



SEG
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Education and Training Curriculum Course Catalog 2017



- ✘ **Mentorship**
- ✘ **Education**
- ✘ **Opportunity**
- ✘ **Exploration**
- ✘ **Discovery**

SOCIETY OF ECONOMIC GEOLOGISTS



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PRELIMINARY
2017 Education and Training Curriculum

The following is a preliminary list of short courses (**SC**) and field trips (**FT**) scheduled for 2017. SEG reserves the right to cancel courses or modify speakers, topics, and locations.

Official registration information will be available about three months prior to the courses. Visit segweb.org/events for the latest updates on courses and events!

SEG Short Course/Field Trip	SEG SC/FT Dates	Conference Dates	Venue/Location	Presenter(s)/Leader(s)
SC Mineral Resource Estimation: An Introduction	February 4–5	Mining Indaba February 6–9	Cape Town, South Africa	Duggan
SC World-Class Gold Deposits: How Do They Form and What Do We Need to Know to Find Them?	March 3–4	PDAC March 5–8	Toronto, Ontario Canada	Goldfarb, Simmons, Monecke
SC Global Exploration Targeting Targeting at the Global Scale	April 5–7	N/A	Littleton, Colorado	Lipson
SC Society of Economic Geologists Mapping Course	May 3–7	ProExplo 2017 May 8–10	Yanacocha, Peru	Chávez, Petersen
FT SEGF Student Field Trip to Carlin-Type Gold Deposits of Northern Nevada, USA	July 15–24	N/A	Nevada, USA	Cline, Muntean
SC Environment Geology of Some North American Mineral Deposits	October 21	GSA 2017 October 22–25	Seattle, Washington	Seal, Bowell
SC Senior Exploration Management	November 28– December 1	N/A	Littleton, Colorado	Hronsky, Bussey, Margeson, Welborn
WS1 Porphyry Copper, Gold and Molybdenum Deposits	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Cooke
WS2 The Geology, Genesis, and Discovery of Epithermal Gold-Silver Deposits	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Simmons, Enders
WS3 A Global Perspective of Sediment-Hosted Zn-Pb and Cu Deposits from Genesis to Exploration	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Leach, Hitzman, Song
WS4 Potash Deposits: Exploration, Orebody Economics, and Global Setting	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Arundell, Stirrett, Edgecombe
WS5 Uranium Deposit Systems and Implication for Exploration	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Cuney
WS6 Magmatic Sulfide Deposits: From Research to Exploration	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Li, Ripley, Barnes
WS7 Spectral Sensing Solutions to Mineral Exploration and Mining Challenges	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Laukamp, Huntington, Pontual
WS8 Fluids, Minerals, and Melts: Investigating Geological Processes Using Laser Ablation-ICP-MS Techniques	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Rusk
WS9 Application of Fluid Inclusion Studies in Economic Geology	September 16–17	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Huizenga

Please note that the 2017 calendar is provisional.
Dates, locations, and courses subject to change. For up-to-date information, see www.segweb.org/events.

2017 Education and Training Curriculum *(continued)*

SEG Short Course/Field Trip	SEG SC/FT Dates	Conference Dates	Venue/Location	Presenter(s)/Leader(s)
WS10 Understanding Orogenic Gold Deposits: Global- to Deposit-Scale Features and Exploration Criteria	September 21–22	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Goldfarb, Groves
WS11 Skarn Deposits	September 21	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Meinert, Chang
WS12 Volcanogenic Massive Sulfide Deposits	September 21–22	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Monecke
WS13 Carlin-Type Gold Deposits, Geology, and Models	September 21–22	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Cline
WS14 Deformation Processes and Structural Analysis in Fracture-Controlled Hydrothermal Ore Systems	September 21–22	SEG 2017 September 17–20	China University of Geosciences, Beijing, China	Cox
FT1 Omchak Gold District – Giant Lode and Epithermal Gold Deposits of Eastern Russia CANCELED	September 10–15	SEG 2017 September 17–20	Starts and finishes in Magadan, Russia	Goryachev
FT2 Epithermal Au Mineralization and Associated Epithermal Alteration in Southern Kyushu SOLD OUT	September 10–16	SEG 2017 September 17–20	Starts and finishes at Kagoshima Airport, Kirishima, Kagoshima Prefecture, Japan	Watanabe
FT3 Porphyry Cu-Au and Cu-Mo Deposits of Southern Mongolia	September 12–15	SEG 2017 September 17–20	Starts and finishes in Ulaanbaatar, Mongolia	Sreenan
FT4 Carlin-Like Gold Deposits in SW Guizhou Province, China	September 14–17	SEG 2017 September 17–20	Begins in Guiyang and ends in Beijing China	Xia, Zhang, Liu
FT5 Jiaodong Gold Deposits	September 13–16	SEG 2017 September 17–20	Starts and ends at Beijing International Airport, Beijing, China	Fan, Qiu, Taylor
FT6 Mineral Deposits of Yunnan CANCELED	September 21–27	SEG 2017 September 17–20	Departs from Beijing and returns to Kunming International Airport	Wang, Zhao, Zong
FT7 Middle-Lower Yangtze Valley Cu-Fe-Au Porphyry Deposits and Related Deposits CANCELED	September 21–26	SEG 2017 September 17–20	Begins in Beijing and ends in Hefei	Zhou
FT8 Jinchuan Ni-Cu Field Trip	September 21–24	SEG 2017 September 17–20	Departs from and returns to Beijing	Song, Jiao, Suo, Wang
FT9 Giant W-Cu, Sn, and Pb-Zn Deposits, NW Jiangxi Province	September 21–26	SEG 2017 September 17–20	Starts in Beijing and ends in Nanchang	Jiang
FT10 Porphyry and Epithermal Systems of the Sunda Banda Arc, Indonesia	September 21–26	SEG 2017 September 17–20	Departing from and returning to Bali, Indonesia	Zhang, Harrison, Orovan, Rompo
FT11 The Metallogenic Provinces of Myanmar (Burma)	September 21–29	SEG 2017 September 17–20	Departs from Beijing and ends at Yangon International Airport. Yangon, Myanmar	Robb, Mitchell, Gardiner
FT12 Late Paleozoic Metallogeny of the Alta Region, Northeastern Kazakhstan CANCELED	September 21–27	SEG 2017 September 17–20	Starts in Beijing and ends in Almaty, Kazakhstan	Naumov



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Mineral Resource Estimation: An Introduction

The University of Cape Town | Rondebosch, South Africa • February 4–5, 2017

DESCRIPTION

This SEG 2-day workshop will be held at the University of Cape Town on February 4–5, 2017, **prior to the Mining Indaba meeting**. The workshop will focus on the fundamentals of geology and sampling that are required for robust mineral resource estimation and will include an introduction to variography and kriging. Industry geologists, mine managers and investors, as well as upper level undergraduate and graduate students in economic geology, will find the workshop relevant and useful.

Day 1

- Introduction to Mineral Resource Management (MRM);
- Geology models for mineral resource estimation;
- Drilling and sampling;
- Data validation, QA/QC, statistics.

Day 2

- Exploratory Data Analysis (EDA) and an introduction to geostatistics;
- Spatial analysis (modelling variograms);
- Kriging;
- Mineral resource classification and an introduction to non-linear geostatistics.

PRESENTER



Sean Duggan

Sean has more than 30 years of international experience in mineral exploration and mineral resource evaluation. Currently he is enjoying working as a Z* consultant evaluating mineral resources. He was previously employed by De Beers, Namdeb, and Anglo

American in various capacities, estimating and classifying mineral resources. His main focus is currently on diamonds and base metals.

Specialties: mineral resource estimation, mineral resource classification, evaluation and mining of marine diamond placers, optimizing drilling and sampling programs, resource geology, evaluation of diamond placers, mineral resource valuation, mineral resource due diligence, and technical reviews.

REGISTRATION

Online at segweb.org/events#17RMRUCT

Early Registration

(through January 15, 2017)

Member: US\$695
Non-member: US\$795
Student: US\$295
Student Non-member: US\$345

Late Registration

(after January 15, 2017)

Member: US\$795
Non-member: US\$895
Student: US\$345
Student Non-member: US\$395

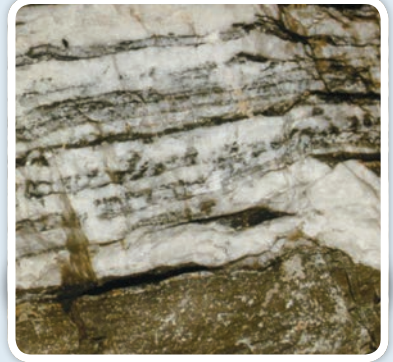
Please note that SEG reserves the right to cancel this event should minimum attendance numbers not be met by January 15, 2017. For further information on cancellation policy, event photography, and dietary restrictions, visit www.segweb.org/tc.



