



## Resourcing the Green Transition

August 26–29, 2023 | Hilton London Metropole, United Kingdom

[www.seg2023.org](http://www.seg2023.org)

A close-up photograph of a person's hand, wearing a dark blue jacket, plugging a black charging cable into the charging port of a red electric vehicle. The background is a blurred asphalt surface with yellow markings. The overall scene is outdoors and appears to be a charging station.

**The future of a better world is clear.**

**It's happening now.**

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## Conference Hotel Hilton London Metropole

225 Edgware Road, London W2 1JU, United Kingdom  
Tel. +44 20 7402 4141



### Wi-Fi Access

Username: SEG 2023 Conference  
Password: #SEG2023

### Mother's room: Mezzanine 12

#### Speaker Ready Room: West Wing Meeting Room 1

Friday: 3:00pm-6:00pm  
Saturday-Monday: 7:00am-5:00pm  
Tuesday: 7:00am-3:00pm

#### Registration:

Friday: 8:00am-6:00pm  
Saturday-Monday: 7:00am-6:00pm  
Tuesday: 7:00am-4:00pm

## Exhibits and Posters (Richmond Suite)

**Friday:** 3:00pm-6:00pm: Exhibits and Group A Poster Set Up  
**Saturday:** 8:00am-3:00pm: Exhibits and Group A Poster Set Up  
6:30pm-9:00pm: Welcome Reception, Exhibits and Group A Posters First on Display  
**Sunday:** 9:00am-10:00am: Poster and Exhibitor-Only Access  
10:15am-11:00am: Morning Poster Session  
5:00pm-7:00pm: Evening Reception, Exhibit and Poster Session  
7:00pm-8:00pm: Group A Poster Tear Down

*\*Note all posters from Group A must be removed by 8:00pm. Any remaining posters will be discarded.*

**Monday:** 8:00am-10:00am: Group B Poster Set Up, Poster and Exhibitor-Only Access  
10:15am-11:00am: Group B Posters First on Display, Morning Poster Session  
5:00pm-7:00pm: Evening Reception, Exhibit and Poster Session

**Tuesday:** 9:00am-10:00am: Poster and Exhibitor-Only Access  
10:15am-11:00am: Morning Poster Session  
2:00pm-4:00pm: Exhibits and Group B Poster Tear Down

*\*Note all posters from Group B must be removed by 4:00pm. Any remaining posters will be discarded.*

The information in this program is current through August 4, 2023. Please refer to the conference app or the online schedule of events ([www.seg2023.org](http://www.seg2023.org)) for updated information. All sessions held in the Kensington Suite at the conference hotel.

## SATURDAY

### 9:30am-10:00am

Morning Networking Session  
- Student and Early Career Professionals

### 10:00am-12:30pm

Career Advice Showcase - Student and Early Career Professionals

### 12:30pm-2:00pm

Lunch and CV Talk - Student and Early Career Professionals

### 2:00pm-4:30pm

Round Table Event - Student and Early Career Professionals

### 4:30pm-5:00pm

Afternoon Networking Session - Student and Early Career Professionals

### 5:00pm-5:30pm

Global Challenges 1  
Supply Chain Issues: Importing Metals and Minerals into Europe/UK in the Next 15 Years  
*Rebecca Major (Global Challenges Speaker)*

### 5:30pm-6:00pm

Global Challenges 2  
Managing and Benefiting from ESG Challenges in the Development of Critical Minerals in the UK  
*Kate Harcourt (Global Challenges Speaker)*

### 6:00pm-6:30pm

Presidential Address and Brian G. Hoal Tribute  
*Stuart Simmons, SEG 2023 President*

### 6:30pm-9:00pm

Welcome Reception

## SUNDAY

### 8:30am-8:45am

Welcome and Conference Chair Remarks  
*Bob Foster, SEG 2023 Conference Chair*  
*Jennifer Craig, SEG Executive Director*

### 8:45am-10:15am

Plenary Session 1  
• Does the Energy Transition Start and End with Metals?  
• Financing Sustainability  
• The Wider Implications for Society at Large

### 10:15am-11:00am

Poster Viewing Session

### 11:15am-12:45pm

SESSION 1: Copper - Red Metal for a Green Future I  
SESSION 2: Battery Metals I

### 12:45pm-1:45 pm

Lunch  
1:45pm-2:45pm  
Career Speed Dating - Student and Early Career Professionals

### 2:00pm-3:30pm

SESSION 3: Copper - Red Metal for a Green Future II

### 3:30pm-4:00pm

Break

### 4:00pm-5:00pm

SESSION 3 (continued): Copper - Red Metal for a Green Future II  
SESSION 4: Battery Metals II

### 5:00pm-7:00pm

Exhibit and Poster Reception

### 7:00pm-9:00pm

SEG Awards Ceremony  
(Admiral Ballroom, Ticket Required)

## MONDAY

### 8:30am-10:15am

SESSION 5: Copper - Red Metal for a Green Future III  
SESSION 6: Battery Metals III

### 10:15am-11:00am

Poster Viewing Session

### 11:00am-12:45pm

SESSION 7: Europe's Metals I  
SESSION 8: Transformational Science I

### 12:45pm-1:45pm

Lunch

### 2:00pm-3:30pm

SESSION 9: Europe's Metals II

### 3:30pm-4:00pm

Break

### 4:00pm-5:00pm

SESSION 9: Europe's Metals II (continued)  
SESSION 10: Transformational Science II

### 5:00pm-7:00pm

Exhibit and Poster Reception

### 7:00pm-9:00pm

Industry Outlook Dinner  
(Admiral Ballroom, Ticket Required)  
*Ross Beaty, Chair, Equinox Gold*

## TUESDAY

### 8:30am-10:15am

SESSION 11: Gold - Responsible Discovery and Mining in the 21st Century I  
SESSION 12: Advances in Geoscience I

### 10:15am-11:00am

Poster Viewing Session

### 11:00am-12:45pm

SESSION 13: Gold - Responsible Discovery and Mining in the 21st Century II  
SESSION 14: Advances in Geoscience II

### 12:45pm-1:45 pm

Lunch

### 2:00pm-3:30pm

SESSION 15: Gold - Responsible Discovery and Mining in the 21st Century III  
SESSION 16: Advances in Geoscience III

### 3:30pm-4:00pm

Closing Ceremony and Concluding Remarks

*Bob Foster, SEG 2023 Conference Chair*  
*Steve Piercey, SEG 2024 President*  
*Anna Nguno, SEG 2024 Conference Chair*

### 4:00pm-6:00pm

Closing Social

Sunday, 7:00pm-9:00pm

### Awards Ceremony and Reception

Monday, 7:00pm-9:00pm

### Industry Outlook Dinner

*Ross Beaty, Chair, Equinox Gold*

For additional information on conference events, please visit the conference website at [www.seg2023.org](http://www.seg2023.org).

## ***Welcome to the SEG 2023 Conference!***



Thank you for joining us as we explore this year's theme, *Resourcing the Green Transition*, which addresses the major challenges facing the energy transition and the demand for strategic metals. The conference theme also embraces the environmental, social, and governance (ESG) issues that are fundamental to responsible sourcing of these essential metals.

The technical program provides wide-ranging insights on the science and technology that are fundamental to meeting these challenges—reflecting the unique science-technology interface provided by the Society of Economic Geologists. We have a truly remarkable lineup of leading industry and academic speakers, supported by a wide range of contributions drawn from 45 countries—a global response to a global issue.

This in-person program of oral and poster presentations is accompanied by field trips to key resource areas and six workshops. A strong emphasis is placed on students and early career professionals. A new dimension is added with local financial and service organizations.

The venue is the Hilton London Metropole, located in London's West End—an ideal location from which to see the sights of this amazing city and then follow up with excursions elsewhere in the United Kingdom and throughout Europe.

Thank you for joining us as we network with old friends and forge new relationships—especially so this year as we welcome the participation of members of multiple affiliated major geoscientific societies around the world that share our vision!



**Bob Foster**  
*Chair, SEG 2023  
Organizing Committee*

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<b>Back Cover</b>	SEG 2024 Announcement

## Conference Information

### Conference Organizing Committee

- **Conference Chair:** Bob Foster
- **Steering Group:** Richard Sillitoe, Karen Hanghøj, Richard Herrington, Laurence Robb
- **Technical Program:** Jamie Wilkinson, Dan Smith
- **Poster Program:** Katie McFall
- **Students/Early Career Professionals:** Alex Gorman, Huw Richards
- **Workshops:** Frances Wall, Lynnette Greyling
- **Field Trips:** Graham Brown, John Clifford
- **Sponsorships and Exhibitors:** Richard Herrington
- **Advisory Panel:** Edith Newton Wilson
- **UK Advisory Panel:** John Meyer
- **Europe Advisory Panel:** Nick Arndt, Maria Boni, Jens Gutzmer, Pasi Eilu, Lorena Ortega

### SEG Contact Information

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

### Conference Organizer

Etherio  
[organizer@seg2023.org](mailto:organizer@seg2023.org)

**For updates and latest information,  
visit [www.seg2023.org](http://www.seg2023.org).**



## SEG Awardees for 2023

The SEG Awards ceremony will be Sunday, August 27th, at 7:00 pm. The event will be held at the Hilton London Metropole.

### R.A.F. Penrose Gold Medal

**RICHARD J. GOLDFARB**  
(China University of Geosciences Beijing and  
Colorado School of Mines)

### SEG Silver Medal

**JONATHAN M.A. HRONSKY**  
(Western Mining Services)

### SEG Waldemar Lindgren Award

**JOSEPH M. MAGNALL**  
(GFZ German Research Centre for Geosciences)

### Brian J. Skinner Award

**JEFFREY W. HEDENQUIST**  
(Hedenquist Consulting Inc.)

**ANTONIO ARRIBAS**  
(University of Texas at El Paso)

### Honorary Fellow

**GERALD G. CARLSON**  
(Pacific Ridge Exploration)

### SEG Distinguished Lecturer

**DAVID A. HOLWELL**  
(University of Leicester)

### International Exchange Lecturer

**KATHY EHRIG**  
(BHP)

### SEG Thayer Lindsley Lecturer

**SALLY GOODMAN**  
(Newmont)

### Regional Vice President Lecturer

**SHAO-YONG JIANG**  
(China University of Geosciences)

## Pre-Conference Program

### Pre-Conference Social Events

#### **Friday, August 25**

1:30pm-6:00pm Geology of London Tour  
6:00pm-8:00pm Flight Club Social Darts

### Student and Early Career Program

#### **Saturday, August 26**

9:30am-10:00am Morning Networking Session  
10:00am-12:30pm Career Advice Showcase  
2:00pm-4:30pm Round Table Event  
4:30pm-5:00pm Afternoon Networking Session

#### **Sunday, August 27**

1:45pm-2:45pm Careers Speed-Dating

## Pre-Conference Field Trips

#### **August 18-24**

Iberian Pyrite Belt: VMS Geology and Mineralization

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

#### **August 17-24**

The Ore Mountains (“Erzgebirge”) of Saxony and Bohemia: Old District-New Opportunities—Sn, W, Li, Ag, Base Metals

*Leaders: Jens Gutzmer, Mathias Burisch-Hassel, and Vojtech Sesulka*

## Pre-Conference Workshops

#### **August 25-26**

Structure and Diversity of Orogenic Gold Deposits

*Presenters: Dave Rhys, Stephen Cox, Richard Goldfarb, and François Robert*

#### **August 25**


Critical Minerals: Geological Perspectives for Discovery and Recovery

*Presenters: Richard Herrington, Kathryn Goodenough, Robin Armstrong, Francesco Putzolu, Reimar Seltmann, Steve Roberts, Frances Wall, Maria Boni, and Anthony Williams-Jones*

