



GEOSTATISTICAL ASSOCIATION OF AUSTRALASIA

Newsletter 16

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Contact Addresses: PO Box 1719, West Perth WA, 6872.

[Http:// www.gaa.org.au](http://www.gaa.org.au)

OVERVIEW FROM THE PRESIDENT



Greetings from Brisbane – or more correctly from an airplane seat somewhere over the Great Southern Land! This is a situation many GAA members find themselves in now days: travelling and working in, or between, a range of locations. This nomadic work pattern is resulting in a wider spread of GAA members around the country. The GAA committee for 2002/2003 is indicative of this, with representatives based in Perth, Kalgoorlie, Townsville and Brisbane.

In this newsletter we address what benefit the GAA provides to its 130 or so wide-spread members, whose common ground includes the practice of, or interest in, spatial statistics. Ian Lipton discusses the aims of the GAA, as set out at its creation in 1996, and whether these are still relevant. In summary, the GAA provides a platform for members to communicate about spatial statistical matters: share ideas; raise questions; answer questions; and generally encourage and support the understanding and application of the techniques amongst members. This newsletter, our website (currently under 're-construction'), formal symposia and ad hoc technical presentations by members or visitors go some way to achieving these aims. These options are at the disposal of each and every GAA member or relevant visitor to our shores who wishes to present feedback from a visit or conference, present a case study for information or comment, or simply repeat a presentation given elsewhere. I encourage members to contact their local committee member to set up a convenient meeting if they wish to make use of this option.

With respect to a formal symposium for GAA members to present papers in 2003, the committee has decided to pursue a link with the AusIMM/AIG sponsored Mine Geology Conference, to be held in Victoria in October 2003 (see the article by Simon Dominy, Co-chairman for the conference, in this newsletter). Sharing a platform with MODSIM 2003 in July 2003 in Townsville did not prove practical, however we still encourage GAA members to support this conference and submit relevant papers as has been done in the past (see article by Ute Mueller, in this newsletter). Whilst the majority of our members are currently from within the mining industry, the majority of research and the implementation into spatial statistics is probably being conducted outside of mining applications. The GAA therefore encourages membership from outside of the mining industry and for our members to be aware of applicable techniques available from outside of the mining industry.

Mark Noppé

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GAA – REVIEW OF GOALS

In any organization it is worthwhile from time to time to review ones goals to make sure that they remain appropriate. It is also important to consider whether they are being achieved. The objectives of the GAA as stated in the (still) draft constitution are:

- Promote the good practice, development, study and application of geostatistics in the mining, petroleum, environment and related fields.
- Increase the awareness and status of geostatistics in its various fields of application.
- Promote co-operation and fellowship among the geostatistical community in Australasia.
- Provide a forum for the exchange of ideas among membership of the Association on technical and professional matters.
- Print or publish (including by electronic means) any periodicals, newsletters, journals, books or leaflets that the Association may think desirable for the promotion of its objectives.
- Organise and promote lectures, meetings, symposia and other activities to further the professional development of membership.
- Promote liaison of the Association and its membership with their colleagues internationally.
- Foster and develop good relations and cooperative efforts with other relevant professional and industry bodies — both locally and internationally — in order to further the objectives of the Association.
- Foster and develop good relations and cooperative efforts with universities

currently teaching or having research efforts in the field of geostatistics (or closely related fields) — both locally and internationally — in order to further the objectives of the Association.

- Recognise outstanding contributions to the Association or to the promotion or development of geostatistics by granting awards.