SEG at PDAC 2017

World-Class Gold Deposits: How Do They Form and What Do We Need to Know to Find Them?

Organizer: Society of Economic Geologists (SEG)
Two days: Friday, March 3, 2017 | 8:00 AM - 5:00 PM
Saturday, March 4, 2017 | 8:00 AM - 5:00 PM
Location: Toronto, Ontario, Canada



DESCRIPTION

This two-day-long workshop will focus on the most widespread mineral deposit types that host much of the current global gold resource. Leading experts will provide descriptions of some of the most important Precambrian and Phanerozoic examples of gold deposit types formed in island and continental arcs, evolving metamorphic belts, and seafloor settings.

Detailed material will be provided on tectonic and structural controls, geological characteristics, geochemical and geophysical signatures, geochronological relationships, and exploration strategies. Specific settings in the geological record, both in space and time, will be compared and contrasted to indicate what type of gold resources are likely to be discovered in various provinces.

Case studies will document key features that have led to successful discovery of deposits. The course is aimed at geoscientists from both industry and academia, as well as students of economic geology who desire a comprehensive understanding of modern concepts on the geology of gold deposits. Emphasis will be on the characterization of deposits representative of the following types:

- Orogenic gold deposits
- Low and high sulfidation epithermal gold deposits
- Gold-rich porphyry deposits
- Intrusion-related gold systems
- Volcanogenic massive sulfide ores

PRESENTERS



Richard Goldfarb, Colorado School of Mines & China University of Geosciences

Richard was a research geologist with the Minerals Program of the U.S. Geological Survey for 35 years. His expertise is in the geology and geochemistry of orogenic gold deposits, regional metallogeny of the North American Cordillera and of China, and tectonic controls on mineral deposits. He has senior- and co-authored more than 220 refereed publications in *Economic Geology*. Rich currently is a research professor at the Colorado School of Mines and the China University of Geosciences Beijing, as well as a global consultant on the exploration for gold resources in metamorphic environments (rjgoldfarb@mac.com).



Stuart Simmons, University of Utah, Earth and Geoscience Institute

Stuart is a research geoscientist at EGI-University of Utah and a consulting geoscientist, with >30 years' experience in hydrothermal processes, epithermal mineralization, and geothermal resources. Much of his professional career was spent in New Zealand, at the Geothermal Institute, University of Auckland. As a consultant, Stuart serves clients around the Pacific Rim in the exploration and development of gold-silver and geothermal resources (website: www.hotsolutions.co.nz).



Thomas Monecke, Colorado School of Mines

Thomas's focus is on the formation of base and precious metal deposits in modern and ancient volcanic arcs. He has more than 20 years' experience in research and mineral exploration and has authored or co-authored approximately 80 journal papers, book chapters, government publications, and field guides. Thomas holds a Ph.D. from the University of Freiberg, Germany and did postdoctoral research at the Institute of Marine Sciences in Kiel, Germany, the University of Ottawa, and the Geological Survey of Canada. Thomas received the 2006 Waldemar Lindgren Award from SEG and in 2008, he joined the Colorado School of Mines, where he currently teaches economic geology.

REGISTER at

www.segweb.org/events#17PDACSEG

ATTENTION SEG MEMBERS

You must complete the SEG Member Registration Form to receive the member rate for this workshop. No discounts are offered on PDAC 2017 registration. www.segweb.org/17PDACSEG-Form

Level of Comprehension: Intermediate

Course Fee (including course material, continental breakfast, three-course lunch, and refreshments):

Early Registration
(through February 3, 2017)

PDAC or SEG Member: C\$799
Non-member: C\$899
Student Member: C\$399

Late Registration
(after February 3, 2017)

PDAC or SEG Member: C\$999
Non-member: C\$1,099
Student Member: C\$399

Please note that SEG/PDAC reserves the right to cancel this event should minimum attendance numbers not be met by February 3, 2017.



Global Exploration Targeting

Targeting at the Global Scale

April 5–7, 2017 | Society of Economic Geologists Course Center
Littleton, Colorado

COURSE DESCRIPTION

This three-day, practical course on the business of exploration is primarily aimed at early career geologists. In providing an overview of the targeting process, the course will examine two gold deposit types—orogenic gold and porphyry Cu-Au systems. Participants will examine, first, the geological criteria for development of these deposit types. Secondly, the focus will then turn to developing criteria for scoring and rating areas (polygons) created using public domain maps and other available data.

COURSE OUTLINE

Day 1 (8:30 am – 5:30 pm):

Introduction and Context

1. Introduction and discussion of context
2. Group workshops on critical context questions (CCQ)
3. Group presentations on CCQ
4. Load data to laptops

Polygon Definition and Findability

1. Presentation and discussion of polygons
2. Group workshops on polygon parameter definition (PPD)
3. Group presentations on (PPD)
4. Development of findability factors (F)

Evening function (5:30 pm – 6:30 pm)

Day 2 (8:30 am – 5:30 pm):

Key ingredients for Global Business Area selection: Part 1

1. Development of geological factors (G) for porphyry Cu-Au and orogenic Au (requires prior review of literature)
2. Discussion of weighting and ranking (WR)
3. Group workshops on GF-WR and matching scoring framework (porphyry/orogenic Au)
4. Group presentations of GF-WR: Porphyry Cu-Au
5. Group presentations of GF-WR: Orogenic gold

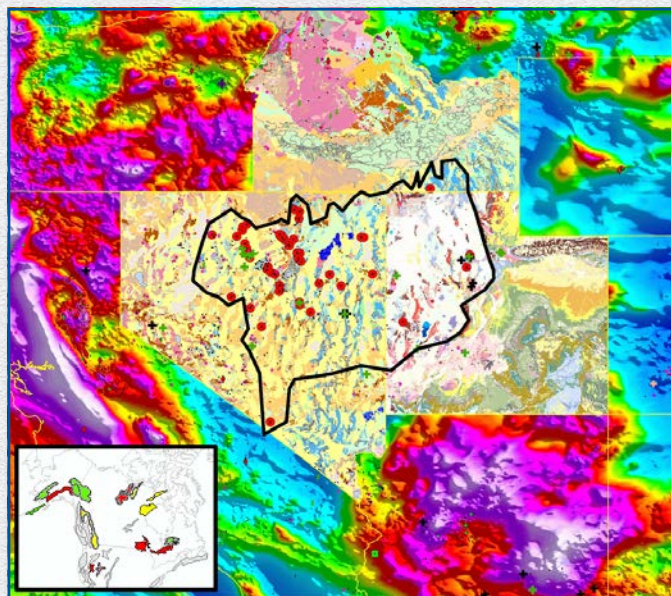
Day 3 (8:30 am – 2:00 pm):

Key ingredients for Global Business Area selection: Part 2

1. Group workshops: Using database and maps/score using GF-WR
2. Group presentations of final scoring outcomes

All course attendees must complete and submit the non-disclosure agreement.

**CLICK
HERE**



PRESENTER



Rael Lipson was employed by Gold Fields for 36 years, first in SEDEX base metal exploration, then in gold, with more than 3 years as chief geologist of a Witwatersrand gold mine. He also was a member of the Tarkwa feasibility study. After transferring from Johannesburg to Denver in 1999 as Gold Fields chief exploration geologist, he oversaw areas of international project reviews as well as strategic planning. His interests include paleoplacer and orogenic-type gold. Currently working as a consultant, Rael established RDLGEO Consulting, Inc., in 2013.

REGISTRATION

Online at segweb.org/events#17RGET

Early Registration
(through March 15, 2017)

Member: US\$990
Non-member: US\$1,090

Late Registration
(after March 15, 2017)

Member: US\$1,090
Non-member: US\$1,190

Please note that SEG reserves the right to cancel this event should minimum attendance numbers not be met by March 15, 2017. For further information on cancellation policy, event photography, and dietary restrictions, visit www.segweb.org/tc.



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Curso de Mapeo – ProExplo2017/Society of Economic Geologists – Yanacocha, Perú
ProExplo2017/Society of Economic Geologists Mapping Course – Yanacocha, Perú
3 al 7 de mayo del 2017/May 3–7, 2017

El Comité Organizador del ProExplo2017 conjunto con el Society of Economic Geologists ofrece un curso de mapeo profesional en el distrito minero Yanacocha, Perú con el auspicio de Newmont Mining. Utilizando un mapeo detallado (1:500) conjunto con aplicación práctica de geoquímica, este curso enfatiza observaciones en alteración-mineralización con el objetivo de explicar las asociaciones mineralógicas y su importancia en la exploración minera.

El curso empezará en Cajamarca a las 18:00 horas el 3 de mayo, y terminará la mañana del domingo, 7 de mayo; se programará el fin del curso de tal manera de permitir participantes de regresar a Lima por la mañana.

