



# SEG 100 Conference

Celebrating a Century of Discovery

Whistler, BC, Canada • September 14-17, 2021 • [seg100.org](http://seg100.org)



A woman wearing a blue jacket, a red safety vest with reflective yellow-green stripes, a brown cap, and sunglasses is working on a rocky, uneven terrain. She is using a tool to examine a rock face. The background shows a steep, rocky hillside under a cloudy sky.

RioTinto

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For 140 years, we've been discovering safer, more effective and more sustainable ways to find mines and process the minerals and metals essential for everyday life.

Exploring eight commodities across 18 countries.



**All Technical Sessions, Listed Below, are Virtual and Available Online to Conference Attendees**

Times are PDT, Whistler

**\*In person events**

For additional events, see p. 7 and seg100.org

**TUESDAY**

8:00am-8:30am

**\*Welcome Remarks**

Gerry Carlson, Conference Chair  
Ballroom A, Whistler Conference Centre

8:30am-9:15am

**\*Presidential Address**

Moira Smith  
Exhibit Hall, Whistler Conference Centre

9:30am-10:30am

**Plenary Sessions:**

- Exploration and Mining-A World of Change
- Early Ore Deposit Observations and Advances by Waldemar Lindgren-A Rock-Solid Foundation for Our Society

10:45am-12:30pm

SESSION 1:

**Game Changers-The First 100 Years**

SESSION 2:

**Lindgren's Legacy-Ore Deposits in Depth**

**Q&A**

1:30pm-3:15pm

SESSION 3:

**Game Changers**

SESSION 4:

**Lindgren's Legacy**

**Q&A**

3:30pm-4:30pm

**The MASH Zone:**

Economic Geology and Big Ideas

**Speed Talk Q&A Sessions on**

Spatial Chat 7:00am - 8:00am and 12:30pm - 1:30pm on Tuesday, Wednesday, Thursday, and Friday.

**WEDNESDAY**

8:00am-8:30am

**Plenary Session:**

Gold 2020s: Golden Past, Precious Future

8:45am-10:30am

Session 5:

**Basins Through Time**

SESSION 6:

**Gold 2020s**

**Q&A**

10:45am-12:30pm

SESSION 7:

**Basins Through Time**

SESSION 8:

**Gold 2020s**

**Q&A**

1:30pm-3:15pm

SESSION 9:

**Basins Through Time**

SESSION 10:

**Gold 2020s**

**Q&A**

3:30pm-4:30pm

**The MASH Zone:**

Economic Geology and Exploration-  
Personal Perspectives

**THURSDAY**

8:00-8:30am

**Plenary Session:**

Tectonomagmatism (Tribute to J.P. Richards)

8:45am-10:30am

SESSION 11:

**Ore Deposit Structure**

SESSION 12:

**Tectonomagmatism**

**Q&A**

10:45am-12:30pm

SESSION 13:

**Ore Deposit Structure**

SESSION 14:

**Tectonomagmatism**

**Q&A**

1:30pm-3:15pm

SESSION 15:

**Ore Deposit Structure**

SESSION 16:

**Tectonomagmatism**

**Q&A**

3:30pm-4:30pm

**The MASH Zone:**

Economic Geology and Big Ideas

**FRIDAY**

8:00am-9:00am

**Plenary Sessions:**

- Global Exploration Trends
- Five Myths of Data Science for Exploration

9:15am-10:30am

SESSION 17:

**Beyond 2021: The Digital Age**

SESSION 18:

**SEG 100: Past Perspectives, Future Vision**

**Q&A**

10:45am-12:30pm

SESSION 19:

**Beyond 2021: Circular Economy and Critical Metals**

SESSION 20:

**Diversity in Ore Deposits**

**Q&A**

1:30pm-3:15pm

SESSION 21:

**Beyond 2021: Our Resources, Our People, Our Future**

SESSION 22:

**Diversity in Ore Deposits**

**Q&A**

3:30pm-4:30pm

**The MASH Zone:**

Wrap Up and Conference Closing Plenary

4:30pm-5:20pm

**SEG Awards and Closing**

**Conference Hotel**

Delta Hotels Whistler Village Suites  
4308 Main Street | Whistler, BC V6G 1B4  
Phone: (604) 905-3987

**Registration**

Grand Foyer, Upper Level, Whistler Conference Centre

Monday	2:00pm-8:00pm
Tuesday	7:00am-3:30pm
Wednesday	7:30am-3:30pm
Thursday	7:30am-3:30pm
Friday	7:30am-3:30pm



Whistler wifi access is available: go to Whistler Conference Center (no password required)

## ***Welcome to the SEG 100 Conference: Celebrating a Century of Discovery!***

Well, it's finally here, and SEG's first experiment with a hybrid meeting will coincide with its 100<sup>th</sup> Anniversary! This milestone event promises to yield an unprecedented program that includes a stellar mix of keynote and invited speakers, with technical session talks based on abstracts submitted under our eight key themes. On top of that, over 238 speed talks will be available on demand to registrants throughout the conference and beyond. The meeting also includes an important focus on Student/Early Career Professionals.

There is also a live component, and we hope you can attend in person to celebrate with us in Whistler. This is an excellent opportunity to reconnect with colleagues, as it will be the first in-person meeting for most of us in a long time. For those who are unable to travel, we provide a seamless integration between the virtual and in-person components, with an emphasis on the virtual technical program. We know there will be hiccups and we ask you to be patient and enjoy the journey. As SEG continues to expand globally, the virtual aspect will be an important part of future activities to make SEG's exceptional technical content available to a growing global community of economic geologists.

This year's conference theme reflects an important crossroads. Looking back, we celebrate the achievements of those innovators who developed our science and technology and applaud the successes they attained. But mostly, we will celebrate our current achievements and look to the future as we move into the next century of discovery and the many challenges on the horizon.

So, whether you are online or joining us live in Whistler, we hope you engage with this robust technical program, our centenary celebration, and the wonderful opportunity to make new friends and catch up with old. The SEG 100 program is the result of the hard work of over 40 Organizing Committee members. The technical program team, headed by Tim Baker and Murray Allan, has done a remarkable job, and Mireille Pelletier and the Student/Early Career Professional Committee have developed an exciting slate of events. If you meet any committee members on the floor or in a chat room, make sure you give them a big thank you.



**Welcome to SEG 100!**

**Gerry Carlson and Craig Hart**

*Co-Chairs, SEG 100 Organizing Committee*



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<b>Back Cover</b>	SEG 2022 Announcement

## Conference Information

### Conference Organizing Committee

- **Conference Chairs:** Gerry Carlson and Craig Hart
- **SEG Executive Director:** Brian Hoal
- **Technical Program:** Tim Baker and Murray Allan
- **Speed Talks:** Ally Brown, Betsy Friedlander, and Lucy Hollis
- **Workshops:** Kirstie Simpson and Sam Weatherley
- **Exhibits:** Paola Chadwick and Mike Tucker
- **Early Career Professionals and Students:** Mireille Pelletier, Fabien Rabayrol, Halley Keevil, and Matt Manor
- **The MASH Zone:** John Thompson, Libby Sharman, Jeanne Liu, Benjamin Larenas and Charlie Beard
- **Marketing and Social Media:** Anne Thompson and Deanne Rider

### SEG Contact Information

7811 Shaffer Parkway  
 Littleton, CO 80127-3732  
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 E-mail: [seg@segweb.org](mailto:seg@segweb.org)

### Conference Organizers

Ian Holliday and Brittany Minskip,  
 Sea to Sky Meeting and Association Management  
 Tel. 1.604.984.6448  
[www.seatoskymeetings.com](http://www.seatoskymeetings.com)  
[www.seatoskyassociations.com](http://www.seatoskyassociations.com)  
 E-mail: [seg100@seatoskymeetings.com](mailto:seg100@seatoskymeetings.com)

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**For updates and latest information,  
 visit [www.seg100.org](http://www.seg100.org).**



## SEG Awardees for 2021

The SEG Award ceremony will be Friday, September 17, at 4:30 pm with Moira Smith, SEG 2021 President, officiating. The event will be virtual, and will be available to watch in person at the Whistler Conference Centre with food and drink. We hope you will join us online for this and the closing remarks for the SEG 100 Conference.

R.A.F. Penrose Gold Medal

**LAWRENCE M. CATHLES, III**

Cornell University, USA

SEG Silver Medal

**ANDREW G. TOMKINS**

Monash University, Australia

SEG Waldemar Lindgren Award

**MARGAUX LE VAILLANT**

The Commonwealth Scientific and Industrial  
Research Organisation (CSIRO), Australia

SEG Ralph W. Marsden Award

**ERICH U. PETERSEN**

University of Utah, USA

Brian J. Skinner Award

**DAVID R. BURROWS**

Vale Exploration, Canada

SEG Distinguished Lecturer

**DAVID R. COOKE**

Centre for Ore Deposit and Earth Sciences (CODES)  
University of Tasmania, Australia

International Exchange Lecturer

**ROSS L. SHERLOCK**

Laurentian University, Canada

SEG Thayer Lindsley Visiting Lecturer

**JULIE V. ROWLAND**

University of Auckland, New Zealand

Regional Vice President Lecturer

**MICHAEL J. ROBERTSON**

MSA Group, South Africa



## Pre-Conference Workshops

(All workshops are virtual; refer to [seg100.org](http://seg100.org) for details)

- **Spectral Exploration and its Future**  
September 7-8  
*Paul Linton, TerraCore; Lori Wickert, Descartes Labs;  
Dave Coulter, Independent Consultant; Dean Riley, Echo Labs*
- **Ancient and Modern Volcanic-Hosted Massive Sulfide (VHMS) Deposits**  
September 7-8  
*Bruce Gemmell, Gemmell Geoscience*
- **Discovery Through Mineralogy: Fundamental Aspects of Alteration Mapping and Spectroscopy**  
September 9-10  
*Anne Thompson, John Thompson, PetraScience Consultants Inc.; Sasha Pontual, Imdex Ltd*
- **How to Thrive in the Mining Industry: Survival Toolbox for Students and Early Career Professionals**  
September 11-12  
*Andy Randell, Below BC; Janice Fingler, Janice Fingler and Associates; Holly Burton, Holly Burton Coaching*
- **Bystander Intervention: Safe, Inclusive, and Respectful Workplaces**  
September 13  
*Susan Lomas and Ali Shahkar, Me Too Mining Association (MTMA)*

