES were freed from strictures of a largely "geological" curriculum. There, for example, Alfredo Prelat focused on Markov-chain applications in oil exploration, Susan Lee on bidding strategies in offshore oil exploration, and Claude Abry on estimating probabilities in drilling outcomes in the Tatum Basin in New Mexico. Unfortunately, AES was closed and merged back into Geology in 1993.

The Geomath program at Stanford has always been more than a strictly "academic" program. I have always been mindful of its "external" connections with industry and elsewhere in academia. After all, Geomath has been an applied program and real-world applications have been important, even though we academics haven't always been concerned about the practical utilization of our research products.

In 1971 an external opportunity arose when I served as the Kansas Geological Survey's Visiting Scientist. I worked in Lawrence that fall planning the "Kansas Oil Exploration Decision System" (the "KOX System") that would treat risk in oil exploration with formalized statistical procedures that would be directly linked with financial analysis. Murfin Drilling Company of Wichita partly sponsored the project, and later provided a real-world test by drilling a wildcat well on a "prob-

ability high" in Rawlins County, Kansas that had been mapped with KOX procedures. The well discovered a new oil field.

The Survey published a description of the plan for the KOX system, and John Davis and I made presentations to oil operators in Wichita, but there wasn't a ground swell of interest. Again, we were ahead of our time and concluded that the state of the art in computing hadn't advanced enough to make such an integrated decision system feasible, although components could be used individually in early versions of the KOX system.

Nevertheless, John and I continued our research in exploration risk-analysis, and were later joined by John Doveton, also of the Kansas Survey. In 1975, Davis, Doveton, and I held a three-day AAPG research conference at Stanford with the title "Probability Methods in Oil Exploration." The conference went well and the issues were of broad interest to the oil industry. We extended the work, culminating in the 1977 book entitled "Probability Methods in Oil Exploration."

We were urged to have a successor conference, but instead we put on shortcourses featuring an initial version of the KOX system. The shortcourse was first presented in 1977 at Snowmass, Colorado, and later in Houston, London, Rio de Janeiro, and Mexico City. The shortcourse manual contained exercises that participants were presumed to work with pocket calculators, but the arithmetic was too extensive. Unfortunately, there were no laptop computers at that time, and desktop PCs were new.

In the late 1970s, John Davis and I worked in Rio de Janeiro in an attempt to adapt an exploration risk-analysis system for Petrobras. An important contact emerged whereby Claudio Bettini of Petrobras, was sponsored for a PhD at Stanford, with his dissertation focusing on oil-resource estimation in Brazil's Campos Basin.

Over the years several generalized courses at Stanford have been part of the Geomath program. One long-running course was entitled "Computer Applications in Geology," and another that is still given is entitled "Risk Analysis in Oil Exploration." Both have provided background for books that have emerged from the program.

A key opportunity arose in 1977 when Glen Kendall asked me to help his fledgling company work on resource estimation for the U S Bureau of Land Management. Serendipitously and unrelated, a few months later a former Stanford geology student, Jean Juilliand, asked me if Stanford would take on a contract for the BLM involving appraisal of the mineral-resource potential of the California Desert Conservation Area (the "CDCA"), a vast area of Federal land in southeastern California. Funds for the project would be immediately awarded to Stanford if I would serve as the principal investigator.

The project was interesting because it would involve a statistical approach to resource estimation, although the resources of the CDCA are mostly ore deposits and sand and gravel, and not oil and gas. Nevertheless, the approach had some similarity to oil- and gas-resource estimation which by then was important in the Geomath program. However, I told Jean that the Geomath program didn't have enough manpower, and instead suggested that Glen's company, Kendall Associates ("KA") would be a good choice, and that I would serve as a consultant if the contract were awarded to them. A few weeks later KA had the contract.

I suggested that John Davis also be engaged as a consultant to the CDCA project, and furthermore that we might involve students in the Geomath program in the project. Fred Lambie worked on the project before starting as a graduate student in the Geomath program in 1979.

The CDCA study involved amassing large volumes of data from the literature, much of it of a qualitative nature such as the presence of gold prospects in specific locations. The procedure involved compartmenting the CDCA into geographic cells and computing probabilities attached to different classes of resources on a cell-by-cell basis, using discriminant-function analysis to establish the classifications. The results were incorporated in a book-length monograph published in 1983 by the BLM entitled "Classification of the California Desert for Geology-Energy-Mineral Resource Potential: A Geostatistical Classification."

In 1982, Glen Kendall and I formed a new company named "Terrasciences." Initially the company was to provide geomathematical services to the oil industry. John Davis joined us as a board member and stockholder. Later, John and I suggested that the new company should focus on software for a desktop workstation for petroleum geologists and engineers that would link subsurface mapping and cross-section generation with reservoir engineering procedures. Our ideas were strongly influenced by research at the Kansas Survey and the Geomath group at Stanford. Although the workstation included many modern ideas, it also included procedures derived from some of the earliest geomathematical work at Stanford, including trend-surface

analysis.