El costo del curso incluye habitación tipo doble, transporte por bus ida/vuelta Cajamarca-Yanacocha-Cajamarca los 4-5-6 de mayo, desayunos, almuerzos en terreno, y las hojas de mapeo. Participantes son responsables por su transporte ida/vuelta Cajamarca, transporte aeropuerto (CJC) al hotel y vuelta, cenas, gastos personales, y el costo de un examen médico requerido por Newmont Mining (aprox. US\$35) que se ofrece en Cajamarca el 3 de mayo.

Se ofrecerá el curso en el español y el inglés.

El curso está restringido a quince participantes para asegurar una calidad de enseñanza, con plazos por hasta dos estudiantes con un costo rebajado.

The ProExplo2017 Organizing Committee and the Education and Training Committee of the Society of Economic Geologists is offering a professional-level Mapping Course at Newmont Mining Corporation's Yanacocha mine near Cajamarca, Perú. Detailed (1:500) mapping of alteration-mineralization in a high-sulfidation epithermal environment is combined with applied geochemistry to explain and interpret mineral associations and their importance in mineral exploration.

The course begins on Wednesday, 3 May in Cajamarca at 6:00PM, and ends on Sunday morning, 7 May, with participants able to return to Lima for the start of ProExplo2017 that Sunday afternoon.

Course registration cost includes double-occupancy lodging, bus transportation from Cajamarca to and from Yanacocha on 4-5-6 May, breakfasts, field lunches, and mapping base sheets. Participants are responsible for their travel to and from Cajamarca, transportation Cajamarca (CJC) airport to and from the hotel, dinners, incidental expenses, and the cost of a required medical exam (about US\$35) that will be offered in Cajamarca on Wednesday, 3 May to all participants.

The course will be instructed in Spanish and in English.

To maintain high quality instruction, the course is limited to fifteen participants, with space for up to two students at a discounted rate.

LÍDERES DEL CURSO/COURSE INSTRUCTORS



William X. Chávez, Jr.
New México School of Mines
Socorro, New México
wxchavez@msn.com



Erich U. Petersen
University of Utah
Salt Lake City, Utah
eupetersen@gmail.com

REGISTRO/REGISTRATION

Se puede matricular al curso por medios del website del ProExplo2017

Course registration through the ProExplo2017 website

Conference Website: www.proexplo.com.pe/2017

Rates in US dollar and includes 18% IGV (tax)

Member: US\$795

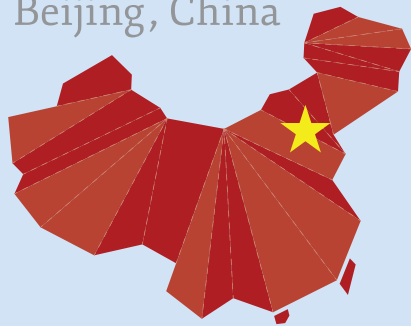
Non-member: US\$895

Student: US\$400

Student Non-member: US\$450

SEG 2017

Beijing, China



Ore Deposits of Asia: China and Beyond

September 17-20, 2017 Beijing, China



SEG



CUGB

seg2017.org

INVITATION TO ATTEND THE SEG 2017 CONFERENCE

ORGANIZING COMMITTEE

Conference Chairs:

Richard Goldfarb

China University of Geosciences, Beijing (CUGB) and Colorado School of Mines

Jun Deng

China University of Geosciences, Beijing (CUGB)

SEG Executive Director

Brian Hoal, *Society of Economic Geologists (SEG)*

SEG Executive Assistant

Alison Cronk, *Society of Economic Geologists (SEG)*

Technical Program

Larry Meinert, *U.S. Geological Survey*

Publications

Zhiming Yang, *Chinese Academy of Geological Sciences, Beijing*

Field Trips

Kezhang Qin, *Chinese Academy of Geological Sciences, Beijing*

Workshops

Zhaoshan Chang, *James Cook University, Australia*

Poster Sessions

Liqiang Yang, *China University of Geosciences, Beijing (CUGB)*

Fundraising

Dawn Zhou, *CSIT Consulting, Inc.*

Marketing/Publicity, China

Jingwen Mao, *Chinese Academy of Geological Sciences*

Marketing/Publicity, Global

Nikki Morrison, *Society of Economic Geologists (SEG)*

Marketing/Publicity, North Eurasia

Marina Yudovskaya, *SEG Regional VP for North Eurasia*

CUGB International Affairs Coordinator

Cathy Pian, *China University of Geosciences, Beijing (CUGB)*

Student Activities

Yuling Xie, *University of Science and Technology Beijing*

Administration/Logistics

Kunfeng Qiu, *China University of Geosciences, Beijing (CUGB)*

The Organizing Committee is pleased to invite you to the SEG 2017 Conference, *Ore Deposits of Asia: China and Beyond* (SEG 2017), September 17–20, in Beijing, China. The conference is jointly hosted by the Society of Economic Geologists and the China University of Geosciences, Beijing (CUGB), at the conference center and hotel complex of the CUGB.

Asia comprises almost one-third of the world's land area and is home to 60% of the world's population. As the Asian countries have grown in the past decades, so has their demand for resources, which has been met by new brownfields and greenfields discoveries in eastern Russia, central Asia, China, and southeast Asia. The SEG 2017 Conference, our first ever held in Asia and the largest SEG conference to date, will focus on recent developments in our understanding of the evolution of eastern Asia and formation of its many world-class mineral deposits.

We expect at least 1,200 attendees from throughout the world, including managers in the resource industry, exploration and mine site geologists, government earth scientists, and academics from dozens of universities. The technical program will include a dedicated student forum on September 17, followed by three days of technical sessions. Beginning with a plenary session including addresses from globally recognized leaders in the areas of resource exploration and geology, the program will subsequently include three parallel sessions over the next two and a half days, as well as dedicated poster session periods.

The technical program will be preceded and followed by an exceptional offering of field trips and workshops. Within China, trips will include visits to the giant Jiaodong lode gold deposits, the Carlin-like deposits of Guizhou, the Yangtze River porphyry-skarn province, the famous Sn-W ores of the southeast, the world-class Jinchuan Ni-Cu ores, and the complex Himalayan ores of Yunnan. Other excursions will include travel to Oyo Tolgoi and other porphyry systems in Mongolia, the gold-VMS-pegmatite province of the Rudny Altai in Kazakhstan, epithermal deposits of Japan, metallogeny of Myanmar, and giant Au and Cu systems in Indonesia. Workshops by world experts will include offerings on porphyry, epithermal, skarn, orogenic gold, Carlin-type, magmatic sulfide, uranium, potash, VMS, and sedimentary rock-hosted base metal deposits, as well as spectral techniques, LA-ICP-MS applications, and applied structural geology.

The venue for SEG 2017 is the conference center of the CUGB, with a modern Western-style hotel attached to the meeting facilities. A wide variety of restaurants are within easy walking distance of the CUGB. Social events will include a dinner, an evening at a microbrewery, and an end-of-meeting overnight train trip to the Terra Cotta Warriors in Xi'an. During the meeting, guest activities will include day visits to the Great Wall, Forbidden City, and Silk Markets.

Preliminary details on the conference, as well as sponsorship and exhibition opportunities, can be found at seg2017.org and on the following pages of this *Newsletter*. The weather in late September in Beijing is generally the nicest of the year. We look forward to seeing you in China this September.

**Jun Deng (SEG 2015) and
Richard J. Goldfarb (SEG 1989 F),
Chairs**



WORKSHOPS

The number of places is limited for the following events. Preference will be given to SEG 2017 Conference registrants. Non-attendees wait-listed prior to July 31. Learn more at www.seg2017.org/workshops.html.

PRE-CONFERENCE WORKSHOPS

WSO1

Porphyry Copper, Gold and Molybdenum Deposits

DATE September 16–17, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTER **David R. Cooke**

Description

This workshop will provide a comprehensive review of porphyry copper, gold, and molybdenum deposits, covering their geodynamic setting, intrusive complexes, mineralization and alteration assemblages, zonation patterns, overprinting relationships, associated breccias, and supergene modifications. It will also review the development of the porphyry copper model and its role in mineral exploration. Case studies of major porphyry districts from around the world and new advances in porphyry exploration will be discussed.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 200

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants



WSO2

The Geology, Genesis, and Discovery of Epithermal Gold-Silver Deposits

DATE September 16–17, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTER **Stuart Simmons**

Description

Epithermal deposits host substantial resources of gold and silver that are often blind and sometimes very high grade. This workshop covers their geologic setting and ore-forming processes, as well as the exploration methods used to discover them. Emphasis is placed on interpreting hydrothermal alteration patterns to understand the depth level of exposure and proximity to upflow zones in which epithermal deposits form. Many deposits are described and the case histories of discoveries are reviewed, covering the spectrum of geological, geochemical, and geophysical exploration methods. All types of epithermal deposits will be covered.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 60

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants



WSO3

A Global Perspective of Sediment-Hosted Zn-Pb and Cu Deposits from Genesis to Exploration

DATE September 16–17, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTERS **David Leach**
Murray Hitzman
Yucai Song

Description

The workshop will focus on Mississippi Valley-type (MVT) and clastic-dominated (CD) zinc-lead deposits and sediment-hosted copper (SHC) deposits. Presentations on the geologic and tectonic controls on the distribution of these ores in the Earth's crust through time will provide insight into where and how these deposits form. The workshop will briefly review the origin of the ore fluids, metal solubility, and transport and precipitation mechanisms and their exploration implications. In addition to describing the global occurrences of the deposits, the workshop will describe the varied styles of these ores in China and other parts of Asia.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 100

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants



WORKSHOPS

WSO4

Potash Deposits: Exploration, Orebodies, Economics, and Global Setting

CANCELED

DATE September 16–17, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTERS **Mark Arundell**
Tabetha Stirrett
Roger Edgecombe

Description

Food production needs to more than double by 2050 in order to feed our growing world. Potash, along with other fertilizers, will be a major component to increase farm productivity in the future. Twenty-first century mining and mineral exploration companies need to understand the tools to minimize the expense and increase the success of a potash exploration strategy.