#### **August 26**

Environment, Social, and Governance (ESG) Across the Mining Industry

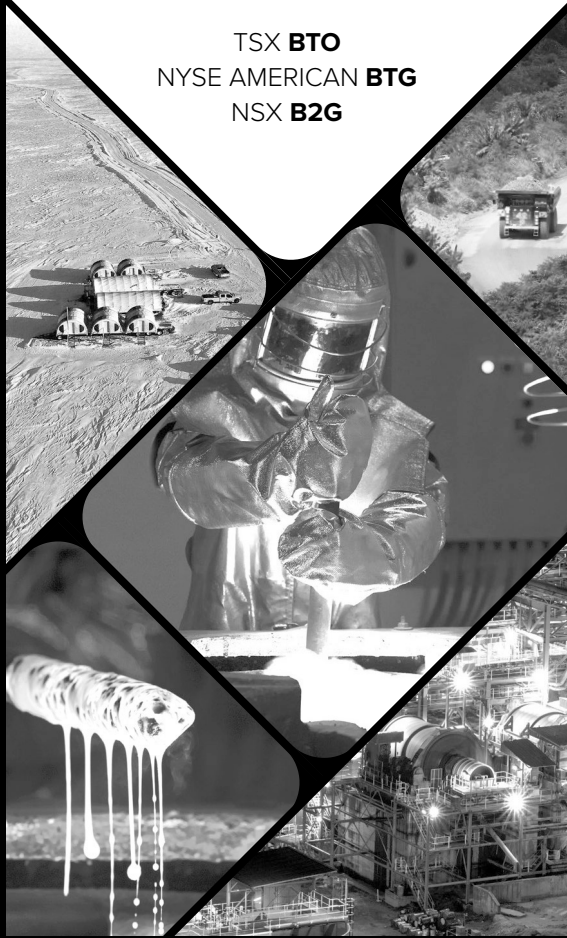
*Presenters: Sarah Gordon and Rose Clarke*



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# Technical Program

## DAY 1 - SATURDAY, AUGUST 26, 2023

### Global Challenges I

5:00 pm - 5:30 pm **Supply Chain Issues: Importing Metals and Minerals into Europe/UK in the Next 15 Years**  
*Rebecca Major (Global Challenges Speaker)*

### Global Challenges II

5:30 pm - 6:00 pm **Managing and Benefiting from ESG Challenges in the Development of Critical Minerals in the UK**  
*Kate Harcourt (Global Challenges Speaker)*

### Presidential Address

6:00 pm - 6:30 pm **Presidential Address and Brian G. Hoal Tribute**  
*Stuart Simmons (SEG 2023 President)*

### Welcome Reception and Exhibit and Poster Viewing

6:30 pm - 9:00 pm Welcome Reception

5:00 pm - 9:00 pm

SATURDAY

## DAY 2 - SUNDAY, AUGUST 27, 2023

### Opening Ceremony

8:30 am - 8:45 am **Welcome and Conference Chair Remarks**  
*Bob Foster, SEG 2023 Conference Chair*  
*Jennifer Craig, SEG Executive Director*

### Plenary Session 1

8:45 am - 9:15 am **Does the Energy Transition Start and End with Metals?**  
*Julian Kettle (Plenary Speaker)*

9:15 am - 9:45 am **Financing Sustainability**  
*Katya Gorbatiouk (Plenary Speaker)*

9:45 am - 10:15 am **The Green Transition Squeezes As It Embraces**  
*John Elkington (Plenary Speaker)*

10:15 am - 11:00 am **Poster Viewing: Saturday and Sunday Posters**

11:00 am - 11:15 am Break

**Oral Session 01**  
**Copper - Red Metal for a Green Future I**

11:15 am - 11:30 am **Central African Copper Belt**  
*Michael Daly (Keynote Speaker)*

**Oral Session 02**  
**Battery Metals I**

**Critical Battery Mineral Resources in the United States: Past, Present and Potential**  
*Jane Hammarstrom*

8:30 am - 11:30 am

SUNDAY



**DAY 2 – SUNDAY, AUGUST 27, 2023 (Continued)**

11:30 am - 11:45 am	<b>Central African Copper Belt, continued</b> <i>Michael Daly (Keynote Speaker)</i>	<b>The Geological Setting of Vanadium Mineralisation in the Neuquén Basin of Central Argentina: An Opportunity for the Clean Energy and Energy Storage Sectors in South America</b> <i>Martin Jackson</i>
11:45 am - 12:00 pm	<b>Copper-Hosting Basins at the Edge of Cratons - the Yeneena Basin in Western Australia as a Case Study</b> <i>Weronika Gorczyk</i>	<b>Canadian Perspective on REE Deposits Hosted by Carbonatite and Alkaline Complexes and Its Implication for Carbonatite and Alkaline Magmatism in Europe</b> <i>Anne-Aurélié Sappin</i>
12:00 pm - 12:15 pm	<b>Numerical Modelling of Basin-Scale Fluid Flow and Cu Transport in the Katangan Basin, Central African Copperbelt</b> <i>Meissam Bahlali</i>	<b>Trace Element Department in Sphalerite Across the Bathurst Mining Camp, New Brunswick, Canada</b> <i>Foteini Drakou</i>
12:15 pm - 12:30 pm	<b>Syntectonic Copper Mineralisation in a Back-Thrust Duplex at Pangeni, NW Zambia</b> <i>John Wilton</i>	<b>From Rocks to Batteries: Insights Into Cobalt Mining, Mineralogy, and Sustainability</b> <i>Quentin Dehaine (Invited Speaker)</i>
12:30 pm - 12:45 pm	<b>Experimental Insights Into the Mobility and Extraction of Metals in Sedimentary Basin-Hosted Copper Systems</b> <i>Julia Woitischek</i>	<b>Occurrence and Spatial Distribution of Cobalt in Skarn Deposits: A Case Study from the Middle-Lower Yangtze River Valley Metallogenic Belt (MLYB) in East China</b> <i>Taofa Zhou</i>

12:45 pm - 1:45 pm	Lunch	
	<b>Oral Session 03 Copper - Red Metal for a Green Future II</b>	<b>Oral Session 04 Battery Metals II</b>
2:00 pm - 2:15 pm	<b>Global Copper Screening for the Energy Transition - a Holistic Exploration Mindset</b> <i>Graeme Nicoll</i>	TBD. Refer to the conference app for updates.
2:15 pm - 2:30 pm	<b>The Role of Crustal Anatexis in Porphyry Copper Formation During Flat-Slab Subduction: Insights from the Laramide Belt, Southwest USA</b> <i>Thomas Lamont</i>	TBD. Refer to the conference app for updates.
2:30 pm - 2:45 pm	<b>Magma Fertility Evolution Trends: Lessons from the Kerman Porphyry Belt, SE Iran</b> <i>Ali Sholeh</i>	TBD. Refer to the conference app for updates.
2:45 pm - 3:00 pm	<b>Late Cretaceous Magnetism in the San Matias District, NW Colombia: Insights of a New Ca. 76 - 66 Ma Porphyry Copper Belt in the Northern Andes</b> <i>Julian Manco (Student)</i>	<b>Challenges of Water Use Impact Assessment of Lithium Production from South American Salar Deposits Using Life Cycle Assessment</b> <i>Rowan Halkes</i>
3:00 pm - 3:15 pm	<b>Unraveling the Thermochemical State of the Whole Lithosphere in Space and Time: New Methods and Their Predictive Power for Exploration</b> <i>Juan Afonso (Invited Speaker)</i>	<b>The Jadar Li(B) Deposit (Serbia): Insights Into a Giant Volcano-Sedimentary-Hosted Li-B System</b> <i>Francesco Putzolu</i>

**DAY 2 – SUNDAY, AUGUST 27, 2023 (Continued)**

3:15 pm - 3:30 pm	<b>Q&amp;A</b>	<b>The Bergby LCT-pegmatite Field, Central Sweden – a New Contender to Produce Swedish Lithium?</b> <i>Karin Högdahl</i>
3:30 pm - 4:00 pm	Break	
4:00 pm - 4:15 pm	<b>A Rapid Transition to an Electrical Economy Based on Energy from Solar and Wind is Not Resource Viable</b> <i>Adam Simon</i>	<b>Cornish Lithium: Exploration for Geothermal Lithium Resources in Southwest England</b> <i>Alistair Salisbury</i>
4:15 pm - 4:30 pm	<b>Copper Mining and Extraction in Cyprus - from Ancient Heritage to a Green Future</b> <i>Zack Van Coller</i>	<b>Unconventional Magmatic Sulfide Systems: Looking Outside of the Box for the Next New Ni-Cu-Co-PGE Discovery</b> <i>David Holwell (2023 SEG Distinguished Lecturer)</i>
4:30 pm - 4:45 pm	<b>Unlocking the Full Potential of Metal Leaching in the Oceanic Crust: Assessing Permeability and Fluid Flow</b> <i>Alannah Brett (Brett-Adams)</i>	<b>Unconventional Magmatic Sulfide Systems, continued</b> <i>David Holwell (2023 SEG Distinguished Lecturer)</i>
4:45 pm - 5:00 pm	<b>Accelerating Discovery through Cutting-Edge Research</b> <i>Elizabeth Sharman</i>	<b>ML Modeling of Multiparameter Data for Ni-Cu-PGE Targeting</b> <i>Wilson Bonner</i>
5:00 pm - 7:00pm	<b>Exhibit and Poster Reception: Saturday and Sunday Posters</b>	

**DAY 3 – MONDAY, AUGUST 28, 2023**

	<b>Oral Session 05 Copper - Red Metal for a Green Future III</b>	<b>Oral Session 06 Battery Metals III</b>
8:30 am - 8:45 am	<b>High Grades in Hypogene Porphyry Copper Deposits</b> <i>Dick Sillitoe (Keynote Speaker)</i>	<b>Tracing Granite-Hosted Mineralization via Zircon Metal Anomalies</b> <i>Laurence Robb</i>
8:45 am - 9:00 am	<b>High Grades in Hypogene Porphyry Copper Deposits, continued</b> <i>Dick Sillitoe (Keynote Speaker)</i>	<b>Quantitative Mineralogy of the Beauvoir Granite and Rare-Metal-Bearing Minerals Characterization</b> <i>Steven Kahou</i>
9:00 am - 9:15 am	<b>Alteration Geothermometry and Exploration Implications of the Gajah Tidur Porphyry System, One of Two Systems that Formed the Supergiant Grasberg Cu-Au-(Mo) Deposit</b> <i>Reza Al Furqan (Student)</i>	<b>GREENPEG: New Toolsets to Explore for Pegmatites Hosting Rare Metals and High Purity Quartz to Feed the Energy Transition</b> <i>Axel Müller</i>
9:15 am - 9:30 am	<b>The Spence Porphyry Copper System Revisited: an Integrated Mineral Systems Study</b> <i>Edward Bunker</i>	<b>Challenges Associated with the Future Supply of Battery Minerals and Black Mass</b> <i>Laurance Donnelly (Keynote Speaker)</i>
9:30 am - 9:45 am	<b>Geology, Mineralisation and Hydrothermal Alteration of the Almalyk Porphyry Copper- Gold Deposit, Tien Shan Mountains, Eastern Uzbekistan</b> <i>Peter Gleeson</i>	<b>Challenges Associated with the Future Supply of Battery Minerals and Black Mass, continued</b> <i>Laurance Donnelly (Keynote Speaker)</i>

**DAY 3 – MONDAY, AUGUST 28, 2023 (Continued)**

9:45 am - 10:00 am	<b>Applications of Multielement Epidote and Chlorite Mineral Chemistry to Locate Mineralized Centers: A Case Study from the Batu Hijau Porphyry Cu-Au District, Indonesia</b> <i>David Cooke</i>	<b>Recovery of Critical Metals from Copper Mine Tailings Utilizing Microanalytical Characterisation for Improved Geometallurgical Outcomes</b> <i>Loren Nicholls (Student)</i>
10:00 am - 10:15 am	<b>A Practical Predictive Targeting Model for Convergent Margin Gold and Copper Deposits</b> <i>Jon Hronsky</i>	<b>Ti-Zr-REE Heavy Mineral Sand Transport Paths and Concentration Processes Revealed by High-Resolution Airborne Radiometric Data</b> <i>Anjana Shah</i>
10:15 am - 11:00 am	<b>Poster Viewing Session: Monday and Tuesday Posters</b>	
	<b>Oral Session 07 Europe's Metals I</b>	<b>Oral Session 08 Transformational Science I</b>
11:00 am - 11:15 am	<b>Metals and Minerals in Europe – Demand, Exploration, Mining and More</b> <i>Karen Hanghøj (Keynote Speaker)</i>	<b>From Planets to Protons - New Geoanalytical Workflows for Characterizing Rocks of Economic Importance</b> <i>Alan Butcher</i>
11:15 am - 11:30 am	<b>Metals and Minerals in Europe – Demand, Exploration, Mining and More, continued</b> <i>Karen Hanghøj (Keynote Speaker)</i>	<b>Opportunities for Rapid, Field-Based Sulfide Deposition and Trace Element Chemistry Using Laser-Induced Breakdown Spectroscopy (LIBS)</b> <i>Cassady Harraden</i>