Terrasciences needed working capital and we persuaded Amax in Denver to participate in the workstation's potential by purchasing part of Terrascience's stock. Amax agreed, and in December 1983 provided working capital of about two million dollars.

With enhanced financial resources, the race was on to develop a prototype workstation. We called it the "Terrastation," and our first goal was to demonstrate it at the AAPG convention in New Orleans in April 1984. We feared that the competition would unveil rival workstations at the same time, but our concerns were groundless because nothing else was displayed that had the Terrastations's aspirations and capabilities. Since then the Terrastation has been vastly improved, although it now has a number of competitors. The company is now based in Denver and I served as its chairman over much of the period since its founding.

Beginning in 1979, John Davis and I were involved in consulting work for the Department of Energy that dealt with assessment of petroleum resources of the National Petroleum Reserve in Alaska which previously was known as Navy Petroleum Reserve Number 4. The work involved forecasts of its petroleum potential, but there was little statistical data to work with, and we focused mostly on devising subjective probabilities. It did however, lead us into petroleum resource evaluation issues in general. Subsequently, John and I proposed to the US Geological Survey that we conduct a post-mortem analysis of part of the US waters in the Gulf of Mexico with respect to the efficacy of estimating outcome probabilities in advance of drilling.

The USGS gave us a contract and ready access to previously confidential files of the offshore Gulf of Mexico. We concluded that statistically based procedures could improve the USGS's ability to assess the offshore petroleum resource potential on a tract-by-tract basis in advance of leasing and drilling. Ironically, the USGS didn't appreciate our suggestions for modifying the assessment procedures - perhaps because they differed so greatly from the subjective procedures that the USGS had used all along.

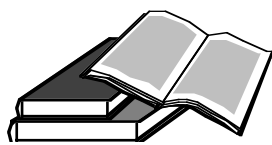
In the late 1970s and early 1980s, Juan Berlanga was sponsored at Stanford by Petroleos Mexicanos ("Pemex") with the proviso that his dissertation work would provide full access to Pemex's exploration and production files, including well and production data and interpreted seismic data. After rummaging for days through Pemex's vaults in Mexico City, Juan and I settled on Mexico's Tabasco region, which provided an excellent opportunity for statistically comparing pre-drill seismic perceptions with post-drill production outcomes. Pre-drill/post-drill comparisons were central to procedures that John Davis and I devised for US waters in the Gulf of Mexico, and the Tabasco region provided a still better opportunity with large volumes of critical information.

During the 1980-81 academic year, Michael Ducastaing of France did an MS thesis that dealt with changes in the volumes of oil and gas fields with respect to their discovery sequence. He found that regardless of region, that the frequency distributions of subpopulations of field volumes declined more or less predictably with discovery sequence. These changes were analyzed by plotting subpopulations of fields in a region on log-probability plots and measuring shifts in subpopulation parameters.

to be continued in IAMG Newsletter 59



"Our funding runs out in a month. Will everyone please think a little faster?"



Recent Books of Interest

Vichi, M., University of Pescara, Italy;
Opitz, O., University of Augsburg, Germany
(Eds.) **Classification and Data Analysis
— Theory and Application.** 378 pp. 97
figs., 78 tabs., 3-540-65633-2 DM 129,-

Publication date: May, 1999, Springer-Verlag Berlin/Heidelberg

The book provides new developments in classification, data analysis and multidimensional methods, topics which are of central interest to modern Statistics. A wide range of topics is considered including methodologies in classification, fuzzy clustering, discrimination, regression tree, neural networks, proximity methodologies, factorial methods, spatial analysis, multiway and multivariate analysis.

Brekhovskikh, L.M., Russian Academy of Sciences, Moscow, Russia;
Godin, O.A., University of Victoria, BC, Canada, **Acoustics of Layered
Media II — Point Sources and Bounded Beams.** 2nd rev. and enlarged
ed. 1999. X, 530 pp. 45 figs., 3-540-65592-1 DM 219,-, Springer-Verlag
Berlin/Heidelberg

Acoustics of Layered Media II presents the theory of sound propagation and reflection of spherical waves and bounded beams in layered media. It is mathematically rigorous but at the same time care is taken that the physical usefulness in applications and the logic of the theory are not hidden. Both moving and stationary media, discretely and continuously layered, including a range-dependent environment, are treated for various types of acoustic wave sources. Detailed appendices provide further background on the mathematical methods. This second edition reflects the notable recent progress in the field of acoustic wave propagation in inhomogeneous media.

Vekovski, A., Zürich, Switzerland; Brassel, K., University of Zürich,
Switzerland; Schek, H.-J., ETH Zürich, Switzerland (Eds.)
Interoperating Geographic Information Systems — Second Interna-
tional Conference, INTEROP'99, Zürich, Switzerland, March 10-12, 1999
Proceedings. 1999. XII, 329 pp. 3-540-65725-8 DM 78,-, Springer-
Verlag Berlin/Heidelberg

This book constitutes the refereed proceedings of the Second International Conference on Interoperating Geographic Information Systems, INTEROP'99, held in Zurich, Switzerland in March 1999. The volume presents 22 revised full papers carefully reviewed and selected for inclusion in the book. Also included are three invited full papers. The book addresses various topics of database interoperability and spatial data processing in particular identification, infrastructure, implementation, vectors and graphics, semantics, heterogeneous databases and representation.