“Mega” potash deposits are the result of the evaporation of seawater and crystallization of potassium salts. Deposits may only be a few to several tens of meters thick but tend to be laterally continuous—individual potash beds can be traced along strike for many kilometers. These “rock salt” deposits are a mixture of sylvite (KCl) and common salt (NaCl).

The workshop will cover the following topics:

- Geology of many important potash deposits around the world, with a focus on Asian deposits.
- How to explore for potash deposits and the various exploration techniques used, such as seismic, wireline geophysics, and the significance of rock mechanics and dissolution testing.
- The differences between conventional and solution mining for potash.
- Identifying minerals commonly associated with important potash deposits (rock samples).



- Why companies report using the NI 43-101 or JORC guidelines.
- How to differentiate between mineral resources and reserves and how to properly report them.
- At a high level, understand the economics of a potash project—what makes a project financially feasible.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 40

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants

WSO5

Uranium Deposit Systems and Implication for Exploration

DATE September 16–17, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTER **Michel Cuney**

Description

During the first day, the workshop will give a general overview of the physical and chemical properties of uranium and thorium and their application to the exploration and understanding of ore-forming processes. The new descriptive (International Atomic Energy Agency) and genetic classifications of uranium deposits will be presented, together with an overview of the world’s uranium resources. The evolution through time of ore-forming processes and uranium deposit types will be introduced. Then, the presentation on the fractionation of uranium during magmatic processes will define the best uranium sources and the mechanisms of formation of the uranium deposits essentially related to igneous processes.

On the second day, the other main genetic types of uranium deposits will be reviewed: hydrothermal U veins associated with granites, volcanic rocks and IOCG deposits,



hydrothermal diagenetic deposits with intra- and interformational and basement/basin redox control, hydrothermal metamorphic and hydrothermal metasomatic deposits, deposits related to meteoric water infiltration, and synsedimentary deposits.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 60

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants

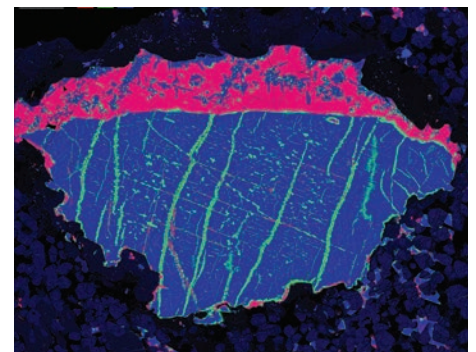
WSO6

Magmatic Sulfide Deposits: From Research to Exploration

DATE September 16–17, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTERS **Chusi Li**, Indiana University
Edward Ripley, Indiana University
Steve Barnes, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

Description

The following will be covered during the workshop: fundamentals, basic concepts, and classification; modeling: mantle partial melting, parental magma estimation, fractional crystallization, sulfur content at saturation in magma, initial PGE concentrations in magma, R-factors, sulfide liquid differentiation; physical processes in magmatic Ni sulfide systems: fluid dynamics, time and length scales, intrusion geometry and emplacement mechanisms; komatiite-related Ni deposits; intraplate magmatic Ni-Cu-(PGE) deposits; magmatic Ni-Cu deposits in convergent tectonic settings; sulfide-silicate textures, breccia ores, and sulfide melt migration; PGE deposits in



WORKSHOPS

large layered intrusions; and application of Re-Os, Cu, and multiple S isotopes.

Early Registration ends July 31, 2017		
ATTENDEE MAXIMUM: 60		
	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants

WS07

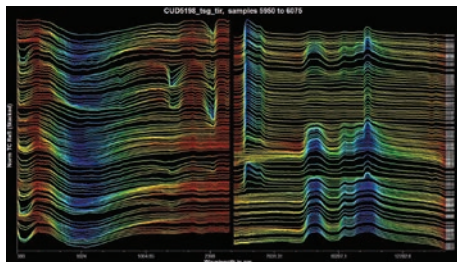
Spectral Sensing Solutions to Mineral Exploration and Mining Challenges

DATE September 16–17, 2017
LOCATION China University of Geosciences, Beijing (CUGB)
PRESENTERS Carsten Laukamp
 Jon Huntington
 Sasha Pontual

Description

Spectral sensing technologies can provide detailed mineralogical information throughout the mining life cycle, from exploration through to mine planning and operation. Reflectance spectroscopy can rapidly characterize mineral assemblages across different ore deposit styles, such as epithermal, porphyry, and skarn systems.

Building on a strong background in mineral spectroscopy theory, this workshop aims to improve skills for identifying the appropriate spectral sensing technologies for the exploration or mining challenge. Case studies of a variety of deposit styles will be presented and various visible, near-, shortwave, and thermal infrared spectral sensing applications will be discussed. Furthermore, solutions to information extraction, product generation, and integration with geochemical and other geoscience datasets will be explored. For this, hands-on case studies will be undertaken using The Spectral Geologist (TSG) software.



Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 20

	EARLY	LATE
SEG Member	\$895	\$ 995
Non-member	\$995	\$1,095
SEG Student Member	\$445	\$ 495
Student Non-member	\$495	\$ 545

Students may not exceed 20% of total participants

WS08

Fluids, Minerals, and Melts:

Investigating Hydrothermal Processes Using Laser

Ablation-ICP-MS Techniques

DATE September 17, 2017
LOCATION China University of Geosciences, Beijing (CUGB)
PRESENTER Brian Rusk

Description

Laser ablation-based microanalysis is rapidly revolutionizing our understanding of ore deposits by enabling precise trace element and isotopic analyses with high spatial resolution and high sensitivity. LA-ICP-MS trace element and isotopic analyses yield insight into a range of processes relevant to ore deposit formation, such as fluid, metal, and magma sources; fluid and magma compositional evolution; fluid-rock reaction pathways; ore and gangue mineral precipitation mechanisms; and metal partitioning among fluids, melts, and minerals. The purpose of this one-day workshop is to show how LA-ICP-MS can be applied to understanding ore deposit genesis and exploration. The workshop will include practical advice on conducting an LA-ICP-MS study along with examples, scenarios, and case studies to illustrate the usefulness of LA-ICP-MS to understanding ore deposit formation. Discussion will consider trace element and isotopic analysis of minerals, fluid inclusions, and melt inclusions. Lectures will detail instrumentation and application of LA-ICP-MS



techniques to solving problems relevant to ore deposit genesis.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 40

	EARLY	LATE
SEG Member	\$395	\$495
Non-member	\$495	\$595
SEG Student Member	\$195	\$245
Student Non-member	\$245	\$295

Students may not exceed 20% of total participants

WS09

Application of Fluid Inclusion Studies in Economic Geology

DATE September 16–17, 2017
LOCATION China University of Geosciences, Beijing (CUGB)
PRESENTERS Jan Marten Huizenga
 Lorena Ortega

Description

This two-day workshop will focus on the fundamentals of fluid inclusion studies, including the following:

- Practical aspects of fluid inclusion studies (e.g., sample selection, sample preparation);
- Fluid inclusion petrography (i.e., principle of fluid inclusion assemblages);
- Phase diagrams of single and multicomponent systems (H₂O, CO₂, H₂O-NaCl, H₂O-NaCl-CaCl₂, H₂O-CO₂);
- Use of the heating-freezing stage and microthermometry;
- Data collection and data presentation;
- Data evaluation using relevant examples;
- Calculation of fluid compositions and isochores using shareware.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 30

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants



All information subject to change. Visit seg2017.org for the latest updates and changes.