11:30 am - 11:45 am	<b>Crystalline Basement of Latvia – An Undercover Opportunity</b> <i>Matiss Brants (Student)</i>	<b>Re-Assessing the Resource Potential of Seafloor Massive Sulfide Deposits</b> <i>John Jamieson</i>
11:45 am - 12:00 pm	<b>An Alternative Formation Environment for Kiruna-Type Iron Deposits: An Example from the Per Geijer IOA Deposit, Northern Sweden</b> <i>Amy-Jo Miles</i>	<b>Machine Learning Algorithms as a Tool for Data-Driven Interpretation of Multiphysics Datasets in Underexplored Areas</b> <i>Artem Gorbunov</i>
12:00 pm - 12:15 pm	<b>Critical Metal Potential of Historic Mining Districts in the Lesser Caucasus and the Eastern Pontides, Central Tethyan Orogenic Belt</b> <i>Robert Moritz</i>	<b>Unlocking the Potential of Predictive Geoscience Through the Adoption of GeoData Science</b> <i>Glen Nwaila (Keynote Speaker)</i>
12:15 pm - 12:30 pm	<b>Ancient Mining, Recent Discoveries and Future Potential for Critical Raw Materials in the Apuseni-Carpathian-Balkan Area of Southeast Europe</b> <i>Irena Peytcheva</i>	<b>Unlocking the Potential of Predictive Geoscience Through the Adoption of GeoData Science, continued</b> <i>Glen Nwaila (Keynote Speaker)</i>
12:30 pm - 12:45 pm	<b>Q&amp;A</b>	<b>Q&amp;A</b>
12:45 pm - 1:45 pm	<b>Lunch</b>	

## DAY 3 – MONDAY, AUGUST 28, 2023 (Continued)

	Oral Session 09 Europe's Metals II	Oral Session 10 Transformational Science II
2:00 pm - 2:15 pm	<b>Seafloor Massive Sulfide Deposits on the Arctic Mid-Ocean Ridges: An Insight Into Ore-Forming Processes Along Ultraslow Spreading Ridges</b> <i>Sabina Strmic Palinkas (Keynote Speaker)</i>	<b>ESG Valuation Model for the Mining Industry</b> <i>Niklas Grönberg</i>
2:15 pm - 2:30 pm	<b>Seafloor Massive Sulfide Deposits on the Arctic Mid-Ocean Ridges, continued</b> <i>Sabina Strmic Palinkas (Keynote Speaker)</i>	<b>Gamification for Technology-Enhanced Education in the Mineral Value Chain: Mining Simulation Game for Teaching the Geometallurgy Concept</b> <i>Glaciale Tiu</i>
2:30 pm - 2:45 pm	<b>New Mineralogical Data on the Mineralizations and Hydrothermal Alteration Zones of the Allumiere-Tofla Historic Mining District, Central Italy</b> <i>Francesca Corrado (Student)</i>	<b>Applying Machine Learning Methods to XRF Data to Quantify the Acid-Generating Potential of Waste and Other Intrinsic Rock Properties</b> <i>Karim Halaseh</i>
2:45 pm - 3:00 pm	<b>Discover the Un-Discovered: New Exploration Concept for the European Kupferschiefer Copper Belt from Rudna (Poland) to Richelsdorf (Germany)</b> <i>Volker Spieth</i>	<b>PROMT: Philippines Remediation of Mine Tailings</b> <i>Gawen Jenkin</i>
3:00 pm - 3:15 pm	<b>Mantle Source Enrichment in the Evolution of One of Europe's Largest Rare Element Provinces - the Gardar Province, South Greenland</b> <i>Adrian Finch</i>	<b>Microbial Impacts on the Circular Economy via Metal Mobility and Carbon Sequestration</b> <i>Thomas Jones</i>

3:15 pm - 3:30 pm	<b>The Iberian Pyrite Belt, a Premier Mining Jurisdiction</b> <i>James Royall (Invited Speaker)</i>	<b>Influence of Mineralogy, Texture, and Grain Size on Density and Magnetic Susceptibility Within the Kiruna Mining District, Sweden</b> <i>Ervin Veress (Student)</i>
3:30 pm - 4:00 pm	Break	
4:00 pm - 4:15 pm	<b>Linking Sn-Li-(W-Cu) Mineralization to Post-Collapse Caldera Evolution Through Cassiterite LA-ICP-MS U-Pb Geochronology</b> <i>Dino Leopardi (Student)</i>	<b>It's Never Too Early for Geometallurgy – Geometallurgy in Exploration</b> <i>Melissa Gregory (Invited Speaker)</i>
4:15 pm - 4:30 pm	<b>Integrated Geological, Geochronological and Geochemical Approach to Exploration in the Hod Gold District, Türkiye: Implications for the Origin of the Hod Maden Au-Cu Deposit</b> <i>Nick Callan</i>	<b>Understanding Your Deposit Better Using Big Data: A Case Study from Kepez North, Balıkesir, Turkey</b> <i>Sinem Oguz</i>
4:30 pm - 4:45 pm	<b>New Investigations on the Geology and Mineralogy of the S'aliderru Bentonite Deposit (Sardinia, Italy)</b> <i>Sebastiano Coticelli (Student)</i>	<b>The Ikkari Gold Discovery, Finnish Lapland</b> <i>Charlotte Seabrook (Keynote Speaker)</i>
4:45 pm - 5:00 pm	<b>Q&amp;A</b>	<b>The Ikkari Gold Discovery, Finnish Lapland, continued</b> <i>Charlotte Seabrook (Keynote Speaker)</i>
5:00 pm - 7:00 pm	<b>Exhibit and Poster Reception: Monday and Tuesday Posters</b>	

## DAY 4 - TUESDAY, AUGUST 29, 2023

Oral Session 11 Gold - Responsible Discovery and Mining in the 21st Century I		Oral Session 12 Advances in Geoscience I	
8:30 am - 8:45 am	<b>Gold: Responsible Discovery and Mining in the 21st Century</b> <i>Mark Bristow (Keynote Speaker)</i>	<b>Trace Element Geochemistry of Pyrite and Marcasite as a Vector Towards Mineralization in Irish-Type Zn-Pb Deposits</b> <i>Claire Geel</i>	
8:45 am - 9:00 am	<b>Gold: Responsible Discovery and Mining in the 21st Century, continued</b> <i>Mark Bristow (Keynote Speaker)</i>	<b>Genesis of BIF-Hosted Martite-Goethite Ores: Concept and Application</b> <i>Caroline Perring</i>	
9:00 am - 9:15 am	<b>The Jibal Qutman Gold Project, Kingdom of Saudi Arabia. Deposit-Scale Structural Models in an Underexplored Terrane to Drive Discoveries</b> <i>Nadia St-Jean</i>	<b>Hydrothermal Alteration and Volcanic Stratigraphy at the Paleoproterozoic Kay Mine Volcanogenic Massive Sulfide Deposit, Black Canyon City, Arizona, USA</b> <i>Aaron Adsit (Student)</i>	
9:15 am - 9:30 am	<b>The Valley Project, a New High-Grade Reduced Intrusion-Related System in the Tintina Gold Province, Yukon Territory</b> <i>Andrew Turner</i>	<b>Random Forest Classification of Epidote Mineral Chemistry from the Aitik Deposit, Northern Sweden</b> <i>Michael Baker</i>	

9:30 am - 9:45 am	<b>The Importance of Mineral System Analysis as Inputs to Data-Driven Gold Targeting Projects</b> <i>Jean-Philippe Paiement</i>	<b>Graph Neural Network for Mineral Prospectivity Mapping - a Possible Solution to Maximise Utilization of Geological Relationships</b> <i>Felix Sihombing (Student)</i>	
9:45 am - 10:00 am	<b>Porphyry-Like Au-Cu System in Paleoproterozoic Greenstone Belts</b> <i>Tramaine James (Student)</i>	<b>Characterizing Geological Uncertainty with Stochastic Implicit Modeling</b> <i>Luiz Gustavo Rasera</i>	
10:00 am - 10:15 am	<b>Q&amp;A</b>	<b>Q&amp;A</b>	
10:15 am - 11:00 am	<b>Poster Viewing Session: Monday and Tuesday Posters</b>		

Oral Session 13 Gold - Responsible Discovery and Mining in the 21st Century II		Oral Session 14 Advances in Geoscience II	
11:00 am - 11:15 am	<b>Muruntau, Uzbekistan: A Giant, Pluton-Related Auriferous System</b> <i>Reimar Seltmann</i>	<b>The Fluids that Form Magnetite-Apatite Deposits</b> <i>Matthew Steele-MacInnis (Keynote Speaker)</i>	
11:15 am - 11:30 am	<b>Hypozonal Orogenic Gold Mineralization Explained by Metamorphic Devolatilization of Komatiites</b> <i>Richen Zhong</i>	<b>The Fluids that Form Magnetite-Apatite Deposits, continued</b> <i>Matthew Steele-MacInnis (Keynote Speaker)</i>	

**DAY 4 - TUESDAY, AUGUST 29, 2023 (Continued)**

11:30 am - 11:45 am	<b>Structural Modelling of the Au Mineral System Using 2D Seismic, Yamarna Greenstone Belt, Eastern Goldfields, Western Australia</b> <i>Armelle Kloppenburg</i>	<b>Fingerprinting Tools to Distinguish Magnetite Deposit Types</b> <i>Patrick Krolop</i>
11:45 am - 12:00 pm	<b>Using Edge Detection Techniques on Aeromagnetic Data to Delineate Structures Control Orogenic Gold Deposits in the Sefwi Granite-Greenstone Belt, Ghana</b> <i>Benjamin Boadi</i>	<b>Tracing the Sources of Rare Earth Elements in IOCGs</b> <i>Antony Burnham</i>
12:00 pm - 12:15 pm	<b>Characterization of Refractory Gold Behaviour in Witwatersrand Mine Tailings: Implications for Gold Recovery</b> <i>Steve Chingwaru (Student)</i>	<b>Mineralogy and Paragenesis of the Boundary Zone Clastic-Dominated Zn Deposit (Macmillan Pass, Yukon)</b> <i>Haruna Grema (Student)</i>
12:15 pm - 12:30 pm	<b>Application of U-Pb Detrital Zircon Geochronology to Delineate Regional Unconformities; Implications for Gold Mineralization in the Red Lake Mining Camp, Ontario, Canada</b> <i>Kate Rubingh (Invited Speaker)</i>	<b>The Paleoproterozoic Amitsoq Graphite Deposit, South Greenland</b> <i>Giacomo Fratelli (Student)</i>
12:30 pm - 1:05 pm (Q&A ends 12:45 pm)	<b>SEG's Role in a Global Society: Diversity, Equity and Inclusion</b> <i>Panel discussion</i>	<b>Q&amp;A</b>
12:45 pm - 1:45 pm	<b>Lunch</b>	

