UNIVERSITY OF ALBERTA
Department of Civil & Environmental Engineering
School of Mining and Petroleum Engineering

Centre for Computational Geostatistics

Report Seven: 2004/2005

Directed by Clayton V. Deutsch and Oy Leuangthong

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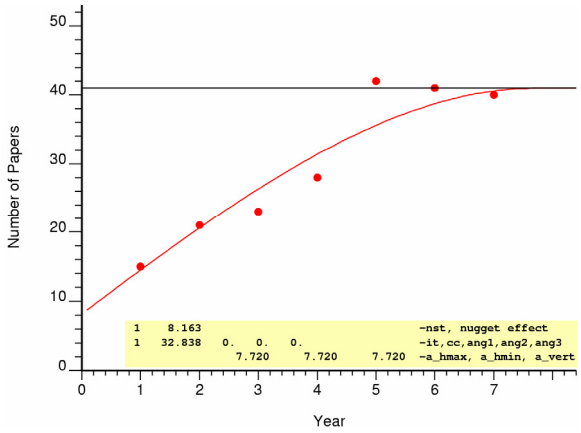
Seventh Annual Report of the Centre for Computational Geostatistics

SEPTEMBER 2005

Introduction

Who hit the ►► button? It seems like yesterday when we arrived back from Banff and we were exhorting the students to maintain a high energy level because we needed to get ready for the 2005 CCG report. We did get ready, but this year seems more stretched than usual. Part of the reason is that we have graduated so many students in recent years. Admitting 10 new students (in addition to the existing students) will ensure that we have the researchers for next year. This year has not been a bust. Consider the statistics of our reports:

```
CCG Report Data
4
Year
Number of Papers
Total Number of Pages
Average Length
1   15   257   17.1
2   21   415   19.8
3   23   356   15.5
4   28   481   17.2
5   42   727   17.3
6   41   548   13.4
7   40   560   14.0
```



Year five is an outlier because it represents 18 months instead of the normal 12 months per year (the meeting was moved from March to September). The chart to the right is the number of papers versus the year. After some trial years, we have established a systematic scheme for our publications. The following publications have been proposed:

- ***Annual Reports*** will be prepared annually and distributed only to member companies. This will not change. We are considering open distribution of CCG reports that are more than, say, five years old. These may be available online without the need for a password.
- ***CCG Software Catalogue*** will be updated yearly and distributed to member companies. This will include the latest revisions to the GSLIB programs, GSLIB-derivative programs and other software developed within the CCG. We are not considering open distribution of these programs; they demonstrate value to CCG members.
- ***Guidebooks*** that are 30-100 page (nominal) documents on specific subjects and are smaller in scope than monographs. A number of guidebooks have already been prepared: *Grade Control*, *Sampling*, *Uniform Conditioning* and the *ALLUVSIM User's Guide*. These will be reserved to CCG member companies for an extended period of time.
- ***Monographs*** that will be published by CCG. These will be distributed to CCG member companies and sold through an online bookseller like www.amazon.com. These 100 to 200 page (nominal) documents will be published in hardcover. The first monograph on *Production Data Integration* has been published and will be released with this report.

We will distribute hardcopies and CDs at the annual meeting; however, our goal is to have all of this information available online at the CCG website. Of course, CCG member companies will have access to everything. The blackout period for annual reports and guidebooks will be decided upon after consultation with member companies. As mentioned, there is no intention of releasing the CCG software or electronic copies of the monographs to non-member companies.

Those of you who attended last year's meeting likely also attended the Geostatistics Congress held in Banff, AB the following week. The congress was attended by over 200 delegates and

featured 119 paper and poster presentations. It took a little while for the dust to settle here at the CCG, but after a few months of facilitating paper reviews and revisions, the final papers were sent off to Springer (the publisher) in early 2005 for publication. These proceedings are due out any day now, and can be ordered through us or any major on-line book store.

Since last year's meeting, we have experienced some change in the research group. Stefan Zanon, who completed his M.Sc. degree in 2004, decided that a change of scenery was in order and joined Snowden in Perth, Australia. Linan Zhang completed her M.Sc. degree in Petroleum engineering in April 2005. Sandra Correa, who was a relatively new student, decided that her interests in GIS applications outweighed her geostatistical prowess and switched to a different program in May 2005. Over this period, the list of steady-state researchers includes Weishan Ren (PhD), Jason McLennan (PhD) and Chad Neufeld (MSc). We were also joined by Dr. Fuenglarb Zabel as a research associate; Fueng spent her year with CCG furthering the research area of geological modeling that Dr. Michael Pyrcz established during his PhD studies.

Ten new students have started this year! That is a lot, but now that there are two of us and given the changes in the last few years, we hope to establish a state of equilibrium in the size of the research group. Some students will receive supervision from either one of us, while others will be co-supervised by both of us. Regardless of supervisors, close collaboration between the two of us will ensure that each student's research area complements the group's overall goal to develop innovative geostatistical tools and techniques for mining, petroleum and other industries.

