

## REGISTRATION DEADLINE

January 26, 2018

Send registrations to: **Laura Johnson**  
Meetings & Membership Department, SME  
12999 E Adam Aircraft Cir., Englewood, CO 80112  
Tel.: 303-948-4222 • Fax: 303-979-3461  
E-mail: johnson@smenet.org  
Register online: www.smenet.org

### SME, CIM, AusIMM, and SAIMM

- Members: \$2,300 USD (Excluding taxes)
- Non-members: \$2,400 USD (Excluding taxes)

Title \_\_\_\_\_

Name \_\_\_\_\_

SME, CIM, AusIMM or SAIMM Member # \_\_\_\_\_

Job Title \_\_\_\_\_

Employer \_\_\_\_\_

Postal Address \_\_\_\_\_

City \_\_\_\_\_

Prov/State \_\_\_\_\_ Postal/Zip Code \_\_\_\_\_

Country \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

Email \_\_\_\_\_

I will bring a laptop  Yes  No

### PAYMENT

Visa  MasterCard  Amex  Chèque  Wire Transfer\*

Card Number \_\_\_\_\_

Expiry Date \_\_\_\_\_ Amount \$ \_\_\_\_\_

CCV Code (3 digit code on back of card) \_\_\_\_\_

Name on Card \_\_\_\_\_

Signature \_\_\_\_\_

**Registration includes course notes, lunch, and morning and afternoon tea.**

Participation in this course may be a valid activity towards continuing professional development with up to **26 contact hours**.

Participants receive a Certificate of Completion.

**Notification of Cancellation received in writing up to (minimum of 10 working days before the course) will incur a 20% cancellation fee. No refund will be made after this time. An alternative participant may be nominated.**

January 26, 2018

### WHO SHOULD ATTEND

Exploration and mine geologists, resource analysts, mining engineers, and anyone acting in the role of “qualified” or “competent person”.

### INSTRUCTORS

**Marcelo Godoy** is the Global Functional Leader for Resource Modeling with Newmont Mining Corporation. Marcelo holds a PhD in Geostatistics and Strategic Mine Planning from the University of Queensland. He has led teams of Geologists, Geostatisticians, Mining Engineers and Process Engineers in the development of Business Plans, Feasibility Studies and Resource & Reserve Estimations in South America, North America, Australia, Europe and Africa. Over the last 15 years Marcelo has carried out resource and reserve audits and due diligence reviews for a series of Tear 1 mining projects and acted as Qualified Person for a number of resource estimation studies. He has recognized international experience in the development of Corporate Policies related to the estimation and reporting of Resources and Reserves.

**Roussos Dimitrakopoulos** is currently the Canada Research Chair in Sustainable Mineral Resource Development and Optimization Under Uncertainty and Director of the COSMO Laboratory, McGill University, Montreal, Canada. Previously he was Professor and Director of the Bryan Research Centre, Univ. of Queensland, Australia. He holds a PhD in Stochastic Modelling from École Polytechnique, Montreal, and an MSc from the University of Alberta, Edmonton. He has been working on risk analysis, risk-based optimization in open pit mine design, and production scheduling. Roussos has been Senior Geostatistician with Newmont Mining Co., Denver, and Senior Consultant with Geostat Systems International. He has taught short courses and worked in Australia, North America, South America, Europe, the Middle East, South Africa and Japan.

“AIME Mineral Economics Award” in 2013:  
<http://www.aimehq.org/programs/award/bio/roussos-dimitrakopoulos>

**Guy Desharnais** has worked as an exploration geologist with Xstrata Nickel on various projects as an exploration geologist and project manager. Since joining SGS in 2010, he has executed a variety of projects from resource estimations, economic evaluations, metallurgical sample selection, geometallurgical studies, and audits of resources and reserves internationally. Guy has prepared technical reports on a wide range of commodities, and is considered a Qualified Person for a number of deposits types including Ni or Nb-REE laterites, coal, Ni-Cu-PGE magmatic sulphides, vein-hosted-Cu-Au-Ag-Co-Zn-Pb, Zn-Pb-Ag-Au VMS, magmatic REE-Fe-Cr-Ti. Guy has also presented training sessions pertaining to the application of international mineral regulations and estimation of resources to a variety of audiences.