## Post-Conference Workshops

(All workshops are virtual; refer to [seg100.org](http://seg100.org) for details)

- **Data Integration and Machine Learning**  
September 20-21  
*June Hill, Jessica Stromberg, Morgan Williams, CSIRO Mineral Resources; Michael Gazley, RSC Mining & Mineral Exploration; Shawn Hood, McLean Trott, Julien Mailloux, Goldspot; Matthew Cracknell, ARC TMVC Research Hub, University of Tasmania*
- **Greenstone Belt Architecture and Metal Endowment of the Superior Craton**  
September 22-23  
*Lucie Mathieu, Université du Québec à Chicoutimi; Taus R.C. Jørgensen, Kate Rubingh, Rasmus Haugaard, Ben Frieman, Zsuzsanna Toth, Chong Ma, Gaetan Launay, Metal Earth Research Associates*

## Social Events

### Welcome Receptions:

Date: Monday, September 13  
Whistler Conference Centre (in person)  
 Time: 7:00pm - midnight  
SEG 100 Icebreaker (Spatial Chat)  
 Time: 5:00pm - 7:00pm

### Irish Night at Black's Pub

Date: Tuesday, September 14  
 Time: 7:00pm - 10:00pm  
 Sponsored by iCrag and the Irish Consul General in Vancouver

### Pub Quiz at Tapley's

Date: Wednesday, September 15  
 Time: 8:00pm - 10:30pm

### Wine Tasting

A tour of the Okanagan (Mark Anthony Group)  
 Date: Thursday, September 16  
 Time: 6:30pm - 8:00pm  
 Cost: US\$32 (registration required)

### SEG 100th Birthday Party

Date: Thursday, September 16  
 Time: 8:00pm - midnight  
 Whistler Conference Centre

## Student and SEG Early Career Professionals (Pre-Conference)

### Saturday-Sunday (Pre-Conference)

**How to Thrive in the Mining Industry: Survival Toolbox for Students and Early Career Professionals**  
 Time: 8:00am-12:00pm  
 (see [seg100.org](http://seg100.org) for details; registration required)

### Monday

**Student Day Course-The Role of Geologists in the Mining Industry: Examples from Planning a Drilling Program**  
 Time: 8:00am-12:00pm  
 FREE (registration required)

**Student-ECP Space**  
 FREE (registration required)

**Networking Event**  
 FREE (registration required)

### Tuesday

**Roundtable Event**  
 FREE (registration required)

For event times and details, visit [seg100.org](http://seg100.org)

# Technical Program

Sessions will be available both to those attending in person and to those viewing online.

## Day 1 – Tuesday, September 14

### Welcome and SEG Presidential Address

*Introduction by Gerry Carlson*

8:00am – 8:30am      **Official Welcome**  
*Gerry Carlson*

8:30am – 9:15am      **Beyond the First Century: SEG in a Changing World**  
*Moira Smith (SEG President)*

### Plenary Session I – Game Changers and Lindgren’s Legacy

*Introductions by Murray Allan and Tim Baker*

9:30am – 10:00am      **Exploration and Mining – A World of Change**  
*John F. Thompson (Keynote Speaker)*

10:00am – 10:30am      **Early Ore Deposit Observations and Advances by Waldemar Lindgren,  
A Rock-Solid Foundation for Our Society**  
*Jean S. Cline (Keynote Speaker)*

**Oral Session 1****Game Changers - The First Hundred Years I***Co-Chairs: Melissa Anderson, Patrick Mercier-Langevin***Oral Session 2****Lindgren's Legacy - Ore Deposits in Depth I***Co-Chairs: Steve Piercey, Ross Sherlock*

10:45am – 11:15am

**Game Changers: The First Hundred Years:  
Analytical Techniques***Dominique Weis (Keynote Speaker)***Large-Scale Multidimensional Mineralization  
Processes: A “Bottom-Up Approach” to  
Predictive Exploration for Tier 1 Deposits**  
*Andrew Wurst (Keynote Speaker)*

11:15am – 11:45am

**The First and Second Opening of Pandora's  
Box – How Re-Os Changed Resource Geology**  
*Holly Stein (Keynote Speaker)***The Earth Model: Using Geologic Data and  
Global Processes to Enable Predictive Exploration**  
*Graeme Nicoll (Keynote Speaker)*

11:45am – 12:00pm

**Changing the Game with Geological Modeling:  
Then and Now**  
*Rebecca Montsion (Invited Speaker)***1:1 Million Map of the Lau Basin: A New Frame-  
work for Geologic Mapping of the Seafloor**  
*Margaret Stewart (Invited Speaker)*

12:00pm – 12:15pm

**Ore Deposit Science: The Emergence of  
Context**  
*Graham C. Begg (Invited Speaker)***A New Model for the Early Crustal Architecture  
of the Archean Abitibi Greenstone Belt, Canada:  
Implications for Gold Mineralization**  
*Kate Rubingh (Invited Speaker)*

12:15pm – 12:30pm

**Q&A****Q&A**

12:30pm - 1:30pm Break

## Day 1 – Tuesday, September 14

## Oral Sessions 3 and 4

**Oral Session 3****Game Changers - The First Hundred Years II***Co-Chairs: Melissa Anderson, Patrick Mercier-Langevin*

1:30pm – 2:00pm

**Game Changers in the Exploration of Submarine Hydrothermal Systems***Mark D. Hannington (Keynote Speaker)***Oral Session 4****Lindgren's Legacy - Ore Deposits in Depth II***Co-Chairs: Ross Sherlock, Andy Wurst*

**The Formation of Iron Oxide Copper-Gold (IOCG) and Iron Oxide-Apatite (IOA) Deposits: New Insights from Field Studies and Lab Experiments**  
*Adam C. Simon (Keynote Speaker)*

2:00pm – 2:15pm

**Porphyry Copper Deposits - from Empirical Models to Mineral Systems***David R. Cooke (Invited Speaker)*

**The Lindgren Classification and Postcollisional Metallogeny: A Case Study from the Western Tethyan Metallogenic Belt**  
*Sabina Strmic Palinkas (Invited Speaker)*

2:15pm – 2:30pm

**The Discovery and Mining of the Olympic Dam Deposit: Impacts on the Optimization of Exploration and Mining/Processing of Complex Ores***Kathy J. Ehrig (Invited Speaker)*

**Redox Controls on Eocene Metallogeny in the Great Basin, U.S.A.: Bridging Porphyry Cu-(Mo-Au) and Reduced Intrusion-Related Au, with Implications for Carlin-Type Deposits**  
*Curtis L. Johnson (Invited Speaker)*

2:30pm - 2:45pm	<p><b>The Role and Development of Government Geological Surveys in making a Difference for Earth Resources Exploration, Discovery and Confident Evidence-based Decisions</b>  <i>Steve Hill (Invited Speaker)</i></p>	<p><b>The Teena Zn-Pb deposit (McArthur Basin, Australia): Carbonate Replacement Sulfide Mineralization During Burial Diagenesis</b>  <i>Joseph M. Magnall (Invited Speaker)</i></p>
2:45pm - 3:00pm	<p><b>Game Changers in Understanding and Exploring for Magmatic Ni-Cu-PGE Deposits</b>  <i>C Michael Lesher</i></p>	<p><b>Unravelling Complex Alteration by Dating Hydrothermal Titanite: Implications for the Use of Geochemical Vectoring Tools in the Propylitic Halos of Porphyry-Type Ore Systems</b>  <i>Lisa Hart-Madigan (Invited Speaker)</i></p>
3:00pm - 3:15pm	<b>Q&amp;A</b>	<b>Q&amp;A</b>
3:30pm - 4:30pm	<p><b>The MASH Zone: Economic Geology and Big Ideas</b>  <i>Moderator: Victoria Sterritt</i>  <i>Panel: Allanah Brett, Simon Jowitt, Jeremy Vaughn</i>  <i>Session Leaders: Libby Sharman, Jeanne Liu</i></p>	



**Day 2 - Wednesday, September 15****Plenary Session II - Gold 2020s - Golden Past, Precious Future***Co-Chairs: Elizabeth Holley, Fabien Rabayrol*

8:00am - 8:30am      **Gold 2020s: Golden Past, Precious Future**  
*Mark Bristow (Keynote Speaker)*

**Day 2 - Wednesday, September 15****Oral Sessions 5 and 6**

**Oral Session 5**  
**Basins Through Time - Linking Process and Ore Systems: Basin-Hosted Ore Systems**

*Co-Chairs: Murray Hitzman, Neil Fernandes*

8:45am - 9:15am      **Global Distribution of Sediment-Hosted Metals Controlled by Steps in Lithospheric Thickness**  
*Fred Richards (Invited Speaker)*

9:15am - 9:30am      **Sequence Stratigraphy in Stratiform Sediment-Hosted Base Metals Exploration: An Example from the ca. 1640 Ma Barney Creek Formation, McArthur Basin, Australia**  
*Marcus Kunzmann (Invited Speaker)*

**Oral Session 6**  
**Gold 2020s - Golden Past, Precious Future: Gold in Canada**

*Co-Chairs: Elizabeth Holley, Fabien Rabayrol*

**Gold Deposits of the Archean Abitibi Greenstone Belt, Canada**  
*Benoît Dubé (Invited Speaker)*

**Metallogeny of the Neoproterozoic Malartic Gold Camp, Abitibi and Pontiac Subprovinces, Canada**  
*Stéphane De Souza (Invited Speaker)*