This year's contributions include some advances in old themes along with some development into newer areas. **Julian** is now quite settled into the University of Chile, but remains active with CCG research via his adjunct professor position with the University of Alberta. He continues to develop research on indicators and multipoint geostatistics. As we mentioned above, **Stefan** is now with Snowden and gaining valuable experience in mining geostatistics. Nevertheless, Stefan's contributions to this year's report lie in uncertainty assessment and efficient methods towards this goal. **Paula** is now working in Chile as a consultant to Codelco, but she also remains closely tied to CCG and continues to develop innovative ideas for dealing with geologic boundaries. **Jason** is only in his second year of his graduate studies, but has already established himself as the group expert in SAGD reservoir characterization and performance. **Weishan** continues to develop his expertise in geostatistical characterization of the McMurray formation, but is now focusing his energies into scaling issues and data integration. **Chad** is wrapping up his MSc, but has unquestionably made great strides in resource/reserve estimation with contributions ranging from the Guidebook on Uniform Conditioning and a case study on reserve calculation. Over the years, he has also established himself as an expert programmer and undertook the responsibility of compiling the CCG software library. **John** and **Steve** were wrapping up their undergraduate degrees and are just starting their graduate studies this September. John spent the summer working with Talisman, and also continued to develop his previous work in direct lognormal simulation. **Brandon** joined CCG as an undergraduate student and has made an enviable number of contributions already.

We would like to welcome Occidental, DeBeers, Wardrop and Statios to formal membership in CCG. A list of all the sponsors is shown next. You will note that while some companies are very large, international organizations, others are quite a bit smaller and may operate regionally. As a result, we now have associate members to accommodate these smaller operations. Associate members pay a reduced membership fee and have access to the research deliverables like other member companies; however, full member companies enjoy more interaction with CCG researchers, informal help with tools and software, and preferential access to CCG students.

CCG Sponsors:

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980 Lincoln Street, No. 200
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contact: Harry Parker

Encana Corporation
150 – 9th Avenue SW
Calgary, AB, Canada T2P 3H9
contact: Tarun Kashib

AngloAmerican
45 Main Street
Johannesburg 2001
Republic of South Africa
contact: Christina Dohm

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contact: Pom Savharwal

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contact: Jeff Volk

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4800 Fournace Place, Room E667
Bellaire, TX USA 77401
contact: Michael Pyrcz

Occidental Oil & Gas Corporation
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Houston, TX USA 77046-0506
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Calgary, Alberta T2P 2H7
contact: Dr. David Garner

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Cid. Univ. Quadra 7, Ilha do Fundao
21949-900 Rio de Janeiro, RJ, BRAZIL
contact: Marcelo Costa Monterio

De Beers Consolidated Mines
Private Bag X01, Southdale 2135
Johannesburg, South Africa
contact: David Bush

Placer Dome
P.O. Box 499330 Bentall Station
Vancouver, B.C. Canada V7X 1P1
contact: Georges Verly

The gOcad Research Program
11011 Richmond Avenue, Suite #350
Houston, TX 77042, USA
contact: Emmanuel Gringarten

RWE-Dea Aktiengsellschaft
Uberseering 40
22297 Hamburg Germany
contact: Thies Dose

Schlumberger Information Solutions
1, rue Henri Becquerel – BP 202
92142 Clamart Cedex, France
contact: Jim Brady

Talisman Energy Inc.
Suite 3400, 888 – 3rd Street SW
Calgary, AB Canada T2P 5C5
contact: Mark Godlewski

Snowden Mining Industry Consultants
87 Colin Street
West Perth, WA 6005 Australia
contact: Ian Glacken

Teck Cominco Ltd.
600 – 200 Burrard Street
Vancouver B.C. Canada V6C 3L9
contact: Bill Armstrong

Statios LLC
1345 Rhode Island Street
San Francisco, CA USA 94107
contact: Emmanuel Schnetzler

Wardrop Engineering Inc.
330 Bay Street, Suite 604
Toronto, ON Canada M5H 2S8
contact: Tim Maunula

CCG Staff / Researchers / Students

Following are the people affiliated with the Centre for Computational Geostatistics. There are numerous contacts in member companies who contributed in significant ways to the results presented in this report. They are prominently acknowledged in the author lists of each paper.

- **Clayton V. Deutsch**: Professor and Director of CCG
- **Oy Leuangthong**: Professor and Director of CCG
- **Julian Ortiz C.**: Adjunct Professor
- **Amanda Potts:** Research Administrative Assistant

- **Rami Abu-Rmaileh:** new M.Sc. student started Fall 2005 with CCG.
- **Olena Babak:** new PhD student started Fall 2005 with CCG.
- **Deepak Bhandari:** new M.Sc. student started Fall 2005 with CCG.
- **Jeff Boisvert:** new M.Sc. student started Fall 2005 with CCG.
- **Sahyun Hong:** new Ph.D. student started Fall 2005 with CCG.
- **Zhou Lan:** new M.Sc. student started Fall 2005 with CCG.
- **Steve Lyster:** new M.Sc. student started Fall 2005 with CCG (intern last year).
- **David Machuca:** new Ph.D. student started Fall 2005 with CCG.
- **John Manchuk:** new M.Sc. student started Fall 2005 with CCG (intern last year).
- **Jason McLennan:** Ph.D. student working on many Mining and Petroleum related topics including the McMurray reservoir characterization.
- **Chad Neufeld:** M.Sc student working on many Mining and Petroleum related topics including recoverable reserves for mine planning.
- **Karl Norrena:** Ph.D. student working on decision making in the presence of uncertainty; now with Nexen Canada Inc.
- **Bora Oz**: Ph.D. student working on scaling relationships in presence of complex geologic structures; now with Shell International in Calgary.
- **Weishan Ren**: Ph.D. student working on exact downscaling for petroleum reservoir characterization.
- **Xingquan Zhang:** new Ph.D. student started Fall 2005 with CCG.
- **Brandon Wilde:** undergraduate summer intern working on many different topics.