	<b>Oral Session 15 Gold - Responsible Discovery and Mining in the 21st Century III</b>	<b>Oral Session 16 Advances in Geoscience III</b>
2:00 pm - 2:15 pm	<b>Geological Features Common for Bonanza-Forming Epithermal Gold Deposits</b> <i>Keiko Hattori</i>	<b>Carbonate U-Pb Geochronology: A Novel Tool for Directly Dating Fluid Flow Events in Mineral Deposits</b> <i>Catherine Mottram (Keynote Speaker)</i>
2:15 pm - 2:30 pm	<b>The Electrochemical Flocculation of Colloidal Gold by Semiconductive P-Type Pyrite: A Novel Ore Forming Mechanism for Gold</b> <i>Duncan McLeish (Student)</i>	<b>Carbonate U-Pb Geochronology: A Novel Tool for Directly Dating Fluid Flow Events in Mineral Deposits, continued</b> <i>Catherine Mottram (Keynote Speaker)</i>
2:30 pm - 2:45 pm	<b>LA-ICP-MS Analysis on Sulfide Minerals from the Higashi-Aogashima Knoll Caldera Hydrothermal Field to Understand the Host Phase of Gold</b> <i>Tatsuo Nozaki</i>	<b>New Approaches to Constraining Cu-Co Mineralisation in the Zambian Copperbelt Using Hydrothermal Rutile and Apatite</b> <i>Jamie Kelly (Student)</i>
2:45 pm - 3:00 pm	<b>Gokona: An Archean Porphyry-Epithermal Au Deposit</b> <i>Charles Routleff (Student)</i>	<b>Far Field Geochemistry and C-O Isotope Signatures of the Bingham Porphyry Cu-Au-Mo Deposit in Carbonate Wallrocks</b> <i>Michael Kirschbaum (Student)</i>
3:00 pm - 3:15 pm	<b>Sustainable Futures for Small-Scale Gold Mining Communities: Mapping the Socio-Economic, Environmental, and Geological Baseline for Peixoto De Azevedo, MT, Brazil</b> <i>Maria Mesquita</i>	<b>Mineral Petrography, Trace Element and Pb Isotope Geochemistry of the Black Butte Cu-Co District, Belt Basin, Montana, USA: Constraints on Ore Genesis</b> <i>Jeffrey Steadman</i>

**DAY 4 - TUESDAY, AUGUST 29, 2023 (Continued)**

3:15 pm - 3:30 pm **Q&A**

**Kyanite Alteration as an Indicator for Saline Fluids and Metal Transport; Case Studies from the Central African Copperbelt**

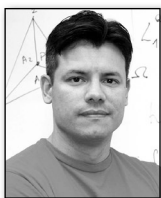
*Anna Bidgood (Invited Speaker)*

3:30 pm - 4:00 pm **Closing Ceremony and Concluding Remarks**

*Bob Foster, SEG 2023 Conference Chair*

*Steve Piercey, SEG 2024 President*

*Anna Nguno, SEG 2024 Conference Chair*

**INVITED AND KEYNOTE SPEAKERS**

**Juan Afonso** is an associate professor in computational geoscience and geo-data integration at the Faculty of Geo-Information Science and Earth Observation (ITC) at the University of Twente in the Netherlands. He also holds academic positions at Southern University of Science and Technology (China) and Macquarie University (Australia). His research focuses on the thermochemical structure and evolution of the lithosphere, the mechanical and geochemical interactions between tectonic plates and the sublithospheric upper mantle, and their effects on small- and large-scale tectonomagmatic processes and associated mineralization events. Juan is the developer of Multi-Observable Thermochemical Tomography (MTT), a technique that combines multiscale probabilistic inversion of multiple data sets, machine learning, and numerical modeling to address fundamental questions about the nature and evolution of the lithosphere, its mineral prospectivity, and geothermal potential.



**Ross Beaty**, Chair, Equinox Gold, founded Pan American Silver in 1994 and served as Chair until 2021; he was CEO of the company from its inception until 2004. Over 27 years, the company grew from a start-up to the world's second largest primary silver producer with the world's largest silver reserves and resources, while also becoming a significant gold producer.





**Anna Bidgood** is a Fulbright scholar at the Carnegie Institution for Science, where she is conducting phase equilibria experiments on cobalt sulfide minerals. This work is a continuation of her work at the Irish Centre for Research in Applied Geoscience, where her research focused on

technology-critical elements in hydrothermal sediment-hosted mineral systems, with a particular focus on the Central African Copperbelt. Anna moved into the field of economic geology after completing her Ph.D. degree in metamorphic geology at the University of Oxford. Her work also takes her to the Arctic, including Greenland, where she has a particular interest in mineral deposits, mineral systems, and the environmental and social considerations of exploration and mining.



**Mark Bristow** is the president and chief executive of Barrick Gold Corporation (NYSE: GOLD, TSX: ABX). Formerly, he was the chief executive of Randgold Resources, the company he built from a small Africa-focused exploration business into one of the industry's most profitable and best-managed

gold miners. In January 2019, Barrick and Randgold merged. Bristow restructured and reestrategized Barrick, and within months he was the prime mover in the combination of the Nevada assets of Barrick and Newmont, creating the world's single largest gold mining complex, Nevada Gold Mines, majority-owned and operated by Barrick. Bristow leads an organization with mines and projects in 18 countries, focused on long-life, high-margin gold and copper assets and containing six of the world's tier-one gold mines. A geologist by profession, Bristow holds a doctorate in geology. His goal is to make Barrick the world's most valued gold and copper producer, owning the best assets, managed by the best people, and delivering industry leading returns.

Ariana is a mineral exploration and development company



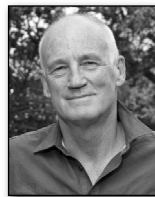
Its partnership with Zenit Madencilik in Turkey includes the operating Kiziltepe Gold-Silver Mine, developing Tavsan Gold Mine and exciting exploration portfolio.



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[arianaresources](https://twitter.com/arianaresources)



**Mike Daly** is a visiting professor in tectonics and resources in the Earth Sciences Department at Oxford University. After a decade of field mapping and a doctorate in structural geology, Daly joined British Petroleum (BP) as a research exploration geologist.

Almost 30 years later, he left BP having been Chief Geologist, Head of Exploration, and an executive vice president on BP's group executive team. Daly then joined Oxford and leads a research group in modern basin analysis, integrating basic geologic principles with leading-edge geophysical and geodynamic tools. He is a principal investigator in the UK's Copper Basin Exploration Science project and sits on the board of CGG, a geoscience technology company. He is a Harvard Business School alumnus and past president of the Geological Society of London.



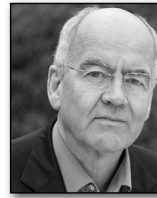
**Quentin Dehaine** is a senior researcher at the Geological Survey of Finland (GTK) where he has been leading several national and EU research and innovation projects on ore geology, mineral processing, and traceability and geometallurgy of battery minerals (cobalt, lithium) and critical

raw materials (CRMs) such as rare earth elements (REEs). After completing his Ph.D. at the University of Lorraine (Nancy, France), he worked as a postdoc researcher at the Camborne School of Mines, University of Exeter (UK), working on the geometallurgy of cobalt from the Democratic Republic of Congo (DRC). In 2019, Quentin joined the GTK with the objective of developing innovative integrated approaches to supporting mine value chain optimization, responsible sourcing, reducing technical risk, maximizing resource efficiency, and minimizing environmental impacts. Quentin is also the officer for Scandinavia within the International Union of Geological Sciences (IUGS) Initiative on Forensic Geology (IFG).



**Laurance Donnelly** is a professional Chartered Geologist and head of the technical department and Chief Geologist at AHK International, responsible for global inspection and associated sample preparation. He is also a Chartered Scientist, European Geologist, and elected fellow of the Geological

Society of America. He holds a first-class honors degree (mineral exploration and mining geology) and a Ph.D. (fault reactivation and geological hazards) and has 34 years of international experience in mineral exploration, mineral resource evaluation, mining geology, forensic geology, engineering geology, geophysics, and geological hazards. He is the founder of the Forensic Geoscience Group of the Geological Society of London, and served as its first Chair. He is also the founder and current Chair of the International Union of Geological Sciences (IUGS) Initiative on Forensic Geology (IFG).



**John Elkington**, Founder and Chief Pollinator at Volans, is one of the founders of the global sustainability movement and has worked as a strategic advisor to businesses across the globe for more than 40 years. He has served on over 70 boards and advisory boards and currently chairs an advisory

council on sustainability and new markets for Neste (Finland) and an impact valuation advisory council for Novartis (Switzerland). John is also a highly regarded keynote speaker and author; he has addressed over 1,000 conferences around the world and is the author or co-author of 20 books. In September 2021, John won the World Sustainability Award.



**Katya Gorbatiouk** has over 20 years of experience in international capital markets. As the head of investment funds in primary capital markets for the London Stock Exchange, Katya is responsible for driving the growth and liquidity of the London listed funds market—a conduit of capital into vital sectors

of the economy, such as infrastructure, energy transition, and innovation. Katya is also a member of the Group Sustainability working group. Since February 2022 Katya has served on the Best Practice Committee of the Board of the Investor Relations Society. She is chair of its Sustainability Communications subcommittee and a member of its IR Communications and Engagement subcommittee. Her articles on the evolution of corporate communications were published in the recent issues of the IR Society Journal *Informed*. Katya has been a long-standing board member of organizations with high social impact, such as the Global Leaders Institute (Washington, D.C.) and London Music Fund.



**Melissa Gregory** is a geometallurgist and mineralogist working for Rio Tinto Exploration based at the Bundoora Technical Development Centre in Melbourne, Australia. She has a Ph.D. degree in economic geology plus over 18 years' experience across various deposit types including

porphyry and sediment-hosted copper, pegmatite-hosted lithium, orogenic gold, ultramafic-hosted nickel, and unconformity U deposits. Her current role focuses on the geometallurgical characterization of mineralization as part of the exploration process.



**Karen Hanghøj** is the director of the British Geological Survey. She is a geologist with extensive experience in research and innovation management and the minerals and metals industry. Karen is passionate about understanding the complexity of resource management,

about environmental and social sustainability, and about the role of geoscience in finding solutions to societal challenges. Karen holds a Ph.D. in geology from the University of Copenhagen. She worked with research on geologic processes in the lower crust and mantle and their associated mineral deposits before taking senior leadership roles in research and innovation organizations. She is a member of a range of international committees and working groups.



**Kate Harcourt** is a sustainability professional with over 30 years of experience across the mining industry. She works as part of owner's teams with leadership on sustainability issues and for Equator Principles financial institutions and engineering groups. She serves as Non-Executive Director to Condor

Gold, Fortuna Silver (transitioning from Roxgold Inc), Orezone Gold Corporation, and Atalaya Mining. Kate works on projects mainly in Europe and Africa, developing policy and environmental management frameworks and navigating local and international ESIA processes, stakeholder engagement and permitting, lender liaison, annual reporting, and construction supervision. She has joined due diligence teams on high-profile new projects and has contributed to documentation on industry good practice. In 2018, she was nominated one of the Top 100 Global Inspirational Women in Mining.



**David Holwell** is an associate professor in applied geology in the Centre for Sustainable Resource Extraction at the University of Leicester, UK. He completed his Ph.D. research at Cardiff University on the Platreef deposit in the Bushveld Complex, and, after three years working as a consultant

exploration geologist on a range of commodities across the globe for SRK Exploration Services, he joined Leicester in 2009. His main research areas focus on magmatic ore deposits, especially Ni-Cu-Co-platinum group element (PGE) sulfides, including PGE deposits in the Bushveld and Skaergaard Complexes, and a range of Ni-Cu sulfide systems across the globe, with a specialization in southern Africa. He has been involved in numerous projects that apply fundamental geoscience to exploration targeting and the understanding of orebodies and the crustal cycling and concentration of critical metals required for the energy transition. He is a Fellow of the SEG and an Associate Editor of *Economic Geology*.



**Robert Kaemba** is currently an M.Sc. economic geology candidate at the School of Geosciences, University of the Witwatersrand, South Africa, and an exploration geologist who has spent over 13 years working in the Central African Copperbelt at various levels of responsibility. His career has

predominantly involved the operation and technical advancement of grassroots to advanced-stage projects of sediment-hosted copper (SHC-type) mineral deposits in Zambia. Robert takes a keen interest in matters surrounding fairness, diversity, equity, and inclusion (DEI) in geoscience. He also maintains an interest in initiatives that can improve stakeholder and local community engagement to foster win-win success in obtaining social license to operate. He is a Fellow of the Society of Economic Geologists and was elected to the SEG Council in 2022.



**Julian Kettle** is the Vice Chairman of Metals and Mining at Wood Mackenzie, having been with the company since 1989. He holds a degree in metallurgy and micro-structural engineering and has over 30 years of experience in analysis of the metals and mining industry in relation to base metals,

battery raw materials, and bulk commodities. Based in the U.K., he travels extensively and regularly presents to senior industry, government, and financial community stakeholders, leveraging his in-depth knowledge of the key factors influencing the industry and issues that stakeholders face to provide strategic advice to clients. Julian has been involved in market environment assessment, expert witness, raw materials sourcing, contract pricing, portfolio optimization, and strategic advisory relating to brownfield and greenfield investments across the value chain.