9:30am - 9:45am	<b>Re-Thinking the Role of Redox in Clastic-Dominant Zn-Pb Deposits</b> <i>Sarah Gleeson (Invited Speaker)</i>	<b>High-Grade Gold Mineralization at the Fenelon Deposit: Going Undercover to Study a Major Discovery in the Abitibi Greenstone Belt</b> <i>Evan Slater</i>
9:45am - 10:00am	<b>Re-Thinking the Role of Redox in Clastic-Dominant Zn-Pb Deposits (Continued)</b>	<b>Postsubduction Porphyry Cu-Au Emplacement During Transtension in Northwestern British Columbia (Canada): The Norm Rather Than the Exception?</b> <i>Bram I. van Straaten</i>
10:00am - 10:15am	<b>Cryptic Alteration Haloes in Sediment-Hosted Ore Deposits: New Tools, New Exploration Vectors, New Genetic Models</b> <i>Shaun L. Barker</i>	<b>The High-grade Gold Ore Paradox of the Brucejack Deposit: Insights from Nanoscale Imaging of Electrum and High-resolution Trace Element and Sulphur Isotope Analyses of Pyrite</b> <i>Duncan F. McLeish (Student)</i>
10:15am - 10:30am	<b>Q&amp;A</b>	<b>Q&amp;A</b>

## Day 2 - Wednesday, September 15

## Oral Sessions 7 and 8

	<b>Oral Session 7</b> <b>Basins Through Time - Linking Process and Ore Systems: Sedimentary Rock-hosted Stratiform Copper Deposits</b> <i>Co-Chairs: Neil Fernandes, Murray Hitzman</i>	<b>Oral Session 8</b> <b>Gold 2020s - Golden Past, Precious Future: Gold Processes</b> <i>Co-Chairs: Rich Goldfarb, Duncan Mcleish</i>
10:45am - 11:15am	<b>Structural controls on geometry, continuity and mineralisation for the Kamao-Kakula deposits of the Western Foreland shelf domain of the Central African Copperbelt</b> <i>George Gilchrist (Keynote Speaker)</i>	<b>Magmatic Origins of Carlin-type Gold Indicated by NanoSIMS Sulfur Isotope and Trace Element Depth Profiling</b> <i>Elizabeth Holley (Keynote Speaker)</i>
11:15am - 11:30am	<b>Metal Sources in the Central Africa Copperbelt: Assessing the Mafic Contribution</b> <i>Daryl E. Blanks</i>	<b>Hydrothermal Alteration Mineralogy, Zoning and Paragenesis at the Low-Sulfidation Epithermal Cerro Blanco Deposit, Guatemala</b> <i>Ekaterina Savinova</i>
11:30am - 11:45am	<b>The Role of Cu- and Co-rich Potassic Brines in Zambian Copperbelt Mineralisation</b> <i>James Davey</i>	<b>Gold and Copper Fertility in Porphyry Systems: Insights from Sulfide Inclusions</b> <i>Ariadni A. Georgatou (Invited Speaker)</i>
11:45am - 12:00pm	<b>Connecting Proterozoic Carbonate-Hosted Zn-Pb-Cu-Ag Mineral Systems Between Two Continents Using Whole-Rock Pb Isotope Geochemistry</b> <i>Neil A. Fernandes</i>	<b>Metallogeny of the Hod Gold Corridor, Eastern Pontides Belt, Turkey: Transitions from VMS to Porphyry-Epithermal Environments</b> <i>Fabien Rabayrol</i>

12:00 pm – 12:15pm **Kodar-Udokan Basin, Siberia (Russia): New Advances in the World-Class Copper District**  
*Alexander Yakubchuk*

**A Focused ca. 120 Ma Granite-hosted Orogenic Gold Mineralization Event in the Jiaodong Peninsula, China**  
*Liang Zhang*

12:15pm – 12:30pm **Q&A**

**Q&A**

12:30pm – 1:30pm **Break**

**Day 2 – Wednesday, September 15**

**Oral Sessions 9 and 10**

**Oral Session 9  
Basins Through Time - Linking Process and Ore Systems: Diversity of sediment-hosted ore systems**

*Co-Chairs: Brian Mahoney, Neil Fernandes*

1:30pm – 1:45pm **Genesis of Polymetallic Hyper-Enriched Black Shale Mineralization in the Northern Canadian Cordillera**  
*Michael G. Gadd (Invited Speaker)*

**Oral Session 10  
Gold 2020s - Golden Past, Precious Future: Global Gold**

*Co-Chairs: Tim Baker, Ariadni Afroditi*

**Assessment of Gold Systems in Brazil: Major Deposits, Camps, and Future Exploration Potential**  
*Lydia M. Lobato (Invited Speaker)*

1:45pm – 2:00pm **Relevance of Hydrocarbon-Water Trace Metal Partitioning and Re-Os Geochronology for Sedimentary-Hosted Ore Deposits and Petroleum Systems**  
*Nicole C. Hurtig*

**The Kibali (KCD) Orogenic Gold Deposit: Gold Without Quartz Veins**  
*Doug MacKenzie (Invited Speaker)*

## Day 2 - Wednesday, September 15

## Oral Sessions 9 and 10

2:00pm - 2:15pm	<b>Mapping the Evolution of Diagenetic Fluids using LA-ICPMS of Carbonate Cements and Implications for Redox-Sensitive Metals</b> <i>Christopher Reed</i>	<b>Obuasi: The World's Largest Precambrian Gold Deposit, Ghana, West Africa</b> <i>Michael J. Nugus (Invited Speaker)</i>
2:15pm - 2:30pm	<b>Banded Iron Formations: Geochemical and Stratigraphic Markers of Ore-Forming Processes?</b> <i>David Diekrup</i>	<b>The Fosterville Gold Deposit, its Geology and Place Amongst the World's Best Orogenic Goldfields</b> <i>Wessley B. Edgar (Invited Speaker)</i>
2:30pm - 2:45pm	<b>Development of World-Class Potash-Bearing Salt Deposits in Large Epicratonic Basins - An Example from the Elk Point Basin, North America</b> <i>Mark D. Cocker</i>	<b>Gold 2020 - Current Understanding and Ongoing Questions</b> <i>Richard J. Goldfarb (Keynote Speaker)</i>
2:45pm - 3:00pm	<b>Why Is the Proterozoic Athabasca Basin Endowed with Rich and Large Unconformity-Related Uranium Deposits?</b> <i>Guoxiang Chi</i>	<b>Gold 2020 - Current Understanding and Ongoing Questions (Continued)</b>
3:00pm - 3:15pm	<b>Q&amp;A</b>	<b>Q&amp;A</b>
3:30pm - 4:30pm	<b>The MASH Zone: Economic Geology and Exploration - Personal Perspectives</b> <i>Introductions: John Thompson</i> <i>Fireside Chats: (1) Ayesha Ahmed, Shawn Hood; (2) Claire Chamberlain, Maggie Layman; (3) Rich Goldfarb, Halley Keevil</i> <i>Reports from the Floor: Neil Fernandes, Lesley Stokes</i> <i>Session Leaders: John Thompson, Benjamin Larenas</i>	

**Day 3 - Thursday, September 16****Plenary Session III****Plenary Session III - Tectonomagmatism and Porphyry-Epithermal Metallogeny***Co-Chairs: Michael Lesher, Rui Wang*

8:00am - 8:30am **Magmatic Controls on Metal Endowments of Porphyry Cu-Au Deposits**  
*Massimo Chiaradia (Keynote Speaker)*

**Day 3 - Thursday, September 16****Oral Sessions 11 and 12**
**Oral Session 11**  
**Ore Deposit Structure - Processes**
*Co-Chairs: Dave Rhys, Chris Siron*

8:45am - 9:00am **Dynamics of Permeability, Flow, and Ore Deposition in Overpressured, Fault-Controlled Hydrothermal Systems: Constraints from Contemporary, High Fluid Flux Faults**  
*Stephen Cox (Invited Speaker)*

9:00am - 9:15am **Dynamics of Permeability, Flow, and Ore Deposition in Overpressured, Fault-Controlled Hydrothermal Systems: Constraints from Contemporary, High Fluid Flux Faults (Continued)**

**Oral Session 12**  
**Tectonomagmatism and Porphyry-Epithermal Metallogeny I**
*Co-Chairs: Michael Lesher, Rui Wang*

**Mesozoic to Cenozoic Metallogenic and Magmatic Evolution of the Lesser Caucasus and the Eastern Pontides**  
*Robert Moritz*

**Regional Magmatic Evolution and Metal Fertility of Igneous Rocks from the Kerman Porphyry Belt, SE Iran: Insights from Whole-Rock and Zircon Geochemistry and Geochronology**  
*Ali Sholeh*



## Day 3 - Thursday, September 16

## Oral Sessions 11 and 12

9:15am - 9:30am	<b>Creation and Destruction of Permeability in the Porphyry Cu Environment</b> <i>Richard M. Tosdal (Invited Speaker)</i>	<b>Using Trace Elements in Zircon to Recognize Variability in Porphyry Magma Fertility Signatures Within and Between Arcs and Arc Settings in British Columbia, Arizona, and Chile</b> <i>Taylor J. Ledoux (Student)</i>
9:30am - 9:45am	<b>Structural Modification of VMS Deposits</b> <i>Bruno Lafrance (Invited Speaker)</i>	<b>Crustal Evolution, Tectonics, and Magma Fertility of the Paleoproterozoic Alta Floresta Mineral Province, Amazonian Craton</b> <i>Veronica Trevisan</i>
9:45am - 10:00am	<b>Synbasin Transform Faults and Their Influence on Late-Stage Orogenic Gold Mineralization: Examples from the Mosquito Creek Basin, Pilbara Craton, Western Australia</b> <i>Anthony A. Morey</i>	<b>Evolution of Metal Endowment in the Porphyry Au-Cu-Mo Deposits of the Long-Lived Sulphurets District, Canada: Implications for Fertile Magma Sources</b> <i>Michelle E. Campbell (Student)</i>
10:00am - 10:15am	<b>Links Between Local Fluid Sinks (orebodies) and Regional Fluid Flow Paths: Formation of Gold-Quartz Reefs of the Barberton Mines, South Africa</b> <i>Caitlin Jones (Student)</i>	<b>CA-TIMS and LA-ICP-MS (zircon) Characterization of Host Volcanic Rock Sequences and Porphyry Intrusions in the Eastern Timok Porphyry Cu-Au District</b> <i>Alan J. Wainwright</i>
10:15am - 10:30am	<b>Q&amp;A</b>	<b>Q&amp;A</b>

