



SEG 2018

Metals, Minerals, and Society

Keystone, Colorado, USA

September 22-25, 2018 • www.seg2018.org

SEG 2018 Conference

BHP

A world-leading global resources company.

We are among the world's top producers of major commodities, including iron ore, metallurgical coal and copper. We also have substantial interests in oil, gas, energy coal, nickel and potash.

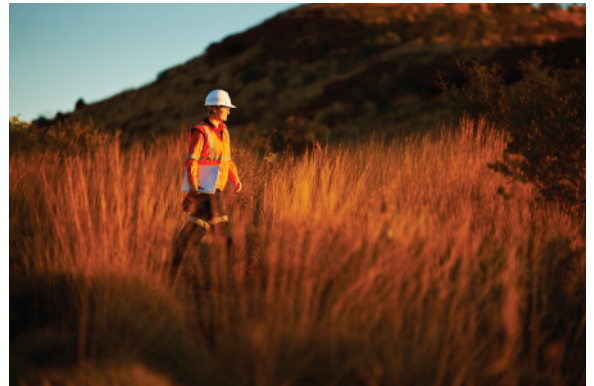
Our corporate purpose is to create long-term shareholder value through the discovery, acquisition, development and marketing of natural resources. We do this through our strategy: managing a simple and diverse portfolio of 12 core operated assets around the world with low-cost options for future growth.

Our unique portfolio allows our diverse team of geoscientists the opportunity to apply unrivalled technical skills and technology to unlock further value from exploration through resource geology, and extraction. This places BHP at the front of the challenge to meet customer needs and resource demand globally.

We are committed to delivering a broader contribution through our social investments, environmental custodianship, and operating to the highest safety and health standards, thereby ensuring lasting economic and social benefits for the communities where we operate.

SEG 2018

For more information, visit www.bhp.com



SATURDAY

1:00pm–5:00pm

Student and SEG Early Career Professionals Forum
Castle Peak/Shavano Peak/
Red Cloud Peak

5:00pm–5:30pm

Presidential Address
J. Bruce Gemmell, SEG President
Shavano Peak/Red Cloud Peak

5:30pm–7:30pm

Welcome Reception
Columbine Ballroom

REGISTRATION

Main Lobby, Keystone Conference Center

Saturday: 7:00am–7:00pm

Sunday: 7:00am–6:30pm

Monday: 7:30am–5:00pm

Tuesday: 7:30am–12:00pm

Wednesday: 7:00am–9:00am

EXHIBITS and POSTERS

Columbine Ballroom

Saturday: 5:30pm–7:30pm

Sunday: 10:00am–7:00pm

Monday: 10:00am–7:00pm

Tuesday: 2:00pm–3:00pm

SPEAKER READY ROOM

Crestone Peak Office

Friday: 8:00am–5:00pm


Saturday: 8:00am–5:00pm

Sunday: 8:00am–5:00pm

Monday: 8:00am–5:00pm

Tuesday: 8:00am–1:30pm

WIFI ACCESS

 Network: Keystone Conference Center
Password: SEG2018

CONFERENCE PROCEEDINGS

Conference Abstracts and submitted presentations are available at www.segabstracts.org/schedule_public.php

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

SUNDAY

8:15am–8:30am

Welcoming Remarks
Steve Enders,
Conference Chair

8:30am–10:10am

Plenary Session:
Recent Breakthroughs in Economic Geology

10:10am–10:40am

Break and Posters

10:40am–12:00pm

Plenary Session:
Integrating Geology, Geochemistry, and Geophysics

12:00pm–1:00pm

Lunch and Posters

1:00pm–3:10pm

Plenary Session:
Integrating Petroleum and Minerals Systems Approaches to Sedimentary Basins

3:10pm–3:40pm

Break and Posters

3:40pm–4:30pm

Plenary Session:
Societal Implications

4:30pm–5:10pm

SEG Distinguished Lecturer:
Christoph Heinrich

5:15pm–7:00pm

Exhibit/Poster Reception
Columbine Ballroom

7:00pm–10:00pm

SEG Dinner and Awards Ceremony*
Torreys Peak

MONDAY

8:15am–10:05am

Session 1:
Technology and Energy Metals
Session 2:
Mineral Exploration Footprints Project

10:05am–10:35am

Break and Posters

10:35am–11:00am

Session 1 (*cont.*)

11:00am–12:30pm

Session 3:
Infrastructure Metals

10:35am–12:30pm

Session 4:

Precious Metals

12:30pm–1:30pm

Lunch and Posters

1:30pm–3:05pm

Session 5:
Base Metals

Session 6:
Precious Metals

3:05pm–3:35pm

Break and Posters

3:35pm–3:55pm

Session 5 (*cont.*)

Session 6 (*cont.*)

3:55pm–5:15pm

Speed Talks 1:
Magmatic-Associated BM, IOCG, G3 Geoscience Education Forum

5:15pm–7:00pm

Exhibit/Poster Reception
Columbine Ballroom

7:00pm–10:00pm

Industry Outlook Dinner*
Torreys Peak

TUESDAY

8:15am–10:25am

Session 7:
Integrating Petroleum and Minerals Systems Approaches to Sedimentary Basins
Session 8:
Base Metals

10:25am–10:55am

Break and Posters

10:55am–12:30pm

Session 9:
Integrating Geology, Geochemistry, and Geophysics

Session 10:
Precious Metals

12:30pm–1:30pm

Lunch and Posters

1:30pm–2:00pm

Speed Talks 2:
Metals and Processes in Basins
Speed Talks 3:
Gold

2:00pm–3:00pm

Posters

3:00pm–3:30pm

Break

3:30pm–5:30pm

Session 11:
Looking to the Future

5:30pm

Closing Remarks
Steve Enders,
Conference Chair

*Ticketed events

Welcome!

We welcome you to SEG 2018 at Keystone, SEG's flagship international conference!

The SEG 2018 conference theme, “Metals, Minerals, and Society,” was chosen to showcase the latest developments across the breadth of our discipline, covering topics from advanced academic studies to practical case histories, and within a societal context. The conference focuses on precious and base metals that form the traditional backbone of our exploration and research projects, infrastructure metals needed for the urbanization of our modern world, and technology and energy minerals and metals used in fast-developing industries and markets.

This conference features an outstanding lineup of speakers, complemented by high-quality poster presentations and an exceptional group of topical pre- and post-meeting field trips and workshops. The technical program also features plenary sessions on recent breakthroughs in economic geology, integration of multidisciplinary geoscience, and the crossover between petroleum and ore deposit geoscience as applied to sedimentary basins. Students and early career professionals play a critical role as current innovators and future leaders in our society, and the conference builds on the SEG tradition of encouraging and sponsoring their participation with a series of integrated pre- and syn-conference events. In addition, we have included sessions with speed talks of five minutes each in this year's conference.

We are most grateful to our conference sponsors, who will help make SEG 2018 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 2018 in the heart of the spectacular Rocky Mountains. Enjoy the conference!

M. Stephen Enders, *Chair, SEG 2018 Organizing Committee*
David Broughton, *SEG 2018 Technical Program Chair*
Brian Hoal, *Executive Director, Society of Economic Geologists*

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Back cover flap	Thank you, Sponsors
Inside Back cover	Conference Center floor plan

Conference Information*

Conference Organizing Committee

- Conference Chair: M. Stephen Enders, Colorado School of Mines
- SEG Executive Director: Brian Hoal
- Technical Program: David W. Broughton, Ivanhoe Mines/Consultant
- Publications: Antonio Arribas, Akita University; Jeffrey L. Mauk, U.S. Geological Survey
- Field Trips: Nathan H. Brewer, Gold Fields Exploration, Inc.
- Workshops: Andrew T. Wurst, Barrick Gold Corporation
- Poster Sessions/Students: Regina M. Baumgartner, Teck
- Fundraising/Marketing: Nikki Morrison, SEG
- SEG Executive Assistant: Alison Cronk

SEG Contact Information

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Conference Organizer

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 Basel Marketing and Events
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Exhibit Sales Manager

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*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. For updates, please visit www.seg2018.org.