**Rebecca Major** is a corporate and projects partner at international law firm Herbert Smith Freehills LLP and head of the firm's mining and energy practice in Paris. She has significant experience advising the firm's clients on a broad range of legal matters arising from their planned investments and

ongoing activities in the mining and energy sectors throughout the world. She has a particular focus on Africa but also works on matters in Europe, Asia, South America, and the Middle East. Rebecca is consistently singled out for her expertise in the energy and mining sectors by the leading independent benchmarking publications (Chambers Global, Legal 500 EMEA, Who's Who Mining). She has been a lawyer for more than 25 years and a partner for over 17 years.



**Catherine Mottram** completed her undergraduate studies in geoscience at the University of St. Andrews before moving to The Open University to work on her Ph.D. in Himalayan tectonics. She spent time as a Fulbright postdoctoral scholar at the University of Santa Barbara, USA, and as a Killam

postdoctoral fellow at Dalhousie University in Canada before moving to the University of Portsmouth in 2017, where she is currently a senior lecturer in structural geology and tectonics. Catherine is a passionate geology educator and science communicator. Catherine's research focuses on directly dating deformation from the ductile to brittle crust using various geochronometers. She has been working on a major project, in collaboration with the Geological Survey of Canada and local exploration companies, focused on understanding structural controls on Au-Cu-Mo mineralization in the Yukon and northern British Columbia, Canada.

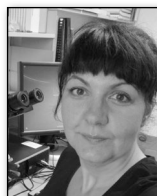


**Lisa M.P. Munoz** is the author of *Women in Science Now: Stories and Strategies for Achieving Equity* (Columbia University Press, 2023). She is the founder and president of SciComm Services, a science communications consulting firm. A former journalist, Munoz was a reporter and managing editor for *Geotimes* magazine and a press officer at the World Meteorological Organization in Geneva, Switzerland. She has more than twenty years of experience crafting science content for scientists and the public alike. Munoz holds an engineering degree from Cornell University with a major in science of the earth systems.



**Glen Nwaila** is the director of the Wits Mining Institute and an adjunct professor at the School of Geosciences, University of the Witwatersrand (Wits). Prior to joining Wits in 2017, he worked in the mining and consulting industries for 12 years, where he led teams of mining professionals and led audits

in mineral resources and extractive metallurgy plants. In mining, Glen led the geology functions for various companies. He also served as manager at Deloitte. Glen has been an Erasmus Mundus Scholar at Uppsala University since 2018. He completed his Ph.D. magna cum laude at Würzburg University in Germany, an M.Sc. in chemical engineering at the University of Cape Town, and a geology degree at the University of Johannesburg. Glen is a professional natural scientist with the South African Council for Natural Scientific Professions and is a Fellow of the Geological Society of South Africa.



**Sabina Strmic Palinkas** is an associate professor in geochemistry and ore geology at UiT the Arctic University of Norway. She also holds an adjunct professor position at the 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 and mineral resources. Her area of expertise comprises aqueous and high-temperature geochemistry, geochemical and thermodynamic modeling, and applications of organic geochemistry and stable isotope systematics to ore-forming and environmental processes. Her recent research interest is focused on submarine hydrothermal systems, including recent systems along the Arctic mid-ocean ridges as well as ancient systems preserved along the Scandinavian Caledonides and within the Fennoscandian Shield.



**Jim Royall** has worked in the mining industry for over 20 years on early-stage and advanced exploration projects for a diverse range of commodities in Europe, Asia, Africa, and South America. This includes 10 years with Rio Tinto and senior management positions for various junior mining companies.

Jim has lived in Spain for many years and has extensive experience throughout the Iberian Peninsula, where he has managed a number of important exploration and development projects. Jim has a bachelor of science degree in geology from Oxford Brookes University, is a member of the Australian Institute of Geoscientists (AIG) and a fellow of the Geological Society of London, and served as a qualified person for several mineral exploration companies.



**Kate Rubingh** is a postdoctoral fellow with MDRU (Mineral Deposit Research Unit) at the University of British Columbia, having obtained an M.Sci. in geological sciences from Durham University, an M.Sc. in mineral exploration from Queen's University, and a Ph.D. from Laurentian University.

Kate is a field economic geologist with research experience in gold deposits of the Paleoproterozoic and Archean, focusing on the application of volcanic stratigraphy and structural analysis to refine the structural framework at both the deposit and regional scale. Kate's current research in the Golden Triangle area of British Columbia will use new lithogeochemistry and geochronology to refine the paleovolcanic architecture of the Hazelton group stratigraphy and its controls on the distribution of mineral deposits to understand metal endowment in the Golden Triangle area.



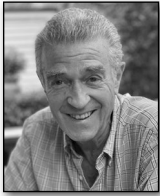
**Charlotte Seabrook** has been Exploration Manager at Rupert Resources in Finnish Lapland since 2018 and led the exploration team to the greenfields discovery of the Ikkari gold deposit in 2020. Charlie has nearly 20 years' experience in multicommodity exploration in

various terranes including Australia and West and Central Africa. Her experience includes exploring the Central African Copperbelt and Birimian basin of West Africa, where she was integral to several discoveries on the Ivory Coast while working for Newcrest as the district geologist. She completed her Ph.D. at the University of the Witwatersrand, holds an M.Sc. in mineral resources from the University of Wales (Cardiff), and is currently based in Finland.



**Libby Sharman** is an exploration geologist working as the Technical Lead for BHP Xplor, having spent five years prior with BHP Metals Exploration contributing to global exploration strategy through project generation and prospectivity analysis. She completed her Ph.D. at McGill University and has since

gained experience in different facets of the exploration and mining industry, including as a project geologist, researcher, and communications specialist. Libby has experience on varied deposit types across five continents, from project generation to resource drilling for companies of all sizes and scopes. Libby's personal experiences have fostered an interest in improving the mining industry and making it a more inclusive and appealing sector in which to work. She pursues this through various volunteer roles in industry organizations including the Society of Economic Geologists.



**Richard Sillitoe** graduated from London University in England, where he went on to earn a Ph.D. degree in 1968. After three years with the Geological Survey of Chile and a Shell postdoctoral research fellowship at the Royal School of Mines in London, he has operated for five decades as an independent consultant to mining companies, international agencies, and foreign governments. He has worked on a wide variety of mineral deposits and prospects in 100 countries worldwide but focuses on the epithermal gold and porphyry copper environments. Published research has earned him awards in Europe, Australia, and North and South America, including the Robert M. Dreyer Award (Society for Mining, Metallurgy, and Exploration), the SGA-Newmont Gold Medal (Society for Geology Applied to Mineral Deposits), and the R.A.F. Penrose Gold Medal of the Society of Economic Geologists, of which he was President from 1999 to 2000.



**Matthew Steele-MacInnis** is a professor of geology at the University of Alberta whose research focuses on geologic processes that involve fluids, especially formation of mineral deposits. Originally from Newfoundland, Canada, he first studied geology at Memorial University of Newfoundland, then did a Ph.D.

at Virginia Tech, after which he held a Marie Curie Postdoctoral Fellowship at ETH Zurich. Matthew has been a recipient of the Hisashi Kuno Award from the American Geophysical Union, a CAREER Award from the U.S. National Science Foundation, the Young Scientist Award from the Mineralogical Association of Canada, and the SGA Young Scientist Award from the Society for Geology Applied to Mineral Deposits.

## Post-Conference Program

### Post-Conference Field Trips

#### **August 30-September 8**

**Fennoscandia: Cu, Ni, Co, Au, PGMs, Balanced Land Use**

*Leaders: Jukka-Pekka Ranta and Nils Jansson*

#### **August 30-September 5**

**Cornwall: Reinvigorated Historic District—Sn, W, Li, Cu, Industrial Minerals**

*Leaders: Jens Andersen and Sam Hughes*

### Post-Conference Workshops

#### **August 30**

**Core Logging—Time to Hit the Reset Button!**

*Presenter: John Orpen*

#### **August 30-31**

**Resource Estimation Masterclass**

*Presenters: Tom Pratelli, Lais Hirata, and James Haythornthwaite*

#### **August 31**

**How to Discover, Drill Out, and Mine a Porphyry Au-Cu Deposit**

*Presenters: Dan Wood and Andre van As*

## Posters

Posters will be on display in two cohorts, with an “A” designation for Saturday and Sunday and “B” for Monday and Tuesday. Poster sessions are posted online.

The presenting author’s name is underlined below.

### Session A: Saturday and Sunday

#### Battery Metals - the Drivers of Future Energy Supply

- A001 Potential Sources of Rare Earth Elements (REEs) in Loch Borrallan, Northwest Highlands, Scotland: Geochemical and Mineralogical Controls on REE Distribution in Carbonatite (*Student*)  
Abdulkadir Mohamed Abdulkadir
- A002 Mineralogy and Whole-Rock Geochemistry as Exploration Tools for Lithium Pegmatites in Ghana: Examples from the Biriwa-Ewoyaa Pegmatite Fields (*Student*)  
Elizabeth Agyekum, Kofi Adomako-Ansah
- A003 Structural-Chemical Vectors to LCT-pegmatites in the Varuträsk Area, Sweden  
Joel Andersson, Edward P. Lynch, Martiya Sadeghi, Samuel Lundsten, Tobias E. Bauer
- A004 Molybdenite from the Palaeoproterozoic REE-line in Bergslagen, Sweden: Textural Relations, Trace Element Chemistry and Re-Os Age Data  
Stefan S. Andersson, Erik Jonsson, Thomas Zack, Martiya Sadeghi
- A005 The Iberian Pyrite Belt as a Strategic Source of “Green” and Critical Minerals: The Co Enrichment in VMS (*Student*)  
Gonzalo Ares, Carmen Conde, Fernando Tornos
- A006 Reassessment of Rare-Metal Potential of the Karagaily-Aktas Deposit (Kazakhstan)  
Akmaral Baisalova, Yerlan Akbarov, Alla Dolgopolova, Reimar Seltmann
- A007 Finding and Quantifying Li Bearing Mineralisations Using the GeoCore X10 Drill Core Scanner  
Mikael Bergqvist, Alexander Hansson, Mikael Kördel, Karin Högdahl, Erik Jonsson, Magnus Leijd, Jaroslaw Majka, Pauline Jeanneret

- A008 The Yin Deposit, A New REE Discovery in the Gifford Creek Carbonatite Complex, Gascoyne Province, Western Australia  
Luke Blais
- A009 Investigating Aeration and Filtration as Pre-Treatment Methods for Flowback and Produced Water Prior to Ion-Exchange for Lithium Extraction (*Student*)  
Bennett Braun, Karthik R. Shivakumar, Daniel Alessi
- A010 Battery Metal Exploration: Integrating Satellite, Airborne, Drone and Field Data with Machine Learning Outputs in Cornwall  
Mark Broadley
- A011 Scientific Drilling at a REE-Mineralised Carbonatite  
Sam Broom-Fendley, Kathryn Goodenough, Michael Marks, John Spear
- A012 Mineralogy and Composition of Vanadium-Bearing Shales at the Van Property, Mackenzie Mountains, Northwest Territories  
Stefanie M. Brueckner, Turner Green, Merilie A. Reynolds, Daniel Gregory
- A013 The Mineralogy and Mineral Associations of Platinum-Group Elements and Base Metal Sulphides in the Down-Dip Critical Zone at Sand-sloot, Northern Bushveld Complex (*Student*)  
Kate R. Canham, David Holwell, Iain McDonald, Hannah Hughes, Andy Lloyd, Lara Du Preez, Kofi Acheampong
- A014 Stream Sediments as an Exploration Tool for Spodumene Pegmatites  
Lawrence C. Carter, Julian Menuge, Ben J. Williamson, Teimoor Nazari Dehkordi, Gavyn K. Rollinson
- A015 Mapping Critical Minerals in Mineral Systems with the Critical Minerals in Ores (CMiO) Database  
George N. Case, Evgeniy Bastrakov, Garth Graham, Albert Hofstra, David Huston, Christopher Lawley, Vladimir Lisitsin, Bronwen Wang
- A016 Cobalt Mineralization in the Central African Copperbelt: Preliminary Insights from Petrography and LA-ICP-MS Analyses (*Student*)  
Malena Cazorla Martínez, Lingli Zhou, Murray Hitzman



