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Building Exploration Capability for the 21st Century

September 27–30, 2014
Keystone, Colorado, USA

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SEG 2014 Conference



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Building Exploration Capability for the
21st Century hosted by the Society of
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Saturday

Presidential Address & Student Mentoring Forum

2:00pm – 4:30pm
Red Cloud Peak

Welcome Reception

5:00pm – 7:00 pm
Columbine Ballroom

REGISTRATION

Lobby, Keystone Conference Center

Friday: 2:00pm – 5:00pm
Saturday: 7:00am – 7:00pm
Sunday: 7:30am – 6:30pm
Monday: 7:30am – 5:00pm
Tuesday: 7:30am – Noon

EXHIBITS

Columbine Ballroom

Saturday: 5:00pm – 7:00pm
Sunday: 10:00am – 7:00pm
Monday: 10:00am – 6:30pm
Tuesday: 10:00am – 1:30pm

POSTER VIEWING

Columbine Ballroom

Saturday: 5:00pm – 7:00pm
Sunday: 10:00am – 7:00pm
Monday: 10:00am – 6:30pm
Tuesday: 10:00am – 1:30pm

SPEAKER READY ROOM

Crestone Office

Saturday: 8:00am – 5:00pm
Sunday: 8:00am – 5:00pm
Monday: 8:00am – 5:00pm
Tuesday: 8:00am – 1:30pm



WIFI

Network: Keystone
Conference Center
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All sessions and social events are held at the Keystone Conference Center.

Sunday

Morning Coffee

7:30am – 8:15am
Red Cloud/Shavano Foyer

Welcome

Bart Suchomel, Chair, Organizing Committee

Session 1 (plenary): Fundamental Advances in Economic Geology

Session Chair: **Jon Hronsky**
8:15am – 10:00am
Red Cloud/Shavano

Morning Break

10:00am – 10:30am
Exhibit Hall, Columbine Ballroom

Session 2: Fundamental Advances in Economic Geology

Session Chair: **Judith Kinnaird**
10:30am – 12:30pm
Red Cloud

Session 3: Mineral System Science

Session Chair: **François Robert**
10:30am – 12:30pm
Shavano

Lunch

12:30pm – 1:30pm
Exhibit Hall, Columbine Ballroom

Session 4 (plenary): Innovations in Exploration Technology

Session Chair: **Jean Des Rivieres**
1:30pm – 3:00pm
Red Cloud/Shavano

Afternoon Break

3:00pm – 3:30pm
Exhibit Hall, Columbine Ballroom

Session 5: Deposit Footprints

Session Chair: **David Kelley**
3:30pm – 5:30pm
Red Cloud

Session 6: Fundamental Advances in Economic Geology

Session Chair: **Bill Chávez**
3:30pm – 5:20pm
Shavano

Reception

5:30pm – 7:00pm
Exhibit Hall, Columbine Ballroom

Colorado Microbrew and BBQ

7:00pm – 9:00pm
Shavano

Monday

Morning Coffee

7:30am – 8:30am
Red Cloud/Shavano Foyer

Session 7 (plenary): Mineral System Science

Session Chair: **Perry Eaton**
8:30am – 10:00am
Red Cloud/Shavano

Morning Break

10:00am – 10:30am
Exhibit Hall, Columbine Ballroom

Session 8: Mineral System Science

Session Chair: **Rich Goldfarb**
10:30am – 12:30pm
Red Cloud

Session 9: Innovations in Exploration Technology

Session Chair: **Amanda Butt**
10:30am – 12:30pm
Shavano

Lunch

12:30pm – 1:30pm
Exhibit Hall, Columbine Ballroom

Session 10 (plenary): Deposit Footprints

Session Chair: **Murray Hitzman**
1:30pm – 3:00pm
Red Cloud/Shavano

SEG Awards (plenary)