My personal assessment is that these goals are as appropriate for the GAA now as they were when drafted in 1997. In terms of how we address these objectives, it seems to me that the only ones that we fall short on are our relationships with other professional and industry bodies and kindred international organizations. I think it would be appropriate for the GAA to make formal contact with organizations such as the AusIMM, AIG, JORC and GASA at least once a year, just to say "We are here, we have an interest in the mining industry, we have a useful forum for discussion of geostatistical issues. How can we help you?" We might even extend this to some sort of annual report from the GAA (of the 'year-in-review' type)

That's my personal view but I expect that many GAA members will have quite different views. From the perspective of Kalgoorlie or Charters Towers, perhaps the GAA is not doing so well? Maybe there are other functions that members would like to see the GAA perform? Make the GAA work for you – jot down your ideas on an email and send them to secretary@gaa.org.au

Ian Lipton
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SAMPLING THEORY AND PRACTICE

If you are interested in sampling, there is an interesting book "Introducción al Muestreo Minero" by Marco Alfaro that is available free of charge from the web site of the Mining Institute of Engineers of Chile (www.iimch.cl). The book has a preface by Pierre Gy and Dominique Francois Bongarcon. Those of you who do not speak Spanish may find some of the detail a little challenging but many of the diagrams and pictures are useful and fairly self-explanatory. The format of the book is PDF. The zipped file has only 914K.

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GEOSTATISTICS IN EUROPE

John Vann, Scott Jackson and Olivier Bertoli, the three principals of Quantitative Geoscience Pty Ltd. ('QG'), made a technical visit to England and France in March 2002. The trip was aimed at getting a snapshot of 'state of the art' geostatistical practices, software developments and research trends. Particular interest was paid to environmental and geotechnical applications. We visited:

The British Geological Survey (BGS), headquartered in Nottingham, is one of the world's largest earth science organisations, with an annual budget of over £200 million. QG spent time with members of the 'Urban Geoscience and Geological Hazards' Programme, Groundwater Information Group and the Information Technology Group (Bill Hatton, the manager of this group, organised our meetings). The BGS are constructing a mammoth integrated database of geological information, mapping and hazard data for the whole of the UK. As part of this work, which is just beginning, they are utilising some geostatistical methods to generate better risk maps. For example, there is a program underway to generate a detailed map of the recent 'drift' or Quaternary cover. This map will be important for planning of civil works (building, roads, etc.). The eventual aim is to produce detailed maps, accessible in GIS systems that allow interrogation of both raw data and processed depth of drift interpretations. These will be eventually made available to the public. More information is available at:

<http://www.bgs.ac.uk/>



The University of Leeds (see picture above) has a long history of teaching and research in geostatistics, dating back to the early 1970's. John Vann was part of the M.Sc. class of 1990 at Leeds (other graduates of this school in Australia include

Sia Khosrowshahi and Richard Gaze at Golders, Mark Sweeny at Rio Tinto and Mike Binns at Minstat). The Geostatistics School at Leeds was founded by Alan ('Bon') Royle, who has since retired, and has been headed since the late 1980's by Peter Dowd (a geologist and mathematician who hails from Broken Hill). QG met with Peter to catch up on recent developments. In a theme that was to recur at Fontainebleau, it was quickly apparent that the schools focus has shifted, by necessity, from mining to non-mining applications. The University now offers two streams in the M.Sc. programme in the School of Process, Environmental and Materials Engineering, one mining-oriented and the other environment oriented. QG had interesting discussions about simulation of objects, and Peter described a case study in the area of nuclear waste disposal. Research activity in the school has been healthy, with a number of recently completed PhD theses, but it directed increasingly towards non-mining applications: eg. simulation of fracture networks, environmental risk management etc. On the educational front, there are some moves afoot to allow some components of the MSC courses to be taken by distance learning. QG also obtained evaluation versions of commercial mineral economics software developed by Peter and one of his post-docs. For more information of geostatistics at Leeds visit:

<http://www.leeds.ac.uk/speme/about/index.htm>.

The Imperial College is home to a well-known geological school, with recent focus on mineral economics. John Vann made a brief visit to Dennis Buchanan to see what they were up to in the areas of geostatistics and mineral economics. Dennis explained the structure and content of his well-known short courses. More information is available from <http://www.ic.ac.uk>.