SEG Awardees

Please be sure to join us Sunday, September 23, from 7:00 to 10:00pm in the Torreys Peak room at the Keystone Conference Center for the SEG Dinner and Awards Ceremony.

SEG R.A.F. Penrose Gold Medal for 2017

CHRISTOPH A. HEINRICH
ETH Zurich, Switzerland

SEG Silver Medal for 2017

KAREN D. KELLEY
U.S. Geological Survey, USA

SEG Ralph W. Marsden Award for 2017

FRANÇOIS ROBERT
Barrick Gold Corporation, Canada

SEG Waldemar Lindgren Award for 2017

PILAR LECUMBERRI SANCHEZ
University of Alberta, Canada

SEG Brian J. Skinner Award for 2017

DAOHAN ZHANG
China University of Geosciences

SEG Brian J. Skinner Honorable Mention for 2017

KEITH D. MORRISON
Arizona State University, USA

SEG Distinguished Lecturer for 2018

CHRISTOPH A. HEINRICH
ETH Zurich, Switzerland

SEG International Exchange Lecturer for 2018

ALAN J. WILSON
Antofagasta Minerals, Canada

SEG Thayer Lindsley Visiting Lecturer for 2018

JOHN H. DILLES
Oregon State University, USA

SEG Regional VP Lecturer for 2018

LENA VIRGÌNIA SOARES MONTEIRO
University of São Paulo, Brazil

Pre-Conference Program

Saturday, September 22, 2018

Student and SEG Early Career Professionals Forum

1:00pm–3:00pm

Roundtable Discussions

Student interactive roundtable sessions.

Open to students and young professionals.

Castle Peak

3:00pm–3:30pm

Coffee Break

Shavano Peak/Red Cloud Peak

3:30pm–5:00pm

Forum

Hosted by **BHP**

A wrap-up and panel discussion of the roundtable sessions.

Open to all conference attendees.

Shavano Peak/Red Cloud Peak

Panel members:

John Thompson, Cornell University

Libby Sharman, BHP

Jesse Clark, BHP

Fabien Rabayrol, UBC

Regina Baumgartner, Teck

5:00pm–5:30pm

SEG Presidential Address

J. Bruce Gemmell, SEG President

Shavano Peak/Red Cloud Peak

5:30pm–7:30pm

Welcome Reception

Columbine Ballroom

Pre-Conference Field Trips

Central and South Kamchatka Mining Districts, Far East of Russia **September 13-19**

Leader: Daria S. Bukhanova

Rare Earth and Precious Metal Systems of the Mojave Desert Region **September 17-22**

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

Lithium and Gold Associated with Rhyolites **September 18-21**

Leaders: Ruth A. Carraher, Jonathan G. Price, Ted Wilton

Uncovering the Bingham and Stockton Cu-Mo-Au Porphyries **September 20-22**

Leaders: Rudy Ganske, Kitty Gundy, Ken Krahulec

Cripple Creek and Victor Mines **September 21**


Leader: Douglas White

Pre-Conference Workshops

Applied Structural Geology of Precious Metal-Bearing Hydrothermal Mineralizing Systems **September 21-22**

Presenters: Wayne Barnett, Stephen Cox, David Rhys, Julie Rowland, Blair Hrabí

Introduction to Geology-Driven Resource Domaining and Modeling **September 21-22**

Sponsored by  **srk**

Presenters: Matt Hastings, Anna Kutkiewicz

Geophysics for Geologists: Basic Principles and Case Histories **September 21-22**

Presenter: Alan King

Mineral Vectoring in Hydrothermal Ore Deposits: A Multiscale Approach **September 21-22**

Sponsored by  **core scan**

Presenters: Cari Deyell-Wurst, Brigitte Martini

Technical Program

Talks for which the presenting author is a student can be identified by an asterisk (*) that follows the presenter. Posters can be viewed during all breaks.

DAY 1 — Sunday, September 23, AM

8:15-8:30 **Welcoming remarks**
Steve Enders, Conference Chair

Plenary - Recent Breakthroughs in Economic Geology

Patrick Redmond, Teck

8:30-9:00 *Nick Hayward (Invited)*
Spatial periodicity in self-organized critical ore systems

9:00-9:30 *John Ashton (SGA Invited Speaker)*
Discovery of the Tara deep Zn-Pb mineralization at the Boliden Tara mine, Navan, Ireland

9:30-9:50 *Aldo Vasquez*
Application of zircons as a magmatic fertility proxy in global porphyry exploration

9:50-10:10 *Don Pridmore*
Alteration in gold systems and its significance in interpreting results from 3D seismic surveys

10:10-10:40 **Break**

Plenary - Integrating Geology, Geochemistry, and Geophysics

Jon Woodhead, JAW Consulting

10:40-11:10 *Mark Jessell (Invited)*
3D uncertainty in contrasting geological scenarios

11:10-11:35 *François Robert (Invited), Rob Krčmarov*
Exploration success: Strategic elements, technology, and innovation

11:35-12:00 *Julie Rowland*
The making of a metal belt: Insights from New Zealand's active accretionary orogen

DAY 1 — Sunday, September 23, PM

12:00-1:00 **Lunch**

Plenary - Integrating Petroleum and Minerals Systems Approaches to Sedimentary Basins

*Richard Chuchla, University of Texas at Austin;
 Cam McCuaig, BHP*

1:00-1:30 *Cam McCuaig (Invited)*
The power of a systems approach to minerals and petroleum exploration in sedimentary basins

1:30-1:55 *Larry Cathles (Invited)*
Processes controlling sedimentary basin resources

1:55-2:20 *Michael Hudec (Invited)*
Fluid flow around evolving salt structures and its influence on metal deposits

2:20-2:45 *Poul Emsbo*
Seawater evaporation and density-driven fluid flow: Fluid source and drive for the formation of sedex zinc-lead-silver deposits

2:45-3:10 *John Walsh (Invited)*
Fault-controlled fluid flow in sediment-hosted mineral deposits

3:10-3:40 **Break**

Plenary - Societal Implications

Steve Enders, Colorado School of Mines

3:40-4:05 *Susan Lomas (Invited)*
MeTooMining - It is time to start the conversation!

-
- 4:05-4:30 *Ben Teschner*
Proposed mercury abatement and disposal at Donlin gold, Western Alaska: Geology, stakeholders, and mine permitting
-
- 4:30-5:10 *Christoph Heinrich,*
2018 SEG Distinguished Lecturer
Fluid evolution and selective metal enrichment in magmatic-hydrothermal Cu-Au ore systems
-
- 5:15-7:00 **Exhibit/Poster Reception**
-
- 7:00 **SEG Dinner and Awards Ceremony**
(ticketed event)

DAY 2 — Monday, September 24, AM**SESSION ONE****Technology and Energy Metals**

Simon Jowitt, UNLV; Patrick Highsmith, Pure Energy Minerals

8:15-8:40 *Roderick Eggert (Invited)*

Critical minerals and modern engineered materials

8:40-9:05 *Simon Jowitt (Invited), Gavin Mudd*

An overview of global critical metal resources: Current and future scenarios and implications for supply security

9:05-9:25 *Isabel Barton*

Iron deficiency and cobalt concentration in sediment-hosted copper deposits

9:25-9:45 *Philip Verplanck*

Isotopic constraints on ore-grade enrichment of rare earth elements in carbonatites: The Elk Creek carbonatite example

SESSION TWO**Mineral Exploration Footprints Project**

Michael Lesher, Laurentian University

Michael Lesher (Invited)

Mineral exploration footprints project - overview

Leonardo Feltrin (Invited)

Footprints: Data integration methodologies and workflows

Robert Lee (Invited)

Exploration footprint of the Highland Valley porphyry copper deposit

Kevin Ansdell (Invited)

Exploration footprint of the McArthur River and Millennium unconformity uranium deposits

9:45-10:05

Ben Cerlienco

The geology and petrogenesis of the Earl Grey albite-spodumene pegmatite: Implications for mineralogical and geochemical zonation in rare-element pegmatites

Stéphane Perrouty (Invited)

Exploration footprint of the Canadian Malartic disseminated gold deposit

10:05-10:35

Break

Break

SESSION FOUR

Precious Metals

Paul Bartos, AngloGold Ashanti

10:35-11:00

Alexandre Aubin

Athabasca Basin uranium deposits - variations in footprints and exploration implications

Christoph Heinrich (2018 SEG Distinguished Lecturer)

Archean gold: Lode deposits, silver isotopes, magmatic degassing, and early life on the Kaapvaal craton

SESSION THREE

Infrastructure Metals

*Adam Simon, University of Michigan Ann Arbor;
Caroline Perring, BHP*

Caroline Perring

Discovery, geologic setting, and controls on iron mineralization, South Flank, Western Australia

Carlos Vargas

The Archean Karagba-Chauffeur-Durba (KCD) gold deposit in the Kibali district, northeast Democratic Republic of Congo

Craig Scherba

The geology and economics of the giant Molo graphite deposit, southern Madagascar

*Michael Tedeschi**

Redefining the timing of orogenic gold mineralization in the Guiana Shield: New U-Pb evidence from the Karouni gold deposits

Adam Simon (Invited)

A holistic model that combines igneous and magmatic-hydrothermal processes to explain Kiruna-type iron oxide-apatite deposits and iron-oxide-copper-gold deposits as products of a single evolving ore system

Ruben Padilla

Discovery and geology of the Windfall Lake gold project

SESSION FOUR (cont.)