- A017 REE Enriched Migmatites and Gneisses of Son Valley Crystalline Area Sonbhadra, Uttar Pradesh: Can It be a Potential REE Deposit in India?  
*Sakthi S. Chinnasamy, Abhishek Verma*
- A018 Integration of Multiscale Hyperspectral Data, Geochemistry, and Mineralogy for Assisting Mineral Exploration: The Brownfield Punta Corna Co-Ni Vein-Type Deposit (Italy) (Student)  
*Rita Chirico, Nicola Mondillo, Carsten Laukamp, Jens Najorka, Diego Di Martire*
- A019 Stratabound Cobalt Mineralization at Kinsevere, DRC (Student)  
*Robert S. Collar, Herve Ilongo, Takalani Mandiwana, A.E. Williams-Jones*
- A020 Melt-Fluid and Fluid-Fluid Immiscibility in Na<sub>2</sub>SO<sub>4</sub>-SiO<sub>2</sub>-H<sub>2</sub>O System and Its Implications for the Formation of Rare Earth Deposits  
*Hao Cui, Richen Zhong, Yuling Xie, Xiaolin Wang, Huan Chen*
- A021 Magma Mixing in the Huangshandong Ni-Cu Sulfide-Bearing Mafic-Ultramafic Complex, NW China  
*Yu-Feng Deng, Sheng-Xuan Cao, Feng Yuan, Xie-Yan Song*
- A022 Textural and Mineralogical Characterization of One Lithium Deposit from the Barroso-Alvão Aplite-Pegmatite Field: Preliminary Study (Student)  
*Filipa Dias, Alexandre Lima, Encarnación Roda-Robles, Tânia Martins*
- A023 Controls on the High-Grade Gold-Cobalt Mineralisation at Rajapalot, Finland (Student)  
*Lily Dickson, Taija Torvela, Robert C. Chapman*
- A024 The Shavazsay Deposit (Uzbekistan) – a Large Caldera-Hosted Volcano-Sedimentary Lithium Deposit  
*Alla Dolgoplova, Reimar Seltmann, Rustam Mirkamalov, Farid Divaev, Rustam Khalmatov*
- A025 The Successful Application of Stream Sediment Geochemistry as an Exploration Tool for As-Bi-Co-Cu-Fe-Ni Mineralisation in Volcano-Sedimentary Settings (Student)  
*Adam Eskdale, Sean Johnson, Amy Gough*

- A026 LREEs, Zr and Th Enrichment of Autometasomatic Alkaline Dikes in Mamuju, West Sulawesi, Indonesia: Constraints from Petrology and Whole Rock Geochemistry (Student)  
*Fadlin Fadlin, Shaban Godang, Arifudin Idrus, Hartaja M. Wicaksono, Wildan N. Hamzah, Rinaldi Ihkram*
- A027 Magmatic Glass as a Source of Lithium: A Case Study of the Cerro Galán Ignimbrite of Northwest Argentina  
*Conor Farrell, Alison Rust, Edward Bunker, Stephen Edwards, Naomi Thompson, Joseph Emmings*
- A028 Hydrothermal Alteration and the Formation of an Iron-Oxide-Apatite (IOA)-Type Rare Earth Element (REE) Deposit at Kwiyjibo, Québec, Canada (Student)  
*Gary Fung, A.E. Williams-Jones, David Martineau*
- A029 Geochemical and Petrographic Effects of Halo Formation in Host Rocks of Spodumene Pegmatites in Southeast Ireland (Student)  
*Elena J. Geiger, Teimoor Nazari-Dehkordi, Julian Menuge*
- A030 Mineralogy and Critical Metal Depletion of Fe-Ni-Co Laterite Ores from Sebuku Island, SE Kalimantan, Indonesia  
*Michele Giorno, Alkiviadis Kontonikas-Charos, Doreen Ebert, Joachim Krause, Robert Möckel, Dirk Sandmann, Mathias Burisch, Ernowo Ernowo, Arifudin Idrus, Yoseph Swamidharma, Yudhi Krishanto, Max Frenzel*
- A031 New Lithium Search Spaces – a Mineral Systems Approach  
*Howard C. Golden, William Heins, Paul Jackson*
- A032 Lithium Pegmatites in Africa: Understanding Parageneses  
*Kathryn Goodenough, Richard Shaw, Anouk Borst, Paul Nex, Judith Kinnaird, Marieke van Lichtervelde*
- A033 Battery Metals in Diverse Geological Environments of the Lesser Caucasus, Armenia: An Overview for Future Exploration  
*Samvel Hovakimyan, Robert Moritz, Marianna Harutunyan, Karen Hambaryan, Kima Charatanyan*

- A034 A Fresh Look at the World-Class “Five-Element” Vein Deposit, Cobalt, ON, Canada: Constraints from Fluid Inclusion and Stable Isotope Systematics, and Mineral Paragenesis (*Student*) Joshua Jackman, Jacob Hanley, Daniel Kontak, Richard Stern, David Lewis
- A035 Green Transition-Critical Metal and Mineral Resources in the European Nordics Erik Jonsson, Tuomo Törmänen, Jakob K. Keiding, Terje Bjerkgård, Pasi Eilu
- A036 Project BATTRACE—Using Geo-Based Fingerprinting for Battery Raw Material Traceability Harri Kaikkonen, Quentin Dehaine, Mari Kivinen
- A037 Market Drivers and Barriers for Battery Raw Material Traceability Harri Kaikkonen, Mari Kivinen
- A038 Tellurium: Geometallurgy of a Critical Element at the Perseverance VMS Deposit, Quebec, Canada (*Student*) Filip Kasprowicz, Katharina Pfaff, Thomas Monecke, David Diekrup, Samuel Pierre, Mark Hannington
- A039 “Multi-Step Distillation” Anatexis as a Mechanism for Generating LCT Pegmatites (*Student*) Lot Koopmans, Tania Martins, Robert Linnen, Richard M. Palin, Catriona Breasley, David Silva, Nicholas J. Gardiner, Lee A. Groat, Laurence J. Robb
- A040 Exploration Model for REE Deposits Associated with Nepheline Syenite Occurrences in Tropical Areas: Case Study of the Eboundja Nepheline Syenite (Cameroon) (*Student*) Kenneth K. Kwanang, Louise Marie Ngo Bidjeck, Yannick Ngono Onana
- A041 Source to Sink Modelling of Salar-Hosted Lithium Brine Systems Christopher Lambert, Jean-Jacques Ferguson, Esme Whitehouse, Edward Bunker, Alexandra Scarlet, Jorge Gines
- A042 Eruption of Extremely Fractionated Magmas: Implications for Magmatic Versus Volatile Processes David R. Lentz, Reimar Seltmann, Nadia Mohammadi



- A043 Critical Metal Occurrences in Historic Mining Waste in Sweden Alexander Lewerentz, Johan Camitz, Patrick Casey, Dick Claeson, Roger Hamberg, Erik Jonsson, Daniel Larsson, Stefan Persson, Gunnar Rauséus, Helge Reginiussen, Johan Söderhielm, Björn Wiberg
- A044 Petrogenesis and Ni-Cu Sulfide Mineralization of Early Permian Mafic-Ultramafic Complexes in the Beishan Area, Xinjiang (*Student*) Hao Lin, Dongyang Zhang
- A045 A Mineral Systems Approach to the Classification of Lithium Deposits Robert Linnen, Wilson Bonner, Kurt House
- A046 Using Scanning Electron Microscope-Based Automated Mineralogy to Better Understand Magnetic and Conductive Anomalies in Ni-Cu-Co-PGE Exploration Targets in W-Greenland Stefanie Lode, Björn H. Heincke, Nynke Keulen, Bo Møller Stensgaard
- A047 Geology of the Paleoproterozoic Järkvissle Li-Sn-Ta Pegmatite System, Central Sweden Edward P. Lynch, Joel B. Andersson, Martija Sadeghi, Irma Bečelytė, Peter Hedin, Tobias E. Bauer
- A048 Emplacement Mechanisms of Rare Element Pegmatites, Separation Lake Greenstone Belt, Northwest Superior Province (*Student*) James A. Macdonald, Alfredo Camacho, Garnet J. Ching

- A049 Origin of Alkaline-Carbonatite Rocks and Related Mineral Deposits at the NW Margin of the West African Craton: Inferences from Field and Petro-Geochemistry (*Student*)  
*Cheikh Elwali Malainine, Muhammad Ouabid, Otmane Raji, Jean-Louis Bodinier*
- A050 Lithium in Manitoba: Production and Exploration Potential  
*Tania Martins*
- A051 The REDOX Setting of the Stratabound V Mineralization at the Van Property, Northwest Territories (*Student*)  
*Chelsey C. Merrick*
- A052 Timing and Linkage of the Mesoproterozoic REE-Y-Zr-Nb Mineralized Strange Lake and Flowers River Deposits to the Neoproterozoic Nekuashu-Aucoin Magmatic Event, Northern Canada  
*Nadia Mohammadi, Anne-Aurélië Sappin, David Corrigan, Neil Rogers, Nicole Rayner*
- A053 Battery Minerals in the Democratic Republic of Congo: Overcoming Challenges to Discover a New World-Class Lithium Deposit in the Kasese-Lulingu Pegmatitic Belts (KLP) (*Student*)  
*Rub'son H. N'nahano, Huan Li, Mohammed A. Ibrahim*
- A054 Application of Soil Geochemistry for Pegmatite Exploration: Spodumene Pegmatites in Ireland and Austria, and High-Purity Quartz-Bearing NYF Pegmatites in Norway  
*Teimoor Nazari-Dehkordi, Julian Menuge, Lawrence Carter, Ben Williamson, Axel Müller*
- A055 Implications of the Magma-Mush Concept for Lithium Enrichment Processes in LCT Pegmatites (*Student*)  
*Louis R. G. Penfound-Marks, Ben J. Williamson, Julian F. Menuge, Lawrence C. Carter*
- A056 The McDermitt Deposit (Oregon, US): Preliminary Results from a Li-Clay Volcano-Sedimentary System  
*Francesco Putzolu, Robin Armstrong, Rebecca Ball, Paul Meyer, Richard Herrington*
- A057 Relationship Between Granitic Intrusions and the Hydrothermal Veins in the Argemela Tin and Lithium Mine (*Student*)  
*Ricardo Ribeiro, Rui Moura, Alexandre Lima, Charles Gumiaux*

- A058 Structural Controls on the Origin of Regolith-Hosted Rare Earth Element Deposits at the Coastal Cordillera, Central-Southern Andes (35-37°S)  
*Tomás Roquer, Paulina Vergara, Nicolás Bustos, Carlos Marquardt*
- A059 Occurrence and Geological Features of LCT Pegmatite in Kalba-Naryn Belt, East Kazakhstan (*Student*)  
*Gleb Smirnov, Azam S. Dehnavi, Reimar Selmann*
- A060 Rare Earth Element Recovery from Apatite (*Student*)  
*Julia Sordyl, Jarosław Majka, Karin Högdahl, Maciej Manecki*
- A061 Geological Analysis of Graphite Deposits in Capim Grosso (BA), Brazil (*Student*)  
*Thales F. Tandel*
- A062 Assessing Vanadium Speciation in Hyper-Enriched Black Shales to Identify the Geochemical Controls Involved: Insights from X-Ray Absorption Near-Edge Spectroscopy (*Student*)  
*Ozgur Can Tekin, Daniel D. Gregory, Anthony Chappaz, Danielle McGill, Daryll B. Concepcion, Merilie A. Reynolds, Chelsey Merrick, Daisy Zhang, Stefanie M. Brueckner*
- A063 The Deeper Platereef at Sandsloot: New Insights Into Controls on Ni-Cu-PGE Mineralisation in the Bushveld Complex (*Student*)  
*Erin Thompson, David Holwell, Iain McDonald, Marc Reichow, Thomas Blenkinsop, Lara Du Preez, Kofi Acheampong, Andy Lloyd*
- A064 Multi-Scale Insights Into the High-Grade Mt Weld REE Deposit from 2D and 3D Active Seismic Survey Data  
*Greg Turner, Tom Bell, Mohamed Megebry, Ganesh Bhat, Brad Knell, Nigel Miller*
- A065 Controlling Factors in Regolith-Hosted Rare Earth Elements Deposits Formation at the Coastal Cordillera, Central-Southern Andes of Chile (*Student*)  
*Paulina Vergara, Tomás Roquer, Nicolás Bustos, Carlos Marquardt*
- A066 Cobalt Distribution and Enrichment in Skarn Iron Deposits: A Case Study of the Zhuchong Skarn Fe-Cu-Co Deposit, Eastern China  
*Fangyue Wang, Xian Liang*