Geovariances is the developer of the world's leading specialist commercial geostatistical software, Isatis. Many GAA members will now be familiar with this software as there are now more than 600 licences in the world, including a significant number in Australia (Rio Tinto, Gold Fields, WMC, Newcrest, Lihir Gold, MPI, University of Sydney, University of NSW, Edith Cowan University, QG, SRK, Snowden, and RSG). QG are very active users of this software as well as conducting formal and informal training and support for our consulting

clients. So we were interested to get a picture of where Geovariances are taking this software. We held business discussions with Brigitte Hogan and a technical session with Yves Touffait. Information on Isatis is available at:

<http://www.quantitativegeoscience.com/software>.



The Centre de Geostatistique

(picture above) was the birthplace of modern geostatistics. Scott Jackson of QG is one of a small handful of Australian graduates from their postgraduate CFSG programme (some others being Michael Humphreys at SRK and Stuart Masters at Rio Tinto). QG's Olivier Bertoli also undertook training in geostatistics at the Centre as part of his studies at the Paris School of Mines. QG held meetings with Jacques Riviorard, Christian Lantuejuel and Helene Beucher. We held some technical discussions about simulation methods, again with emphasis on the simulation of objects, such as fractures. QG also had a technical discussion of simulation in general, including the role of kriging in the simulations (as conditioning in TB and SGS for example). Too often, insufficient attention is paid to this aspect by practitioners: in fact we should pay the same attention to setting up kriging searches and other parameters in simulation as in estimation! A major area of research at Fontainebleau is now pollution (especially air pollution), and there is a very large commercial programme underway in Paris right now (with another Australian and ex-Geoval consultant Chris Roth driving that process). Some mining research is still going on, but it is not the main focus any longer. Helene Beucher explained to us the current status of the CFSG, which has also been split into two streams, in this case mining and petroleum. The other big news from the Centre is that the new head of the school is Jean-Paul Chiles, who left the BRGM to take up this job in April 2002. Margaret Armstrong has now taken up a position at Cerna at

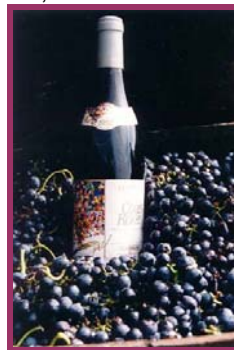
Ecole des Mines in Paris where her main focus is financial research. See also <http://www.cg.ensmp.fr> for more news from the Centre.

National School of Public Works

(Ecole nationale des travaux publics de l'Etat) is located in campuses all over France and QG visited the facility in Lyon. The facility is closely associated with a research institution specialising in tunnelling. Senior academic Richard Bertoli (yes, related to QG's Olivier Bertoli) hosted our visit. We were interested in getting an idea of the current state of research and issues relating to civil geotechnical risk modelling. These issues have relevance to mining applications: a new tunnel in the alps, for example, will be over 50km long and have nearly 1,000m of rock above it at its deepest point. By any other name this *is* mining! More information is available from <http://www.cge.asso.fr/>.

In conclusion, QG found that the traditional mining base of geostatistical research and training is eroding and that the main directions are petroleum, environment and geotechnical applications. We also saw that a strong emphasis on the association between geostatistics and financial modelling is emerging. Finally we concluded that the high-level postgraduate courses in geostatistics are surviving in Europe, but with fewer and fewer mining participants.

Oh, and...



Guigal (just south of Lyon) are producing some damn fine reds (see picture above) QG were researching geostatistical applications in viticulture...of course!

See <http://www.guigal.com/>

John Vann

jv@quantitativegeoscience.com

UPCOMING MEETING

Dr Simon Dominy

MCA Lecturer in Mining Geology & Resource Engineering
Course Director: MAppSc Mining & Exploration Geology, James Cook University
will be presenting a talk for the GAA on

Bendigo

18th September 2002

Venue: BFP Consultants Boardroom
2nd floor, 233 Adelaide Terrace, East Perth
talk starts at 6 pm. Drinks and nibbles will be provided from 5.15
Sponsored by Bateleur Minerals, Ravensgate and BFP Consultants.