**Oral Session 13**  
**Ore Deposit Structure – Patterns**
*Co-Chairs: Sally Goodman, Dave Rhys*

10:45am – 11:00am

**Structural Geology and Hydrothermal Ore Deposits**
*Thomas Blenkinsop (Invited Speaker)*

11:00am – 11:15am

**Structural Geology and Hydrothermal Ore Deposits (Continued)**

11:15am – 11:30am

**Practical Examples of the Role Structures Play in Porphyry and Epithermal Deposit Exploration**
*Stephanie Sykora (Invited Speaker)*

11:30am – 11:45am

**Coincident Fold-Fault-Vein Geometric Patterns at Galore Creek and Sulphurets Cu-Au Districts: Reflections of Cryptic Basin Architecture and Transcrustal Magma Conduits**
*Gayle Febbo (Invited Speaker)*
**Oral Session 14**  
**Tectonomagmatism and Porphyry-Epithermal Metallogeny II**
*Co-Chairs: Jeff Hedenquist, Ali Sholeh*
**The Onto Cu-Au Discovery, Eastern Sumbawa, Indonesia: A World-Class Middle Pleistocene Lithocap-Hosted Covellite-Pyrite Deposit** (ends 11:00am)  
*David Burrows*
**Porphyry Deposits May Not Require a Unique Melt**  
*Ijaz Ahmad (Student)*
**Epithermal Alteration in the Yellowstone Hydrothermal System, Wyoming, USA**
*Peter B. Larson*
**Crystal Mush Dikes as Conduits for Porphyry Copper Deposit-Forming Fluids**
*Lawrence C. Carter (Student)*

## Day 3 - Thursday, September 16

## Oral Sessions 13 and 14

11:45am - 12:00pm	<b>Regional to Licence-Scale Structural Controls Derived from Structural Mapping, Geophysical Analysis, and 3D Modeling of New Luika Gold Mine, Lupa Terrane, SW Tanzania</b> <i>Corné Koegelenberg</i>	<b>Multiple Formation Environments of Advanced Argillic Alteration and Exploration Implications</b> <i>Antonio Arribas</i>
12:00pm - 12:15pm	<b>Patterns of Gold Distribution, Pure Gold Mine, Red Lake Greenstone Belt, Ontario</b> <i>Darcy Baker</i>	<b>Evolution of a Laramide Porphyry Cu Cluster Near Tucson, Arizona</b> <i>Roy Greig (Student)</i>
12:15pm - 12:30pm	<b>Q&amp;A</b>	<b>Q&amp;A</b>
12:30pm - 1:30pm	<b>Break</b>	

	Oral Session 15 Ore Deposit Structure – Innovations	Oral Session 16 Tectonomagmatism and Porphyry-Epithermal Metallogeny III
	<i>Co-Chairs: Chris Siron, Sally Goodman</i>	<i>Co-Chairs: David Cooke, Elizabeth Ronacher</i>
1:30pm – 1:45pm	<b>Application of Alteration Facies and Infrared Spectroscopy (IRS) in Structural Geology Analyses</b> <i>Anna Fonseca (Invited Speaker)</i>	<b>The Late Miocene Middle Cauca Au-Cu Porphyry/Epithermal Belt, NW Colombia: Tectonomagmatic History and Controls on Mineralization</b> <i>Hildebrando Leal-Mejia</i>
1:45pm – 2:00pm	<b>Application of Alteration Facies and Infrared Spectroscopy (IRS) in Structural Geology Analyses (Continued)</b>	<b>PGE Chemistry and Magma Fertility of El Teniente Porphyry Copper Deposit, Central Chile</b> <i>Yamila Cajal (Student)</i>
2:00pm – 2:15pm	<b>Structural Modeling in 2D and 3D and with Time (4D) for Mineral Exploration and Mine Development</b> <i>Armelle Kloppenburg (Invited Speaker)</i>	<b>Lithospheric Architecture of the Central Andes and the Localization of Giant Porphyry Copper Deposits</b> <i>Alex Farrar</i>
2:15pm – 2:30pm	<b>Automated Core Imaging: Opportunities for Integrating Hyperspectral Mineralogy and Structural Orientation Data for More Robust Structural Interpretations</b> <i>Cassady L. Harraden</i>	<b>Sulfide Saturation in Thick Arc Crust Plays No Role for Porphyry Cu Deposit Formation</b> <i>Rui Wang</i>

## Day 3 - Thursday, September 16

## Oral Sessions 15 and 16

2:30pm - 2:45pm	<b>3D Structural Modeling Using Oriented Drill Core: A Best-Practice Case Study from the Ormaque Discovery, Val-d'Or Mining Camp, Québec</b> <i>Sean McKinley</i>	<b>Distinctive Chemical Characteristics and Petrogenesis of Gold-Ore-Forming Arc Magmas</b> <i>Robert Loucks</i>
2:45pm - 3:00pm	<b>Stress-Strain Modeling as Part of a Mineral Systems Approach to IOCG Exploration and Target Generation: A Case Study from the Mt. Woods Inlier, Gawler Craton, South Australia</b> <i>Jonathan N. Gloyn-Jones</i>	<b>Promising Fertility Indicators of Magmatic Systems: An Integrated Study of Zircon Geochemistry and Multilayer Perception</b> <i>Si-Yuan Li (Student)</i>
3:00pm - 3:15pm	<b>Q&amp;A</b>	<b>Q&amp;A</b>
3:30pm - 4:30pm	<b>The MASH Zone: Economic Geology and Big Ideas</b> <i>Moderators: Brit Bluemel, Steve Piercey</i> <i>Session Leaders: Charlie Beard, John Thompson, Benjamin Larenas, Jeanne Liu</i>	

**Day 4 - Friday, September 17****Plenary Session IV****Plenary Session IV - Global Exploration Trends (Rio Tinto Plenary) and Beyond 2021 - The Next Hundred Years***Co-Chairs: Moira Smith, Francisco I. de Azevedo, Jr.*

8:00am - 8:30am **Global Exploration Trends**  
*Sinead Kaufman (Keynote Speaker)*

8:30am - 9:00am **Five Myths of Data Science for Exploration**  
*Kurt House (Keynote Speaker)*

**Day 4 - Friday, September 17****Oral Sessions 17 and 18**

**Oral Session 17**  
**Beyond 2021: The Digital Age: Towards  
Data-Driven Discovery and Value Creation**

*Co-Chairs: Chad Hewson, Anna Kutkiewicz*

9:15am - 9:30am **What Can Machine Learning Do for Me? Improved Targeting, 3D Modelling, and Resource Estimation: A Case Study from the Castelo de Sonhos Paleoplacer Gold Deposit, Brazil**  
*Britt Bluemel*

9:30am - 9:45am **Direct Discovery of Buried Mineralization through Microbial Community Fingerprinting**  
*Bianca P. Iulianella Phillips (Student)*

**Oral Session 18**  
**SEG100 - Past Perspectives, Future Vision**

*Chair: Anne Thompson*

**Fireside Chat - Legends of Economic Geology (ends 9:40am)**  
*Anne Thompson and Russell Mearns*

**The Presidents' Panel (9:40am - 10:30am)**  
*Moira Smith, Richard Sillitoe, Judith Kinnaird, Lluís Fontboté (moderated by Anne Thompson)*



## Day 4 – Friday, September 17

## Oral Sessions 17 and 18

9:45am – 10:00am	<b>Performance of Predictive Supervised Classification Models of Trace Elements in Magnetite for Mineral Exploration</b> <i>Émilie Bédard</i>	The Presidents' Panel (Continued until 10:30am)
10:00am – 10:15am	<b>Machine Learning in Earth Science Is Hard; Now What?</b> <i>Matt Hall (Invited Speaker)</i>	The Presidents' Panel (Continued until 10:30am)
10:15am – 10:30am		Q&A

## Day 4 – Friday, September 17

## Oral Sessions 19 and 20

	<b>Oral Session 19</b> <b>Beyond 2021: Circular Economy and Critical Metals</b> <i>Co-Chairs: Britt Bluemel, Samuel Cantor</i>	<b>Oral Session 20</b> <b>Diversity in Ore Deposits I</b> <i>Co-Chairs: Naomi Welt, Halley Keevil</i>
10:45am – 11:00am	<b>Metals Fuel the Circular Economy: Process Metallurgy a Key Enabler (ends 11:15am)</b> <i>Markus Reuter (Keynote Speaker)</i>	<b>Crustal Architecture of a World-Class Mineral District: Transcrustal Upflow Zones and Metal Endowment</b> <i>Taus R. Jørgensen</i>
11:00am – 11:15am	<b>Metals Fuel the Circular Economy: Process Metallurgy a Key Enabler (Continued)</b>	<b>Geochemical Signatures of Felsic Rocks in Modern Intraoceanic Settings and Implications for Archean Greenstone Belts</b> <i>Marc L. Fassbender (Student)</i>

11:15am - 11:30am	<b>The Critical Mineral Supply Chain: Evolution and Revolution as New Battery Technologies Emerge</b> <i>Edith Newton Wilson</i>	<b>Genesis and Oxygen Isotope Signature of Hematite and Magnetite from Magmatic-Hydrothermal BIF-hosted Iron Ore</b> <i>Flávia C. Silveira Braga</i>
11:30am - 11:45am	<b>Waste as a Resource: Seeking Critical Minerals and Other Commodities in Mine Waste and Reducing Environmental Footprints at Legacy and Modern Mines</b> <i>Robert R. Seal</i>	<b>A Tale of Two Magnetites: An LA-ICP-MS Study of Massive and Disseminated Magnetite from the Bushveld Igneous Complex, South Africa</b> <i>Daryll Bien C. Concepcion (Student)</i>
11:45am - 12:00 pm	<b>Economic Geology and Geomet for Ocean Resources: Sustainable Seafloor Metals</b> <i>Nicholas R. Mitchell (Student)</i>	<b>Titanium Isotopes in Magnetite as Tracers of Ore-Forming Processes in Iron Oxide Apatite (IOA) and Iron Oxide Copper Gold (IOCG) Systems</b> <i>Christopher Emproto (Student)</i>
12:00 pm - 12:15 pm	<b>Controls on Rare Metal Concentration in the Crust: Implications for Future Exploration</b> <i>Anthony E. Williams-Jones (Invited Speaker)</i>	<b>The El Alacrán Cu-Au Deposit: A Hybrid Iron Oxide-Copper-Gold and Carbonate-Replacement Deposit in the Colombian Andes</b> <i>Julian Manco (Student)</i>
12:15 pm - 12:30pm	<b>Q&amp;A</b>	<b>Q&amp;A</b>
12:30 pm - 1:30pm	<b>Break</b>	