- A067 Characteristics and Origin of the Li-Rich Hydrothermal Altered Granite: A New Type of Clay Li Deposits?  
*Zhiqiang Wang, Feng Yuan*
- A068 Ewoyaa Lithium Project—Rediscovery to Resource  
*Isaac I. Williams, Lennard Kolff van Oosterwijk, Abdul-Razak S. Ballah, Kathryn Goodenough, Richard Shaw, Marieke Van Lichtervelde*

### Copper - Red Metal for a Green Future

- A070 Timing of Cu-Mo Mineralization in the Deep Extension of the Giant Chuquicamata Deposit, Northern Chile (*Student*)  
*Claudio A. Araya, Antonio Arribas*
- A071 Geology, Mineralization, Geochemistry, Geochronology, and Ore Potential of Cu Deposits, Central African Copperbelt: A Review  
*Kevin Igor Azeuda Ndonfack, Jilin Zhang, Zhiming Yang*
- A072 Tectonic Controls on Porphyry Copper Formation in the Northern Great Basin (Nevada-Utah-Idaho), Western USA (*Student*)  
*Hero Bain, Thomas Lamont, Dan Bevan, Frances Cooper, Tim Elliott, Adam Gorecki*
- A073 Alteration Products of Seafloor Massive Sulfides: A New Source of Copper? (*Student*)  
*Christian S. Bishop, Bramley J. Murton, Stephen Roberts, Anna Lichtschlag*
- A074 Application of Alteration and Geochemical Vectors for Blind Porphyry Cu-Au-Ag-Mo Exploration: An Example from Camp Creek, Thorn District, British Columbia, Canada  
*Farhad Bouzari, Shaun Barker, Robert G. Lee, Cassidy Harraden, Gary Thompson, Christina Anstey, Brock Riedell*
- A075 The Potential Porphyry Cu-Mo Deposit on the Patacual Claim, El Limon-La Cuesta Locations, Municipality of Tecpan De Galeana, Guerrero State, Southern Mexico (*Student*)  
*Lizbeth G. Carrillo-Marrodan, Jesus Castro-Mora*
- A076 Magmatic-Hydrothermal Crystal Mush within the Porphyry-Forming Environment—Spatial and Temporal Constraints  
*Lawrence C. Carter, Ben J. Williamson, Simon Tapster, Gavyn K. Rollinson*
- A077 The Orion Cu-Au-Ag-Co-Zn Discovery in the West Kimberley Region, Western Australia – A New Mineralisation Style in a Greenfields Terrane  
*Nicholas Chapman*
- A078 The Role of Exhumation in Generating High-Grade Copper Deposits: Insights from the Central Andes, Northern Chile  
*Frances J. Cooper, Byron A. Adams, Simon I. Dahlström, Todd A. Ehlers, Matthijs C. van Soest, Kip V. Hodges, Brian R. Jicha, Bradley S. Singer, Jaime Cortes Yañez*
- A079 Rapid Cu-Porphyry Indicator Mineral Characterization by  $\mu$ XRF: Automated Detrital Indicator Mineral Analysis of British Columbian Cu-Porphyry Exploration Properties (*Student*)  
*Ben M. Eaton, Shaun L. Barker, Lindsey J. Heagy*
- A080 Petrology and Geochronology of Pre- to Post-Ore Igneous Rocks from Asarel Porphyry Cu ( $\pm$ Au $\pm$ Mo) Deposit, Central Sredna Gora Zone, Bulgaria  
*Stoyan Georgiev, Irena Peytcheva, Elitsa Stefanova, Atanas Hikov, Albrecht von Quadt, Marcel Guillong, Desislav Ivanov*
- A081 Competency-Controlled Copper Mineralization at the Onganja Mining District, Namibia (*Student*)  
*Matthew P. Hales, Judith Kinnaird, Paul Nex*
- A082 Porphyry Cu Fertility of Late Mesozoic-Cenozoic Magmatism Along the East Anatolian Magmatic Belt Based on Zircon Trace Element Compositions  
*Ali İmer, Rui Wang, Kaan Sayit, Ersin Koralay*
- A083 Copper in the Guiana Shield  
*Salomon B. Kroonenberg*
- A084 Improving the Sustainability of Copper Mining Through XRF Sensing, Machine Learning, and Bulk Ore Sorting  
*Hannah Lang, Karim Halaseh, Giovanni Pamparana*
- A085 Deciphering Fluid Origins in the Paleozoic Iron Oxide-Cu-Au (IOCG) Deposits, NW China: Constraints from Noble Gases and Halogens  
*Pei Liang, Yuling Xie, Lingling Xiao*

- A086 Implementation of a Tectonic and Magmatic GIS-Based Database for Porphyry Copper Deposits Across the Southwest USA (*Student*)  
*Roseanne Marshall, Thomas Lamont, Frances Cooper, Robert Loucks, Adam Gorecki*
- A087 Understanding Climate and Weather-Drivers of Tailings Risk in Chile: A Complex Multi-Hazard Challenge  
*Linda Jakschies, Blake O'Sullivan, John Coll, Stephen Edwards, Katie McFall*
- A088 Contrasting Tectonomagmatic Conditions for Porphyry Cu and Iron-Oxide-Apatite Deposits in Phanerozoic Arcs  
*Xuyang Meng, Jingwen Mao, Adam Simon, Chao Duan, Guiqing Xie, Huimin Su, Tong Hou, Ke Shi, Nian Chen*
- A089 Isotopic Microanalysis of Calcite in the Permian Kupferschiefer System (Saale Subbasin, Eastern Germany) (*Student*)  
*Mohammed S. Mohammedyasin, Joseph M. Magnall, Sarah A. Gleeson, Hans-Martin Schulz, Maria R. Scicchitano, Michael Wiedenbeck*

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- A090 The Use of Phlogopite as an Indicator of Magmatic Cu-Ni Mineralisation in the Curaçá Valley, Brazil (*Student*)  
*Ellen Oliver, David Holwell, Daryl Blanks, Dongyang Zhang, Fillipe Porto, Taíla Sant'ana*
- A091 Lithostratigraphy, Mineralogy, and Structural Controls of the Late Ediacaran Tizi N'ousatour Cu-Ag Deposit, Northwestern Anti-Atlas, Morocco (*Student*)  
*Mehd Ousbih, Mohamed Charroud, Mourad Essalhi, Moha ikenne, Askkour Fatiha, Salih Amarir, Hassan Essaidi*
- A092 Application of Facies Analysis and Sequence Stratigraphy in the Zambian Copperbelt and Its Implications for the Tectonostratigraphic Evolution Katangan Basin (*Student*)  
*Martin Purkiss, Bruce K. Levell, Michael C. Daly*
- A093 Integrated Re-Os, Ar/Ar, and U-Pb Geochronology Directly Dates the Timing of Mineralization at the Mina Justa and Marcona Deposits, Peru (*Student*)  
*Maria Alejandra Rodriguez Mustafa, Adam Simon, Robert Holder, Holly Stein, Andrew Kylander-Clark, Brian Jicha, Daniel Blakemore, Edson Machado*
- A094 3D Mineralogical Analysis Using X-Ray Attenuation Computed Tomography (CT) and XRF to Determine Geoenvironmental Reactivity of Future Non-Ore Material (*Student*)  
*Enrique Saez Salgado, Anita Parbhakar-Fox, Nathan Fox, Regina Baumgartner*
- A095 Insights into the Origin of Sedimentary-Hosted Copper Mineralization in Kazakhstan  
*Azam Soltani Dehnavi, Reimar Seltmann, Fereshteh Shabani-Sefiddashti*
- A096 Hydrothermal Apatite: A Distal Proxy for Potassic Alteration in Porphyry-Cu Systems? (*Student*)  
*George Stonadge, Andrew Miles, Daniel Smith, Philip Bird*
- A097 Detrital Zircon Indicators of Metallogenic Magma Fertility: A Potential Tool for Exploration Targeting for Porphyry Copper (*Student*)  
*Eliana Toro Paz, Frances Cooper, Byron Adams, Thomas Lamont, Anthony Kemp, Robert Loucks, Catherine Belgarde*

- A098 Mineralogical Characterization of Potential Source, Aquifer and Trap Rocks in the Central African Copperbelt Using the TESCAN TIMA® Automated SEM Mapping System  
*Veronica G. Trevisan, Jamie J. Wilkinson, Martin Purkiss, Mike Daly*
- A099 Alteration Assemblages in the Southern Congolese Copperbelt. A Comparison of Background Stratigraphy with Cu-Vein Hosted Mineralisation and Salt Dissolution Alteration (Student)  
*Helen Twigg, Murray W. Hitzman*
- A100 Rhenium - Potential as Proxy for Mineralization: Insights from the Altar Porphyry Cu-(Au-Mo) Deposit (Student)  
*Martin G. Vallejos, Laura Maydagán, David Selby, Kevin B. Heather, Mariano Poodts*
- A101 Greenfield Porphyry Copper Prospects in Peru  
*César E. Vidal*
- A102 Mineralization Timing and Characteristics of the Heavy Sulfide Zone at the Grasberg Porphyry Cu-Au Deposit, Papua, Indonesia  
*Kotaro Yonezu, Shunnosuke Omachi, Thomas Tindell, Adrian Boyce, Euis Yuningsih, Mega Rosana*

### Transformational Science, Engineering, and Governance in Economic Geology

- A104 A Trace Element and C-O Isotope Study of Sb-Au Vein-Hosting Carbonate-Talc Schists of the Murchison Greenstone Belt, South Africa  
*Andrea Agangi, Axel Hofmann, Robert Bolhar*
- A105 Ambient Noise Seismic Interferometry Applied to Tailings Dam Monitoring in Minas Gerais State, Brazil (Student)  
*Amanda M. Bezerra*
- A106 Data Capture from Geoscience Documents Using Transformers  
*Amit Juneja, Henri Blondelle*
- A107 3D Deep Electrical Resistivity Tomography Study of the Calamita Distal Fe-Skarn Deposit, Elba Island (Italy): New Perspectives for Mineral Exploration (Student)  
*Damian Braize, Julien Sfalcin, Matteo Lupi, Kalin Kouzmanov, Andrea Dini, Gianfranco Morelli, Federico Fischanger*

- A108 Petrography and Economical Potential of Banded Iron Formations of the Neoproterozoic-Age Buem Formation, Ghana (Student)  
*Ernest Brakohiapa*
- A109 A Shift to Natural Gas, Nuclear, and Ocean Mining Could Initiate an Adequate and Resource-Viable Green Transition  
*Lawrence Cathles, Adam C. Simon*
- A110 A Multi-Approach Hyperspectral Analysis for the Mineralogical Characterization of Zn-Cu-Pb Vanadate Ores in the Otavi Mountainland (Namibia) (Student)  
*Francesca Corrado, Anna Sorrentino, Rita Chirico, Matteo Massironi, Sabrina Ferrari, Nicola Mondillo*
- A111 How to Empower the Geologist's Expert Knowledge with Machine Learning in Drill Core Logging? (Student)  
*Christian Günther, Filip Siman, Nils Jansson, Foteini Simistira-Liwicki, Marcus Liwicki, Tobias Hermansson, Paul McDonnell*
- A112 Exploration and Utilization Prospects of Coastal Placer Deposits  
*Min Liu*
- A113 Determining the Lowest Quantity of Variables Required for Geometallurgical Machine Learning-Based Modelling: A Review (Student)  
*Ethan E. Mack, Bjorn von der Heyden, Margreth Tadie, Tobias Louw*
- A114 Deriving Plate Boundary Information from Deep-Time Palaeo-Reconstruction Models and Implications for Regional Mineral Exploration Targeting (Student)  
*Hoang Anh Tu Nguyen, Dène Tarkyth, Bruce Eglinton, Jean-Christophe Wrobel-Daveau, Graeme Nicoll, David Evans, Drew Heasman, Samuel Butler*
- A115 Unconventional Mineral Resource Potential in a Low-Temperature Geothermal System (Student)  
*Valeria S. Nogales Herrera, Sean A. Fulcher, Karin E. Olson Hoal*
- A116 Differentiation Between Endoskarn and Exoskarn Using Portable X-Ray Fluorescence (pXRF) at Antakori Cu-Au-Ag Project, Northern Perú  
*Luis Paredes Santa Cruz, David Portocarrero*