Precious Metals

Paul Bartos, AngloGold Ashanti

DAY 2 — Monday, September 24, PM (continued)

12:10-12:30

*Maria Mustafa**

The chemistry and textures of magnetite from the Candelaria IOCG deposit and Quince IOA prospect in the Chilean iron belt

Kathryn MacWilliam

Geology and genesis of the Coffee gold deposit, west-central Yukon Territory: Implications for the tectonic and metallogenic evolution of the North American Cordillera

12:30-1:30

Lunch

Lunch

SESSION FIVE

Base Metals

Wolf Schuh, Freeport; Cathy Knight, Khoemacau

1:30-2:00

Poul Emsbo (Invited)

Impact of exhalative hydrothermal systems on marine chemistry: Applications for ore genesis and mineral exploration

Judith Kinnaird (Invited), Iain McDonald

The northern limb of the Bushveld Complex: A new economic frontier

SESSION SIX

Precious Metals

Paul Bartos, AngloGold Ashanti

SESSION FIVE (cont.)

2:00-2:25 *David Selley (Invited)*
Structural configuration of the Central African Copperbelt, with particular reference to the Congolese arm: Roles of evaporites in structural evolution, basin hydrology, and ore location

2:25-2:45 *Wesley Hall (Invited)*
Regional- to deposit-scale controls on base metal mineralization in the Kalahari Copperbelt, Botswana, defined by detailed lithostratigraphy and magnetic lithostratigraphy

2:45-3:05 *Nicole Hurtig*
The importance of hydrocarbon-water interaction in sedimentary-hosted ore deposits

3:05-3:35 **Break**

SESSION SIX (cont.)

Marina Yudovskaya (Invited)
Anhydrite assimilation by Bushveld ultramafic melts and its ore-petrological consequences

Nadezhda Krivolutskaya (Invited)
Magmatic and tectonic constraints on the formation of the unique PGE-Cu-Ni Norilsk deposits, Siberian Trap province

*Justin Milliard**
Genetic links between the development of extensional basins and the formation of low sulfidation epithermal deposits

Break

3:35-3:55	<p><i>John Guven</i> Segmented fault arrays and their control on Irish Zn-Pb deposits</p>	<p><i>Jeffrey Edelen</i> Geology of the Esperanza gold skarn deposit, Morelos, Mexico</p>
3:55-4:00	<p>See Speed Talks on the following page</p>	<p><i>Vicki McConnell, GSA</i> Geoscience Education Forum - Introduction</p>
4:00-4:15	<p><i>Heather Houlton, AGI</i> The pipeline problem</p>	<p><i>David Thesenga, Dawson School, CO</i> MGSS standards: Challenge/opportunity</p>
4:15-4:30		<p><i>Samuel Moore, GeoForce, Austin, Texas</i> Industry solutions</p>
4:30-4:45		<p><i>Dean Moosavi, GSA</i> Professional society solutions</p>
4:45-5:00		<p>Panel discussion</p>
5:00-5:15		

DAY 2 — Monday, September 24, PM (continued)**SPEED TALKS ONE****Magmatic-Associated BM, IOCG, G3, David Broughton, Steve Enders**

3:55	<i>Jamie Wilkinson</i>	From arc magmas to ores (FAMOS): A multidisciplinary research project investigating porphyry ore genesis in subduction zones
4:00	<i>Oliver Higgins*</i>	Metals and volatiles partitioning during protracted magma differentiation from the deep to upper crust
4:05	<i>Michael Calder*</i>	Porphyry-style alteration and vein types of the Far Southeast porphyry Cu-Au deposit, Mankayan district, Philippines
4:10	<i>Ken Witherly</i>	What lies beneath: Mapping conductive zones within porphyry copper systems
4:15	<i>Camilo Uribe Mogollon</i>	White mica geochemistry of the Copper Cliff porphyry Cu deposit: Insights from a vectoring tool applied to exploration
4:20	<i>Marta Codeço*</i>	Using geochemistry and B-isotopes of hydrothermal tourmaline and mica to trace metals and fluid sources in the world-class Panasqueira W-Sn-Cu deposit (Portugal)
4:25	<i>TBA</i>	<i>TBA</i>
4:30	<i>Danielle Schmandt*</i>	Rare earth element minerals and their compositional variation in the Olympic Dam deposit, South Australia

4:35	<i>Jean-Luc Pilote</i>	Controls on VMS ore-forming processes in ancient successions - a study of the Cambro-Ordovician Ming VMS deposit, Newfoundland Appalachians, Canada
4:40	<i>Jessica Bogossian*</i>	Structural controls and hydrothermal alteration of the Cascavel and Sertão gold deposits, Goiás, central Brazil
4:45	<i>Mark Barton</i>	Integrated approaches to the temporal, spatial, thermal, and geochemical evolution of the Chilean iron belt
4:50	<i>Irene del Real Contreras*</i>	Iron oxide copper-gold mineralization formed during transpression, Candelaria-Punta del Cobre district, northern Chile
4:55	<i>Sarah Hayes</i>	Elemental trends in criticality studies
5:00	<i>Greg Turner</i>	Seismic exploration for orogenic gold in Western Australia: Identifying midcrustal controls through to drill targeting with 3D seismic
5:05	<i>Dan Hollis</i>	Use of ambient noise surface wave tomography in mineral resource exploration and evaluation
5:10	<i>Benjamin Murphy*</i>	Lithospheric magnetotelluric imaging for regional mineral resource exploration
5:15-7:00	Exhibit/Poster Reception	
7:00	<i>Mark Bristow, CEO, Randgold</i>	Industry Outlook Dinner — The global mining industry through the eyes of a gold miner - how do we stay relevant in a modern, dynamic, and populist world? (ticketed event)

DAY 3 — Tuesday, September 25, AM

SESSION SEVEN

Integrating Petroleum and Minerals Systems Approaches to Sedimentary Basins

*Richard Chuchla, University of Texas at Austin;
Cam McCuaig, BHP*

8:15-8:40 *Richard Chuchla (Invited), Kevin Bohacs*
Carlin-type mineralization in a sequence stratigraphic context

8:40-9:05 *Quinn Passey (Invited)*
Yikes, my source rock is now my reservoir - the strange underworld of unconventional hydrocarbons

9:05-9:25 *Elizabeth Turner*
Basin dynamics and geochemistry during deposition of the Neoproterozoic Rapitan iron formation (northwestern Canada)

SESSION EIGHT

Base Metals

*Wolf Schuh, Freeport-McMoRan; Cathy Knight,
Khoemacau*

Ralph Stegen (Invited), Mark Barton
Cerro Verde-Santa Rosa porphyry copper-molybdenum deposits, Peru: Magmatic and hydrothermal evolution of adjacent systems

José Perelló (Invited)
Geologic controls on hypogene mineralization at the Zaldívar porphyry copper-gold deposit, Escondida district, northern Chile

Douglas Kirwin
Characteristics of intrusion-related copper-bearing tourmaline breccia pipes

