



THE CHANGING FACE OF MINING

# CONVENTION PROGRAM & EXPO GUIDE

PROGRAMME DU CONGRÈS  
et GUIDE DE L'EXPO

LE VISAGE CHANGEANT DE L'INDUSTRIE MINIÈRE



APRIL 28-MAY 1, 2019 | 28 AVRIL AU 1<sup>ER</sup> MAI 2019

PALAIS DES CONGRÈS DE MONTRÉAL | MONTRÉAL, QUÉBEC | [CONVENTION.ICM.ORG](http://CONVENTION.ICM.ORG)

# TECHNICAL PROGRAM MONDAY

## PROGRAMME TECHNIQUE LUNDI

| AM (10:50)                                         |                                                                    |      |
|----------------------------------------------------|--------------------------------------------------------------------|------|
| <b>Innovation, Automation and Data</b>             | Optimizing Value                                                   | 513A |
|                                                    | Managing Innovation                                                | 513C |
| <b>Operations: Case Studies and Best Practices</b> | Data Driven Optimization in Mining                                 | 514B |
|                                                    | Mining in Perspective and Looking Ahead                            | 515A |
| <b>People and Communities</b>                      | Social License: From 101 to Complex Strategies                     | 516A |
| <b>Sustainable Mining</b>                          | Holistic Mine Water Management                                     | 513E |
| <b>From Rocks to Resources</b>                     | Mineral Property Valuation Methods                                 | 516D |
| <b>Health and Safety</b>                           | Education and Risk Management                                      | 516B |
| <b>7th North American Iron Ore Symposium</b>       | Iron Ore Resources                                                 | 516C |
| PM (14:00)                                         |                                                                    |      |
| <b>Innovation, Automation and Data</b>             | Autonomous Mining                                                  | 513A |
|                                                    | AI and Mining                                                      | 513C |
| <b>Operations: Case Studies and Best Practices</b> | Rock Engineering I (Underground)                                   | 514B |
|                                                    | Processing                                                         | 515A |
| <b>People and Communities</b>                      | Canadian Mining Education Forum: Integrating Social Responsibility | 516A |
| <b>Sustainable Mining</b>                          | A Fresh Take on Maximizing Value                                   | 513E |
| <b>From Rocks to Resources</b>                     | Risk Management for Practitioners                                  | 516D |
| <b>Health and Safety</b>                           | J.T. Ryan Award Winners 2017                                       | 516B |
| <b>7th North American Iron Ore Symposium</b>       | Projects Overview                                                  | 516C |

## MONDAY, APRIL 29 | 10:50 - 12:30

ROOM: 513A

### OPTIMIZING VALUE

INNOVATION, AUTOMATION AND DATA

Chair: Mark Richards, Teck Resources Limited

**10:50 PAPER 144**

**Rocking the boat: Capturing existing value through pit-to-port optimization**

Danielle Zyngier, Nooshin Nekoiehmehr, and Hao Li, Hatch

**11:15 PAPER 190**

**Vale's approach towards continuous mining: evaluating the application of mechanical rock cutters**

Andy Charsley and Negar Saeidi, Vale; Trevor Courchesne and Samantha Espley, Vale, Technology & Innovation Centre

**11:40 PAPER 112**

**The story of iROC, or how we optimized our business**

Paul Bird, ArcelorMittal Mining Canada G.P.

**12:05 PAPER 52**

**Deploying Smart IoT to support the performance of your digital mine**

Maxime Guillaumot and Ron White, 3D-P

ROOM: 513C

### MANAGING INNOVATION

INNOVATION, AUTOMATION AND DATA

Chair: Andrew Scott, Barrick Gold Corporation

**10:50 PAPER 247**

**How to use new technologies to improve advanced control and advisory system?**

Nicolas Lazare, XPS a Glencore Company

**11:15 PAPER 200**

**But, where is the value? A mining engineer attempts to decipher technological buzzwords**

Andrew Chapman, Peck Tech Consulting Ltd.

**11:40 PAPER 358**

**Cyber threats to safe production**

Rob Labbe and Cherie Burgett, Mining and Metals Information Sharing and Analysis Centre

**12:05 PAPER 383**

**Amping up innovation to drive down the carbon intensity of surface mining fleets**

Peter Wan, Teck Resources Limited

**ROOM: 514B**

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**DATA DRIVEN OPTIMIZATION IN MINING**

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Julia Gartley, Gartley Consulting Corp.; Mike Samuels, TMAC

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**10:50 PAPER 46**

**Data-driven operations management and production optimization**

Bill Tubbs, B. Tubbs & Associates Consulting; John Hedengren, Brigham Young University

**11:15 PAPER 130**

**Defining, modeling and enabling a remote, autonomous mining operation through advanced techno-economic visioning, modeling and scanning**

Kate McLaughlin, Stantec Consulting Ltd.; George Hemingway, The Stratalis Group; Andrew Gibson, Stantec Consulting Ltd.