WORKSHOPS

POST-CONFERENCE WORKSHOPS

WS 10

Understanding Orogenic Gold Deposits: Global- to Deposit-Scale Features and Exploration Criteria

DATE September 21–22, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTERS **Richard J. Goldfarb**
David I. Groves

Description

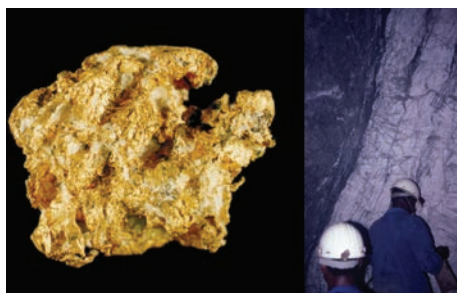
This two-day workshop is for geologists from academia and industry who want to improve their understanding about the geology and genesis of gold deposits in metamorphic rocks. The workshop will provide a comprehensive overview of all aspects of the geology of gold ores in Phanerozoic and Precambrian metamorphic terranes, including the most important provinces throughout China. Aspects of the geology, geochemistry, mineralogy, alteration, structure, tectonics, and exploration approaches will be covered.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 200

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants



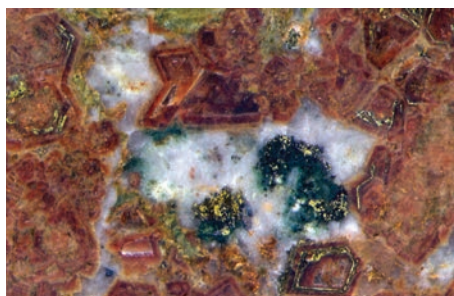
WS 11

Skarn Deposits

DATE September 21, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTERS **Larry Meinert**
Zhaoshan Chang

Description

Skarn deposits are some of the largest ore deposits in the world but can be complicated in the field. This one-day workshop is designed to help explorers understand skarn deposits



with common sense exploration concepts and easy-to-apply mineralogical guides. We will clarify the basic concepts and terminology, explain the current understanding of skarn-forming processes, and summarize the general characteristics of major skarn types. The focus will be on the zonation patterns in skarns that are useful in exploration, with a discussion of how the zonation pattern varies in different environments. The workshop will cover the following topics: (1) Introduction, definition and mineralogy; (2) Classification and terminology; (3) Skarn-forming processes and evolutionary stages; (4) General characteristics of major skarn types (Au, Cu, W, Sn, Pb-Zn, Fe, Mo, and others); (5) Zonation in skarn systems; (6) Factors affecting the formation of skarns and zonation patterns; and (7) Skarn exploration techniques.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 40

	EARLY	LATE
SEG Member	\$395	\$495
Non-member	\$495	\$595
SEG Student Member	\$195	\$245
Student Non-member	\$245	\$295

Students may not exceed 20% of total participants

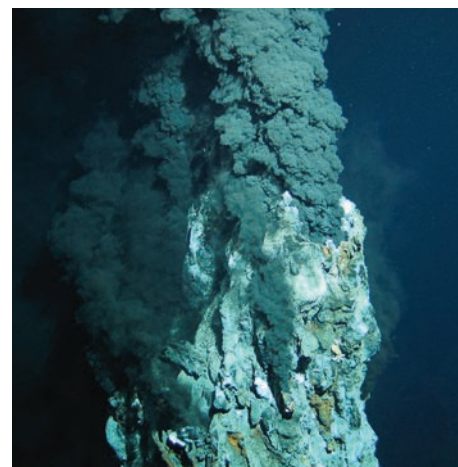
WS 12

Volcanogenic Massive Sulfide Deposits

DATE September 21–22, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTER **Thomas Monecke**

Description

Submarine hydrothermal systems represent one of the oldest and most important ore-forming processes in the geologic record. This workshop will examine the diversity of hydrothermal systems and the nature of fluid flow in submarine volcanic environments, with an emphasis on the formation of volcanogenic massive sulfide deposits. The geologic characteristics of these base and precious metal deposits and the hydrothermal processes that produce them will be discussed. Special



emphasis will be placed on the interpretation of geologic settings, controls on mineralization, ore mineralogy and geochemistry, hydrothermal alteration, and enrichment in precious metals. Strategies for exploration in ancient volcanic terrains will be developed.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 60

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants

WS 13

Carlin-Type Gold Deposits, Geology, and Models

DATE September 21–22, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTER **Jean Cline**

Description

The Carlin-type gold deposits in northeastern Nevada, USA, comprise one of the most productive gold districts in the world, with gold production now in excess of 135 million



WORKSHOPS

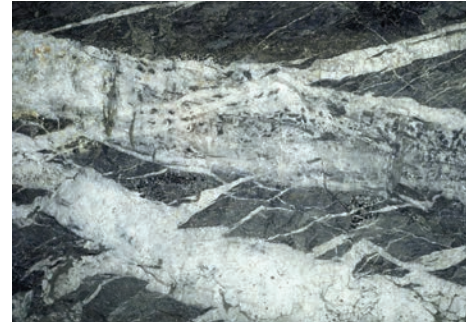
WS 14

Deformation Processes and Structural Analysis in Fracture-Controlled Hydrothermal Ore Systems

DATE September 21–22, 2017
 LOCATION China University of Geosciences, Beijing (CUGB)
 PRESENTER **Stephen F. Cox**

Description

The workshop is designed to provide exploration and mining geoscientists with a robust understanding of structural analysis and ore targeting in fracture-controlled hydrothermal ore systems, including orogenic gold and intrusion-related systems. Within the context of high fluid flux seismogenic systems, the workshop will examine how the formation of fracture-controlled flow systems and their structural styles are influenced by fluid pressure regimes, stress states, and fluid flow. We will explore the processes controlling why and where permeability enhancement and high fluid flux are localized in faults and examine how deformation processes influence the geometry of high fluid



flux pathways and ore deposits formed within fault zones and fracture networks. Lectures will be supplemented by simple practical exercises that will further develop participants' expertise in structural analysis and ore targeting.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 60

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants

ounces. Mining and research since discovery of the Carlin deposit in the 1960s have generated detailed descriptions of deposit geology, including recognition of features that are common to deposits across northern Nevada, though no single, widely acceptable genetic model has been developed. This two-day workshop will focus on (1) the geologic evolution of northeastern Nevada that produced an ideal geologic architecture for the deposits, (2) geologic processes in the late Eocene that were critical to deposit formation, (3) geologic models for deposit formation, and (4) the geology of Carlin-like deposits in Guizhou Province, China, including a comparison with the Nevada deposits. Presentations will include detailed descriptions of deposit geology and implications for exploration and research.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 100

	EARLY	LATE
SEG Member	\$595	\$695
Non-member	\$695	\$795
SEG Student Member	\$295	\$345
Student Non-member	\$345	\$395

Students may not exceed 20% of total participants

FIELD TRIPS

The number of places is limited for the following events. Preference will be given to SEG 2017 Conference registrants. Non-attendees wait-listed prior to July 31. Learn more at www.seg2017.org/field-trips.html. Flights/Airfare not included in cost of trip unless noted.

PRE-CONFERENCE FIELD TRIPS

FT01

Omchak Gold District – Giant Lode and Placer Gold Deposits of Eastern Russia

DATE September 10–15, 2017
LOCATION Departing from and returning to Magadan, Russia

FIELD TRIP LEADER

- **Professor Nikolay A. Goryachev**, Senior Scientist of North East Interdisciplinary Scientific Research Institute, Far East Branch of the Russian Academy of Sciences

Description

The Omchak gold district is located in south-eastern part of the famous Yana-Kolyma gold belt, a belt that has yielded 3,100 t Au from orogenic gold deposits and related placers during the past 85 years. The Omchak district includes three major lode deposits, with past production of about 300 t Au and reserves of >800 t Au at Natalka and Pavlik. The Late Jurassic-Early Cretaceous deposits consist of low-grade disseminated and high-grade quartz vein ore styles by Late Permian volcanoclastic sequences along a major regional-scale fault. Natalka is the largest gold deposit in eastern Russia (>612 t Au), with the main orebody being 4 km long, 1 km wide, and 500 m deep. This trip will allow participants to develop a thorough understanding of the great gold resources and future potential of this part of eastern Russia.

Participants must have warm and waterproof field clothing. The temperature in the Omchak area in mid-September typically ranges from +5° to -5°C. Transportation from Magadan to Omchak will be by all-terrain vehicle. The distance is 400 km and will require one day of travel. Daily flights to Magadan depart from Moscow, Khabarovsk, and Vladivostok, with connections through Seoul-Incheon,



Tokyo-Narita, Hong Kong, and Beijing to Khabarovsk and/or Vladivostok.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 10

	EARLY	LATE
SEG Member	\$895	\$ 995
Non-member	\$995	\$1,095
SEG Student Member	\$595	\$ 645
Student Non-member	\$645	\$ 695

FT02

Epithermal Au Mineralization and Associated Hydrothermal Alteration in Southern Kyushu

DATE September 10–16, 2017
LOCATION Starts and finishes at Kagoshima Airport, Kirishima, Kagoshima Prefecture, Japan

FIELD TRIP LEADER

- **Yasushi Watanabe**, Faculty of International Resource Sciences, Akita University, Japan

Description

This field trip will provide the opportunity to observe the young epithermal gold mineralization and associated hydrothermal alteration in the Ryukyu volcanic arc, Japan. The trip includes visits to the Hishikari low-sulfidation deposit and the Kasuga and Akeshi high-sulfidation deposits in southern Kyushu. This trip also will allow observation of advanced argillic alteration, steam-heated alteration, an active geothermal system, and an active volcano (Kirishima or Sakurajima).