9:25-9:45	<i>Helen Twigg*</i> Geology of the Kakanda deposits, DRC	<i>Keiko Hattori</i> Use and limitations of zircon compositions during exploration for intrusion-centered deposits
9:45-10:05	<i>Jeff Mauk</i> Geochemistry of fluid inclusions, sequence stratigraphy, and geophysics refine exploration priorities for sediment-hosted copper deposits in the 1.1 Ga Midcontinent Rift	<i>John Dreier</i> The exploration and evaluation of copper heap leach-SXEW deposits: Why geologists should manage the process
10:05-10:25	<i>Simon Jones*</i> Basin-scale fluid flow and alteration associated with the White Pine Cu-Ag deposit, Michigan, USA	<i>Don Taylor</i> Arizona Mining's Taylor deposit - a world-class zinc, lead, and silver discovery
10:25-10:55	Break	Break

SESSION NINE

Integrating Geology, Geochemistry and Geophysics

Jon Woodhead, JAW Consulting

10:55-11:20

Albert Hofstra

Integration of regional to deposit-scale geological, geochemical, and geophysical data from Mesoproterozoic IOA-IOCG systems on the SE margin of Laurentia

11:20-11:45

Rebecca Montsion

Dismantling geo-silos: An integrated model for Cu porphyry in the Quesnel terrane, British Columbia

11:45-12:10

Melissa Anderson

Integrating geophysical and geochemical data to understand the relationships between geodynamics, volcanism, and massive sulfide formation in back-arc basins

SESSION TEN

Precious Metals

Paul Bartos, AngloGold Ashanti

Jean Cline

Core and rim textures of Carlin-type pyrite – key discriminators of a new discovery?

*Elizabeth Hollingsworth**

Gold mineralization in the Rain-Railroad district, southern Carlin trend, Nevada: Investigation into shallow Carlin-type and intrusion-related gold deposits

Karl Jabagat

Ore-forming mechanisms at the Sangilo epithermal deposit, Baguio mineral district, Philippines: Insights from paragenetic and fluid inclusion studies of the Taka Barr vein

DAY 3 — Tuesday, September 25, PM (continued)

12:10-12:30

Jean-Marc Lulin

Predictive modelling applied to country-scale mineral exploration: From theory to practice

Armelle Kloppenburg

A relay ramp extensional structural style for the Paleozoic epithermal Bayan Khundii gold project, Gobi Desert, Mongolia

12:30-1:30

Lunch

Lunch

SPEED TALKS TWO

Metals and Processes in Basins, David Broughton

*Joseph Armstrong**

Critical element accumulations within black shales: Selenium, tellurium, and cobalt enrichment during the Neoproterozoic atmospheric oxygenation event

*Christopher Herron**

Defining the carbonate alteration footprint of the Cortez Hills Carlin-type gold deposit, Nevada, using ¹³C and ¹⁸O stable isotopes and geochemistry as an exploration tool

1:35

Elizabeth Turner

Architecture of Neoproterozoic carbonate host rocks underlies the distribution of Zn and Cu ore at Kipushi (DRC) and Gayna River (Canada)

Carson Richardson

Palinspastic restoration of the dismembered Roberts Mountains thrust, northern Shoshone Range, Nevada: Implications for exploration of concealed Carlin-type deposits

SPEED TALKS THREE

Gold, Steve Enders

SPEED TALKS TWO (cont.)

1:40 *Timothy MacIntyre**
Structural geology of the Kansanshi Cu-Au deposit, Northwestern Province, Zambia

1:45 *Andrea Herazo**
Bitumen-bearing stratabound Cu-(Ag) deposits in northern-central Chile: An active role for liquid hydrocarbons?

1:50 *Heta Lampinen*
3D mineral footprints of an undercover sediment-hosted polymetallic Abra ore system, Western Australia

1:55 *Raúl Berrospi**
Role of Jurassic salt tectonics in the structural shaping of MVT Pb-Zn deposits and hydrocarbon traps in Peru, and implications for exploration

2:00-3:00 Posters

3:00-3:30 Break (coffee)

SPEED TALKS THREE (cont.)

*Ajeet Miliard**
Temporal and spatial constraints on Carlin-type gold deposits at the Pequop Mountains, Nevada

*Robert Johnson**
Hydrothermal features in siliciclastic-volcanic rocks above carbonate-hosted high-grade ore at the Turquoise Ridge Carlin-type gold deposit

*Halley Keevij**
Distal disseminated gold mineralization in the Hunjiang basin, Jilin Province, China: The White Mountain sediment-hosted gold deposit

*Nicholas Hillemeier**
Controls on epithermal gold-silver mineralization and alteration at the Gravel Creek deposit, Elko County, Nevada

SESSION ELEVEN

3:30-3:45	<i>John Thompson, Regina Baumgartner</i> Introduction and presentation of awards for student presenters
3:45-4:05	<i>Charles Funk (Invited)</i> Who will be doing grassroots exploration and what will they be doing?
4:05-4:25	<i>Pablo Mejia (Invited)</i> How far can we go to maximize value thought mine/project exploration?
4:25-4:45	<i>Regina Baumgartner (Invited)</i> How will we characterize orebodies from day one and deliver value?
4:45-5:05	<i>Elizabeth Sharman</i> The future of geoscience in exploration? Holistic skills to harness the rising technological tide
5:05-5:25	<i>Murray Hitzman (Invited)</i> What will academic and government research look like and how will it benefit exploration?
5:25-5:30	<i>Luis Fontboté</i> Closing comments
5:30	<i>Steve Enders, SEG 2018 Conference Chair</i> Conference closing remarks

INVITED SPEAKERS

Kevin Ansdell is a professor of geology at the University of Saskatchewan. He obtained a bachelor's degree in geology from Oxford University in 1982, prior to earning an M.Sc. degree from the University of Alberta and a Ph.D. degree from University of Saskatchewan. He has been a faculty member since completing a postdoctoral fellowship with the Geological Survey of Canada in 1993 and has been actively involved in the teaching and supervision of undergraduate and graduate students in the areas of petrology, Precambrian geology, and mineral deposits. Kevin is a professional geoscientist with the Association of Professional Engineers and Geoscientists of Saskatchewan, a Fellow of the SEG, Geoscientists Canada, and the Geological Association of Canada, and academic advisor to the University of Saskatchewan SEG Student Chapter.



John Ashton graduated from the Royal School of Mines, London, in 1975 with a B.Sc. degree in mining geology. He undertook Ph.D. research focusing on ore geology and wall-rock geochemistry of Pb/Zn and Au veins in Wales at the University of Aberystwyth until 1978. After work-



ing for Mogul of Ireland Ltd, Silvermines, as a mine and senior mine geologist, he joined Tara Mines Ltd, Navan, in 1980. John held several positions, including chief mine geologist, with involvement in computer systems, resource estimation, delineation, and exploration drilling, and he became chief exploration geologist for Boliden Tara Mines in 2005. His experience and interests include 3D geologic modeling, resource estimation, the genesis of carbonate-hosted Zn/Pb deposits, and exploration for base metal deposits.

Larry M. Cathles performed doctoral research on the viscosity of the Earth's mantle at Princeton University, then spent seven years at Kennecott Copper Corporation's Ledgemont Laboratory. After joining the faculty of the Pennsylvania State University in 1978, he investigated the formation of massive sulfide deposits newly discovered at mid-ocean ridges. At the Chevron Oil Field Research Company (1982-1986), he developed genetic and exploration models for gold and sulfide deposits and investigated CO₂ generation during steam flooding. He has been at Cornell University since 1986, where he has undertaken a wide variety of scientific investigations. Recently, his research has involved the impact of natural gas emissions on climate change, separating natural and anthropogenic drivers of global warming, and glacial isostatic calculations of sea-level change.



Richard J. Chuchla was born and raised in the shadow of the El Salvador porphyry copper deposit in Chile. He received his undergraduate degree in geology from Cornell University and his master's degree from the University of Texas at Austin. He retired as an executive from Exxon-Mobil in 2015 after a 35-year career with the company. Richard has had broad experience in minerals (base and precious metals), coal, oil, and gas exploration, development, research, and management, including a corporate assignment as upstream strategic advisor to ExxonMobil's Management Committee and CEO. Richard has worked in basins and has participated in discoveries around the world. He was appointed as the Director of the Energy and Earth Sciences (EER) Graduate Program and the Leslie Bowling Professor in Geological Sciences at the University of Texas-Austin in 2016.