3:00pm – 4:00pm
Red Cloud/Shavano

Afternoon Break

4:00pm – 4:30pm
Exhibit Hall, Columbine Ballroom

Session 11: Dedicated Exhibits and Poster Session

Session Chair: **Thomas Monecke**
4:00pm – 5:30pm
Columbine Ballroom

Reception

5:30pm – 6:30pm
Exhibit Hall, Columbine Ballroom

Industry Outlook Dinner

7:00pm – 9:00pm
Shavano

Tuesday

Morning Coffee

7:30am – 8:30am
Red Cloud/Shavano Foyer

Session 12 (plenary): Exploration Management and Targeting

Session Chair: **Tracey Kerr**
8:30am – 10:00am
Red Cloud/Shavano

Morning Break

10:00am – 10:30am
Exhibit Hall, Columbine Ballroom

Session 13: Exploration Management and Targeting

Session Chair: **Rob Krčmarov**
10:30am – 12:20pm
Red Cloud

Session 14: Mineral System Science

Session Chair: **John Everest**
10:30am – 12:30pm
Shavano

Lunch

12:30pm – 1:20pm
Exhibit Hall, Columbine Ballroom

Session 15: Case Studies of 21st Century Exploration Success

Session Chair: **Mike Christie**
1:30pm – 3:30pm
Red Cloud

Session 16: Fundamental Advances in Economic Geology

Session Chair: **Mary L. Little**
1:30pm – 3:30pm
Red Cloud

Afternoon Break

3:30pm – 4:00pm
Red Cloud/Shavano Foyer

Session 17 (plenary): Case Studies of 21st Century Exploration Success

Session Chair: **Bruce Gemmell**
4:00pm – 5:30pm
Red Cloud/Shavano

Welcome!

We welcome you to SEG 2014 at Keystone, SEG's flagship international conference!

The SEG 2014 Conference theme, "Building Exploration Capability for the 21st Century," will showcase exciting new research and technologies aimed at proactively addressing the global industry trends of increasing raw material demand and depletion of near-surface ore deposits. To develop an exploration capability that will meet these 21st century challenges, we will need access to the best new science, the best new tools, and the best new ways to pragmatically apply them.

This Conference features an outstanding lineup of widely recognized international speakers, complemented by high-quality poster presentations and an exceptional group of topical pre- and post-meeting field trips and workshops. The meeting brings together a broad spectrum of economic geology stakeholders and practitioners, covering advanced academic studies to practical case histories.

Student participation is a major focus of SEG 2014. In addition to the pre-conference student mentoring forum, there will be significant student participation in the technical program and a number of SEG student chapter displays throughout the venue.

We are most grateful to our Conference sponsors who, during a difficult period for the industry, have stepped up to help make SEG 2014 a success. Their generosity directly facilitates student participation and programs.

On behalf of the Organizing Committee and all other volunteers, we welcome you to SEG 2014 in the heart of the spectacular Rocky Mountains. Enjoy the Conference!

Bart Suchomel, *Chairman,*
SEG 2014 Organizing Committee

Brian Hoal, *Executive Director,*
Society of Economic Geologists

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Back cover	Conference Center floor plan

Conference Information*

Conference Organizing Committee

- Chairman: Bart Suchomel, Western Mining Services, LLC
- Technical Sessions: Jon Hronsky, Western Mining Services, LLC
- Publications: Karen Kelley, U.S. Geological Survey
- Posters/Students: Thomas Monecke, Colorado School of Mines
- Workshops: John Black, Double Black Diamond Resources LLC, and Brad Margeson, Western Mining Services, LLC
- Field Trips: Bill Chávez, New Mexico Institute of Mining and Technology
- Fundraising/Marketing: Brian Hoal and Nikki Jamison, Society of Economic Geologists
- Exhibits/Administration: Darline Daley, Quality Business Services
- Secretary/Students: Christine Horrigan, Society of Economic Geologists

SEG Contact Information

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 Website: www.segweb.org

Conference Facilitator/Exhibits

Quality Business Services (QBS)
 P.O. Box 622009, Littleton, CO 80162 USA
 E-mail: darline@qbsoffice.com
 Tel. 303.914.0694

Conference Registration

Sea to Sky Meeting Management Inc.
 Suite 206, 201 Bewicke Avenue
 North Vancouver, BC, Canada V7M 3M7
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Network: **Keystone Conference Center**
 Password: **SEG2014**

*For registration, exhibit, and speaker ready room hours, as well as an overview of schedules, please see the inside front cover of this program. A Conference Center floor plan is located inside the back cover. All events, except where attendees have been informed otherwise, will be held in the Center.