## Day 4 - Friday, September 17

## Oral Sessions 21 and 22

	Oral Session 21 <b>Beyond 2021: Our Resources, Our People, Our Future</b> <i>Co-Chairs: Britt Bluemel, Mireille Pelletier</i>	Oral Session 22 <b>Diversity in Ore Deposits II</b> <i>Co-Chairs: Julian Manco, Matthew Manor</i>
1:30 pm - 2:00 pm	<b>Developing Capable Technical Professionals to Support the Future Resource Industry</b> <i>Joanne Heyes (Keynote Speaker)</i>	<b>Fluid Inclusions and Origin of Carlin-style Mineralization at the Cove Deposit, Nevada (ends 1:45pm)</b> <i>Sarah R. Shapley (Student)</i>
1:45 pm - 2:00 pm	<b>Developing Capable Technical Professionals to Support the Future Resource Industry (Continued)</b>	<b>The Vergenoeg Strato-Volcano - IOCG-like Mineralization Associated with Felsic Magmatism in the Bushveld Magmatic Province, South Africa</b> <i>Laurence Robb</i>
2:00 pm - 2:15 pm	<b>Accelerating Innovations in Subsurface Modeling and Analysis: The Human Factor</b> <i>Adam Pidlisecky (Invited Speaker)</i>	<b>Tungsten Mineralization in the Eastern Alps - Tracking Ore-Forming Processes Using Scheelite Trace Element Chemistry and Micro-textures</b> <i>Florian Altenberger (Student)</i>
2:15 pm - 2:30 pm	<b>New Developments: In-Field Measurements and Analyses</b> <i>James Cleverley (Invited Speaker)</i>	<b>Characterization of Polymetallic Vein-Type Occurrences in the Meguma Terrane: A Lesser-Known Gold Deposit Type for Nova Scotia?</b> <i>Naomi Welt (Student)</i>

2:30 pm – 2:45 pm **The Mining Map of the Future**  
*Michel Jebrak*

**Remote Sensing-based Mapping of Zn-Pb-Carbonate Hosted Ore Deposits Using Sentinel-2 and PRISMA Satellite Imagery: The Jabali Test Site (Western Yemen)**  
*Rita Chirico (Student)*

2:45 pm – 3:00 pm **Inserting Orebody Knowledge into Resource Definition**  
*Jelena Puzic (Invited Speaker)*

**Petro-Geochemical Characterization Of Supergene Copper Mineralization In Atacama Desert (Northern Chile): U-Pb Chronometric Potential And Formation Conditions**  
*Steven Kahou (Student)*

3:00pm –3:15pm **Q&A**

**Q&A**

3:30pm - 4:30pm **The MASH Zone: Conference Closing**  
*Moderator: Sarah Gordon*  
*Panel: Murray Allan, Steve Barnes, Jocelyn Fraser, Anita Parbhaker-Fox*  
*Session Leaders: Jeanne Liu, John Thompson*

4:30 pm - 5:20 pm **Conference Awards and Closing**



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## INVITED/KEYNOTE SPEAKERS



**Graham Begg** has over 30 years of experience in the mining and minerals exploration sector and a Ph.D. degree in tectonics and epithermal deposit geology. Since 2002 he has spearheaded collaborative research at Macquarie University, aimed at systematic multidisciplinary mapping of the architecture and geodynamic evolution of the continental lithospheric mantle and crust, with the aim to facilitate a breakthrough in greenfields exploration discovery. The outputs contribute toward the commercial Global Lithospheric Architecture Mapping (GLAM) product, a framework for area selection in the resource sector marketed by his consultancy, Minerals Targeting International (MTI).

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**Thomas Blenkinsop** is a professor at the School of Earth and Ocean Sciences, Cardiff University. His expertise is the application of structural geology to the study of natural resources. He is interested in faulting, fluid flow, and the formation of mineral deposits and structural controls on mineralization at all scales. Tom graduated from Oxford University and completed an M.Sc. degree at Imperial College before undertaking his doctorate at Keele University. He did postdoctoral research on the San Andreas fault at the University of California, Santa Barbara, and was a professor at the University of Zimbabwe and then at James Cook University in Australia, where he was also director of the Economic Geology Research Unit. He has published over 150 papers and one textbook.



## INVITED/KEYNOTE SPEAKERS *(cont.)*



**Mark Bristow, Ph.D.**, serves as President, Chief Executive Officer, and Director of Barrick Gold Corporation since his appointment in January 2019. Previously, Dr. Bristow was the chief executive officer of Randgold from its inception in 1995, following his pioneering exploration work in West Africa. He subsequently led Randgold's growth through the discovery and development of high-quality assets into a major international gold mining business. Mr. Bristow played a pivotal role in promoting the emergence of a sustainable mining industry in Africa and has a proven track record of delivering significant shareholder value. During his career, he has held board positions at a number of global gold mining companies. Dr. Bristow holds a doctorate in geology from the University of KwaZulu-Natal in South Africa.

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**Massimo Chiaradia** is senior lecturer at the Department of Earth Sciences of the University of Geneva (Switzerland). He obtained his M.Sc. degree at the University of Padova (Italy) and a Ph.D. from the University of Fribourg (Switzerland). His research focuses on the petrogenesis of arc magmas with implications for continental crust formation and the relationship between magma chemistry, dynamics of subduction zones and the formation of porphyry-type deposits. To carry out his research Massimo combines fieldwork with various analytical techniques including petrography and ore microscopy, mineral and rock geochemistry, light and heavy stable isotopes, radiogenic isotopes, and high-precision radiometric dating.



**James Cleverley** is the UK-based Global Product Manager at ASX-listed Imdex Limited, a leading METS company providing software and technology for the minerals industry under its REFLEX and AMC brands. James completed his Ph.D. degree in hydrothermal geochemistry at University of Leeds before moving to Australia as a postdoc at James Cook University in the Predictive Mineral Discovery Cooperative Research Centre (CRC). Following this he joined the Commonwealth Scientific and Industrial Research Organisation in Computational Geoscience and X-Ray Characterisation and was later involved in the Deep Exploration Technologies CRC. James joined Imdex in 2014, where he has learned much about the process of commercialization of technology and the challenges of introducing new disruptive technology products to market.

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**Jean Cline** is Professor Emerita of *Economic Geology* in the Department of Geoscience, University of Nevada Las Vegas, where she continues to conduct research on Nevada's Carlin-type deposits and similar deposits in Canada, China, and Kyrgyzstan. Research techniques include petrographic and microchemical analyses of host rocks and ore to identify physical and chemical processes related to ore formation. She holds degrees from Wisconsin State University-Platteville (B.S.), University of Arizona (M.S.), and Virginia Tech (Ph.D.). Jean was elected an honorary member of the Geological Society of Nevada and is a past president of the Society of Economic Geologists (2021).

## INVITED/KEYNOTE SPEAKERS (*cont.*)



**David Cooke**, together with his students, postdoctoral research fellows, and collaborators has been researching hydrothermal and magmatic processes that lead to porphyry copper and epithermal gold ore formation for more than three decades. The team has also been studying geochemical halos to porphyry and epithermal deposits for the past 16 years, developing new exploration tools for the minerals industry. David has been an associate editor of *Economic Geology* since 2001 and is director of both the TMVC ARC Industrial Transformational Research Hub and the Centre for Ore Deposit and Earth Sciences. He was named the SEG Thayer Lindsley Lecturer in 2005 and the SEG Distinguished Lecturer in 2021 and was awarded the SEG Silver Medal in 2013.

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**Stephen Cox** is Emeritus Professor in the Research School of Earth Sciences at the Australian National University. His research interests are primarily in the coupling between deformation processes and fluid flow in crustal regimes, with applications to fracture-controlled ore systems and crustal fault mechanics. His research is pursued via field-based studies, microstructural, microchemical, and stable isotope analyses, high-pressure–high-temperature rock deformation experiments, and numerical modeling. He holds a B.Sc. (Hons) degree from the University of Tasmania and a Ph.D. degree from Monash University.



**Stéphane De Souza** graduated from Université du Québec à Montréal in 2004, where he also obtained M.Sc. (2007) and Ph.D. (2011) degrees. His doctoral research on mountain-building processes, plus a keen interest in economic geology, led him to undertake postdoctoral research (2012–2015) with the Geological Survey of Canada. He also worked in the mineral exploration industry and contributed to mapping projects with government agencies. He is now a professor of economic geology and field geology at the Université du Québec à Montréal, developing several research projects aimed at better understanding the genesis of precious and base metal deposits.

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**Benoît Dubé** received his B.Sc. Ing. (1982) and M.Sc. (1985) degrees from Laval University and his Ph.D. degree from Université du Québec at Chicoutimi (1990). Since 1989, he has been a research scientist with the Geological Survey of Canada, where he has conducted research on various types of gold deposits. He is an associate professor at the Université du Québec (INRS-ETE) and Laurentian University. He has senior-authored and co-authored more than 60 refereed publications. He was the 1997 Geological Association of Canada Robinson Lecturer and a member of the Editorial Board of *Economic Geology* (2004–2008). He received the AEMQ Jean Descarreaux award, the SEG Brian J. Skinner Award (2007), and the Geological Association of Canada Duncan Derry Medal (2011).

## INVITED/KEYNOTE SPEAKERS (*cont.*)



**Wessley Edgar** joined the Australian operations of Kirkland Lake Gold in 2016 in a role that coordinates geological research, staff training, and project generation. He has 29 years' experience in various mine and exploration roles from greenfields base metals to near-mine deep extension projects. After graduating from Monash University, he worked for RGC and associated Goldfields Limited for 13 years before undertaking several exploration manager roles with junior explorers. While spending eight years exploring the Eastern Goldfields around Kalgoorlie, he also worked for Auriongold and Placer Dome Asia Pacific and conducted a major resource drill out of the Raleigh gold deposit near Kundana that added over 1 Moz in a calendar year.