INVITED SPEAKERS (cont.)

Roderick G. Eggert is the Viola Vestal Coulter Foundation Chair in Mineral Economics at the Colorado School of Mines, where he has taught since 1986. He also is deputy director of the Critical Materials Institute, an energy innovation hub (research consortium, led by the Ames Laboratory) established by the U.S. Department of Energy in 2013, to accelerate innovation in energy materials. He has a B.A. degree in earth sciences from Dartmouth College, an M.S. degree in geochemistry and mineralogy from Pennsylvania State University, and a Ph.D. degree in mineral economics, also from Penn State.



Poul Emsbo is a research geologist with the U.S. Geological Survey (USGS) in Denver, Colorado. He received his B.S. degree in biology and chemistry from Union College (1986) and earned his M.Sc. (1993) and Ph.D. degrees (1999) in economic geology and geochemistry from the Colorado School of Mines.



Since arriving at the USGS in 1989, Poul has investigated the genesis of Carlin Au, MVT, SEDEX, and sedimentary copper deposits, as well as high-salinity brines. For the past several years, he has explored the interplay between ocean chemistry, seafloor hydrothermal deposits, marine sediment-hosted deposits, and metalliferous black shales using high-resolution bio-, chemo-, and sequence stratigraphy, high-resolution chronostratigraphy, and chemical tracers (e.g., Sr, $\delta^{88}\text{Sr}$, Pb, Nd, C, O, and S isotopes, REEs, and trace metals).

Leonardo Feltrin recently joined the Harquail School of Earth Sciences at Laurentian University as an associate professor of earth systems modeling. He received a Ph.D. degree in economic geology with emphasis on 3D modeling and GIS mineral prospectivity mapping from James Cook University and gained exten-



sive experience in ore deposit-related science through his work in industry and academia. His research considers the use of computational geoscience, artificial intelligence (AI), and data analytics in ore deposit exploration. An overarching objective is to generate workflows that promote the informatization process of exploration data. These tools are applicable in three connected areas of research: (1) geochemical and geophysical ore deposit mapping in 3D, (2) multivariate analysis, and (3) development of AI tools and their application to mineral exploration.

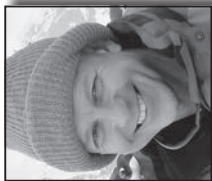
Wesley S. Hall earned his bachelor's degree in geology from Colorado State University, followed by his master's and doctorate degrees in economic geology from the Colorado School of Mines after a short period working in industry. His specialties include sedimentary rock-hosted copper systems, sedimentology and



stratigraphy, regional-scale structural geology and tectonics, mineral systems analysis, and geophysical interpretation. Wesley has worked as a geologist on greenfield exploration programs covering porphyry copper in Alaska, breccia pipe uranium in Arizona, alkaline porphyry gold in northwestern Ontario, and sedimentary rock-hosted copper deposits in southern Africa. His most recent work has helped elucidate the geologic framework and geochronology of the Kalahari Copperbelt in Botswana and Namibia. Currently, he is operating as an independent consultant to the mineral exploration industry.

INVITED SPEAKERS (cont.)

Nick Hayward is currently the director of Global Project Generation with Teck Resources, principally focused on driving major copper, zinc, and gold discoveries. Previously, he held roles in the Teck Exploration Group as their global zinc specialist and chief geoscientist for Asia-Pacific and Africa, following five years with BHP Billiton as the global practice leader in structural geology and resource targeting, and 20 years with WMC Resources. Nick has extensive technical leadership, project generation, and project management experience for base metals and bulk commodities across the globe, as well as a Ph.D. degree in structural geology and tectonics. His current career passions include making greenfield discoveries, predictive structural geology, mineral system modeling, research and innovation, coaching, and mentoring.



Christoph (Chris) A. Heinrich studied Alpine geology and high-pressure metamorphic petrology at ETH Zurich (Switzerland). He then moved to Australia to develop his interests in economic geology with Comalco, CSIRO, and Geoscience Australia. At the Department of Scientific and Industrial Research in New Zealand, he completed a project in experimental hydrothermal geochemistry. In 1994, Chris was appointed professor of mineral resources at ETH Zurich, where he has since built a teaching and research group investigating processes of hydrothermal ore formation (www.geopetro.ethz.ch/research/orefluids). Chris was the first recipient of the Paul Niggli Medal (1988) and has served as an associate editor for *Economic Geology* and other journals, and as a Council member for the SEG and SGA. In 2006, he was awarded the SEG Silver Medal and, in 2017, the R.A.F. Penrose Gold Medal.



Mike Hudec is a senior research scientist at the Bureau of Economic Geology and directs the Applied Geodynamics Laboratory (AGL), an industry-sponsored research consortium studying salt tectonics. He received his Ph.D. degree from the University of Wyoming in 1990 and spent the next eight years at Exxon Production Research, where he specialized in salt tectonics, extensional tectonics, and seismic interpretation. His current research interests include palinspastic restoration of salt structures, deepwater structural styles, and the evolution of the Gulf of Mexico Basin.



Mark Jessell is a professor and Western Australian Fellow at the Centre for Exploration Targeting, University of Western Australia, and was previously based in Toulouse, France, where he was a directeur de recherche with the Institut de recherche pour le développement, and where he started the West African Exploration Initiative (WAXI). His scientific interests include microstructure studies (the Elle platform), integration of geology and geophysics in 2D and 3D (the WA_In3D project), and the tectonics and metallogenesis of the West African craton. His recently completed Western Australian Fellowship is focused on improving the links between geologic and geophysical data analysis in 3D via analysis of the geologic and topological uncertainty. In 2013 he was awarded the Geological Society of Australia Hobbs Medal for major contributions in structural geology.



INVITED SPEAKERS (cont.)

Simon Jowitt is an assistant professor in economic geology at the University of Las Vegas, Nevada. He has B.Sc. (Hons.), M.Sc., and Ph.D. degrees from the University of Edinburgh, Camborne School of Mines, and the University of Leicester, respectively, all in the U.K. He spent several years at Monash University



in Australia working on various aspects of economic geology and igneous petrology, including the supply of critical metals. Simon's current research focuses on the use of geochemistry to unravel geologic processes in a variety of settings. Several of his recent publications have focused on global Cu, Ni, Co, Pb-Zn, PGE, REE, and In resources. He was awarded the SEG Lindgren Award in 2014 and Institute of Materials, Minerals and Mining (IoM3) Mann Redmayne Medals in 2013 and 2016.

Judith Kinnaird is the director of the Economic Geology Research Institute at the University of the Witwatersrand, Johannesburg, South Africa, where she leads research on the Northern limb of the Bushveld Complex and works on various projects related to critical metals. She is also co-director of the National Cen-



tre of Excellence for Minerals and Energy Research Analysis (CIMERA). She has a B.Sc. (Hons.) degree from the University of London and M.Sc. and Ph.D. degrees from the University of St. Andrews in Scotland. She has worked on the tin-bearing granites in Nigeria and South Africa, Li-Be-Sn-Nb-Ta and gem-bearing pegmatites in Namibia, Nigeria, and Somaliland, and uraniferous deposits in Namibia, South Africa, and Malawi. Judith has served as SEG president and as an SEG Council member.

Joe Knight has degrees in geology from the University of Nottingham and Camborne School of Mines and a Ph.D. degree from the University of Western Australia. He has 25 years of global experience in minerals exploration and resource development across multiple commodities and mineralization styles. Joe is currently the general manager resource development for Rio Tinto Iron Ore.



Nadezhda A. Krivolutsкая graduated from Moscow State University in 1976 with a degree in economic geology. Since 1977, she has worked at the Russian Academy of Sciences (RAS), including its Siberian Branch. Now she is a leading researcher at Vernadsky Institute of Geochemistry and Analytical Chemistry, RAS (Moscow, Russia). She studies the geology, geochemistry, and mineralogy of the Pt-Cu-Ni deposits of Russia, mainly the Noril'sk deposits. Nadezhda is the author or co-author of five books and many articles. She was awarded the prize of the RAS (2015) and the Ministry of Natural Resources (2009) for studying the deposits of eastern Siberia.