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SEG Awardees

Please join us for the SEG Awards Ceremony on Monday from 3:00 to 4:00pm in the Red Cloud Peak and Shavano Peak rooms, Keystone Conference Center

SEG R.A.F. Penrose Gold Medal for 2013

NOEL C. WHITE
Consultant, Australia

SEG Silver Medal for 2013

DAVID R. COOKE
University of Tasmania, Australia

SEG Ralph W. Marsden Award for 2013

JEFFREY W. HEDENQUIST
Consultant, Canada

SEG Waldemar Lindgren Award for 2013

SHAUN L.L. BARKER
University of Waikato, New Zealand

SEG Brian J. Skinner Award for 2013

LINDA LERCHBAUMER
OMV, Austria

SEG Distinguished Lecturer for 2014

KAIHUI YANG
Zijin Mining Group, China

SEG International Exchange Lecturer for 2014

PAUL S. HEITHERSAY
DMITRE, Australia

SEG Thayer Lindsley Visiting Lecturer for 2014

NEIL WILLIAMS
Hon. Professorial Fellow,
University of Wollongong, Australia

SEG Regional VP Lecturer for 2014

ZENGQIAN HOU
Chinese Academy of Geological Sciences, China

Pre-Conference Program

Saturday, September 27, 2014

Presidential Address & Student Mentoring Forum

2:00 pm – 4:30 pm

Red Cloud Peak

Presidential Address: Judith Kinnaird, Geology: Lifelong Learning

Student Mentoring Forum

Hosted by  **bhpbilliton**

Forum Panel:

Mary Doherty, Chief Geochemist, Newmont Mining

Tracey Kerr, Group Head of Exploration, Anglo American

Larry Meinert, Head – Natural Resources Program,

US Geological Survey

John Muntean, Director, Ralph Roberts Center for Research in

Economic Geology at University of Nevada

David Rainey, Chief Geoscientist, BHP Billiton

Brock Riedell, Consulting Geologist, Minerals Exploration

Moira Smith, Chief Geologist, Pilot Gold

Welcome Reception

5:00 pm – 7:00 pm

Columbine Ballroom



Pre-Conference Field Trips: Dates as Noted

Porphyry and Skarn Systems of the Southwest United States **September 21-27**

Field Trip Leaders: William X. Chávez, Jr., Erich U. Petersen

Non-Ferrous Mineralization Associated with the Wawa-Abitibi Terrane and Duluth Complex Cu-Ni-PGM Deposits, Northeastern Minnesota **September 22-25**

Field Trip Leaders: George Hudak, Dean Peterson

Colorado Porphyry-Molybdenum Deposits and Leadville District **September 25-27**

Field Trip Leaders: Ralph J. Stegen, Tommy B. Thompson

Cripple Creek and Victor Gold Mine **September 26**

Field Trip Leaders: Timothy R. Brown, Sergei A. Diakov

Pre-Conference Workshops: Saturday, September 27, 2014

Advanced GIS Techniques — Maximizing Your Data

Presenters: Willy Lynch, Mike Price

Application of Multi-Element Geochemical Data: Exploring Datasets for Better Targeting and Domaining

Presenters: Lynda Bloom, Pim van Geffen, Gervais Perron, Peter Winterburn, Chris Benn, Juan Carlos Ordóñez, Réjean Girard

Future of Mineral Exploration Drilling and Sampling

Presenters: James S. Cleverley, Richard Hillis

Technical Program

Talks for which the presenting author is a student can be identified by an asterisk (*) after the title.

Names of invited speakers are highlighted

Day 1: Sunday, September 28, 2014

Session 1 (plenary): Fundamental Advances in Economic Geology

Welcome and Introduction 8:15 am

Bart Suchomel, Conference Chairman,
Western Mining Services (WMS)
Session Chair: Jon Hronsky, WMS

Mineral evolution: Episodic metallogenesis, the supercontinent cycle, and the coevolving geosphere and biosphere 8:30 am

Robert Hazen, Carnegie Institution for Science;
George Mason University

The physical hydrology of ore-forming magmatic-hydrothermal systems 9:00 am

Philipp Weis, ETH Zurich

Timescales of mineral systems—advances in understanding over the past decade 9:30 am

Massimo Chiaradia, University of Geneva

Break 10:00 am

Session 2: Fundamental Advances in Economic Geology

Session Chair: Judith Kinnaird, EGRU, University of the Witwatersrand

Ore formation drives ore extraction: Economic geology is the foundation for geomet 10:30 am

Karin Olson-Hoal, Colorado School of Mines

Textural and isotopic evidence for metallic nanoparticles in bonanza epithermal ores 10:50 am