- A117 TRIM4Post-Mining: Artificial Intelligence and Virtual Reality for Decision-Making in Remediation for Mining Companies  
*Luis Pizano, Jörg Bendorf, Andreas Knobloch, Diego Restrepo*
- A118 Quantitative Evidence of a Rift Origin for the Katangan Basin from Subsidence Analysis in the Zambian Copperbelt (Student)  
*Martin Purkiss, Michael C. Daly*
- A119 Maximizing the Value of Geoscience Databases: A Comprehensive Review of Advanced Data Processing Techniques  
*Mana Rahimi*
- A120 A Novel Approach for Delineation and Mapping of K-Rich Igneous Rocks and their K<sub>2</sub>O Content to Support Unconventional Potash Exploration  
*Otmame Raji, Muhammad Ouabid, Cheikh Elwali Malainine, Youssef Ahechach, Aaron Herve Mbissik, Hicham El Messbahi, Jean-Louis Bodinier*
- A121 Automated Multi-Sensors Core Logging and Analysis for the Assessment of Sn-W Mineralization Pattern and Distribution - Hemerdon Deposit, Devon, UK  
*Reza Ramdhan, Gavin Hunt, James Shreeve, Briony Shreeve*
- A122 Prospects for Byproduct Critical Mineral Recovery from Mine Waste  
*Robert R. Seal, Nadine M. Piatak, Sarah Jane O. White, Sarah M. Hayes*
- A123 Environmentally Friendly Low Impact, Low Carbon Footprint, Low Power Electromagnetic Technique for Mineral Exploration Undercover  
*Gordon Stove*
- A124 Geometallurgy of a Complex Ore: Lappberget Zn-Pb-Ag-(Cu-Au) Deposit, Garpenberg Mine, Sweden  
*Glaciale Tiu, Christina Wanhainen, Nils Jansson, Yousef Ghorbani*
- A125 Can Gold Mining Provide Critical Metals as By-Products Using Novel Solutions? A Case Study at Björkdal Gold Mine, Sweden (Student)  
*Lara Tritton, Gawen Jenkin, Dan Smith, Helena Moosberg-Bustnes*

- A126 The Green Transition Resource and Supply Chain Model: A Recipe for Global Energy Equity  
*Edith Newton Wilson*

### Session B: Monday and Tuesday

### Advances in Mineral Deposit Geoscience

- B001 Geological Settings and Future Ore Potential of the Orudubad Region, Nakhchivan (Naxçıvan), Azerbaijan, Lesser Caucasus  
*Stephen J. Westhead, Robin N. Armstrong, Anar Valiyev, Rustam Abdullayev, Araz Orujov*
- B002 Trace Element Composition and Cathodoluminescence of Quartz in the Tsunheg Tungsten Deposit in Western Mongolia (Student)  
*Amitan Baatar, Jamsran Erdenebayar, Takeyuki Ogata, Takeyuki Ogata, Yondon Majigsuren*
- B003 An Insight into the Southern Extension of the Egyptian Golden Triangle and Its Potentiality for Mineral Occurrences Related to Shear Activity (Student)  
*Mohamed Badawi*
- B004 Using Chemistry of REE-Bearing Phosphates for ISCG Exploration (Student)  
*Travis D. Batch, Caroline Tiddy, Adrienne Brodewo, David Giles*
- B005 Assessing the Petrogenesis and Magmatic Sulfide Prospectivity of the Southwestern Laurentia Large Igneous Province (SWLLIP) (Student)  
*Thomas J. Boes, Simon M. Jowitt*
- B006 Enhancing Exploration of Green Energy Transition Metals: Directly Dating Carbonate Vein-Hosted Cu-Au Mineralization (Student)  
*Sarah Bowie, Catherine Mottram, Dawn Kellett, James Darling*
- B007 The Santa Maria Pb-Zn-Cu-(Au, Ag) Deposit, Camaquã Basin, Brazil: Geology, Geochemistry and Geothermometry (Student)  
*Lucas F. Brito, Caetano Juliani*
- B008 Hydrothermal Alteration Zones Estimated by ASTER Satellite Image and ASD Terraspec on the Eastern Zone of Cerro de Pasco, Perú (Student)  
*Evelyn Caiza*

- B009 The Al:Ti Geochemical Classifier: Distinguishing Between Granites of Similar Characteristics Under Different Degrees of Alteration (*Student*)  
*Andrés Canales, Diego Guido, Julietta Zamora*
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*Yana Chen*
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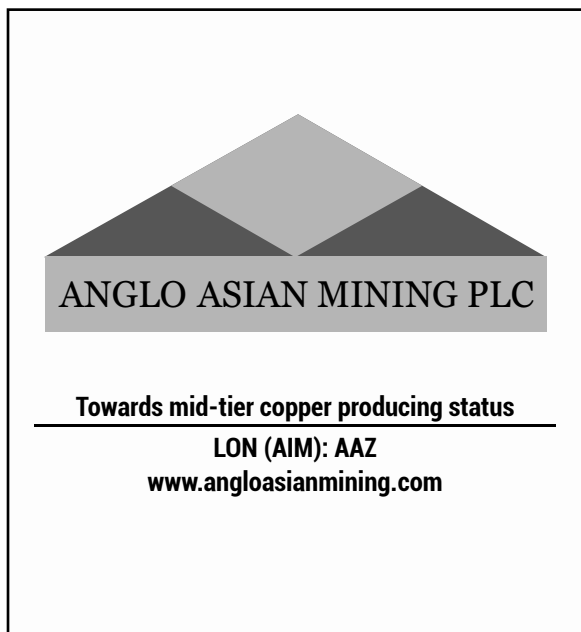
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- B127** Identification of Ore-Finding Targets Using the Anomaly Components of Ore-Forming Element Associations Extracted by BEMD and PCA in the Jiaodong Gold Clusters, Eastern China  
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- B128** Application of BEMD in Extracting Gravity Anomaly Components Showing Deep Ore-Forming Geo-Dynamic Background of Jiaodong Giant Gold Cluster Region, Eastern China  
*Aoyue Zheng, Yongqing Chen*
- B129** Melt Inclusion Constraints on the Initial Metal Budget of Suspected Causative Magmas in the Au-Rich Doyon-Bousquet-LaRonde Mining District, Abitibi Greenstone Belt, Québec (Student)  
*Kevin Nevedley, Jacob J. Hanley, Patrick Mercier-Langevin, Zoltan Zajacz, Alexandra Tsay*



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#	Exhibitor	Website
1	Equinox Gold	<a href="http://www.equinoxgold.com">www.equinoxgold.com</a>
2	Barrick	<a href="http://www.barrick.com">www.barrick.com</a>
3	BHP	<a href="http://www.bhp.com">www.bhp.com</a>
4	BHP	<a href="http://www.bhp.com">www.bhp.com</a>
5	Exploration Mapping	<a href="http://www.explorationmapping.com">www.explorationmapping.com</a>
6	Krux Analytics	<a href="http://www.kruxanalytics.com">www.kruxanalytics.com</a>
7	Ariana Resources	<a href="http://www.arianaresources.com">www.arianaresources.com</a>
8	Goldeneye	<a href="http://www.goldeneye-project.eu">www.goldeneye-project.eu</a>
9	SciAps	<a href="http://www.sciaps.com">www.sciaps.com</a>
10	TerraCore	<a href="http://www.terracoregeo.com">www.terracoregeo.com</a>
11	Corescan	<a href="http://www.corescan.com.au">www.corescan.com.au</a>
12	MDRU	<a href="http://www.mdru.ubc.ca">www.mdru.ubc.ca</a>
13	iCRAG	<a href="http://www.icrag-centre.org">www.icrag-centre.org</a>
14	Geotek	<a href="http://www.geotek.co.uk">www.geotek.co.uk</a>
15	Geosense	<a href="http://www.geosense.nl">www.geosense.nl</a>
16	Bruker Nano Analytics	<a href="http://www.bruker.com">www.bruker.com</a>
17	Veracio	<a href="http://www.veracio.com">www.veracio.com</a>
18	CODES	<a href="http://www.utas.edu.au/codes">www.utas.edu.au/codes</a>
19	Actlabs	<a href="http://www.actlabs.com">www.actlabs.com</a>
20	UNEXMIN Georobotics	<a href="http://www.unexmin-georobotics.com">www.unexmin-georobotics.com</a>
21	Society of Economic Geologists	<a href="http://www.segweb.org">www.segweb.org</a>
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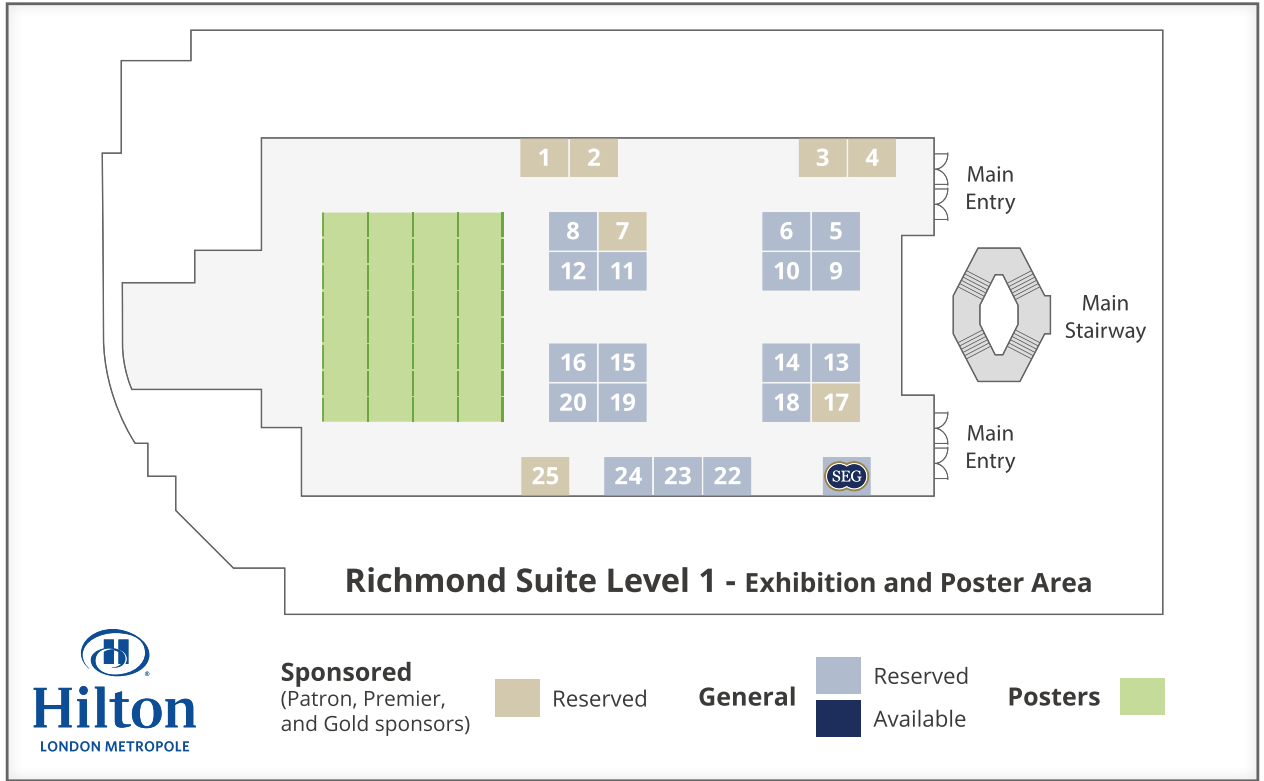


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# Exhibit Booths and Posters Map



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