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**Kathy Ehrig** completed a Ph.D. degree in geology from the University of California-Berkeley in 1991 and left San Francisco in 1992 to join the former WMC as a research geologist to work on the genesis of the Olympic Dam deposit and to provide mineralogical support to metallurgy. In 2006, she moved to Adelaide to lead the development of a geometallurgy program. In recognition of her contribution to the geologic and geometallurgical understanding of the Olympic Dam deposit, Kathy has received the Professional Excellence Award from the AusIMM (2017), a degree of Doctor of Science honoris causa from Flinders University (2017), the Bruce Hobbs Medal (Geological Society of Australia, 2018), the Roy Woodall Medal (Australian Geoscience Council, 2020), and the SEG Silver Medal (2020).



**Gayle Febbo** received her B.Sc. degree in geology (2007) and her M.Sc. degree in structural geology (Mineral Deposit Research Unit, 2016) from the University of British Columbia, Canada. Her 17-plus years of work in mineral exploration couples geologic mapping and petrographic study of structurally controlled and deformed porphyry-epithermal systems in British Columbia, including Brucejack, Kerr-Sulphurets Mitchell (KSM), and Galore Creek. Gayle is currently Vice President Exploration for Kingfisher Metals Corp., an early-stage explorer of high-grade copper and gold systems of British Columbia.

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**Anna Fonseca** obtained a B.S. degree from the University of Alaska Fairbanks in 1993 and worked the next two years in Alaska, Yukon, and Siberia, then resurfaced in Vancouver and obtained an M.Sc. degree in structural geology from the University of British Columbia in 1998. She moved north to the Yukon Territory to work as a survey geologist and contract mapper. By 2006 she took an interest in alteration mapping in Mexico, USA, the Andes, and Turkey. In 2012 she joined SRK Consulting Toronto's structural geology team to develop integrated methodologies for structural and alteration studies applied to mineral exploration and mining, and in 2019 she transferred to SRK Kazakhstan to focus on large underexplored epithermal and porphyry deposits of eastern Uzbekistan.

## INVITED/KEYNOTE SPEAKERS (*cont.*)



**Michael Gadd** is a research scientist at the Geological Survey of Canada and specializes in the geochemistry of sediment-hosted base metal deposits. His research applies bulk and microanalytical geochemical (e.g., LA-ICP-MS) techniques to these mineral deposits to determine their geochemical evolution and to build genetic models. He is currently working on shale-hosted Ni-Zn-Mo-Re-PGE mineralization in the Northern Cordillera of western Canada. Dr. Gadd received his B.Sc. degree from Tennessee Technological University and his M.Sc. and Ph.D. degrees from Queen's University, Ontario. He is also an adjunct professor at Queen's University, where he co-supervises graduate theses related to the geochemistry of base metal deposits.

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**Ariadni Georgatou** graduated with a master's degree in geology from the Department of Earth Sciences of the University of Geneva under the supervision of Dr. Chiaradia Massimo (Switzerland, 2016) studying sulfide saturation in typical Andean-type arc magmas, using Ecuador as a case study. Ariadni's current Ph.D. project investigates the role of sulfide saturation for porphyry ore formation on a broader scale by studying the mineral chemistry of magmatic sulfides and chalcophile metal behavior during crustal evolution in subduction and post-subduction magmas of both barren and fertile areas.



**George Gilchrist** is Vice President: Resources at Ivanhoe Mines.

George studied geology at the University of the Witwatersrand, South Africa, and has worked in the mining industry for 19 years. He specializes in understanding the geologic controls on

mineralization and building these controls into geologic and resource models used in exploration, mining studies, and production environments. He has worked for Ivanhoe Mines for the last seven years across their platinum group element, zinc, and copper projects, and he was heavily involved in the discovery, delineation, and modeling of the Kakula copper deposit in the DRC. George has lived and worked in both South Africa and Canada, with projects focused on gold, silver, platinum, copper, and nickel across a range of geologic and geographical settings.

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**Sarah Gleeson** received a B.A. (mod.) degree in geology from Trinity College Dublin and a Ph.D. degree in geochemistry from Imperial College London. Subsequently, she held

postdoctoral positions at the Natural History Museum, London,

and the University of Leeds. She was a professor at the University of Alberta from 2001 to 2016. Since 2016 she is a professor of mineral resources at the Freie Universität Berlin and runs the Inorganic and Isotope Geochemistry Section at the GFZ, Helmholtz Centre Potsdam. She was the recipient of the SEG's Waldemar Lindgren Award in 2007 and was the SEG Thayer Lindsley Visiting Lecturer in 2019. Sarah has broad research interests in mineral deposit genesis, hydrothermal fluid flow, and water-rock interactions.

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## INVITED/KEYNOTE SPEAKERS (cont.)



**Richard Goldfarb** was a research geologist at the U.S. Geological Survey for 36 years. His studies have focused on global metallogeny, geology of ore deposits in the North American Cordillera with emphasis on

orogenic gold, lode gold deposits in China, and fluid inclusion and stable isotope applications to the understanding of ore genesis. Rich has authored more than 230 papers on mineral resources. Rich is a past president of the Society of Economic Geologists and past chief editor of *Mineralium Deposita*. Presently, Rich is a research professor at Colorado School of Mines and China University of Geosciences Beijing, serves on the board of Golden Predator Mining Corp., and is an independent consultant to the exploration and mining industry.

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**Matt Hall** has a Ph.D. degree in sedimentology from the University of Manchester, UK, and 20-something years' experience in the energy industry. He has worked for Statoil (now Equinor), Landmark, and from 2005 to 2010 at ConocoPhillips as a

geophysical advisor. Matt has written various papers, articles, conference papers, and book chapters and has edited three books.

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**Mark Hannington** is a professor of economic geology at the University of Ottawa and former head of marine mineral resources at the Helmholtz Center for Ocean Research in Kiel, Germany. He obtained his Ph.D. degree at the University of Toronto (1989) and spent 15 years as a research scientist at the Geological Survey of Canada before moving to the University of Ottawa in 2005. His research combines the study of active volcanoes on the ocean floor with ancient volcanic environments that host VMS deposits. He has participated on 29 research cruises to the East Pacific Rise, Juan de Fuca Ridge, Mid-Atlantic, Mediterranean, Iceland, New Zealand, Tonga, New Hebrides, Antarctica, and Papua New Guinea. Dr. Hannington was editor of *Economic Geology* from 2001 to 2008.

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**Joanne Heyes** is a resource industry executive with 24 years professional experience, spanning strategic, team leadership, and corporate roles, with a strong focus on ESG. She is the former chair of ICMM Closure Group and a current member of the Minerals Research Institute of WA (MRIWA) College, a cohort that identifies and recommends priority research opportunities to the MRIWA Board. A recipient of a B. Eng (Hons) degree in mining engineering from the University of Leeds, UK, Joanne is a Fellow of the Australasian Institute of Mining and Metallurgy. A strong technical background underpins her current role on the leadership team of BHP Global Resource Excellence, which integrates engineering and geoscience together at a strategic level. This insight across the breadth of critical technical inputs gives clarity to the strategic and professional importance of groups such as SEG in developing capable industry professionals.

## INVITED/KEYNOTE SPEAKERS *(cont.)*



**Steve Hill** commenced as Chief Scientist for Geoscience Australia in October 2018. In this role, he is responsible for strategic science leadership, influence, and external engagement. Prior to this he was the chief government geologist and director of the Geological

Survey of South Australia from 2013 to 2018. Steve completed a B.Sc. (1st class Hons) degree at The University of Melbourne and a Ph.D. degree at the Australian National University. He then spent nearly 20 years as a lecturer at the University of Adelaide and University of Canberra. Most recently he has been involved in planning for the new MinEx CRC and most particularly its National Drilling Initiative (NDI). He has published over 150 scientific and technical papers.

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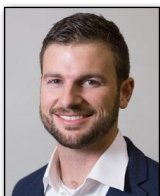
**Kurt House** is the cofounder and chief executive of KoBold Metals, a full stack battery metals exploration company that is developing and deploying machine learning and other scientific computing techniques to improve the efficacy and efficiency of

exploration programs. He's a career entrepreneur who works at the interface of technology and natural resources as well as an adjunct professor in Stanford University's Energy Resources Engineering Department. Previously, he founded and ran a carbon sequestration and enhanced oil recovery business as well as a separate direct investment platform. He received his Ph.D. from Harvard University in earth and planetary science and his B.A. in physics from the Claremont Colleges. Kurt has also worked in private equity and corporate advising for Bain and Company.



**Elizabeth Holley** is an Associate Professor at Colorado School of Mines, Colorado, and the site director of the National Science Foundation-funded industry-university collaborative Center for Advanced Subsurface Earth Resource Models. Dr. Holley specializes in mineral exploration and mining geology. She has a Ph.D. degree from Colorado School of Mines, an M.Sc. degree from the University of Otago in New Zealand, and a B.S. degree from Pomona College in California. Dr. Holley's Mining Geology Research Group works on projects throughout the mining life cycle, funded by federal agencies, industry, and nongovernmental organizations.

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**Curtis Johnson** received his M.S. degree in geology in 2015 from Oregon State University (OSU) under Dr. John H. Dilles and received his Ph.D. degree in 2020 with Dr. Michael W. Ressel and Dr. Philipp Ruprecht at the University of Nevada, Reno (UNR), studying the Phoenix-Fortitude porphyry-skarn system and regional controls on gold-rich metallogeny of the Great Basin, USA. From 2015 to 2017, he worked in production and exploration roles for Newmont Mining Corporation in the northern Carlin trend and at the Phoenix mine in Nevada, USA. He is currently a senior economic geologist with EMX Royalty Corporation focused on generative exploration for gold in Idaho and Nevada.

## INVITED/KEYNOTE SPEAKERS (cont.)



**Sinead Kaufman** first joined Rio Tinto as a geologist in the United Kingdom in 1997. After working across Europe and Africa in various geologist roles, Sinead transitioned into operations, leading mining sites in both underground and open-pit environments across copper, aluminum, bauxite, diamonds, coal, salt, uranium, and iron ore. In 2018 she was appointed Managing Director, Copper and Diamonds.