For further information, please contact Stella Searston (bateleur@omen.net.au)

5TH INTERNATIONAL MINING GEOLOGY CONFERENCE

17-19 November 2003

Bendigo, Victoria

The Fifth International Mine Geology Conference is to be held in Country Victoria from the 17-19 November 2003 to follow on from the successful events staged in Coolom in 2000, Launceston in 1997, Kalgoorlie in 1993 and Mt Isa in 1990. This is the Premier forum for Mine Geologists throughout Australia and Overseas to meet and exchange information and views on their operations and the latest developments and innovations in key areas directly impacting on their day-to-day work. The Conference venue will be Bendigo, the centre for the major rejuvenation of the Central Victorian Goldfield.

We are planning a strong technical content based around world class keynote speakers in each of several interest areas supported by case studies to give specific examples of current practices and how these are being implemented in operations similar to your own. Geologists from across all types of mining are invited to submit papers and/or attend, from hard rock to soft rock and underground to open cut. The following is the current list of session topics to give you an idea of the planned content.

- *The Role of the Mine Geologist*
- *Drilling, Sampling and Analysis*
- *Mapping and Geology Modelling*
- *Structural Geology and the Resource Estimation Process*
- *Metallurgy and Ore Characterisation*
- *Ore Reserves and Mineral Resources*

- *Geostatistical Applications*
- *Grade Control and Reconciliation*
- *Dealing with the Nugget Effect*
- *Geological Risk Management*
- *Management, Education and Training*

The aim is for the conference to be a forum to share and exchange ideas between working mine geologists. The technical content will therefore be supported by events designed to encourage this free flow of ideas. An open forum session using the key speakers will be held one afternoon. A trade display and exhibition will be held to highlight major industry suppliers and the geology of mining operations in our area. A program of local mine-based field excursions and a partners program is planned.

The conference is being organised by a committee drawn from The AusIMM, AIG, Geostatistical Association of Australasia (GAA), International representatives, and aided by the Conference Team at The AusIMM.

GAA members are invited to consider attending the event, submitting an abstract for consideration and/or considering participation in the exhibition and trade display. A first circular will be produced in the near future.

Dr Simon C Dominy
(James Cook University)
Conference Co-Chair
Email: simon.dominy@jcu.edu.au

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QUANTIFYING RISK AND ERROR SYMPOSIUM 22 MARCH 2002

During July and August, delegate hard copies of the symposium proceedings, together with the CD were posted out to attendees and authors.

Additional copies of the proceedings are available on CD, at the cost of \$65 per volume, plus \$8 postage and handling.

For orders, or to follow up on your proceedings copies, please contact either Stella Searston (bateleur@omen.net.au) or John Warner (rj.warner@bigpond.com.au)

MODSIM CONFERENCE 2003

MODSIM is a biennial conference held by the Modelling and Simulation Society of Australasia. Members of this association come from a very broad background of disciplines that employ mathematics as a tool. These include hydrology, agricultural science, economics, finance engineering, ecology. They attract a high quality field of international speakers to their conferences. Broad themes of the last conference were Natural Systems, Socio-economic Systems and General Systems. In the past years the conference catered for geostatistics in a special section, last time within General Systems: Geostatistical and Geophysical Modelling and Computational Modelling and Techniques, including topics such as mine site rehabilitation.

Because of its breadth the conference should offer good exposure to geostatistics as a field. The next conference, MODSIM2003 will be held in July in Townsville, QLD. More detailed information about the conference can be found at the following web address:

<http://mssanz.cres.anu.edu.au/modsim2003.html>

Simon Dominy
JCU simon.dominy@jcu.edu.au

TOSSING OUT THE 'RULES OF THUMB'

The Value Tracking Symposium coming up this October aims to take a step closer towards tossing out some of the rules of thumb that have existed in the minerals extraction industries since time immemorial, according to AusIMM Year 2002 President Ian Goddard.

He said more rigorous analysis of the factors influencing the mining and processing of mineral products were necessary to track the value of minerals as they pass through a transformation process.

"Starting as a solid body of rock, the product is reduced to smaller relatively dry particles, enters a fluid stream, turned into even smaller particles, converted into a hot liquid stream, cooled until solid, returned to a solution, then finally ends as a solid metal for sale," Mr Goddard said, referring to copper ore processing.