James Saunders, Auburn University

Widespread euxinic conditions are not a prerequisite for sedimentary exhalative mineralization in the Selwyn Basin, Canada* 11:10 am
Joseph Magnall, University of Alberta

Contemporaneous alkaline lamproites and carbonatites in the Kalmakyr and Muruntau ore districts, Tienshan, Uzbekistan: Mantle contribution for the formation of giant ore deposits 11:30 am
Reimar Selmann, Natural History Museum, CERCAMS

Investigation of the quartz-gold interface utilizing electron microscopy* 11:50 am
Michelle Burke, Miami University

Duration and dynamics of orogenic-type gold deposits 12:10 pm
Steven Micklethwaite, Centre for Exploration Targeting (CET), University of Western Australia



Barrick's Goldrush discovery is the direct result of years of robust technical work. The geological foundation and understanding of ore controls developed in the Cortez district were used to target concealed mineralization, resulting in the one of the largest, highest grade gold discoveries worldwide since 2001. The discovery team was awarded PDAC's prestigious 2014 Thayer Lindsley Discovery Award. Quality technical work, perseverance, discipline and teamwork are core to Barrick's exploration efforts and will be critical to the next generation of discoveries.

Session 3: Mineral System Science*Session Chair:* François Robert, Barrick

Syntectonic formation of giant porphyry copper and intrusion-related ore deposits in linear belts by decompression fluid saturation of regularly spaced diapiric plutons ascending fault ramps within the anticlinal hinge of the frontal Cordilleran fold and thrust belt 10:30 am

George Brimhall, University of California, Berkeley

The physical and tectonic setting of Andean high-sulfidation epithermal gold-silver deposits and what it means for mineralizing processes and exploration targeting 10:50 am

Thomas Bissig, MDRU, University of British Columbia

Volcanic processes in the formation porphyry copper deposits 11:10 am

Stephen Sparks, University of Bristol

Structural controls on the emplacement of porphyry systems: The case of the Rio Blanco-Los Bronces cluster, Andes of central Chile* 11:30 am

Jose Piquer, CODES, University of Tasmania

Porphyry copper deposits in China: Spatial-temporal distribution and their tectonic settings 11:50 am

Jingwen Mao, Institute of Mineral Resources, Chinese Academy of Geological Sciences

Jurassic gold metallogeny in the Colombian Andes 12:10 pm

Hildebrand Leal-Mejía, MDRU, University of British Columbia

Lunch**12:30 pm****Session 4 (plenary): Innovations in Exploration Technology***Session Chair:* Jean Des Rivieres, BHP Billiton

Coiled tubing drilling and real-time sensing—enabling prospecting drilling in the 21st century? 1:30 pm

Richard Hillis, Deep Exploration Technologies, CRC

Muon tomography: Bringing new physics to ore-body imaging 2:00 pm

Doug Bryman, University of British Columbia

Next generation three-dimensional geologic modeling and inversion 2:30 pm

Mark Jessell, University of Western Australia

Break**3:00 pm****Session 5: Deposit Footprints***Session Chair:* David Kelley, MMG

Using multi-element geochemistry to map multiple components of a mineral system. Case study from a sediment hosted Cu-Ni camp, NW Province, Zambia 3:30 pm

David Wood, First Quantum Minerals, Ltd.

Chlorite chemistry as an exploration tool in the propylitic halo of porphyry-epithermal systems: A case study of the Batu Hijau porphyry Cu-Au system, Indonesia 3:50 pm

Jamie Wilkinson, CODES, University of Tasmania; Imperial College (London); Natural History Museum (London)

Copper isotopic vectors to supergene enrichment: Leached cap isotopic footprint of the Quellaveco porphyry copper deposit, southern Peru 4:10 pm

David Braxton, Anglo American; presentation by Ryan Mathur, Juniata College

Contrasting footprints and characteristics of IOCG-type and porphyry-type hydrothermal systems related to episodic Mesozoic arc magmatism in coastal northern Chile 4:30 pm

Mark Barton, University of Arizona

Structural, mineralogical, geochemical and petrophysical characterization of mafic dykes: A key to defining the Canadian Malartic gold deposit footprint 4:50 pm

Stéphane Perrouty, University of Western Ontario

Geochemical alteration footprint of the Eskay Creek sulfide and sulfosalt deposit, British Columbia* 5:10 pm
Tom Meuzelaar, Colorado School of Mines