INVITED SPEAKERS (cont.)

Robert Lee received his Ph.D. degree at Oregon State University in 2008, where he focused on the formation and mineral chemistry of the El Salvador porphyry copper deposit in northern Chile. Upon completion of his dissertation, he worked in industry with the major mining company Freeport-McMoran, where he was



part of the greenfields exploration team working on projects in North America, the Philippines, and Europe. Since 2014, he has been at the University of British Columbia as the lead researcher for the Canada Mining Innovation Council (CMIC)-Footprints Cu-site subproject, where he oversaw the multicollaborative endeavor to define new innovative methods toward the distal expression and vectoring toward economic ore deposits. Additionally, Robert is working on the Western Tethyan II project as the lead geochronologist.



Michael Lesher is a professor of economic geology and research chair in mineral exploration in the Mineral Exploration Research Centre, Harquail School of Earth Sciences, and Goodman School of Mines at Laurentian University. He has worked on iron deposits in Labrador and

Quebec, gold deposits in Western Australia and the southern Appalachians, chromite deposits in northern Ontario, and nickel-copper-PGE deposits in Brazil, China, Western Australia, Manitoba, Ontario, northern Quebec, and Russia. He is presently the principal investigator and director of the Natural Sciences and Engineering Research Council of Canada (NSERC)-Canada Mining Innovation Council (CMIC) Mineral Exploration Footprints project, and a co-investigator on the Canada First Research Excellence Fund (CFREF) Metal Earth project.

Susan Lomas has over 30 years of experience in the exploration and mining industry and is a professional geoscientist in British Columbia (Engineers and Geoscientists BC), Canada. Her wide range of experience includes grassroots exploration programs to feasibility-stage studies and work in operating mines. Susan



started Lions Gate Geological Consulting Inc. (LGGC) in 2006 with her husband and has completed work for clients around the globe on projects concerning gold, copper, silver, lead, zinc, uranium, and potash. In February 2018, Susan founded the Me Too Mining Association to launch a conversation in the mining industry about sexual assault, sexual harassment, intimidation, and discrimination. MeTooMining recognizes that, to change the culture in mining, men also need to be welcomed and actively engaged in the conversation.

Cam McCuaig graduated with honours in geology energy and fuel science from Lakehead University, then obtained a Ph.D. degree in geology from the University of Saskatchewan. He enjoyed 10 years with SRK Consulting, becoming a director of the Australasian practice. In 2005, he became the inaugural director of the



Centre for Exploration Targeting at the University of Western Australia, leading a team focused on applied research with the minerals industry. In August 2016, Cam joined BHP as a principal geoscientist in their internal Geoscience Centre of Excellence. Cam's career has taken him to 41 countries on six continents, working in a wide variety of mineral systems from Archean to Neogene in age.

INVITED SPEAKERS (cont.)

Quinn R. Passey graduated with honors from Brigham Young University (1978) with a B.S. degree in geology, then obtained M.S. (1979) and Ph.D. (1982) degrees in planetary science and geology from the California Institute of Technology. He worked for ExxonMobil Upstream Research Company until his retirement in April



2015. Quinn has authored numerous publications and taught many short courses on topics ranging from planetary geology to meteoroid breakup, Earth-crossing asteroids, isostatic rebound, and various aspects of petrophysics. He was the recipient of the 2011 Society of Petrophysicists and Well Log Analysts Distinguished Technical Achievement Award, 2011 American Association of Petroleum Geologists (AAPG) Energy Minerals Division Best Paper, 2012 AAPG Distinguished Lecturer for Europe, and 2015 AAPG Robert R. Berg Outstanding Research Award.

José (Pepe) Perelló completed his undergraduate studies at the Universidad de Chile and his graduate studies at Queen's University. Pepe has 36 years of experience in exploration in over 40 countries, beginning at the Escondida project as a junior geologist in January 1982. He worked with BHP from 1982 to mid-1999 and



with Antofagasta Minerals from mid-1999 to the present. Pepe has published extensively on the topics of economic geology and copper metallogeny, mainly porphyry and sediment-hosted copper. He has served on the editorial boards for both *Economic Geology* and *Mineralium Deposita*, and as the SEG Regional Vice President of South America. Pepe was awarded the SEG Silver Medal in 2012. He currently works for Antofagasta Minerals as an exploration manager, based in Santiago, Chile.

Caroline Perring was educated at Cambridge University and the Royal School of Mines but has spent most of her career working in the Archean Yilgarn craton of Western Australia. She completed a Ph.D. degree at the University of Western Australia in the field of mesothermal Au mineralization before joining the Commonwealth Scientific and Industrial Research Organisation. Apart from a brief stint as a research fellow at James Cook University, working on Fe oxide Cu-Au deposits, she spent the next 25 years studying magmatic Ni-Cu sulfide mineralization and komatiite volcanism, latterly with Western Mining Corporation and then BHP Billiton Nickel West. Since 2015, she has been a principal geologist with BHP's WA Iron Ore division.



Stéphane Perrouty is an assistant professor of Precambrian geology in the Mineral Exploration Research Center and the Harquail School of Earth Sciences at Laurentian University, Canada. He completed a Ph.D. degree at the University of Toulouse, France, a postdoctoral fellowship at the Institute of Research for the Development, France, and a postdoctoral fellowship at the University of Western Ontario, Canada. He is currently involved in several collaborative research programs, including the AMIRA West African Exploration Initiative, the Natural Sciences and Engineering Research Council of Canada-Canada Mining Innovation Council Exploration Footprints project, and the Canada First Research Excellence Fund Metal Earth project. His research integrates structural geology, mineralogy, litho geochemistry, applied geophysics, and three-dimensional modeling to understand tectonic processes associated with Precambrian ore deposits.



INVITED SPEAKERS (cont.)

François Robert holds a degree in geological engineering from Ecole Polytechnique in Montreal, where he also obtained his M.Sc. (1980) and Ph.D. (1983) degrees in economic geology. This was followed by post-doctoral work at the University of Michigan (1984). He joined the Geo-



logical Survey of Canada in 1985 as a research scientist with the Mineral Deposits Division. In 1997, he joined Barrick Gold Corporation, where he occupied various positions in Canada, Australia, and South America. He is currently vice president and chief geologist for global exploration. François has published numerous papers in scientific journals and served on several committees of scientific organizations. He was president of SEG in 2015 and has been the recipient of the SEG Ralph W. Marsden Award, Silver Medal, and Waldemar Lindgren Award.

David Selley is an explorer and researcher with expertise in structural geology and basin analysis. He has experience in a diverse range of commodity types and deposit styles, including orogenic Au, magmatic-hydrothermal Cu-Mo-Au, IOCG, magmatic Ni-Cu sulfide, and VHMS, but his passion lies with sediment-hosted

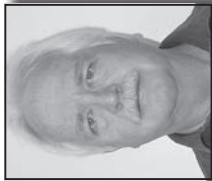


ore systems. Over the past 25 years, David has worked on potash, U, SEDEX Pb-Zn, and sediment-hosted Cu systems across four continents. The highlight of his career has been his work on the Central African Copperbelt, the world's premier sediment-hosted Cu province. The province boasts superb datasets, generated over nearly 100 years of systematic exploration and mining. Due to the scale and complexity of the mineralizing system, each new discovery emphasizes the need to continually develop and refine our exploration models.

Adam Simon earned his B.S. degree from the University of Maryland, his M.S. degree from Stony Brook University, and his Ph.D. degree in geology from the University of Maryland. He was a postdoctoral fellow at Johns Hopkins University for two years, where he investigated the formation of volcanic rocks in the Dry Valleys of Antarctica. Adam then spent seven years as a faculty member of the University of Nevada Las Vegas. In 2012 he joined the faculty of the University of Michigan, where he is currently a professor of geology. Adam's research combines field, analytical, and experimental work designed to unravel the genesis of mineral systems. Adam co-authored the textbook *Mineral Resources, Economics and the Environment* and has published 50 papers in the mineral resource field.