### VENUE DETAILS

**McGill University**  
**Department of Mining and Materials Engineering**  
3450 University Street  
Frank Dawson Adams Building, Room 105  
Montreal Quebec Canada H3A 0E8  
admrcr.mining@mcgill.ca

### LOGISTICS

Lectures are given from 9 AM (refreshments at 8:30 AM) to 5 PM with two 15 minute coffee breaks and a 1 hour lunch break.



COSMO – Stochastic Mine Planning Laboratory Mining Engineering  
cosmo.mcgill.ca

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, Kinross, Newmont Mining, Vale, and the Canada Research Chairs Program, NSERC, and CFI.

<http://www.smenet.org/students/short-courses>

# PROFESSIONAL DEVELOPMENT SERIES 2017

Strategic Risk Quantification and Management for Ore Reserves and Mine Planning

**GEOSTATISTICAL MINERAL RESOURCE ESTIMATION AND MEETING THE NEW REGULATORY ENVIRONMENT: STEP BY STEP FROM SAMPLING TO GRADE CONTROL**

- **Marcelo Godoy**  
Newmont Mining Corporation, USA
- **Roussos Dimitrakopoulos**  
McGill University, Canada
- **Guy Desharnais**  
SGS Canada Inc., Canada

**February 12 – 16, 2018**

**Montreal, Canada**





# GEOSTATISTICAL MINERAL RESOURCE ESTIMATION AND MEETING THE NEW REGULATORY ENVIRONMENT: STEP BY STEP FROM SAMPLING TO GRADE CONTROL

## CONTENT AND OBJECTIVES

This course is designed according to the latest regulations on public reporting of Mineral Resources. It aims at showing how state-of-the-art statistical and geostatistical techniques help answering the requirements of those regulations in an objective and reproducible manner. A particular emphasis is put on understanding sampling and estimation errors and how to assign levels estimation confidence through the application of resource classification fundamentals. In addition to a solid introduction to mining geostatistics this course provides a comprehensive overview of industry's best practices in the broader field of Mineral Resource estimation.

## ATTENDEES WILL LEARN

- How to use statistical inference to identify problems with the data
- How to produce models that address the needs of mining companies
- Compliance with NI43-101, SEC Industry Guide 7 and JORC
- Effective workflows from data preparation to resource classification
- How to validate, reconcile and communicate resource estimation results
- The fundamentals of resource classification and how to apply them in practice
- How to produce auditable and reproducible resource estimates
- Estimation of grade control models and best practices in ore selection
- How to leverage costly geometallurgical testing to reduce risk
- How to use conditional simulations to quantify uncertainty in resource estimates
- How to integrate orebody simulations into mine planning

**PLEASE NOTE** it is strongly recommended that participants bring a laptop and no previous exposure to statistics and geostatistics is required.

<http://www.smenet.org/students/short-courses>

## COURSE OUTLINE

### **Public Reporting of Mineral Resources and Mineral Reserves**

- Resource estimation and the mining business cycle
- Estimation of mineral resources and mineral reserves
- International standards for public reporting

### **Data Concepts**

- Geological data acquisition
- Quality Assurance and Quality Control
- The management of drilling data
- Transforming data into information

### **Geological Modeling**

- Geological setting and modeling criteria
- Geological interpretation and 3D modeling
- Common traps and pitfalls

### **Exploratory Data Analysis**

- Statistical inference and spatial declustering
- Identifying geological controls over grades
- Dealing with outliers
- Selection of compositing methodology and composite size

### **Variography**

- Spatial relationships and the variogram
- Inference of spatial continuity
- Variogram parameters and geology
- Practical modeling of variograms

### **Estimation**

- Change of support concepts
- Spatial estimation and estimation errors
- Kriging explained
- Indicator Kriging
- Calibration of estimation parameters
- Block model validation
- Documentation and audit trail
- Grade control models

### **Resource classification**

- Definitions and methodologies
- Classification criteria: best practices and applications
- Case Studies

### **Introduction to Conditional Simulation**

- Assessment of geological uncertainty
- Methods and applications
- Translating geological uncertainty into production risks
- Geological risk in mineral value chain optimization

### **Special topics**

- Spatial estimation of geometallurgical attributes
- The effective communication of estimation results
- Reconciliation - Delivering on promises

The AusIMM Proceedings: "Orebody Modelling and Strategic Mine Planning  
SMP 2014: Integrated mineral investment and supply chain optimisation"  
is included on USB key with the course materials