Clauser, C., (Hannover, Germany) **Thermal Signatures of Heat
Transfer Processes in the Earth's Crust,** 130 pp. 67 figs., 20 in color, 8
tabs. 3-540-65604-9, DM 98,- Publication date: May, 1999, Springer-
Verlag Berlin/Heidelberg

This book deals with the signatures left by geodynamic processes in the temperature field of the Earth's crust. First, it introduces briefly the established, indirect methods for interpreting the present temperature field and methods for reconstructing the thermal fields of the geological past. Then the spatial and temporal scales that are relevant for heat transport processes are described. This problem is discussed both theoretically and on the basis of data from the German Continental Deep Drilling Program (KTB). The climate of the last 200 years and the postglacial warming in central Europe are reconstructed on the basis of two sets of temperature data from shallow and deep boreholes. This book is written for an audience at an advanced undergraduate or graduate level with an understanding of basic physical principles. It avoids particular terminology, and special terms are introduced.

Groshong, R.H.Jr., University of Alabama, Tuscaloosa, AL, USA, **3D
Structural Geology — A Practical Guide to Surface and Subsurface
Map Interpretation.** 320 pp. 366 figs., 8 tabs. 3-540-65422-4, DM
129,- Publication date: July, 1999, Springer-Verlag Berlin/Heidelberg

This is a handbook of practical techniques for making the best possible interpretation of geological structures at the map scale and for extracting the maximum amount of information from surface and subsurface maps. The 3D structure is defined by internally consistent structure contour maps and cross sections of all horizons and faults. The book is directed toward the professional user who is concerned about both the accuracy of an interpretation and the speed with which it can be obtained from incomplete data. Quantitative methods are emphasized throughout, and numerous analytical solutions are given that can be easily implemented with a pocket calculator or a spreadsheet. Interpretation strategies are defined for GIS or CAD users, yet are simple enough to be done by hand. The user of this book will be able to produce better geological maps and cross sections, judge the quality of existing maps, and locate and fix mapping errors.

Stein, M.L., University of Chicago, IL, USA **Interpolation of Spatial
Data — Some Mathematics for Kriging.** Approx. 275 pp. 0-387-
98629-4 DM 98,-, Publication date: July, 1999, Springer-Verlag
Berlin/Heidelberg

Prediction of a random field based on observations of the random field at some set of locations arises in mining, hydrology, atmospheric sciences, and geography. Kriging, a prediction scheme defined as any prediction scheme that minimizes mean squared prediction error among some class of predictors under a particular model for the field, is commonly used in all these areas of prediction. This book summarizes past work and describes new approaches to thinking about kriging.

Michael Ed. Hohn (West Virginia Geological & Economic Survey,
Morgantown, USA) **Geostatistics and Petroleum Geology** (Second
Edition), Kluwer Academic Publishers, Dordrecht, Hardbound, ISBN
0-412-75780-X, November 1998, 248 pp., NLG 220.00 / USD 132.00
/ GBP 77.00. Available at a reduced price for course adoption when
ordering six copies or more.

This book introduces the concepts and methods of spatial statistics to geologists and engineers working with oil and gas data, and covers all of the most commonly encountered geostatistical methods for estimation and simulation.

Topics include calculation and modeling of semivariograms, linear methods of kriging, cokriging, nonlinear methods such as indicator kriging and disjunctive kriging, and conditional simulation, including sequential indicator simulation, sequential Gaussian simulation, and simulated annealing. Semivariogram models range from very simple to complex. All of the fundamental semivariogram models are illustrated, along with anisotropic models, hole effects, geometric and zonal models, and the mechanics of fitting models.

For each geostatistical method treated in detail, the author introduces necessary theory and background, describes how the method works, the steps a user must go through, and problems a user might encounter.

The emphasis throughout is on what the practitioner needs to know, and the results that can be expected. The book is replete with examples in two and three dimensions, using real-world data such as porosity and permeability, gas production, structural elevation of a reservoir, and seismic information.

Geostatistics and Petroleum Geology will be an invaluable advanced-level text for students on petroleum engineering and geosciences courses, as well as an important reference for petroleum geologists and petroleum engineers in oil companies worldwide.



SECOND YEAR IN A ROW!!

Again a \$1000 Award from IUGS to IAMG!

12 April 1999

Dr. Thomas A. Jones
Secretary General, IAMG
Exxon Production Research Co.
P.O. Box 2189
Houston, TX 77252-2189
USA

RE: 1998 ANNUAL REPORT FOR IAMG TO IUGS

Dear Dr. Jones,

Thank you for sending us the 1998 Annual Report for IAMG, which was received 11/20/98. Your report was examined and discussed at the IUGS 45th Executive Committee meeting in Florence, Italy, January 26-30, 1999.

