“Geometallurgy – Optimising Resource Value” is a 2 day course for managers and senior professionals. It will provide an overview on how geometallurgy can increase the value of a project or operation via increased knowledge of the behaviour of geological materials from an extraction process perspective. The course builds upon the latest research from the AMIRA P843 GEM® “Geometallurgical Mapping & Mine Modelling” and Cooperative Research Centre for Optimising Resource Extraction (CRC ORE). It is focused on practical aspects of application and implementation management and future directions of geometallurgy.

Because geometallurgy is a cross disciplinary approach which spans the value chain, this course is aimed at senior technical and management personnel in project development and operations from functional units such as geology, mining, processing, environmental and project evaluation.

The course will present, via lectures, case studies and interactive exercises, the state of the art for geometallurgy in the minerals industry covering such topics as:

- Language differences between technical disciplines and implications;
- Using geometallurgical models– systems and scenario based approaches to increase mining project value;
- Building robust spatial geometallurgical models;
- Implementation and management of geometallurgical programs;
- Specific challenges associated with analysis of geometallurgical data;
- Overview of geometallurgical measurement & tests; and
- Sampling and sampling strategies for geometallurgy.

There will be specific time set aside during the sessions to discuss real industry implementation problems and participants are encouraged to come with prepared questions. The management and strategic issues of geometallurgy will also be framed and addressed in the course.

The presenters are highly knowledgeable industry practitioners with experience in delivering this type of training to senior audiences.

For 2011, this course is exclusively available to sponsors of the AMIRA P843, P843A projects and CRCORE at one of the following sponsor only courses:

17-18 March | Toronto, Canada
22-23 March | Santiago, Chile
14-15 April | Perth, Australia
Geometallurgy - Optimising Resource Value - Process Map

Day 1 Fundamentals

Introduction
- Opening / housekeeping
- Introductions
  - Exercise
- What is geomet?
- Models
- The geomet curve
- Risk, NPV, value
- Value chain

Sampling and Measurement for Geomet
- Apparent v actual values
- Sampling and sampling strategies for geomet
  - Exercise
- Measurement and testing
- How do we know if we have right & sufficient data?
  - Case examples

Getting Moving with Geomet
- Stages of project
- Geomet curve
- Categorisation v domaining
- Language
- Practical steps
- Case examples

Behaviour of Geomet Variables
- Support
- Non-additivity
- Non-linearity
  - Exercise
- Testing for non-additivity
- Jensen
- Primary-response framework
- Wrap up for the day

Day 2 Implications

Building Spatial Models for Geomet
- Spatial variability
- What is a block model
- Domaining
- Krige story
- What can be modelled and how to model it
  - Exercise
  - Simulation and approaches to non-additive variables

Using Geomet I: Systems
- Hierarchy of planning
- Strategic v tactical
- Reconciliation
- Sustainability
- Optimisation
- Variability and constraints
  - Case examples

Using Geomet II: Scenarios
- What do we mean by scenarios?
- Current approaches
- Optimisation
- The path ahead (technically)
  - Exercise
  - Case examples

The Road Ahead
- Change management
  - Exercise
- Teams/agility
- Wrap up and a-ha moments
- The road ahead – “what are you going to do?”
**Presenters**

**John Vann, Director and Principal, Quantitative Group**

John is a geologist and geostatistician who was a founding Director of QG in 2001. He is a well-known minerals industry consultant with 25 years project experience across 5 continents. John has run more than 100 technical short courses for mining companies since 1994, as well as programs for senior mining executives. He has also run in house geometallurgical workshops for Rio Tinto copper in the USA and Australia, Rio Tinto iron ore in Australia, BHP’s Olympic Dam and Xstrata Nickel in Western Australia. John is currently Adjunct Professor of Geology at The University of Western Australia; he also has adjunct roles at the University of Adelaide (Geostatistics) & Duke University in the USA (Business). John has geology degrees from RMIT and the University of New England, an M.Sc in geostatistics from the University of Leeds and a Masters of Business and Technology from the Australian School of Business (UNSW). He is a Fellow of both the AusIMM and the AIG and for 11 years (1997-2008) was a member of the JORC Committee.

