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Eighth Annual Report of the Centre for Computational Geostatistics

SEPTEMBER 2006

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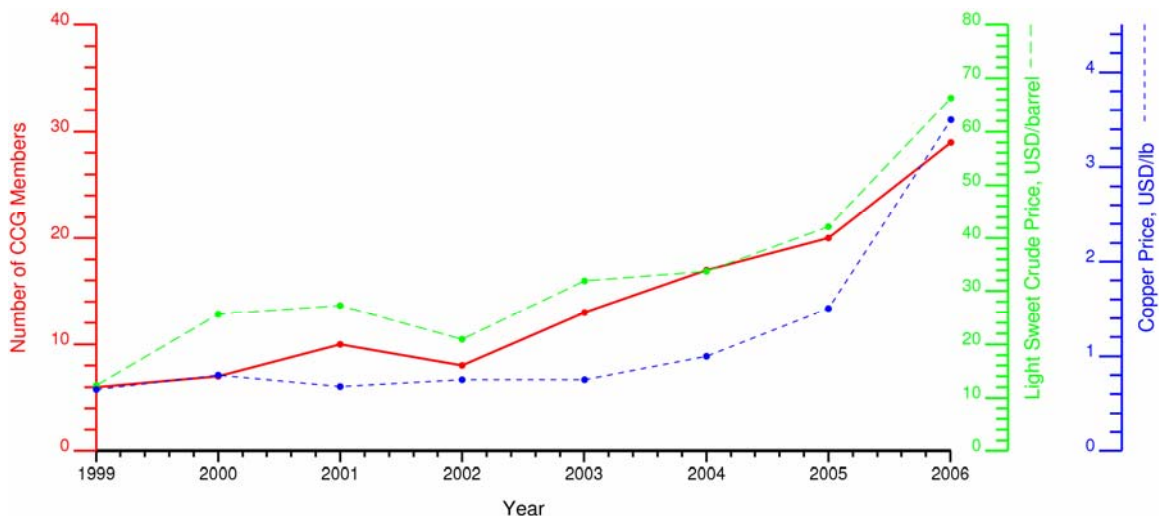
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Introduction

Writing the introduction always comes last and is always a challenge. We are faced with a deadline from the printer and we are burned out from reviewing papers and cajoling students for last minute results. For inspiration, we glanced back at the first CCG report prepared for the six founding members in January 1999. The opening paragraph:

It has been a challenge launching a new industrial affiliates program during times of record low energy and commodity prices. Budgets are being cut and mergers of unprecedented size are taking place. In spite of these pressures, I am pleased to introduce the first annual report of the Centre for Computational Geostatistics (CCG).

Six members and record low prices! We now have twenty nine paying members and times of record high energy and commodity prices. The chart below shows the number of CCG members for our eight years of operation (solid red line). The oil price and copper price are also shown. Two comments: (1) there appears to be a strong correlation between the three variables, but we know better than to assign causality, that is, you should not attribute strong energy and commodity prices to the strength of the CCG research program, and (2) looking at the values for 2006 may indicate a concern – oil and copper appear to be outperforming the CCG; no problem, we could fix this easily by adjusting the scales.



We are proud to deliver this eighth annual report to our twenty nine members. The quantity and quality of demonstrated research in this report is intimidating. You are busy. How will you sift through more than 800 pages (55 papers) and select some ideas to develop/implement? This is a concern for us too. We will be working hard over the next year to collect, organize and present our results in innovative ways to ensure that you realize full value for your membership. We are implementing an improved system to access our server that has an archive of all reports, papers, thesis, programs, guidebooks and other resources. We are prototyping a version control system and search capability.

An exciting aspect of research at a university is the constant change. One year is a long time in the life of a graduate student. We are grateful that some things do not change. **Amanda** continues to provide vital administrative support. **Chad** remains at CCG as a Research Engineer providing valuable theoretical, practical and computational assistance. **Julián** remains actively involved in CCG, supervising students and undertaking research as an adjunct professor.

Michael Pyrcz also remains engaged in CCG and has accepted our offer to undertake a similar role aimed at petroleum geostatistics.

This year's research contributions will be appreciated by the 55 papers, 15 posters, 25 presentations and many discussions at the annual meeting. **Olena** has established herself as the go to person for math questions and has made interesting developments in the quantification of parameter uncertainty and estimation in a finite domain. **Deepak** has touched a number of interesting subjects this year including direct estimation with a training image, comparing methods for recoverable reserves calculation and standards for geostatistical software. **Jeff** has made record progress toward an M.Sc. He has devised interesting techniques for building and assessing training images. **Hadi** has explored many interesting avenues in geostatistics including variogram uncertainty, spatiotemporal geostatistics and practical modeling for storage of greenhouse gases. **Sahyun** has developed an interesting inversion algorithm for 4-D seismic and is becoming an expert of data integration. **Zhou** has established a multivariate distribution model for how the categorical variables change with scale. **Steve** has made many contributions related to generating simulated realizations with multiple point statistics. **David**, as our current representative from South America, is following in Julián's footsteps by discovering interesting insight (and intractable problems). **John** has also made record progress toward an impressive M.Sc. related to stope optimization. He has already launched into Ph.D. research related to population of unstructured grid blocks. **Jason** has been a top producer for years; even an ironman cannot keep up his pace. He shares deep insight into stationarity and how to account for geological controls and trends. **Mehran** has dug into a number of research avenues related to searching and permeability tensors for unstructured grid elements. **Mike** Monroe is a new student with a high standard to live up to. **Weishan** will graduate soon. He has accepted a position with a CCG Member company. He documents interesting developments in large scale mapping and downscaling those results to high resolution flow models. **Xingquan** (Kevin) has made a number of enhancements to process-mimicking geological modeling that remain an area of significant interest.

The research at CCG is driven by the vision of our members, our interpretation of that vision and the color added by our students. It is absolutely essential that each member organization remain engaged in CCG activities on a number of fronts: contract our expertise for prototype projects, hire students, send a delegation to Edmonton, invite CCG researchers to your site, disseminate CCG resources within your organization, and send staff to spend time with us or participate in training opportunities. There are many ways to stay involved and we are committed to stay involved with you.

We are at an all-time high in terms of member companies – twenty nine! We would like to welcome BHP Billiton Corp., Innovative Petrotech Solutions, Mintec, Newmont Mining Corp., Nexen Inc, Petro-Canada, Quantitative Geoscience, RSG Global and SRK Consulting, to the CCG. A list of all members is shown on the following two pages.

Two handwritten signatures in black ink. The signature on the left is stylized and appears to be 'J. A.'. The signature on the right is more legible and appears to be 'C. L. Thompson'.

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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
- **Chad Neufeld:** Professional Engineer Researcher
- **Julian Ortiz C.:** Adjunct Professor
- **Amanda Potts:** Research Administrative Assistant

- **Olena Babak:** PhD student.
- **Deepak Bhandari:** M.Sc. student.
- **Jeff Boisvert:** M.Sc. student.
- **Hadi Derakshan:** M.Sc. student.
- **Sahyun Hong:** Ph.D. student.
- **Zhou Lan:** M.Sc. student.
- **Steve Lyster:** Ph.D. student.
- **David Machuca:** Ph.D. student.
- **John Manchuk:** M.Sc. student.
- **Jason McLennan:** Ph.D. student
- **Mehran M. Hassanpour:** M.Sc. student.
- **Mike Munroe:** new M. Sc. Student started Fall 2006 with CCG.
- **Weishan Ren:** Ph.D. student.
- **Xingquan Zhang:** M.Sc. student.