The Committee accepted the IAMG report. Dr. Robin Brett referred to a letter from your Association, expressing the disturbance that the 1998 Executive Committee minutes had created. IUGS deeply regrets what happened. The statements contained in the Minutes were probably the result of misinterpretation of some remarks about IAMG reported to IUGS. The Committee decided to allocate USD 1,000 for travel of participants from Eastern Europe to the Fifth IAMG Meeting in Norway.

We wish you all the best in 1999.

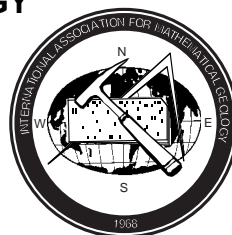
Sincerely,

Attilio C. Boriani Secretary General

cc: Dr. Ricardo A. Olea, IAMG President

IUGS Bureau

**INTERNATIONAL ASSOCIATION FOR MATHEMATICAL GEOLOGY
1999 MEMBERSHIP APPLICATION/RENEWAL**



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REQUIRED: IAMG DUES. Check at least one journal (subscription includes annual dues).

- Mathematical Geology US\$ 32.00
- Computers & Geosciences, regular \$ 69.00
- Computers & Geosciences, student (proof of enrollment required) \$ 34.50
- Natural Resources Research (previously Nonrenewable Resources) \$ 49.00

OPTIONAL: IAMG Monograph Series. Circle prices of desired monographs.

- #2: "Oil and Gas Forecasting – Reflections of a Petroleum Geologist" by Lawrence J. Drew US\$ 42.00
- #3: "Geostatistical Glossary and Multilingual Dictionary" edited by Ricardo Olea \$ 31.50
- #5: "Computers in Geology – 25 Years of Progress" ed. by John J. Davis and Ute Herzfeld \$ 38.50

NOTE: Monographs #1 and #4 are no longer available

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Upcoming Meetings

Palaeoclimate Modelling and Analysis: QUATERNARY EARTH SYSTEM Interactions and TELEGEOPROCESSING - TeleGeo'99, **6-7 May 1999**. Robert Laurini, Program Chairman, Claude Bernard University of Lyon, France; E-mail: laurini@lisisun1.insa-lyon.fr

Modelling, I.C. Prentice (Lund), Albufeira, Portugal, **21 - 27 May 1999**. Dr Josip Hendekovic, Telephone +33 3 88 76 71 35; fax +33 3 88 36 69 87, email: euresco@esf.org.

6th FUZZY DAYS - International Conference on Computational Intelligence. Dortmund, Germany, **25-27 May 1999**. Ms Ulrike Lippe (Conference Secretariat). Phone: +49 231 755 6223. Fax: +49 231 755 6555. <http://lrb.cs.uni-dortmund.de/fd6/>

GEOLOGICAL ASSOCIATION OF CANADA-Mineralogical Association of Canada, Sudbury, Ontario, Canada, **26-28 May 1999**. P. Copper, Dept. of Earth Sciences, Laurentian University, Sudbury, Ontario, P3E 2C6, Canada; Phone: +1 705 675 1151, ext. 2267; Fax: +1 705 675 4898; E-mail: gacmac99@nickel.laurentian.ca

AMERICAN GEOPHYSICAL UNION (Spring Meeting), Boston, Massachusetts, USA, **31 May-4 June 1999**. AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA; Phone: +1 202 462 6900; Fax: +1 202 328 0566; E-mail: meetinginfo@kosmos.agu.org; Website: <http://www.agu.org>

VAIL ROCK '99, Symposium Rock Mechanics for Industry, Vail, Colo., American Rock Mechanics Assoc., **6-9 June 1999**. Expomasters, Phone: 303/771-2000. Fax: 303/843-6212. E-mail: mcramer@expomasters.com)

MODELS OF VOLCANIC-SEDIMENTARY ORE-FORMING SYSTEMS, St.Petersburg, **7-10 June 1999**. Dr.Mikhail P.Torokhov, VNIIOkeangeologia, Angliisky ave.1,S.Petersburg, 190121 Russia, Phone: 7-812-2195064; Fax:7-812-1141470; e-mail: torokhov@g-ocean.spb.su

EAGE 61st Annual Meeting and Exhibition (European Association of Geoscientists & Engineers), Helsinki, Finland, **7-11 June 1999**. EAGE Business Office, Standerdmolen 10, PO Box 59, 3990 DB Houten, The Netherlands. ph. +31 30 6354066 Fax: +31 30 6343534, E-mail: eage99@hut.fi or eage@eage.nl <http://www.eage.nl/eage5.html>

COASTAL SEDIMENTS 1999, Hauppauge, New York, USA, **20-24 June 1999**. N. Kraus, Co-Chair, U.S. Army Engineer Waterways Experiment Station, Coastal & Hydraulics Laboratory, 3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199, USA; Phone: +1-601 634 2016; E-mail: preinfo@coastalsediments.org; Website: <http://www.coastalsediments.org>; abstract Deadline: May 11, 1998