Today, Sinead is Chief Executive, Minerals. In this role, Sinead has accountability for the minerals product group, which comprises high-grade iron ore from the Iron Ore Company of Canada operation, titanium dioxide from the Rio Tinto Fer et Titane (Canada), Richards Bay Minerals (South Africa), and QIT Madagascar Minerals (Madagascar) operations, borates and lithium from the Boron (California) operation and the Jadar project (Serbia), and diamonds from the Diavik Diamond Mines (Canada) operation. Sinead brings to her current role strong operational expertise and asset leadership combined with commitment to sustainability. Sinead is Rio Tinto's second female product group chief executive, and with a strong focus on empowerment, she is committed to advancing a culture of diversity and inclusion in the mining industry.

Sinead holds a master's degree in mineral exploration from the University of Leicester and a degree in applied geology with honors from the University of Birmingham and has attended the Advanced Management Program at Insead through a Chief Executive Women scholarship.

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**Armelle Kloppenburg** is a Dutch structural geologist with a Ph.D. degree from Utrecht University, The Netherlands, and a background in Archaean hard-rock geology of Western Australia. She spent 12 years with Midland Valley Pty in Scotland, first consulting on petroleum-related projects, then diversifying the company to also serve the mining and exploration industry. Operating as a freelance consultant since 2012, she is based in Holland with a global mix of clients in exploration and mining, oil and gas, and geothermal and geological surveys. She constructs digital 2-D, 3-D, and 4-D structural models, using geometric validation principles and kinematic techniques, for a range of commodities across tectonic settings worldwide. When time allows, she enjoys mentoring and giving short courses at universities.

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**Marcus Kunzmann** is a research scientist with the Mineral Resources unit at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Perth, Australia. His work focuses on the application of basin analysis and mineral systems analysis to develop multiscale targeting concepts for sediment-hosted mineral deposits. Marcus graduated with an M.Sc. degree from the Technische Universität Bergakademie Freiberg (Germany) in 2011 and a Ph.D. degree from McGill University (Canada) in 2016.

## INVITED/KEYNOTE SPEAKERS (cont.)



**Bruno Lafrance** is a professor of structural geology at the Harquail School of Earth Sciences, Laurentian University. His research focuses on the primary structural controls on the formation of ore deposits and their subsequent modification during orogenic events. Although most of his research has been on gold and volcanogenic massive sulfide deposits, Dr. Lafrance also researched the structural controls on the formation and modification of Ni-Cu-PGE deposits in Sudbury, Ontario. Dr. Lafrance holds a Ph.D. degree from the University of New Brunswick and a B.Sc. degree from the Université de Montréal. He was a member of the team who proposed the successful Metal Earth project, the largest mineral exploration research initiative in Canadian history, and is now serving as associate director of Metal Earth.

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**Doug Mackenzie** is Professional Practice Fellow at the University of Otago, New Zealand, where he teaches applied structure and exploration geology. He has over 30 years' experience in mineral exploration, regional mapping, and ore deposits research. Doug is an international consultant and director of Camino Geoscience, which is currently focused on exploration targeting in northwest Iberia. He is also a regular consultant and mentor for Barrick Gold in Africa. Dr. MacKenzie is a graduate of the University of Toronto (B.Sc.) and the University of Otago (M.Sc. Hons, Ph.D.) and is a chartered professional of the AusIMM (CP GEO).

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**Lisa Hart-Madigan** is an exploration geologist and geochemist with 12 years' experience in mineral exploration and resource definition and in the research and development of cutting-edge geochemical exploration techniques. For seven years Lisa worked for BHP on exploration projects in Western Australia and West Africa. Subsequently, she embarked on Ph.D. studies at Imperial College London, focusing on the development of geochemical exploration tools that help to identify and locate undercover porphyry copper deposits. The Oyu Tolgoi district of southern Mongolia was the case study for Lisa's Ph.D. research. Since completing her Ph.D. degree, Lisa has expanded her research into the epithermal environment and has gained experience in geoscience consulting.



## INVITED/KEYNOTE SPEAKERS (cont.)



**Joseph Magnall** is a postdoctoral research scientist at the GFZ Helmholtz Centre in Potsdam (Germany). Joe completed his B.Sc. (environmental geology) and M.Sc. (geochemistry) degrees at the University of Leeds (UK) and his Ph.D. degree at the University of Alberta (Canada). Joe's research is primarily focused toward developing a better understanding of some of the fundamental aspects of sediment-hosted mineral systems, including the temporal and spatial distribution of deposits and the specific parameters that control the formation of high-grade systems. Joe has worked on deposits from world-class Zn districts in the Canadian Cordillera and northern Australia and typically enjoys combining field geology, petrographic techniques, and multiple types of geochemical data.

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**Russell Meares** is a semiretired Australian exploration manager with extensive technical, management, and corporate experience through exploring for precious and base metal deposits in Australia, Asia, and the southwest Pacific. He was the inaugural chairman of the NSW Minerals Council's Exploration Committee from 2011 to 2017 and has represented NSW explorers on the Council's main executive committee since 2016. His principal objective in these roles has been to influence government policy to make NSW once again an attractive exploration destination. Also, since 2008 he has compiled and edited the Australian/NZ exploration news section for the SEG's quarterly *SEG Discovery*. In addition, he continues to mentor several professionals in the industry.

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**Rebecca Montsion** is a cotutelle Ph.D. candidate at Laurentian University's Mineral Exploration Research Center (MERC) in Sudbury, Canada, and the University of Western Australia's Center for Exploration Targeting (CET) in Perth, Australia. Rebecca has eight years of experience with 3-D geologic modeling and geostatistical analyses. In 2017, she completed a master's degree in earth science at the University of Ottawa, where she tested 3-D modeling capabilities for structurally complex settings. Rebecca and a team of young geoscientists won the 2017 Frank Arnott Award Challenge in the Experienced category for innovation in 3-D mineral exploration under cover. Currently, her research focuses on improving exploration in greenfields settings through development of feature engineering techniques and machine learning for mineral exploration.

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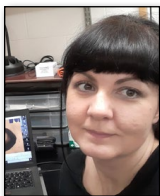
**Graeme Nicoll** is Solution Owner: Global Geological Systems at Neflex, Halliburton Landmark. Graeme joined Neflex in 2012, after completing postdoctoral work in geochronology and basin dynamics at Edinburgh University and working as an industry consultant looking at North Atlantic crustal evolution. He holds a Ph.D. degree in volcanic structure, geochemistry, and tectonics from Trinity College Dublin, Ireland. He has developed the Neflex global mineral deposit and geochronology data sets, as well as their subsequent integration into source-to-sink maps, gross depositional environment mapping, and supporting plate tectonic modeling. Graeme is now responsible for strategy, scientific vision, and development of the Neflex portfolio of global geoscience products.

## INVITED/KEYNOTE SPEAKERS *(cont.)*



**Michael Nugus** is a 25-year geoscientist with practical and strategic experience in gold mining, project development, value generation, and, more specifically, characterizing geologic controls on mineralization in deposits from Australia, Ghana, South Africa, Tanzania, and Colombia. Following more than 18 years in greenfields exploration and underground production, his more recent focus is to create spatially and geologically based, predictive models for resource estimation, mineral processing, and optionality within strategic projects—in particular, Sunrise Dam, Obuasi, and Quebradonna. He is currently employed by AngloGold Ashanti as Principal Economic Geologist for the Strategic Planning and Technical Group.

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**Sabina Stmic Palinkas** is an associate professor in geochemistry and ore geology at UiT The Arctic University of Norway. She also holds an adjunct position at University of Bergen, Norway. After receiving a Ph.D. degree in ore deposit geology from the University of Zagreb, Croatia, in 2009, she worked as a research fellow at the University of Auckland, New Zealand, and as an assistant professor at the University of Zagreb. In fall 2015 she joined UiT, where her main goal is to establish an internationally recognized research program in ore geology/mineral resources. Her area of expertise comprises aqueous and high-temperature geochemistry, geochemical/thermodynamic modeling, and applications of organic geochemistry and stable isotope systematics to ore-forming and environmental processes.

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**Adam Pidlisecky** is an associate professor of geoscience at the University of Calgary, where his recent research focus is on the use of data science techniques to improve geoscience decision-making, as well as the use of geophysics for improved management of groundwater resources. He has published over 30 papers on variety of topics and holds a commercial patent in medical imaging. He has received several awards for both teaching and research, including a 2013 Cox Fellowship from Stanford and the 2012 Early Career Research Award from the Environment and Engineering Geophysics Society. Adam is also a successful technology entrepreneur and executive, having been involved in two successful start-ups as well as serving as the chief research officer for Seequent from 2016 to 2020.

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## INVITED/KEYNOTE SPEAKERS *(cont.)*



**Jelena Puzic** is an economic geologist with 25 years of international, technical, and leadership experience covering in-mine, near-mine, and greenfields exploration environments from remote high altitudes to the ocean floor.

Jelena graduated with a BScH degree in economic geology from Queen's University and has held progressively more senior roles at Teck, including international assignments in Peru and Australia. Currently, Jelena is Director of Geoscience Services for Teck; she and her team drive business value through geoscience and orebody knowledge at Teck's Operations and Advanced Projects.

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**Markus Reuter** is currently Senior Expert at SMS Group Germany (2020 ongoing). He holds D.Eng. and Ph.D. degrees from Stellenbosch University (South Africa) and a Dr.habil. from RWTH Aachen (Germany).

He was Chief Technologist for Ausmelt Australia and Director Of Technology Management for Outotec Australia and Finland (2006–2015). He also worked for Mintek and Anglo American Corporation in South Africa. He was the director at Helmholtz Institute Freiberg (2015–2020) and a full professor at TU Delft (Netherlands; 1996–2005) and holds or has held honorary and adjunct professorships at TUBAF Freiberg (Germany; 2015 ongoing), Aalto University (Finland; 2012–2018), Central South University (China; 2012–2017), Melbourne University (also full professor 2005–2018), and Curtin University Perth (Australia; 2018 ongoing).