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 10

	EARLY	LATE
SEG Member	\$ 995	\$1,095
Non-member	\$1,095	\$1,195
SEG Student Member	\$ 995*	\$1,095*
Student Non-member	\$1,095*	\$1,195*

*Student discounts not available.



FT03

Porphyry Cu-Au and Cu-Mo Deposits of Southern Mongolia

DATE September 12–15, 2017
LOCATION Departing from and returning to Ulaanbaatar, Mongolia

FIELD TRIP LEADER

- **Jargalan Sereenan**, Mineral Resources Research Group, School of Geology and Mining Engineering, Mongolian University of Science and Technology

Description

South Mongolia is rich in various types of mineral deposits, including Cu-Au and Cu-Mo porphyry deposits and occurrences located within the middle to late Paleozoic island arc terranes of the Central Asian orogenic belt. This trip will visit the Tragaan Suvarga, Kharmagtai, and giant Oyu Tolgoi deposits. We will observe different styles of porphyry mineralization at the various occurrences. At the Tsagaan Suvarga Cu-Mo deposit (240 Mt at 0.53% Cu and 0.018% Mo), ore-related sericitic alteration can be observed overprinting the dominant potassic (K-feldspar) alteration of the main syenogranite. Chlorite-epidote alteration associated with Cu-Au mineralization overprints potassic (biotite-magnetite) alteration at Kharmagtai, with much of the mineralization related to a large tourmaline breccia system. The visit to the Cu-Au-Mo-mineralized quartz monzodiorite intrusions at the Oyu Tolgoi group of deposits (43 million tonnes Cu, 1,850 t Au) will include examination of muscovite- and pyrophyllite-bearing alteration associated with Cu-Au mineralization that was subsequently upgraded by advanced argillic alteration at the Hugo Dummett orebody.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 17

	EARLY	LATE
SEG Member	\$1,395	\$1,495
Non-member	\$1,495	\$1,595
SEG Student Member	\$ 795	\$ 845
Student Non-member	\$ 845	\$ 895



FIELD TRIPS

FT04

Carlin-Like Gold Deposits in SW Guizhou Province, China

DATE September 14–17, 2017
 LOCATION Departing from and returning to Guiyang, China

FIELD TRIP LEADERS

- **Yong Xia**, Institute of Geochemistry, Chinese Academy of Sciences
- **Xingchun Zhang**, Institute of Geochemistry, Chinese Academy of Sciences
- **Jianzhong Liu**, Chief Geologist, No. 105 Geological Team, Guizhou Bureau of Geology and Mineral Exploration and Development

Description

Carbonate-bearing sedimentary sequences in southwestern Guizhou Province host China's most important Carlin-like Au deposits. Combined proven gold reserves in these deposits exceed 650 tonnes. Deposits can be divided into strata-bound and the fault-controlled ores. During this field trip into the scenic karst region of SW China, we'll visit the largest Carlin-type Au deposits of each type. The Shuiyindong Au deposits (263 t Au at 5 g/t), controlled by the Huijiabao anticline, are dominated by auriferous pyrite disseminated in Permian bioclastic limestone, with minor orebodies also hosted in calcareous siltstone and argillite, and along a major unconformity. The Jinfeng deposit (165 t Au at 4.7 g/t) is controlled by faults, and typically occurs in the carbonaceous siltstone of the Middle Triassic Xuman and Bianyang formations, with minor Au mineralization in carbonaceous shale and K-feldspar-rich sandstone.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 17

	EARLY	LATE
SEG Member	\$ 995	\$1,095
Non-member	\$1,095	\$1,195
SEG Student Member	\$ 595	\$ 645
Student Non-member	\$ 645	\$ 695



FT05

Jiaodong Gold Deposits

DATE September 13–16, 2017
 LOCATION Departing from and returning to the Beijing Airport

FIELD TRIP LEADERS

- **Hongrui Fan**, Chinese Academy of Sciences, Beijing
- **Kunfeng Qiu**, China University of Geosciences, Beijing
- **Ryan Taylor**, USGS, Denver

Description

The Jiaodong gold province on the eastern margin of the North China block is China's largest gold producer and is responsible for about 25% of China's annual gold production. The pre-mining resource in Jiaodong is enormous, with an estimated 4,000 t Au. Gold is now recovered from at least 159 mining operations with a combined annual production in excess of 30 t Au per year. Jiaodong is well recognized as one of the world's great gold provinces, but also is one of the most controversial to classify and difficult to fully understand.

More than 95% of the Jiaodong gold resource is hosted by Mesozoic granitoids that intruded Precambrian high-grade metamorphic basement rocks. The most important deposits occur along regional NNE-trending fault zones. Main orebodies are present as quartz vein systems (e.g., Linglong type) and as stockwork veinlets and disseminated mineralization (Jiaojia type). In many places, the two mineralization styles are transitional and thus are present within the same gold deposit. This four-day trip will visit the large underground operations at the Sanshaodao, Xincheng, and Linglong mines, as well as surface exposures of the Jurassic ore-hosting and Cretaceous syngold intrusions, Au orebodies, and ore-controlling structures.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 18*

Flights/Airfare included in cost of trip

	EARLY	LATE
SEG Member	\$ 995	\$1,095
Non-member	\$1,095	\$1,195
SEG Student Member	\$ 695	\$ 745
Student Non-member	\$ 745	\$ 795

*Students may not exceed one-third of total participants.



POST-CONFERENCE FIELD TRIPS

FT06

Mineral Deposits of Yunnan

DATE ~~September 21–27, 2017~~
 LOCATION ~~Departing from and returning to the Kunming Changshui Airport~~

FIELD TRIP LEADERS

- **Qingfei Wang**, China University of Geosciences, Beijing
- **Xinfu Zhao**, China University of Geosciences, Wuhan
- **Yucai Song**, Chinese Academy of Geological Sciences, Beijing

Description

The geologic and metallogenic evolution of the scenic Yunnan Province is complex and diverse, leading to an exceptional distribution of mineral deposit types. These include the IOCG deposits of the Kangdian belt, the orogenic gold deposits along the Ailaoshan belt, polymetallic skarn deposits, and sedimentary rock-hosted base metal deposits. This trip will include visits to the massive Fe and strata-bound Cu-Fe orebodies in the Paleoproterozoic metamorphic rocks of the Kangdian belt and to the >60-t Au Zhenyuan orogenic gold deposit, one of the few global examples of a very young (Oligocene) productive orogenic gold deposit. At Beiya, we will examine the geology of China's largest gold skarn orebody. In the Lanping basin, we will observe the geologic features of the world-class Jinding Pb-Zn deposits, where sandstone-hosted ores formed by the diapiric migration of evaporites.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 21

	EARLY	LATE
SEG Member	\$1,495	\$1,595
Non-member	\$1,595	\$1,695
SEG Student Member	\$ 795	\$ 845
Student Non-member	\$ 845	\$ 895



All information subject to change. Visit seg2017.org for the latest updates and changes.

FIELD TRIPS

FT07

Middle-Lower Yangtze Valley Cu-Fe ~~CANCELLED~~ Skarn, and Related Deposits

DATE September 21–26, 2017
LOCATION Departing from and returning to Hefei, China

FIELD TRIP LEADERS

- **Taofa Zhou**, Director of School of Resources and Environmental Engineering, Hefei University of Technology
- **Yu Fan**

Description

The Middle-Lower Yangtze River Valley is one of the most important metallogenic belts in China, and is located at the northern margin of the Yangtze craton. It hosts a series of ore districts, such as Edong, Jiurui, Anqing-Guichi, Luzong, Tongling, Ningwu, and Ningzhen, with about 200 Cu-Fe polymetallic deposits, including Cu-Fe skarns, Cu-Au porphyries, and magnetite-apatite ores.