CLAY MINERALS SOCIETY, Purdue University, West Lafayette, Indiana, USA, **26 June - 1 July 1999**. Patricia Jo Eberl, Clay Minerals Society, P.O. Box 4416, Boulder, Colorado 80306, USA; Phone: +1 303 444 6405; Fax: +1 303 444 2260; E-mail: peberl@clays.org

4th LIQUID MATTER Conference. Granada, Spain, **3-7 July 1999**. +34 58 24 32 13 / +34 58 24 32 14, email: liquid99@ugr.es, <http://www.ugr.es/~liquid99/>

GAS HYDRATES and Challenges for the Future. Park City, Utah, USA, **18-22 July 1999**. United Engineering Foundation, Three Park Avenue, 27th Floor, New York, NY 10016-5902 Tel: 1-212-591-7836; F: 1-212-591-744; E-mail: engfnd@aol.com <http://www.engfnd.org/engfnd/9ag.html>

International Union of GEODESY AND GEOPHYSICS and International Association of HYDROLOGICAL SCIENCES, Birmingham, UK, **19-30 July 1999**. IUGG99, School of Earth Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK. Fax: 44 121 414 4942; E-mail: IUGG99@bham.ac.uk

JOINT STATISTICAL MEETINGS, Baltimore, Maryland, **8 - 12 August 1999**. Sponsored by ASA, ENAR, IMS and WNAR, ASA, 1429 Duke St., Alexandria, VA 22314-3402, USA, Tel: 703 6841221; Fax:703 6842037; E-mail: meetings@asa.mhs.compuserve.com

IAMG'99, Trondheim, Norway, **August 6-11, 1999**. Stephen Lippard, Conference Secretariat IAMG '99, Department of Geology and Mineral Resource Engineering, 7034 Trondheim, Norway, Phone: 47 73 594837, Fax: 47 73 594814, e-mail: iamg99@geo.ntnu.no <http://www.geo.ntnu.no/igb/iamg99/text.html#program>

International STATISTICAL Institute, 52nd Biennial Session, Helsinki, Finland, **11 - 18 August 1999**. ISI Office, Prinses Beatrixlaan 428, P.O. Box 950, 2270 AZ Voorburg, The Netherlands. Tel: 31 70 3375737; Fax: 31 70 3860025; E-mail: isi@cs.vu.nl

Society for Geology Applied to Mineral Deposits and International Association on the Genesis of Mineral Deposits, "MINERAL DEPOSITS: PROCESSES TO PROCESSING", London, UK, Imperial College Natural History Museum, **22-25 August 1999**. Dr. Chris Stanley, Department of Mineralogy, Natural History Museum, Cromwell Road, London, SW7 5BD, UK. Tel: +44 171 938 9361; Fax: +44 171 938 9268; E-mail: cjs@nhm.ac.uk

GOLDSCHMIDT Conference, Cambridge, Massachusetts, USA, **22-27 August 1999**. Stein B. Jacobsen, Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA 02138, USA; Phone: +1-617 495 5233; Fax: +1-617 496 4387; E-mail: goldschmidt@eps.harvard.edu; Website: <http://cass.jsc.nasa.gov/meetings/gold99/>

SEDIMENTOLOGY (19th Regional European Meeting), Copenhagen, **24-26 August 1999**. Conventum Congress Service, Carit Etlarsvej 3, DK-1814, Frederiksberg C, Denmark; Phone: +45 31 31 08 47; Fax: +45 31 31 63 99; or Lars B Clemmensen, Geological Institute, Oster Voldgade 10, DK-1350, Copenhagen K, Denmark; Phone: +45 35 32 24 49; E-mail: larsc@geo.geol.ku.dk

ENVIRONMENTAL GEOCHEMICAL BASELINE MAPPING IN EUROPE, Vilnius, Lithuania, **1-4 September 1999**. Dr. Virgilija Gregorauskiene, Head of Geochemistry Group, Geological Survey of Lithuania, S. Konarskio 35, 2600 Vilnius, Lithuania; Phone: +370 67 239055; Fax: +370 67 06376; E-mail: virgilija.gregorauskiene@lgt.lt

International Association of Hydrogeologists "HYDROGEOLOGY AND LAND USE MANAGEMENT", Bratislava, Slovakia, **6-10 September 1999**. Marian Fendek, Geological Survey of Slovak Republic, Mlynska dolina 1, 817 04 Bratislava, Slovakia; Phone +421-7 3705355; Fax:+421-7 371940; E-mail: IAHCONG@GSSR.SK

MINING AND THE ENVIRONMENT II, Sudbury, Ontario, Canada, **6-12 September 1999**. Sudbury '99, Centre in Mining and Mineral Exploration Research (CIMMER), Laurentian University, Sudbury, Ontario, P3E 2C6, Canada; Phone:+705 673 6572; Fax:+705 673 6508; E-mail: cmosher@nickel.laurentian.ca or bevans@nickel.laurentian.ca