"To be able to assess value we have to be able to measure relevant parameters involved in this transformation."

He said to do this effectively the mining industry must further develop its skills in order to be familiar with the latest practices in mineral beneficiation, while broadening its outlook and understanding of the approach of other related disciplines – such as accounting.

"Then we will have a more complete grasp of the full range of issues and be able to determine the 'real' value of the commodity or the project."

Symposium convener Mr. David Goeldner said the Value Tracking Symposium is the first international meeting to focus on the key factors involved in tracking the value of mineral resources by bringing technical and financial expertise together in one forum.

"To make this event a success, and thereby taking new knowledge and techniques back into this side of the industry, we need as many people as possible connected with the diverse aspects of tracking resource value to attend the Symposium."

Organised by the Southern Queensland branch of the AusIMM in conjunction with the JKMRRC, the Value Tracking Symposium will be held at the Carlton Crest Hotel in Brisbane, Australia from 7-8 October 2002.

To register go to www.ausimm.com/sympos/index.html, or contact the Value Tracking Symposium Convener Mr. David Goeldner on +61 7 3365 5848, email d.goeldner@uq.edu.au.

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MEMBERSHIP MATTERS

All membership dues will be invoiced in August for the current financial year 2002-2003. The invoices (in 'pdf' format) will be sent via email where possible. The membership dues have remained unchanged from last year, the membership categories being

- Life Member - Nil
- Ordinary Member - \$35
- Associate Member - \$15
- Student Member - \$5

If you are unsure of your membership category, please check our web site or email John Warner (rj.warner@bigpond.com).

If you have not already done so, please play your part in the development of geostatistics in the region by becoming a financial member of the GAA. The GAA has a bright future and your committee would like you to be a part of it!

ON THE MOVE

Peter Rolley has returned to Perth after a company transfer, having spent a couple of years in the 'Land of the Maple Leaf'. Peter is Manager Geology – Technical Services for Teck Cominco Australia Pty Ltd.

Michael Erickson has resigned from Sons of Gawlia to take up a position of Geology Superintendent at Sunrise Dam Mine with AngloGold Australia.

Congratulations to **Alan Miller** on his recent wedding

Jennette Binns has become the Honorary Editor of "The Australian Geologist" (TAG), the Newsletter for the Geological Society of Australia.

WEBSITE.

As most members are aware, the GAA website has been unavailable for a number of months as a result of problems with the host server. Data Analysis Australia P/L (DAA) (www.daa.com.au) has agreed to provide a host server for the GAA website. The Australian Institute of Geoscientists (AIG) (www.aig.asn.au) has agreed to allow the GAA the use of their website framework as a basis for developing a new GAA website (www.gaa.org.au). The redeveloped website is currently being reviewed before installation and testing on the host server in late August. If members have comments in regard to improving the website, please email these to webmaster@gaa.org.au.

The GAA committee would like to express many **thanks** for **Data Analysis Australia P/L** and **Australian Institute of Geoscientists** for assisting in re-establishing the GAA website.

JOB ADD

Your attention is invited to the following in which we seek your assistance in identifying a suitable person who the International Atomic Energy Agency (IAEA) will fund for a short term expert visit to Jamaica.

GEOSTATISTICIAN NEEDED

The International Centre for Environmental and Nuclear Sciences (ICENS) requires the services of a geostatistician to help to develop methodologies to estimate elemental soil concentrations from measured sample data from a large number of food and soil samples collected in Jamaica. Submissions by qualified personnel are being solicited by ICENS to help recommend the expert to the IAEA. These can be sent to:

The Administrator
International Centre for Environmental and Nuclear Sciences,
University of the West Indies,
Mona Campus,
Kingston 7,
Jamaica, West Indies.

Email Address: gvtaylor@uwimona.edu.jm

Telephone No. 1-876-927-1777

Fax No. 1-876-977 0768

Web Site: www.icens.org

We would be most happy to entertain suggestions from you on this matter as well as ask that you bring this to the attention of appropriate persons.

G.V. Taylor

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