Ralph J. Stegen is vice president of mine site exploration for Freeport-McMoRan based in Tucson, Arizona. He is responsible for exploration and resource modeling functions at Freeport's operating and closed properties in North and South America. Prior to this role, he was chief geologist at Morenci and Tyrone



for Phelps Dodge and previously worked on various base and precious metal exploration programs in Utah, Colorado, Nevada, and New Mexico.

INVITED SPEAKERS (cont.)

Carlos Vargas is an exploration geologist with over eight years of experience in mineral exploration and ore deposit research, with expertise in orogenic Au and Au skarn deposits in West and Central Africa and Ag-Pb-Zn (Au) epithermal, porphyry, and Carlin deposits in North, Central, and South America. His work has ranged from detailed deposit analysis to near-mine and regional greenfield analysis as well as craton-scale studies in over 10 different countries. Carlos has extensive experience in the integration of structural geology with alteration, lithological, geochemical, and geophysical datasets to define the 3D geometry and geologic control of ore deposits. He holds a B.Sc. degree from the Universidad de Costa Rica and a master's degree in mining and mineral exploration from the New Mexico Institute of Mining and Technology.



John Walsh was a co-founder of the Fault Analysis Group at the University of Liverpool in 1985 and oversaw its relocation to University College Dublin (UCD) in 2000. Currently, he is a professor of structural geology at UCD and co-principal investigator and founding director of the Irish Centre for Research in Applied Geosciences. His group has conducted basic research on all aspects of faults and fractures and applied their results to practical problems within several industries. John has published more than 150 scientific papers and received a selection of awards for his work, including an Honorary Fellowship (2015) and the William Smith Medal (2017) from the Geological Society of London, and the Royal Irish Academy Gold Medal for Environmental Sciences and Geosciences (2018).





Marina Yudovskaya is a researcher at the Institute of Geology of Ore Deposits, Mineralogy, Petrography and Geochemistry, Russian Academy of Sciences, in Moscow, Russia. She graduated from Lomonosov Moscow State University with a Ph.D. in geology of ore deposits. Her earlier research interests centered on orogenic gold deposits in black shales, metal transport in volcanic fluids, Cu-Ni-PGE magmatic sulfides, and nontraditional PGE sources. Since 2007, Marina has been involved in various projects focusing on the different aspects of PGE mineralization in the Bushveld Complex as a postdoc and a visiting researcher at the University of the Witwatersrand (Johannesburg, South Africa).

Post-Conference Program

Post-Conference Field Trips

Paradox Basin Fluids and Colorado Plateau Copper, Uranium, and Vanadium Deposits **September 25-28**

Leaders: Isabel Barton, Mark Barton, Jon P. Thorson

Colorado Porphyry-Molybdenum Deposits and Leadville District **September 26-28**

Leaders: Eric Seedorff, Ralph Stegen, Tommy Thompson

Post-Conference Workshops

Exploration Geochemistry: From Fundamentals to the Field **September 26-27**

Presenter: Peter Winterburn

Cu-Mo Porphyry Deposits: Multiscale Approach from Magmas to Minerals **September 26-27**

Presenters: John Dilles, Kalin Kouzmanov

Posters

Posters will be on display during regular conference hours on the ground level of the venue in the Columbine Ballroom.

Titles and authors of posters are listed below. Posters for which the senior author is a student can be identified by an asterisk (*) following the poster title.

For schedule updates, please go to www.seg2018.org.

Base Metals: Cu, Zn, Ni, Pb

- P.001 **Linking Structural and Stratigraphic Controls on Cu-Ag Mineralization at the Zone 5 Deposit in the Kalahari Cu Belt, Botswana**
Clemens Augenstein, Catherine Knight, David J. Catterall, David Martin, Wesley S. Hall, Batanani Muyoba, Oarabile Disang, Murray W. Hitzman, Stephen M. Enders
- P.002 **Impacts of Cation Substitution on the Geometallurgical Response of Sphalerite from Low-Grade Ores: An Experimental Perspective***
Lebogang Babedi, Bjorn von der Heyden, Margreth Tadie
- P.003 **Introduction to Paleozoic Metallogeny of Mongolia**
Delgertsogt Baljinnyam, Bat-Ireedui Yandag
- P.004 **Characterization of Sericitic Alteration at the Taca Taca Bajo Porphyry Cu Deposit, Argentina**
Sebastian B. Benavides
- P.005 **The Correlation Between the Contents of Cu, Pb, Fe, Zn, and Sb with S in Sulfide Partial Melts at 600°C***
Govindarao Boddepalli, Kamal L. Pruseth, Biswajit Mishra

- P.006 **Zircon U-Pb and Molybdenite Re-Os Age Constraints on Formation of the Malmyzh Porphyry Cu-Au Deposit, Far East of Russia**
Daria S. Bukhanova, Gregory Collins
- P.007 **Evidence for Rapid Multistage Construction of the Spence Porphyry Copper Deposit, Northern Chile: Implications for Mineralization***
Edward G. Bunker, Jon Blundy, Simon Tapster, Frances Cooper
- P.008 **Zn-Pb Exploration in the Lismore Block, County Waterford, Ireland: Preliminary Data***
Amedeo Cauceglia, Nicola Mondillo, Maria Boni
- P.009 **Identification of the Anomaly Component Using BEMD Combined with PCA from Element Concentrations in the Tengchong Sn-Pb-Zn Polymetallic Belt, SW China**
Yongqing Chen, Lina Zhang, Binbin Zhao
- P.010 **Syn- to Postmineralization Structural Dismemberment of the Olympic Dam Fe-Cu-U-Au-Ag Deposit, Gawler Craton**
Jesse M. Clark, Nicholas Poznik, Kathy Ehrig, Alex Cherry, Jocelyn McPhie, Vadim S. Kamenetsky
- P.011 **Mineralizing Fluids of the Kamo-a-Kakula Sedimentary Rock-Hosted Copper Deposit, Democratic Republic of Congo***
Sarah E. Clay, Elizabeth C. Turner, Daniel J. Kontak
- P.012 **Zircon Saturation and Ti-in-Zircon Thermometry of Felsic Volcanic Rocks in the Iberian Pyrite Belt: Useful Exploration Tools for Volcanogenic Massive Sulfide Deposits?***
Marta S. Codeço, António Mateus, Jorge Figueiras, Pedro Rodrigues, Luís Gonçalves

- P.013 **The Effects of Amphibolite Facies Metamorphism on the Trace Element Content of Pyrite and Pyrrhotite***
Calvin D. Conn, Paul G. Spry, Alan E. Koenig
- P.014 **Evolution of Host-Rock Diamictite Matrix at the High-Grade Kakula Copper Deposit, Democratic Republic of Congo***
Quinn Dabros, Elizabeth Turner
- P.015 **Exhumation of Granites in the Central Andes: Implications for Porphyry Copper Enrichment and Preservation***
Simon Dahlström, Frances Cooper, Jon Blundy, Simon Tapster, Daniel Condon, Jaime Cortes Yañez, Matthijs van Soest
- P.016 **Sources, Styles, and Scales of Sedimentary-Hosted Copper Mineralization: Evidence from the Zambian and Kalahari Copper Belts***
James Davey, Stephen Roberts, Jamie Wilkinson, Thomas Gernon
- P.018 **Ore Petrography of the World-Class Cerro Lindo Volcanic-Hosted Massive Sulfide Deposit, Perú**
Thomas Dols, Thomas Monecke
- P.019 **An Assessment of Metal Release Potential During the Mining of SMS Deposits from the Central Indian Ridge**
Emily Fallon
- P.020 **Contrasting Igneous-Related Hydrothermal Systems of the Laramide Porphyry Cu Province, Tucson Mountains, Arizona***
Roy Greig, Mark Barton, Isabel Barton
- P.022 **Re-Os and U-Th-Pb Age Constraints on Host Rocks and Mineralizing Events in the Kalahari Copperbelt, Botswana**
Wesley S. Hall, Holly J. Stein, Andrew R. Kylander-Clark, Catherine Knight, Yvette D. Kuiper, M. Stephen Enders, Murray W. Hitzman