For our field excursion, we will visit six large deposits in the Tongling and Ningwu districts, which are most typical of deposits in the belt in regard to their geological characteristics and mineralization styles. The first two days, we will visit the Tongling district in the center of the metallogenic belt. Mesozoic igneous rocks (140–135 Ma) are widespread in the district, including more than 70 intrusions consisting of pyroxene diorite, quartz diorite, monzodiorite, and granodiorite, which are closely related to skarn and porphyry mineralization. The next two days, we will visit Ningwu district on the eastern side of the metallogenic belt to examine the important magnetite-apatite deposits associated with pyroxene diorite plutons (130 Ma). The last day we will travel to the Huang Mountain, enjoying the beautiful scenery and granite geology.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 25

	EARLY	LATE
SEG Member	\$1,295	\$1,395
Non-member	\$1,395	\$1,495
SEG Student Member	\$ 795	\$ 845
Student Non-member	\$ 845	\$ 895



FT08

Jinchuan Ni-Cu Field Trip

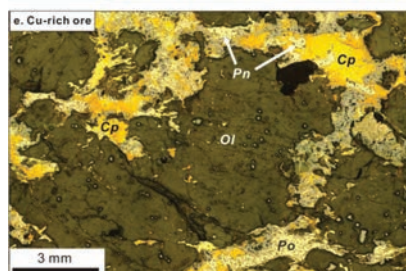
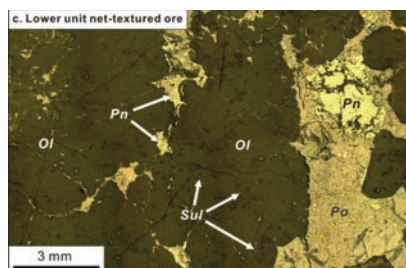
DATE September 22–25, 2017
LOCATION Departing from and returning to Beijing, China

FIELD TRIP LEADERS

- **Xie-Yan Song**, Institute of Geochemistry, Chinese Academy of Sciences, Guiyang
- **Jian-Gang Jiao**, Changan University, Xian
- **Wen-De Suo**, Jinchuan Group Lid, Jinchang, Gansu
- **Yong-Cai Wang**, Jinchuan Group Lid, Jinchang, Gansu

Description

Jinchuan is one of the largest Ni-Cu-(PGE) deposits in the world. It is in Gansu Province, NW China, and contains >500 million tonnes of sulfide ores (avg. 1.1 wt % Ni, 0.7 wt % Cu), mainly in three huge orebodies that are now mined underground. The ~830 Ma Jinchuan intrusion comprises mainly Iherzolite and dunite and is divided into four segments by a series of faults; we will visit the three main orebodies. The huge lens-shaped No. 1 orebody that we will visit occurs at depths between 200 and >1,100 m, is 1,500 m long and up to 120 m wide, and comprises disseminated and net-textured sulfides. It contains ~50% of the total Ni, Cu, and PGE reserves of the Jinchuan deposit. We will also visit the No. 2 orebody, which contains disseminated and net-textured sulfides as well as small massive sulfide veins that locally contain xenoliths of ultramafic rocks and metamorphosed country rocks. The tabular-shaped No. 24 orebody shows sulfides concentrated in the base of the thickest part of the body and a sulfide-poor upper unit.



Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 15

Flights/Airfare included in cost of trip

	EARLY	LATE
SEG Member	\$1,395	\$1,495
Non-member	\$1,495	\$1,595
SEG Student Member	\$ 695	\$ 745
Student Non-member	\$ 745	\$ 795

FT09

Giant W-Cu, Sn, and Pb-Zn Deposits, NW Jiangxi Province

DATE September 21–26, 2017
LOCATION Departing from and returning to Nanchang, China

FIELD TRIP LEADERS

- **Shao-Yong Jiang**, China University of Geosciences, Wuhan
- **Xinkui Xiang**

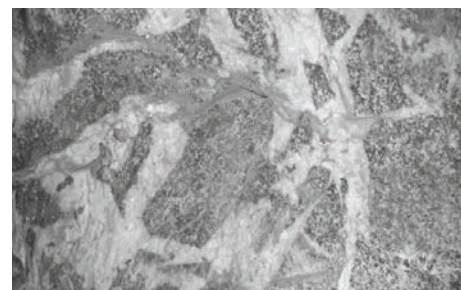
Description

The Jiangxi Province in south China hosts world-class Sn, W, and base metal deposits that are all related to late Mesozoic granitic intrusions. Participants will visit open pits and underground mines and examine drill core samples at a number of the more important deposits. Different types of magmatic rocks and hydrothermal alteration assemblages will be examined in these deposits. Ore types to be observed at the Dahutang W-Cu deposit, one of the world's largest W deposits with an estimated WO₃ reserve of 2 million tonnes, include disseminated, veinlet, quartz vein, greisen, and hydrothermal breccias in highly fractionated S-type granites. Ore minerals include wolframite, scheelite, chalcocopyrite, and molybdenite. At the Pengshan Sn deposit and Zhangshiba Pb-Zn deposit, ore types we will see include stratiform skarn, greisen, and quartz veins containing cassiterite, sphalerite, and galena.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 18

	EARLY	LATE
SEG Member	\$1,095	\$1,195
Non-member	\$1,195	\$1,295
SEG Student Member	\$ 595	\$ 645
Student Non-member	\$ 645	\$ 695



FIELD TRIPS

FT10

Porphyry and Epithermal Systems of the Sunda Banda Arc, Indonesia

DATE September 21–26, 2017
LOCATION Departing from and returning to Bali, Indonesia

FIELD TRIP LEADERS

- **Adi Maryono**
- **Lejun Zhang**, Centre of Excellence in Ore Deposits (CODES)
- **Rachel Harrison** (CODES)
- **Iryanto Rompo**, Independent Consultant Geologist

Description

This field trip will introduce participants to the geology and mineralization that characterizes the Sunda-Banda arc. The trip will start with a site visit to the Tujuh Bukit project, where the 30.1-Moz Au Tumpangpitu porphyry Cu-Au-Mo and high-sulfidation epithermal (HSE) Au-Ag deposits were discovered in 2010, making it one of the largest recent discoveries in SE Asia. The project also offers the opportunity to examine a world-class exposure of telescoped HSE mineralization onto an outcropping island of porphyry mineralization at Pulau Merah. A transect by boat and foot along the coastline will allow participants to observe exposures of upper and lower facies of a diatreme breccia body, as well as proximal to distal hydrothermal alteration of host rocks associated with high-sulfidation mineralization. A visit to the island of Lombok will include field exposures of lithocap, intermediate-sulfidation epithermal (ISE), HSE, and porphyry mineralization with a focus on exploration techniques in the lithocap environment. Drill core from the Brambang and Selodong porphyry prospects will be examined. The trip will end with a visit to the Batu Hijau porphyry Cu-Au mine (20.05 Moz Au), where participants will



Batu Hijau porphyry Cu-Au mine open pit

have the opportunity to examine porphyry mineralization in drill core from Batu Hijau, as well as from other nearby deposits, including Elang (25 Moz Au).

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 20

	EARLY	LATE
SEG Member	\$1,995	\$2,095
Non-member	\$2,095	\$2,195
SEG Student Member	\$1,995*	\$2,095*
Student Non-member	\$2,095*	\$2,195*

*Student discounts not available.

FT11

The Metallogenic Provinces of Myanmar (Burma)

DATE September 21–29, 2017 (tentative)
LOCATION Departing from and returning to the Yangon Airport

FIELD TRIP LEADERS

- **Laurence Robb**, Oxford University, UK
- **Andrew Mitchell**
- **Nick Gardiner**

Description

Myanmar contains a broad diversity of mineral deposits, including tin, tungsten, copper, gold, zinc, lead, silver, and nickel, as well as an abundance of colored gemstones. This diversity is related to a complex geological history linked largely to Tethyan orogenesis. Myanmar can be divided into three principal metallogeneses, namely (1) the Wuntho-Popa Arc, comprising subduction-related granites and porphyry-epithermal styles of mineralization; (2) the Mogok-Mandalay-Mergui Belt, comprising orogenic gold mineralization and significant tin-tungsten mineralization associated with crustal granites; and (3) the Shan Plateau, containing massive sulfide-type base metal deposits. Recent social and political change in Myanmar has created opportunities for resource-related exploration



and development. This field trip is aimed at providing an overview of the metallogenic characteristics and the resource potential of this fascinating country.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 20

	EARLY	LATE
SEG Member	\$2,895	\$2,995
Non-member	\$2,995	\$3,095
SEG Student Member	\$2,895*	\$2,995*
Student Non-member	\$2,995*	\$3,095*

*Student discounts not available.

FT12

Late Paleozoic Metallogeny of the Altai Region, Northeastern Kazakhstan

DATE September 21–27, 2017
LOCATION Departing from and returning to Almaty, Kazakhstan

FIELD TRIP LEADER

- **Evgeniy Naumov**, Institute of Geology and Mineralogy, Siberian Branch, Russian Academy of Sciences

Description

The late Paleozoic terranes of the Altai Mountains in Kazakhstan are well recognized for their variety of world-class mineral deposits. This field trip will visit some of the most significant orogenic gold (Akzhal and a few others like it), VMS (Artemievskoe), and rare metal granite-hosted (Yubileynoe) deposits throughout this part of the Central Asian orogenic belt. For most of western countries, a visa to visit Kazakhstan is required.