**Stephen Coward, Principal Geometallurgist, Quantitative Group**

Steve is a professional metallurgist with experience in production positions at a range of operations for De Beers. He also worked for Anglo American’s Minred department to improve the interaction between metallurgical plant design and operation teams and the Diamond resource and reserve estimation/evaluation teams. Prior to joining QG in 2008, Steve worked in the research arm of the De Beers UK-based Mineral Resource Evaluation team, where he headed up the Metallurgical Recovery Factor Research project. This project focussed on developing geometallurgical tools and techniques to quantify the impact that recovery uncertainty has on overall project value. Steve has run several geometallurgical workshops and worked on geometallurgical projects in diamonds, gold, copper and nickel. Steve holds an NHD in extractive metallurgy, a B.Comm from the University of South Africa and an MBA from the University of the Witwatersrand. He is currently completing a PhD in geostatistics and geometallurgy at the University of Adelaide. He is a member of the SAIMM.

**John Jackson, Manager Geometallurgy and Sustainable Solutions, JKTech**

John is a geologist and geophysicist with over 20 years of experience in the minerals industry across a number of commodities. He has built a career around integrating technologies and systems within resource companies to improve productivity and mineral deposit knowledge for improved extraction performance. His previous roles include Exploration Geologist/Geophysicist for MIM and Sons of Gwalia and Manager of Technical Services – Resources at Sons of Gwalia where he managed the company’s resource portfolio and the integration with mine planning operations. Later, at Inco he was Study Manager for a large nickel laterite feasibility project and then Exploration Manager for Vale. John has geology/geophysics degrees from the University of Tasmania and a Masters of Business and Technology from the Australian School of Business (UNSW). He is a Member of the AusIMM , AIG, SME and ASEG and was a member of the Advisory Board of the Bryan Mining & Geology Research Centre at the University of Queensland.

**Dr Karin Olson Hoal, Principal Geometallurgist, JKTech**

Karin is a geologist with 25 years of experience, including seven years of direct geometallurgical experience developing new applications through project-supported R&D. Prior to joining JKTech, Karin was Director of the Advanced Mineralogy Research Centre at Colorado School of Mines, dedicated to the interdisciplinary uses of quantitative mineralology in geometallurgy and to developing new mining, energy, and environmental applications. She has held positions in industry, academia and government, including Research Professor at Colorado School of Mines, Consultant in Geometallurgy and Diamonds, Director of Administrative Services for Hazen Research, Project Manager for Rio Tinto Namibia, Project Coordinator for the New York State Geological Survey, and Project Geologist for Asarco, Inc. Karin has her Doctorate from the University of Massachusetts, USA, Master’s degree from McGill University, Canada, and Bachelor’s degree from St Lawrence University, USA. She spent two years as a Postdoctoral Fellow at the University of Cape Town, South Africa in diamond-related research.
Useful Information for JKTech Specialist Courses

Course Cost

<table>
<thead>
<tr>
<th>Location</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Toronto, Canada</td>
<td>CAD $5300*</td>
</tr>
<tr>
<td>Santiago, Chile</td>
<td>USD $5300*</td>
</tr>
<tr>
<td>Perth, Australia</td>
<td>AUD $5300* (ex GST)</td>
</tr>
</tbody>
</table>

*plus GST/VAT/Local Taxes where applicable

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Registration

SMI Knowledge Transfer is pleased to offer you the convenience of online registration. ‘Register’ will enable you to give contact details online with a follow up from a SMI KT staff member regarding payment details. Click here to register or go to www.jktech.com.au.

Timings

Professional development events will generally commence at 8.30am and conclude at 5.00pm. Times are subject to slight variations on the day, however SMI Knowledge Transfer will undertake to keep time accordingly.

Cancellation

SMI Knowledge Transfer reserves the right to cancel any course at its discretion. Whilst we endeavour to make every effort not to do this, there could be circumstances beyond our control (e.g. insufficient numbers), that may prevent us from going ahead. In light of this, if you need to fly, we suggest that you purchase a fully flexible airline ticket. Delegates cancellations 14-8 days before course commencement incur an administration fee of $110. For cancellations 7 days or less before course commencements and non-attendance at the course, the full registration fee is payable. Substitutions accepted when advised.