- P.023 **New Insights into Zircon Fertility Indicators for Porphyry Copper Deposits: Deciphering the Adakitic Signatures in Patagonia***
Gonzalo J. Henriquez, Robert R. Loucks, Marco L. Fiorentini, Charlotte M. Allen
- P.024 **A Genetic Link Between Late Cretaceous Granitic Magmatism and Sn Mineralization in the SW South China Block: A Case Study of the Dulong Sn-Dominant Polymetallic Deposit**
Lin Hou, Zhenyu Zhao, Shusheng Liu, Qiming Zhang, Songyang Wu
- P.025 **Interaction Between Hydrocarbon Fluids and Host Rocks/Evaporite in the Jinding World-Class Zn-Pb Deposit: Implication for Ore Genesis***
Shiqiang Huang, Yucai Song, David Leach, Zengqian Hou
- P.026 **Carboniferous-Early Permian Pb-Zn-Ag Skarn and Au-Cu Skarn-Porphyry Deposits in Chillagoe, North Queensland, Australia, and Their Implications to Geodynamic Evolution***
Peter E. Illig, Zhaoshan Chang, Jeff Benowitz
- P.027 **Petrogenesis of Volcanic Assemblages Hosting the Flambeau Cu-Zn Massive Sulfide Deposit, Northwestern Wisconsin, USA***
Regan E. Jacobson, Robert W. Lodge, Zachary A. Zens
- P.028 **Trace Elements in Cu-Fe Sulfides from the Mantoverde IOCG Deposit, Northern Chile***
Cinthia Johansson, Fernando Barra, Martin Reich, Artur Deditius, Adam Simon, Paula Rojas
- P.029 **The Origin of Inclusions in the Contact Sublayer of the Sudbury Igneous Complex, Ontario, Canada**
Taus R. C. Jørgensen, Douglas K. Tinkham, C. Michael Lesher

P.030 U-Pb Zircon Geochronology and Geochemistry of Volcanic Rocks in the Deguisier Formation, Abitibi Greenstone Belt, Quebec: Implications for Gold and VMS Mineralization

Taus R. C. Jørgensen, Harold L. Gibson, Michael A. Hamilton

P.031 Apatite as a Tool for Quantifying the Magmatic Volatile Budget of Arc Magmas*

Lillian Kendall-Langley, Anthony Kemp, Steffen Hagemann

P.032 Zircon from the Granite Mountain Batholith, a Host of the Gibraltar Porphyry Cu-Mo Deposit, in the Canadian Cordillera*

Christopher H. Kobylinski, Keiko Hattori, Alain Plouffe, Scott Smith



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- P.033 **Trace Element Chemistry, Polytypes, Isotopic Composition, and Re-Os Ages of Molybdenite from the Bingham Canyon Cu-Au-Mo Porphyry Deposit, Utah**
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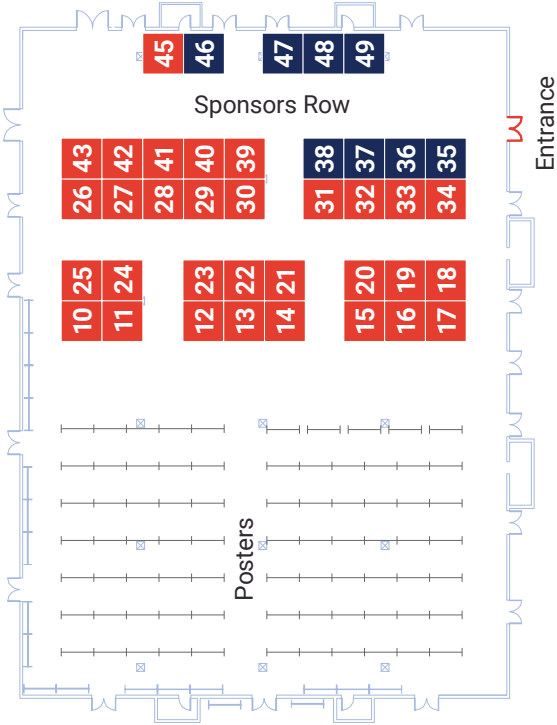
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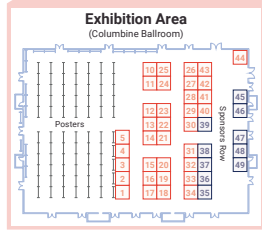
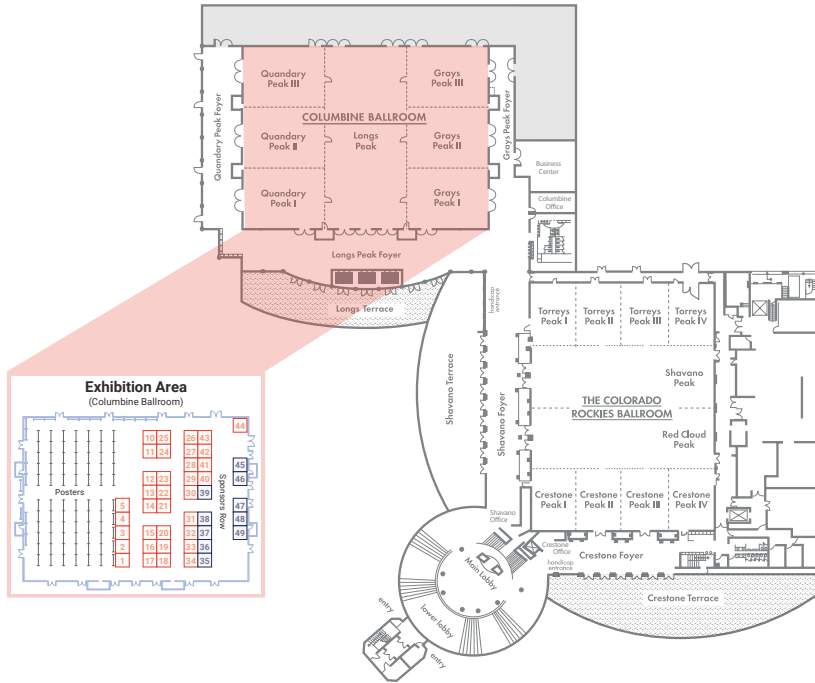
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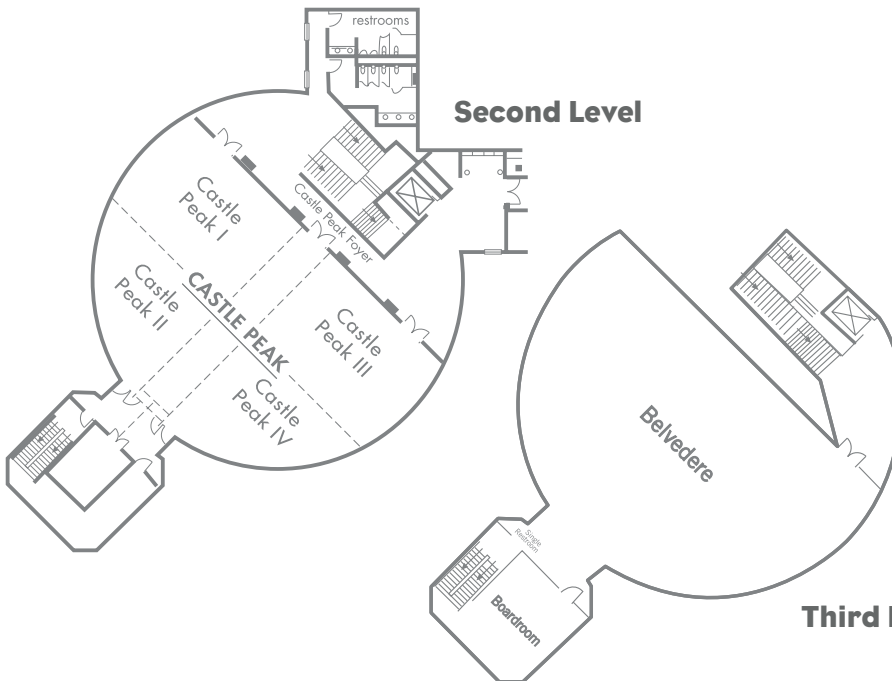
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