Session 6: Fundamental Advances in Economic Geology

Session Chair: Bill Chávez, New Mexico Tech

Experimental constraints on the transport and deposition of metals in ore-forming hydrothermal systems 3:30 pm
Anthony Williams-Jones, McGill University

Mafic magma contributions to arc-related porphyry ore deposits 4:00 pm
Adrian Fiege, University of Michigan

Pulsed intrusive events, magma mixing, and mineralization of the Don Manuel porphyry copper system, central Chile* 4:20 pm
Amy Gilmer, University of Bristol

Generation of porphyry copper deposits by gas-brine reaction in volcanic arcs 4:40 pm
Jon Blundy, University of Bristol

Ore metal extraction during magma crystallization: A dynamic experimental approach 5:00 pm
Brian Tattich, University of Bristol

Evening Reception - Exhibit Hall 5:30 pm



Day 2: Monday, September 29, 2014

Session 7 (plenary): Mineral System Science

Session Chair: Perry Eaton, Newmont

The mineral system concept: The key to successful undercover targeting 8:30 am
Cam McCuaig, University of Western Australia

The Carlin gold system: Applications to exploration in Nevada and elsewhere 9:00 am
John Muntean, Nevada Bureau of Mines, University of Nevada-Reno

A giant Mesoproterozoic crustal gold-enrichment episode: Possible causes and consequences for exploration 9:30 am
Hartwig Frimmel, University of Würzburg

Break 10:00 am

Session 8: Mineral System Science

Session Chair: Rich Goldfarb, USGS

Tectonic architecture of ca. 1.60-1.57 Ga IOCG mineralisation in Australia 10:30 am
Caroline Forbes, DET CRC, University of Adelaide

Orogenic gold systems in the Andes of South America 10:50 am
Steffen Hagemann, CET, University of Western Australia

Gold metallogeny of northwestern Iberia: Superimposed orogenic and intrusion-related mineralization in an evolving Variscan orogeny 11:10 am
James Mortensen, University of British Columbia

The Abitibi breaks: Syn-orogenic extensional faults inverted as thick-skinned thrusts 11:30 am
Wouter Bleeker, Geological Survey of Canada

MONDAY

11:50–1:30

Multiple sulfur isotope geochemistry of Au-rich systems of the southern Abitibi subprovince, Québec, Canada 11:50 am

Elizabeth Sharman, McGill University

Epizonal overprinting of mesozonal orogenic gold systems: Relating crustal exhumation and Yukon's gold endowment 12:10 pm

Murray Allan, MDRU, University of British Columbia

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Session 9: Innovations in Exploration Technology

Session Chair: Amanda Butt, Rio Tinto

Micro-analytical innovation for diamonds exploration and beyond 10:30 am

Paul Agnew, Rio Tinto

Examples of seismic signatures of large mineral systems 11:00 am

Greg Turner, HiSeis; presentation by Don Pridmore, HiSeis

Finding the blind: Targeting carbonate-hosted deposits using stable isotopes 11:20 am

Shaun Barker, University of Waikato

Core orientation—data QC as a key to discovery 11:40 am

Russell Myers, Corvus Gold, Inc.

Improved interface designs for automated analysis of potential field data 12:00 pm

Eun-Jung Holden, CET, University of Western Australia

Lunch**12:30 pm**

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Session 10 (plenary): Deposit Footprints

Session Chair: Murray Hitzman, Colorado School of Mines

New advances in detecting the distal geochemical footprints of porphyry systems—epidote mineral chemistry as a tool for vectoring and fertility assessments 1:30 pm

David Cooke, CODES, University of Tasmania

2:00–7:00

MONDAY

Geochemical dispersion through transported cover in regolith-dominated terrains—towards an understanding of process 2:00 pm

Ravi Anand, CSIRO, Minerals Down Under

Geophysical expressions of ore systems—our current understanding 2:30 pm

Ken Witherly, Condor Consulting, Inc.