**Fred Richards** is currently an Imperial College Research Fellow in the Department of Earth Science and Engineering at Imperial College London. His research investigates how the internal dynamics of our planet affect the processes that sculpt its surface, with a particular emphasis on natural resource formation, sea-level change, and landscape evolution. Much of his work has focused on improving the mapping between seismic velocity models and temperature to constrain the thermomechanical structure of the upper mantle and its relationship with the location of major sediment-hosted base metal deposits. Before arriving at Imperial, Fred spent a year at Harvard University as a Schmidt Science Fellow. He holds a Ph.D. degree in geophysics from the University of Cambridge and an MEarthSci degree from the University of Oxford.

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**Kate Rubingh** obtained an M.Sci. degree in geological sciences from Durham University, an M.Sc. degree in mineral exploration from Queen's University, and a Ph.D. degree from Laurentian University. Kate is a field economic geologist with research experience in structural geology, volcanology, and gold deposits and previous work experience with Vale in Thompson, Manitoba, SRK Consulting in Sudbury, and the CNGO office in Nunavut, managing surface drilling operations and geotechnical and hydrogeological programs and working in regional exploration and mapping programs with a focus on economic geology. Kate's current research, as part of the Metal Earth research group at Laurentian University, is on the geology of the Larder Lake area, Ontario.

## INVITED/KEYNOTE SPEAKERS (*cont.*)



**Adam Simon** is the Arthur F. Thurnau Professor of Earth and Environmental Sciences at the University of Michigan. He earned degrees in geology from the University of Maryland and Stony Brook University, followed by a postdoctoral fellowship at The Johns Hopkins University, where he investigated the formation of layered mafic intrusions in the Dry Valleys of Antarctica. Adam spent his first seven years as a faculty member of the University of Nevada Las Vegas, where he worked on Carlin-type gold deposits before moving to Michigan in 2012. He is a Fellow of the Society of Economic Geologists. His research program combines field, analytical, and experimental work to unravel the genesis of mineral systems. Adam co-authored two textbooks and has published nearly 50 papers.

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**Moira Smith** is Vice President Exploration and Geoscience for Liberty Gold. Formerly she was Chief Geologist, Nevada, for Fronteer Gold, and was instrumental in the successful advancement of the Long Canyon flagship project, for which she built the geological model for ongoing exploration and resource growth. Previously she managed exploration programs for Teck, including the 5.5 Moz Pogo gold deposit in Alaska; the 1.5 Gt Petaquilla (Cobre Panama) Cu-Mo-Au porphyry deposit in Panama; and the 3.5 Moz El Limon gold deposit in Mexico. Moira has a Ph.D. in geology from the University of Arizona. She is currently president of the Society of Economic Geologists and recent winner of the Colin Spence award from the Association for Mineral Exploration of B.C.

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**Holly Stein** is known for her enthusiastic, curiosity-driven approach to science and her ability to cross the academic-industry divide and is sought out for her expertise in ore geology and petroleum systems. At the center of her field-oriented approach

is the absolute time component essential to reconstructing resource-forming events. In the mid-1990s, Dr. Stein and the AIRIE Program she founded pioneered radiometric dating of molybdenite, pyrite, and arsenopyrite, using the Re-Os isotope clock. Dr. Stein is a Fulbright Scholar and has received the SEG Silver Medal (2005), the Helmholtz-Humboldt Research Prize (2008), and the Bunsen Medal in Geochemistry from the European Geosciences Union (2020). She holds a B.S. degree from Western Illinois University and M.S. and Ph.D. degrees from the University of North Carolina at Chapel Hill.

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**Margaret Stewart** is an assistant professor of geology at Mount Royal University in Calgary. Her research focuses on the relationship between plate tectonics, crustal-scale structures, and magmatic-hydrothermal mineralizing

systems in modern and ancient arc-back-arc settings. She participates in scientific research cruises, and her current research area is the Lau basin of the southwest Pacific Ocean. She has a B.Sc. Honours degree in earth sciences with a minor in mathematics from Carleton University and a Ph.D. degree in mineral deposits and Precambrian geology from Laurentian University, and she recently completed a postdoctoral fellowship at the University of Ottawa.

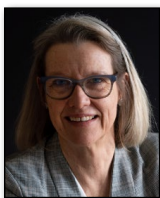


## INVITED/KEYNOTE SPEAKERS (*cont.*)



**Stephanie Sykora** completed her Ph.D. degree at the Centre for Ore Deposits and Exploration Sciences (CODES), University of Tasmania, Australia, under the supervision of Professor David Cooke and Dr. David Selley. Her research was on the giant Lihir alkalic epithermal gold deposit in Papua New Guinea. She currently works as a consultant exploration geologist for OreQuest Consultants and others. Previously she has worked for First Quantum Minerals in South America, Australia, and globally for generative porphyry copper exploration, and Teck Resources in BC, Canada, in porphyry exploration and at Highland Valley Copper. Prior to that she completed her undergraduate B.Sc. degree at the University of Victoria, Canada. Stephanie is also an avid scientific communicator for earth sciences through outreach programs and online articles.

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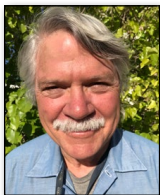
**Anne Thompson** is the producer and cohost of the *Discovery to Recovery* podcast and recent author of *Innovation in Mineral Exploration* published by PDAC. She has 35 years' experience working in and consulting to the mineral exploration industry, including field work and applied mineralogy. She was an early adopter of field spectroscopy and coedited the *Atlas of Alteration*, a resource for exploration geologists. Anne's company, PetraScience, a partnership with John Thompson, focuses on technology, sustainability, and innovation in the mining industry. Anne was named to the WIMUK Global 100 Inspirational Women in Mining 2020.



**John Thompson** has partnered since 2012 in a consulting business based in Vancouver, BC, focused on exploration, mining, innovation and sustainability. From 2013 to 2018 he was the Wold Professor of Environmental Balance for Human Sustainability at Cornell University; he is currently an adjunct professor at Cornell and the University of British Columbia and the Honorary Professor of Responsible Resources at the University Bristol, UK. John has over 35 years' experience in the mining industry and related research and has held diverse roles in many organizations, including Teck Resources, Genome BC, the World Economic Forum, Resources for Future Generations 2018, SEG, Geoscience BC, Canada Mining Innovation Council, and MDRU-UBC. He is a director and advisory board member for several exploration, technology, and venture capital companies.



## INVITED/KEYNOTE SPEAKERS (*cont.*)



**Richard Tosdal** received a bachelor's degree from the University of California, an M.Sc. degree from Queen's University, and a Ph.D. degree from the University of California at Santa Barbara. He worked for the U.S. Geological Survey (1978–1999)

and was the director of the Mineral Deposit Research Unit at the University of British Columbia (1999–2008). He currently consults to the minerals industry on the metallogenic evolution of plate margins, structural controls on ore deposition, and evolution of a range of hydrothermal deposits. He serves on technical advisory boards, is active in facilitating industry-designed research and development projects, and retains an adjunct appointment at the University of British Columbia.

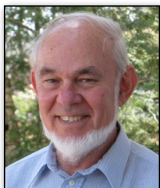
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**Dominique Weis** is Director of the Pacific Center for Isotopic and Geochemical Research, a major analytical facility serving the needs of academic, government, and industry, and a professor at the University of British Columbia. She is a leader in the innovative use of

trace element and isotope geochemistry and is widely respected "for the elegance, precision, and impact of her geochemical studies of the Earth from large igneous provinces to the environment" (AGU Fellow 2010 citation). Her research aims to determine the origin, source, and pathways of mantle plumes and their variations through time, apply geochemical tools to resolve Indigenous-led questions, and improve our understanding of human impact and study metal distribution in the environment. Dr. Weis has published more than 230 peer-reviewed articles.

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**Anthony (Willy) Williams-Jones** is a professor in economic geology and geochemistry at McGill University, Canada. He received his early education in South Africa, completing B.Sc. and M.Sc. degrees at the University of Natal, and then immigrated to Canada where he earned a Ph.D. degree in metamorphic petrology at Queen's University. His research, which combines field-based, experimental, and theoretical approaches, focuses on the behavior of metals in crustal fluids and the genesis of hydrothermal ore deposits. The results of his research have appeared in over 250 refereed journal articles and book chapters and have been recognized by awards from the Society of Economic Geologists (Penrose Gold Medal), the Geological Association of Canada, the Mineralogical Association of Canada, and the Royal Society of Canada.

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**Andy Wurst** joined Barrick Gold in 2014 as Global Chief Geoscientist Project Generation, based in Montreal, Canada. Prior to this he held senior positions at Gold Fields and Ivanhoe Mines in chief geologist and project generation roles. He gained his B.Sc. (Hons) degree majoring in marine biology and geology from the University of Adelaide, and a Ph.D. degree in economic geology from the University of Tasmania. Dr. Wurst has over 27 years of worldwide experience in the mineral industry searching for a range of metal types in over 40 countries on five continents in diverse environmental and geographical regions. Dr. Wurst has been a part of teams associated with several internationally significant mineral deposit discoveries and developments.



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Eldorado Gold	Mira Geoscience
AngloAmerican	PhotoSat
SGS	Westhaven Gold Corp

### Exhibit Schedule

#### Ballrooms B/C, Upper Level, WCC

Monday	7:00pm-8:00pm
Tuesday	9:00am-5:30pm
Wednesday	9:00am-5:30pm
Thursday	9:00am-5:30pm
Friday	9:00am-3:30pm

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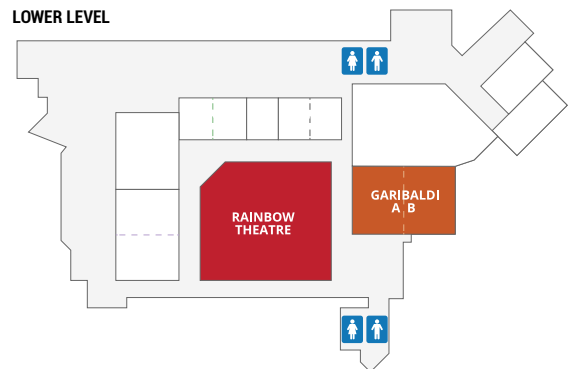


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