19th International Meeting on ORGANIC GEOCHEMISTRY, Istanbul, Turkey, **6-10 September 1999**. Conference Chairman Prof. Dr. M. Namik Yalçin, Tübitak MAM. Conference Secretary Mr. Cengiz Soyulu,TPAO Arastirma Merkezi, Mustafa Kem al Mah. 06520 Esentepe, Ankara, Turkey, Tel: (+90-312) 284 34 90, Fax: (+ 90-312) 284 34 91, E-mail: oge99@petrol.tpaogov.tr, <http://www.nemrut.mam.gov.tr/eaog99/eaog99.html>

BioGeo IMAGES 99, int'l conf., Dijon, France, by SEPM, Association de Paleontologie Francaise, and sponsored and supported by IAMG, **6-9 Sept. 1999**. BGI 99, Biogeosciences -Dijon, UMR 5561 CNRS, 6 blvd Gabriel, 21000 Dijon, France. E-mail: BGI99@u-bourgogne.fr, <http://www.u-bourgogne.fr/BIOGEOSCIENCE/BGI99.html>

The DEEP EARTH: Theory, Experiment and Observation: Large Scale Processes and Properties, George Helffrich (Bristol) and John P. Brodholt (London), Acquafredda di Maratea, Italy, **11 - 16 September 1999**. Dr Josip Hendekovic, Telephone +33 3 88 76 71 35; fax +33 3 88 36 69 87, email: euresco@esf.org (Please quote 99-125 in any correspondence)

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, int'l. mtg., Birmingham, England, **12-15 Sept. 1999**. AAPG Conventions Dept., P.O. Box 979, Tulsa, Okla. 74101-0979, Phone: 918/560-2679. Fax: 918/560-2684, <http://www.geobyte.com/meetings.html>

MESOZOIC TERRESTRIAL ECOSYSTEMS, Buenos Aires, **26 September - 2 October 1999**. Georgina Del Fuego, Av. Angel Gallardo 470, 1405 Buenos Aires, Argentina; E-mail: imposio@musbr.org.secyt.gov.ar

TRANSPORT IN SEDIMENTARY SYSTEMS: from the pore- to the basin-scale, Paris, France, **27-28 September 1999**. Medard Thiry, Ecole des Mines de Paris, Centre Informatique Geologique,

I. P. SHARAPOV (1907 - 1996)

During my recent stay in Moscow I learned about the death of Ivan Prokofyevich Sharapov — one of the old pioneers of mathematical geology in Russia.

I got his address in the USA in 1964 and started to exchange some letters. In 1965 we met for the first time at the Black Sea shore in Sochi when he flew several hours from Perm to see me briefly during a week-end.

He started to publish his scientific papers already in 1946 and continued to make practically oriented research, more and more emphasizing new exploration methods including the application of mathematical statistics. Working at the Perm University (in the chair of the department for exploration methodology of mineral resources) he was in the age of 50 years arrested for political motives. When he got his liberty again, he had a very difficult life. Despite all negative circumstances he continued in his intensive creative work, since 1962 publishing many studies and research works. In 1965 his book "Application of Mathematical Statistics in Geology" was described by D.A. Rodionov as the first attempt in the USSR to publish a practical guide for geologists how to use mathematical methods in the earth sciences. (The second edition appeared in 1971 and the book was also translated into the Romanian language.) At the age of 60 Sharapov was allowed to move to Moscow where he started an extreme activity paying lot of attention to a new discipline — metageology, i.e. the science about the struc-

ture, methodology and exploration of geology. For 17 years he had to wait for the first publication of his monograph on Metageology, however a complete version was published just in the year of his death in 1996. He was already almost 80 years old when — in the years of perestrojka — he was permitted to defend his scientific degree of Doctor of Sciences at the University of Novosibirsk. He had lot of health problems, however he worked almost to the last day of his life. His daughter is now completing the 4th volume of the "History of Humanism" (the first three volumes prepared by Sharapov himself have not yet been published at all).

I had the pleasure to meet I.P. Sharapov many times at various symposia in Novosibirsk and Moscow and I had to admire his indefatigable vitality as well as a deep respect of many of his colleagues. I started many scientific and personal contacts thanks to him — not only with the colleagues from Russia and other parts of the USSR but also from the Western countries (incl. D.G. Krige or G. Matheron). Being in Moscow I paid visits to him in his small flat, the last one in 1994. When visiting Moscow two years later he was in the hospital. His later death was not reported to me and I continued to send him circular letters of our symposia at Pribram or in Prague where he was never allowed to come.

His memory should be kept in mind of everybody who will want to make a complete history of the development of mathematical geology as well as of all Earth sciences in the world.

