Registration and Costs

Send your binding registration until 07 August 2009

The possible number of participants is limited; an early registration is recommended. Please, use the internet registration form:

http://www.energie-und-rohstoffe.org/2009/ anmeldung_und_information.php

or send the attached registration form via mail or e-mail to:

Dr. Steffen Knospe Clausthal University of Technology Institute of Geotechnical Engineering and Mine Surveying Erzstrasse 18 • 38678 Clausthal-Zellerfeld Germany E-mail: steffen.knospe@tu-clausthal.de

Costs (Teilnahmegebühr): 800 € The participation fee includes course materials, lunch and breaks.

After registration you will receive an invoice which is also confirmation of the registration. The registration is complete by transfer of the participation fee.

Please note:

It is strongly recommended that participants bring a laptop.

Who should attend?

Mining engineers, mining geologists, resource analysts, and project managers involved in feasibility studies, development and operations, interested in new technologies for risk management and optimized decision-making.

Participants are not required to have prior background on the course topic.

The workshop will be held in advance of the conference



Energie und Rohstoffe 2009

Organization

Department Mine Surveying and Geoinformation Institute of Geotechnical Engineering and Mine Surveying Clausthal University of Technology

Contact

Jörg Benndorf E-mail: joergbenndorf@gmx.de, subject: WS Geostatistik

Dr. Steffen Knospe E-mail: steffen.knospe@tu-clausthal.de Phone: 0049 5323 72 2794

Workshop Location and Schedule

The workshop starts on 07 September 2009 at 09.00 a.m. and ends on 08 September 2009 at 17.30 p.m. On monday evening you are invited for dinner to a restaurant in Clausthal-Zellerfeld.

The workshop takes place at the Institute of Geotechnical Engineering and Mine Surveying Clausthal University of Technology Erzstrasse 18 38678 Clausthal-Zellerfeld Germany



Information about the city and accommodation: http://www.clausthal-zellerfeld.de/de/tourismus/



Stochastic Resource Modelling and Mine Planning Optimization Stochastic Resource Modelling and Mine Planning Optimization

Modern geostatistics and optimization tools for the mining industry



September 7th and 8th, 2009

Clausthal University of Technology Institute of Geotechnical Engineering and Mine Surveying

Lecturer:

Roussos Dimitrakopoulos McGill University

In cooperation with: **DMV** – Deutscher Markscheider-Verein e.V.

Participants will:

- Discover how and why risk-based models create value and opportunities
- Understand how to quantify and utilize grade/ tonnage/metal uncertainty and variability
- Learn about new efficient simulation methods for modeling ore bodies and how to utilize the results in a diversity of mining applications
- Understand how to use quantified ore body risk in ore reserve estimation, mine planning and design, and mineral project valuation
- Learn from actual industry examples and diverse applications
- Participate in hands-on computer workshops using real case studies

The final stage of the course is a series of computer workshops, and introduces to participants new powerful public domain software (SGeMS). Data and software remains with the participants.

Content and Objectives

Growing volatility and uncertainty in global markets highlight the need to focus now, more than ever, on new technologies that can add significant value to mine plans and evaluations.

This two-day course presents the new generation of applied technologies integrating conditional simulation methods for reserve risk management with new risk-based mine-planning optimization, leading to improved cash flow assessments. Emphasis is placed on the downstream applications pertinent to the feasibility, design, development and planning stages of mining ventures, as well as in the financial optimization of relevant aspects of operations and production.

Computer workshops introduce participants to the practical aspects of the technologies taught in lectures. New public domain software with graphic capabilities is introduced.

Course Outline

Introduction

- Quantification of uncertainty creates opportunities, value, shelters investment and maximizes profits
- Frameworks for uncertainty modeling, profitability, optimization
 and mining operations

Concepts and Techniques

- Introduction to Monte Carlo simulations and risk assessment
- Mining data analysis and description
- Grade estimation or simulation?
- Fast and efficient sequential conditional simulation algorithms

Practice of Conditional Simulations for Risk Modeling in Mining

- Simulation based resource/reserve classification (gold and coal deposits)
- Drill hole optimization (coal deposit)
- Reserve risk quantification, selectivity and dilution (nickel deposit)
- Fault simulation and uncertainty assessment (coal deposit)
- Assessing risk in recoverable reserves and meeting project production schedules ahead of mining (gold deposit)
- Uncertainty in pit design and production scheduling with simulated ore bodies (disseminated gold deposit)
- Profitability and risk based grade control (gold deposit)
- Risk based optimal design for sublevel open stoping (underground copper mine)
- Stochastic production scheduling application and comparison to conventional scheduling (copper deposit)
- Product quality management and production scheduling with simulated deposits (iron ore deposit)
- Rehabilitation and environmental modeling (Spring water in space-time)

Computer Workshops

- Simulation of a lateritic nickel deposit with SGeMS and assessing the risk from resource variability
- Stochastic production sceduling in a copper deposit

Instructor

Roussos Dimitrakopoulos is currently Professor and the Canada Research Chair in Sustainable Mineral Resource Development and Optimization under Uncertainty - BHP Billiton, and Director of the COSMO Laboratory, McGill University, Montreal, Canada. Previously he was Professor and Director of the Bryan Research Centre, University of Queensland, Australia. He holds a PhD in Geostatistics from Ecole Polytechnique, Montreal, and a MSc from the University of Alberta, Edmonton. He has been working in orebody risk analysis since 1983 and the last decade on risk-based optimization in open pit mine design. Roussos has been Senior Geostatistician with Newmont Mining Co., Denver, and Senior Consultant with Geostat Systems Int. He has taught short courses and worked in Australia, North America, South America, Europe, the Middle East, South Africa and Japan.

http://people.mcgill.ca/roussos.dimitrakopoulos/

COSMO - Stochastic Mine Planning Laboratory, a global centre for leading-edge research and graduate education in "orebody modelling and strategic mine planning with uncertainty", is supported by AngloGold Ashanti, Barrick Gold, BHP Billiton, De Beers, Newmont, Vale, Vale Inco, and Canada Research Chairs Program, NSERC, CFI.



Roussos Dimitrakopoulos is the IAMG (International Association for Mathematical Geosciences) Distinguished Lecturer for 2009.

Language

The Workshop language is English. All lectures and material will be given in English.