SEG Awards Ceremony (plenary): For a list of awardees, see p. 5 3:00 pm

Location: Conference Center, Red Cloud Peak and Shavano Peak

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Session 11: Dedicated Exhibits and Poster Session

Break (Concurrent with Dedicated Exhibits and Poster Session)

Dedicated Exhibits and Poster Session 4:00 pm
(poster titles below, p. 24)

Session Chair: Thomas Monecke, Colorado School of Mines

Evening Reception in the Exhibit Hall 5:30 pm

Industry Outlook Dinner 7:00 pm

Guest Speaker - Robert Friedland, Ivanhoe Mines Ltd




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8:30–11:40

TUESDAY

Day 3: Tuesday, September 30, 2014

Session 12 (plenary): Exploration Management and Targeting

Session Chair: Tracey Kerr, Anglo American

What does the global exploration industry need to deliver in the 21st Century? 8:30 am

A shareholder's perspective

Randall Oliphant, New Gold

The global shift to undercover exploration—How fast? How effective? 9:00 am

Richard Schodde, MinExCo

Finding the copper mine of the 21st century: conceptual exploration targeting for hypothetical reserves* 9:30 am

John Sykes, Curtin University

Break

10:00 am

Session 13: Exploration Management and Targeting

Session Chair: Rob Krčmarov, Barrick

The business of exploration in China 10:30 am

(SEG Distinguished Lecture)

Kaihui Yang, Zijin Mining Group

The role of organizational culture and its link to strategy in mineral exploration management 11:00 am

Eric Seedorff, Lowell Institute for Mineral Resources, University of Arizona

Data mining—a powerful tool for exploring under cover in mature districts 11:20 am

Colin Barnett, BW Mining

Curvature attribute from surface-restoration as predictor variable in Kupferschiefer copper potentials: An example from the Fore-Sudetic Region (Poland)* 11:40 am

Pablo Mejia-Herrera, Université de Lorraine

An innovative structural hypothesis established during target generation for gold and copper mineralisation in the Cobar district, NSW Australia 12:00 pm
Lize Stander, New Gold

Session 14: Mineral Systems Science

Session Chair: John Everest, KGHM

Mineral systems and area selection: Application to IOCG, Ni, and other mineral systems in Australia 10:30 am
Roger Skirrow, Geoscience Australia;
presentation by David Huston, Geoscience Australia

The chonolith Ni-Cu model: Expanding the footprint of Ni-Cu deposits and chasing weaknesses in the nickel mineral system model 10:50 am
Steve Beresford, First Quantum Minerals;
presentation by Jon Hronsky, WMS

Mesoproterozoic carbonatitic magmatism in the Bayan Obo deposit, Inner Mongolia, North China: Constraints for the mechanism of super accumulation of rare earth elements 11:10 am
Kuifeng Yang, Chinese Academy of Sciences

Mesoproterozoic iron oxide-apatite and iron oxide-copper-gold-rare earth element deposits of southeast Missouri, USA: Geology, geophysics, and exploration potential 11:30 am
John Slack, USGS



Controls on the formation of a large Zn-Pb Irish-type deposit: Evidence from the Navan halo* 11:50 am
Freya Marks, University College Dublin

Proterozoic basement structures and thermogenic sulfate reduction-derived H₂S as key controls on economic Laisvall-type Pb-Zn deposits, eastern erosional front of the Scandinavian Caledonides, Sweden* 12:10 pm
Nicolas Saintilan, University of Geneva

Lunch

12:30 pm

Session 15: Case Studies of 21st Century Exploration Success

Session Chair: Mike Christie, First Quantum Minerals

Discovery history of the Sakatti Cu-Ni-PGE deposit, Finland 1:30 pm
Jim Coppard, Consultant

Geology and discovery of Escondida Este porphyry Cu-Mo deposit, Escondida cluster district, northern Chile 1:50 pm
Marco Ipinza, Minera Escondida Ltda.; presentation by Alejandro Pizarro, Minera Escondida Ltda.

Geology and discovery history of the Chukaru Peki Cu-Au deposit, Timok magmatic complex, Serbia 2:10 pm
Vertrees (Mac) Canby, Freeport McMoRan Exploration

Boliden's Garpenberg Zn-Pb-Ag mine, Sweden—critical factors behind the discoveries that turned mine closure into a large expansion project 2:30 pm
Rodney Allen, presentation by Rolf Jonsson, Boliden Group

Discoveries of Fresnillo plc: The silver giant in Mexico 2:50 pm
David Giles, Fresnillo plc

Discovery of the Nuevo Chaquiro porphyry Cu-Au-(Mo) deposit, Antioquia Department, Colombia 3:10 pm
Paul Bartos, AngloGold Ashanti

Session 16: The Fundamental Advances in Economic Geology

Session Chair: Mary L. Little, Mirasol Resources Ltd.