Early Registration ends July 31, 2017

ATTENDEE MAXIMUM: 15

	EARLY	LATE
SEG Member	\$1,995	\$2,095
Non-member	\$2,095	\$2,195
SEG Student Member	\$1,995*	\$2,095*
Student Non-member	\$2,095*	\$2,195*

*Student discounts not available.



All information subject to change. Visit seg2017.org for the latest updates and changes.



SEG
www.segweb.org

SEG at GSA 2017



October 22–25, 2017 Seattle, WA, USA
SEG Meeting Coordinator, Garth Graham (U.S. Geological Survey)

Short Course – One-day, Saturday, October 21, 2017 *(immediately pre-meeting)*

Environmental Geology of Some North American Mineral Deposits

Coordinators: Bob Seal and Rob Bowell

Contributors: Heather Jamieson, Kirk Nordstrom, Laura Ruhl and others to be confirmed

Description: The aim of the course is to present the environmental implications from the geology and geochemistry of the most common mineral deposits in North America and, through this, examine the implications for these deposits in design, operation, and closure with respect to minimizing environmental impacts.

Proposed SEG-Sponsored/Co-Sponsored Sessions

T148. System-Scale Zonation of Ore Systems: Insights into 3-D Architecture from Lateral and Deep Exposures Due to Mining and Structural Deformation

Carson A. Richardson (University of Arizona) • Simone E. Runyon (University of Arizona) • Eric Seedorff (University of Arizona)

T213. Integrated Approaches to Deciphering Major Crustal Boundaries in Polyphase Orogenic Settings

James V. Jones III (USGS) • James J. Ryan (GSC) • Jonathan Caine (USGS) • Benjamin Drenth (USGS)

T225. New Perspectives on Cordilleran Tectonics, Paleogeography, and Metallogeny

Luke P. Beranek (Memorial University of Newfoundland) • Justin V. Strauss (Dartmouth College)



SEG Mapping Course

Mineral Park Mine | Ithaca Peak District, Arizona
November 5–11, 2017

DESCRIPTION

This advanced- to professional-level mapping course is offered by the Education and Training Committee of the Society of Economic Geologists. Working at the Mineral Park Cu-Mo porphyry system in northwest Arizona, participants will map at detailed 1:240 to 1:480 scales, with emphasis on mapping veinlet styles, densities, and alteration mineralogy. In-the-field discussions of the geochemistry of porphyry systems and the development of alteration assemblages and associated hypogene and supergene ore minerals will complement our mapping of rock types and mine-scale structures.

This course is appropriate for geologists seeking to enhance their understanding of detailed mapping methods and the geochemistry of large hydrothermal systems, and graduate-level students who desire to enhance their skills at detailed mapping.

Participants will assemble at the Car Rental Center in Las Vegas, Nevada, on Sunday, 5th November, and depart Las Vegas late Saturday morning, 11th November. The course fee covers group transportation from the Car Rental Center to the mine and return, lodging for six nights in Kingman, Arizona, breakfasts, field lunches, base maps, and Certificate of Completion. Participants are responsible for their travel to and from Las Vegas, dinners, and incidental expenses, and must provide safety gear and Brunton compass.

INSTRUCTORS



- Dr. William X. Chávez, Jr.**

A professor of geological engineering at the New Mexico School of Mines since 1985. Dr. Chávez has instructed field and in-class workshops for the Society of Economic Geologists involving a variety of ore deposit types, with emphasis on the practical application of geochemistry to mineral exploration.



- Dr. Erich U. Petersen**

A professor of geology and geophysics at the University of Utah in the Latin American Studies Program. Dr. Petersen's geographical regions of interest include Central and South America. He has worked closely with the Society of Economic Geologists over the years through several field trips, short courses, and workshops.

REGISTRATION Online at www.segweb.org/events#17RMAPAZ

Early Registration

(through September 25, 2017)

Member: US\$1,195
Non-member: US\$1,295
Student: US\$595
Student Non-member: US\$645

Late Registration

(after September 25, 2017)

Member: US\$1,395
Non-member: US\$1,495
Student: US\$695
Student Non-member: US\$745

**The course is limited to 15 participants.
 Student participants are limited to 2 at the attendee minimum or 3 at attendee maximum.**

Please note that SEG reserves the right to cancel this event should minimum attendance numbers not be met by September 25, 2017. For further information on cancellation policy, event photography, and dietary restrictions, visit www.segweb.org/t&c.

Senior Exploration Management Course



SEG Course Center | Littleton, CO, USA
November 28–December 1, 2017, 8:30am – 5:00pm



Organizer: Society of Economic Geologists (SEG)
Presenter: Western Mining Services (WMS)

SCOPE

This four-day training course covers the principles and practices of effective mineral exploration management. The curriculum focuses on the broad spectrum of technical and business issues that senior exploration managers typically face.

- Mineral exploration at the strategic scale – the roles of greenfields and brownfields exploration in development and implementation of corporate growth strategies
- The design and management of exploration programs and portfolios
- The importance of group structure, program design, process discipline, and effective people management in achieving exploration group objectives
- Opportunity generation including the exploration search space concept, targeting science, and the application of targeting models
- How to negotiate land and minerals access deals, identify and manage nontechnical project risks, engage in early stage evaluation of project economics, and maintain the important social license to operate exploration projects in varied risk environments

The course format utilizes lecture and workshop and stresses interactive thinking and problem solving. Participants work in teams to design solutions for exploration management challenges and present their results to the larger group.



WHO SHOULD ATTEND?

This course is ideal for regional and country exploration managers, for senior project managers who are on track to move into positions of senior responsibility, and for geoscientists who aspire to senior exploration management roles. The course is also recommended for commercial managers who participate in mineral exploration programs as well as government and academic professionals who interact with the mineral exploration industry.

This SEG-sponsored course in November-December 2017 will be the twelfth public presentation of the SEM Course. WMS has also presented numerous in-house SEG Courses to major mining companies, each tailored to the needs of the individual client.

Senior Exploration Management Course

SEG Course Center | Littleton, CO, USA | Nov. 28–Dec. 1, 2017



FACULTY

■ Jon Hronsky (BAppSci, Ph.D., MAIG, FSEG)



With more than 30 years of experience in mineral exploration, Jon has worked across a diverse range of commodities, including discovery of the West Musgrave nickel sulfide province in Western Australia. Prior to joining Western Mining Services (WMS), he served as Manager of Strategy & Generative Services for BHP Billiton Mineral Exploration and as Global Geoscience Leader for WMC Resources Ltd. He is chairman of the board of the Centre for Exploration Targeting in WA.

■ Steven Bussey (BA, M.Sc, PhD)



At WMS, Steve's focus is on framework studies, mineral exploration targeting, and project due diligence. He has more than 35 years' experience in mineral exploration. Before joining WMS in 2007, Steve worked in a number of senior exploration roles, including principal geoscientist for WMC Resources Ltd.

■ Brad Margeson (BA, M.Sc., SME, FSEG)



Brad held several senior management roles for WMC Resources Ltd. prior to co-founding WMS in 2005. At WMC, he was global manager of exploration projects, leading teams that discovered gold deposits in Canada. With 35 years' experience in the industry, Brad's focus is on exploration strategy/planning, greenfield and brownfield exploration targeting, and due diligence.



■ Jeff Welborn (BA, JD)



Jeff is a co-founder and partner at WMS and has more than 40 years' experience as a mining, oil & gas and natural resources lawyer. His experience covers a broad range of commercial, legal, and risk management matters in mineral exploration and mining. He assists WMS clients globally with commercial strategy development, program design and planning, deal analysis and negotiation, and minerals and land access.

Registration *(early deadline: November 10, 2017)*

Register online: segweb.org/events#17RWMS

Member (Early / Late) – US\$3,200 / US\$3,400

Non-member (Early / Late) – US\$3,500 / US\$3,700

CURRICULUM

Day 1

- *Course overview; Introduce Exploration Strategy Exercise*
- Mineral Exploration: Business Environment; Key Concepts
- Mineral Exploration: Principles and Philosophies
- Strategy, Business Planning and Portfolio Management

Day 2

- Minerals Access and Deal Making
- Commercial Risk Management (CRM)
- *CRM Group Exercises and Discussion*
- Mineral Exploration: Targeting

Day 3

- *Group Discussion*
- Mineral Exploration: Targeting
- Mineral Exploration: Tactics
- Mineral Exploration: Culture and People

Day 4

- *Strategy Exercise: Presentations, Group Discussion Awards*
- *Group Discussion Course Feedback Wrap-up*

Please note that SEG reserves the right to cancel this event should minimum attendance numbers not be met by November 10, 2017. For further information on cancellation policy, event photography, and dietary restrictions, visit www.segweb.org/tc.



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