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SPE Annual Technical Conference and Exhibition, Houston, Texas, U.S.A., **3-6 October 1999**. SPE Continuing Education, P.O. Box 833836, Richardson, TX 75083-3836, U.S.A., Phone: 01-972-952-9316, Fax: 01-972-952-9435, E-mail: cladowski@spelink.spe.org

The Mining Pribram Symp. 1999 - International section on MATHEMATICAL METHODS IN GEOLOGY and also on GEOETHICS, Prague, Czech Republic, **4-9 October 1999**. Co-organized by the Regional Center of the IAMG in Prague. The Mining Pribram Symposium, PO Box 41, 261 02 Pribram, Czech Republic, Fax +420306 23169, or Václav Nemeč, K rybníčkům 17, 100 00 Praha 10 - Stránská, Czech Republic. Phone: +4202 7811801, E-mail: nemcoval@vse.cz

Int'l Conference on TEXTURES AND PHYSICAL PROPERTIES OF ROCKS, Goettingen, Germany, **13-15 October 1999**. Dr. Bernd Leiss, Institute of Geology and Dynamics of the Lithosphere, Goldschmidtstr. 3, D-37077 Göttingen, E-mail: bleiss1@gwdg.de, <http://www.gwdg.de/~bleiss1/tppr.html>

GEOLOGICAL SOCIETY OF AMERICA, ann. mtg., Denver, Colo., **25-28 Oct. 1999**. Becky Martin, GSA Meetings Department, Box 9140, Boulder, Colo. 80301-9140. Phone: 303/447-2020, ext. 164. Fax: 303/447-1133, E-mail: meetings@geosociety.org; Website: <http://www.geosociety.org/meetings/index.htm>

ENVIRONMENTAL HYDROLOGY AND HYDROGEOLOGY, San Francisco, California, USA, **7-10 November 1999**. American Institute of Hydrology, 2499 Rice Street, Suite 135, St. Paul, MI 55113-3724, USA; Phone +1 651 484 8169; Fax: +1 651 484 8357; E-mail: AIHydro@aol.com; Website: <http://www.aihydro.org>

SLOPE STABILITY ENGINEERING: Geotechnical and Geoenvironmental Aspects, Matsuyama, Shikoku, Japan, **8-11 November 1999**. Prof. Takua Yamagami, Gen. Secretary of IS-Shikoku '99, Dept. of Civil Eng., Univ. Tokushima, 2-1 Minami-josanjima-cho, Tokushima 770, Japan; Phone: +81-886 56 7345; Fax: +81-886-56-7319; Email: takuo@ce.tokushima-u.ac.jp

Advanced RESERVOIR CHARACTERIZATION for the Twenty-First Century, Houston, Texas. GCSSEPM Foundation, 165 Pinehurst Rd., West Hartland, Conn. 06091-0065. Phone: 800/436-1424. Fax: 860/738-3542. E-mail: gcsepm@mail.snet.net; Website: <http://www.gcsepm.org>

AMERICAN GEOPHYSICAL UNION (Fall Meeting), San Francisco, California, USA, **13-17 December 1999**. AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA; Phone: +1 202 462 6900; Fax: +1 202 328 0566; E-mail: meetinginfo@kosmos.agu.org; Website: <http://www.agu.org>

FLUID AND THERMAL HISTORY OF SEDIMENTARY BASINS IN THE SOUTHERN MIDCONTINENT, 13th Annual OGS Workshop, hosted by: Oklahoma Geological Survey, Kansas Geological Survey,

and the International Association for Mathematical Geology, Norman, Oklahoma, **22-24 February 2000**.

Society for MINING, METALLURGY, AND EXPLORATION, Salt Lake City, Utah, USA, **6-9 March 2000**. SME, 8307 Shaffer Parkway, P.O. Box 625002, Littleton, CO 80162-5002, USA; Phone: 1 303 973 9550; E-mail: smenet@aol.com

The nature and tectonic significance of FAULT ZONE WEAKENING, London, UK, **8-9 March 2000**. R.E. Holdsworth, Department of Geological Sciences, University of Durham, Durham DH1 3LE, UK; Fax: +44 0191 374 2510; E-mail: R.E.Holdsworth@durham.ac.uk; Website: <http://www.dur.ac.uk/~dgl1ms/reh.htm>

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, ann. mtg., New Orleans, La., **16-19 April 2000**. AAPG, 1444 So. Boulder Ave., P.O. Box 979, Tulsa, OK 74101-0979. Phone: 918/560-2639. Fax: 918/560-2626, E-mail: dkeim@aapg.org

SALT SYMPOSIUM, The Hague, The Netherlands, **7-11 May 2000**. Secretariat Organizing Committee 8th World Salt Symposium, PO Box 25, 7550 GC Hengelo Ov, The Netherlands. Phone: 31 74 2443908. Fax: 31 74 2443272. E-mail: Salt.2000@inter.NL.net

GEOLOGY AND ORE DEPOSITS 2000: The Great Basin and Beyond, symposium, Reno and Sparks, Nev., **15-18 May 2000**. Geological Society of Nevada, Nevada Bureau of Mines and Geology, et al. Geological Society of Nevada, P.O. Box 12021, Reno, Nev. 89510-2021. Phone: 702/323-3500. Fax: 702/323-3599, E-mail: gnsymp@nbgm.unr.edu; Website: <http://www.seismo.unr.edu/GSN>