The geobiology of sediment-hosted mineral deposits 1:30 pm

Clinton Scott, USGS

Sources of reduced sulfur, early diagenesis, and fine laminae in the currently forming metalliferous sediment of the brine-covered Atlantis II Deep, Red Sea* 2:00 pm

Tea Laurila, University of Ottawa, Geomar

Iron and oxygen isotope and element systematics of magnetite from the Los Colorados IOA deposit, Chile: A paradigm shift for IOA deposits? 2:20 pm

Adam Simon, University of Michigan



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Daven Mashburn
South America
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Craig Miller
Australia
craig.miller@newmont.com

Steven Woods
Africa
steven.woods@newmont.com

Volcanostratigraphic controls on the occurrence of massive sulfide (VMS) deposits in the Semail ophiolite, Oman 2:40 pm

Larryn Diamond, University of Bern

Metal mobility and hydrothermal alteration within the Kevitsa Ni-Cu-PGE deposit, Lapland, Finland 3:00 pm

Frank Santaguida, First Quantum Minerals

Break

3:30 pm

Session 17 (plenary): Case Studies of 21st Century Exploration Success

Session Chair: Bruce Gemmill, CODES, University of Tasmania

Anglo American exploration: Key ingredients to a decade of success 4:00 pm

Graham Brown, Consultant

The Ivanhoe Group—two decades of global discoveries 4:30 pm

David Broughton, Ivanhoe Mines

Motive, means and opportunity: Key factors in the discovery of the Nova-Bollinger magmatic nickel-copper sulfide deposits in Western Australia 5:00 pm

Mark Bennett, Sirius Resources NL



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Post-Conference Program

Post-Conference Field Trips

The Viburnum Trend: A World-Class Pb-Zn-Cu MVT District in SE Missouri, USA **October 1-3**

Field Trip Leaders: Thomas G. Schott, Anna A. Kutkiewicz, Harrison J. Ingham, Kyle Williams

Uncovering the Bingham and Stockton Cu-Mo-Au Porphyries **October 1-2**

Field Trip Leaders: Kim E. Schroeder, Kenneth A. Krahulec, Rudy Ganske

Gold and Silver Mines of the Sierra Madre Occidental, Mexico **October 1-5**

Field Trip Leader: Guillermo Gastelum-Morales

Post-Conference Workshops: October 1-2, 2014

Exploration in 2025: The Tools and Techniques to Explore Under Cover

Venue: Colorado School of Mines, Golden Colorado
Presenters: Ken Witherly, Neil Williams, John R. Holliday, Thomas Bissig, Jon A. Woodhead, Peter L. Kowalczyk, Dianne E. Mitchinson, James S. Cleverley
Student Coordinator: Douglas T. (Ty) Conner

Getting More from Drill Core — Automated, Spectral-Based Mineral and Texture Mapping

Presenters: Brigette A. Martini, Ronell Carey, Representatives from Leapfrog, aQuire, and exploration companies

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Posters will be on display throughout the Conference in the Columbine Ballroom. In addition to the regular hours, a dedicated exhibits and poster session chaired by Thomas Monecke will be held on **Monday, September 29, at 4:00 p.m.**

Regular hours are as follows:

Saturday: 5:00 pm – 7:00 pm
 Sunday: 10:00 am – 7:00 pm
 Monday: 10:00 am – 6:30 pm
 Tuesday: 10:00 am – 1:30 pm

Titles and authors of posters are listed below, grouped by theme.

Posters for which the senior author is a student can be identified by an asterisk (*) that follows the poster number.

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Fundamental Advances in Economic Geology

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- P 002*** **Tracking the link between epidiosites and volcanogenic massive sulfide (VMS) deposits in the Semail ophiolite, Oman**
Samuel A. Gilgen, Larry W. Diamond, and Ivan Mercolli
- P 003*** **Bulk compositional controls on mineral assemblages in metamorphosed ore deposits: An example from the LaRonde-Penna Au-rich VHMS deposit, Quebec, Canada**
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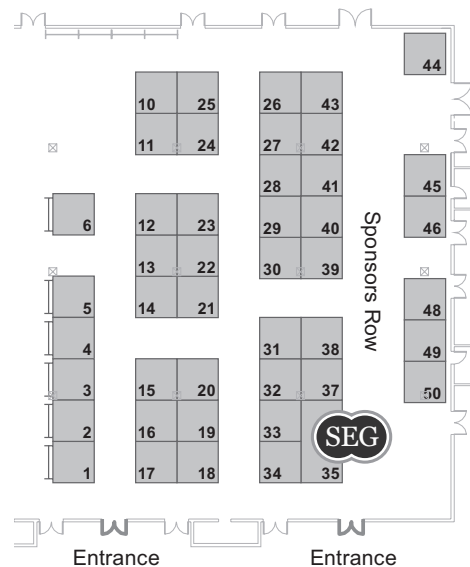
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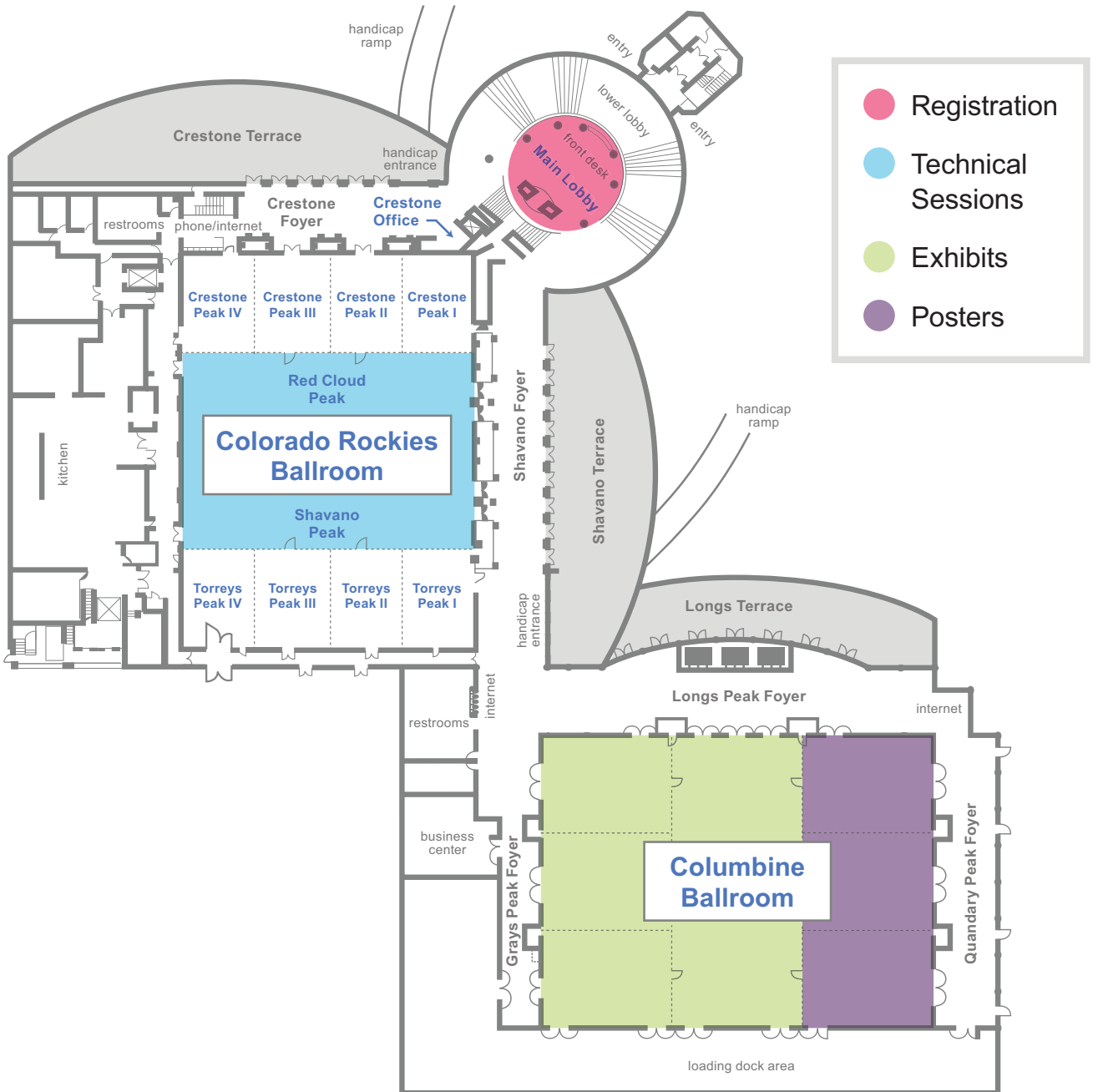
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