TRACERS AND MODELLING IN CONTAMINANT HYDROLOGY, Liège, Belgium, **23-25 May 2000**. TraM'2000, LGIH, University of Liège, B19 Sart-Tilman, 40000 Liège, Belgium; Phone: +32 4 366 2216; Fax: +32 4 366 2817; E-mail: adassarg@lgih.ulg.ac.be

EAGE 62nd Conference and Technical Exhibition, Glasgow, UK, **29 May - 2 June 2000**. 31-30-696-2655, e-mail: eage@eage.nl

AMERICAN GEOPHYSICAL UNION (Spring Meeting), Washington, DC, **30 May - 3 June 2000**. AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA; Phone: +1 202 462 6900; Fax: +1 202 328 0566; E-mail: meetinginfo@kosmos.agu.org; Website: <http://www.agu.org>

4th International Symposium on SPATIAL ACCURACY ASSESSMENT in Natural Resources and Environmental Sciences, Amsterdam, **12-14 July 2000**. Symposium chair Dr Gerard B.M. Heuvelink, University of Amsterdam, Nieuwe Prinsengracht 130, 1018 VZ Amsterdam, The Netherlands. E-mail: accuracy@frw.uva.nl, <http://www.gis.wau.nl/Accuracy2000>

"GEO-INFORMATION FOR ALL" (19th International Congress of the International Society for Photogrammetry and Remote Sensing), Amsterdam, **16-22 July 2000**. Prof. K.J. Beek, PO Box 6, 7500 AA Enschede, The Netherlands; Phone: +31 (0) 53 4874214; Fax: +31 (0) 53 4874200; E-mail: beek@itc.nl

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Positions available!

**Teaching and Research Assistants, Geomathematics,
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The Geomathematics Division at the Universität Trier, Germany, is inviting applications for two teaching and research assistant positions. Salary is half-time equivalent. Candidates are required to hold a diploma, masters degree or equivalent in mathematics, a geoscience, physics, computer science, or a related science, and should have an interest in research in the interdisciplinary field of geomathematics. Candidates are expected to pursue a doctoral degree in geomathematics by working on a topic related to one of the projects conducted in our group, which include theoretical and applied geomathematics, glaciology, environmental sciences, marine geology and geophysics, satellite and remote sensing data evaluation, and field work in Arctic and Alpine areas. A strong background in mathematics and programming experience is desired.

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Inquiries and applications may be sent to

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Germany
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Meetings continued from p.15

31st Int'l GEOLOGICAL CONGRESS - Geology and Sustainable Development: challenges for the Third Millennium, Rio de Janeiro, Brazil, **6-17 August 2000**. IGC Secretariat Bureau, Av. Pasteur, 404, Anexo 31 ICG, Urca, Rio de Janeiro - RJ - CEP 22.290-240, Brazil. Tel. (0055-21) 295-5847, Fax: (0055-21) 295-8094, E-mail: 31igc@cristal.cprm.gov.br, Website: www.31igc.org

GOLDSCHMIDT 2000, Oxford, UK, **3-8 September 2000**. P. Beattie, Cambridge Publications, Publications House, PO Box 27, Cambridge UK CB1 4GL; Phone: +44-1223 333438; Fax: +44-1223 333438; E-mail: Gold2000@camppublic.co.uk; Website: <http://www.camppublic.co.uk/science/conference/Gold2000/>

ECCOMAS2000, European Congress on Computational Methods in Sciences and Engineering, Barcelona, **11-14 September 2000**. SEMNI, Edificio C-1, Campus Norte (UPC), C/Gran Capitán, s/n, 08034 Barcelona, Spain, ph. +34 93 401 6487, fax: +34 93 401 6517, e-mail: eccomas2000@etsecpb.upc.es, <http://cimne.upc.es/cimne/congresos/eccomas.htm>

GEOLOGICAL SOCIETY OF AMERICA, ann. mtg., Reno, Nev., **13-16 Nov. 2000**. GSA Meetings, Box 9140, Boulder, CO 80301-9140. Phone: 303/447- 2020, ext. 164. Fax: 303/447-1133

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (Annual Meeting), Denver, Colorado, **8-11 April 2001**. AAPG Conventions Department, P O Box 979, 1444 S. Boulder Ave., Tulsa, OK 74101-0979, USA. Phone: +1 918 560 2679; Fax: +1 918 560 2684; E-mail: dkeim@aapg.org

International Conference on GEOMORPHOLOGY (5th), Tokyo, Japan, **23-28 August 2001**. Prof. Kenji Kashiwaya, Dept. of Earth Sciences, Kanazawa University, Kakuma, Kanazawa 920-1192, Japan; Phone & Fax +81-76 264 5735; E-mail: kashi@kenroku.kanazawa-u.ac.jp; Web Site: wwwsoc.nacsis.ac.jp/jgu/

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