**11:40 PAPER 20**

**Industry 4.0: Taking mining operations from Good to BAD? Go in with your eyes open!**

Tracy Holmes, Jenike & Johanson Ltd.

**12:05 PAPER 71**

**Case study: Accelerating business decisions and mine performance through operational data analysis at an Australian coal operation**

Devon Wells and Simran Walia, Wenco International Mining Systems

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**ROOM: 515A**

**MINING IN PERSPECTIVE AND LOOKING AHEAD**

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Peter Edmunds, Epiroc

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**10:50 PAPER 5**

**Mining Canada in time**

Donna Beneteau, University of Saskatchewan

**11:15 PAPER 59**

**The control room of the future – Technology and the workforce**

Fiona Campbell, ABB AB

**11:40 PAPER 175**

**From paper to production: A collaborative 'full lifecycle' model for operations**

Adrian Churcher, Mining Plus; Zach Allwright, Mining Plus

**12:05 PAPER 217**

**Operational readiness – A critical element of a successful project**

Uday Shinde, Shindey Associates

**ROOM: 516A**

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**SOCIAL LICENSE: FROM 101 TO COMPLEX STRATEGIES**

**PEOPLE AND COMMUNITIES**

Chair: Jenifer Hill, JLH Environmental

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**10:50 PAPER 218**

**Community relations for Mining 101: Back to basics**

Sabrina Dias, SOOP Strategies Inc.

**11:15 PAPER 36**

**Lessons learned: Torex Gold's evolving CSR strategy in a complex operating environment**

Bernarda Elizalde-Andrews and Mark Thorpe, Torex Gold

**11:40 PAPER 191**

**Enhancing socio-economic sustainability of mining projects**

Krista Maydew and Brigitte Masella, Wood Environment & Infrastructure Solutions

**12:05 PAPER 261**

**Disaster sureties, risk management and the social license: A critical assessment**

Anne Johnson and Paul Semkowich, Queen's University; Laeeque Daneshamend, Robert M. Buchan Department of Mining, Queen's University

**ROOM: 516D**

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**MINERAL PROPERTY VALUATION METHODS**

**FROM ROCKS TO RESOURCES**

Chair: Keith Spence, Global Mining Capital

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**10:50 PAPER 427**

**Overview of mining valuation, preview of the updated Canadian Mining Valuation Standards and Guidelines (CIMVAL) and the International Valuation Standards (IMVAL)**

Keith Spence, Global Mining Capital

**11:15 PAPER 470**

**Stage Based Valuation Premia**

Peyvand Bayzae, Mining Valuation Research

**11:40 PAPER 469**

**Trends in Gold Property Transaction Values 2016-18**

William E. Roscoe, Paul Chamois and Grant Malensek, RPA Inc.

**12:05 PAPER 471**

**Mining Industry Corporate and Equity Valuations Parameters In The Next Decade**

Terence Ortslan, TSO & Associates

**ROOM: 513E**

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## **HOLISTIC MINE WATER MANAGEMENT**

### **SUSTAINABLE MINING**

Chair: Resa Furey, Stantec

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**10:50 PAPER 157**

**What about too much water? Lessons learned in extreme environments**

Henri Sangam, SNC-Lavalin

**11:15 PAPER 198**

**Application of telemetric sensors in mining to holistically manage vulnerability and risk in watersheds**

Gabriel Castillo, Aquatic Life Ltd.

**11:40 PAPER 88**

**Smart sustainable and effective water management in active and closed mines**

Uwe Seebacher, ANDRITZ

**12:05 PAPER 329**

**Water and mine development, the impact and the pitfalls**

Dirk Cornelis Grobler and Bea Moolman, Fluor South Africa

**ROOM: 516B**

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## **EDUCATION AND RISK MANAGEMENT**

### **HEALTH AND SAFETY**

Chair: Shannon Campbell, Kameron Coal

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**10:50 PAPER 66**

**Mind the skills gap: The future of work and learning in mining**

Don Duval, NORCAT

**11:15 PAPER 129**

**Enhancing health and safety education in engineering and business schools opportunities for the mining sector**

Vic Pakalnis, MIRARCO Mining Innovation; Anthony Pasteris, Minerva Canada Safety Management Education Inc.

**11:40 PAPER 367**

**Professional certification for mine safety and health: recent international developments**

Tom Hethmon, SSR Mining

**12:05 PAPER 425**

**Unique training challenges in the Canadian mining sector**

Dana Imbeault, Mining Industry Human Resources Council

**ROOM: 516C**

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## IRON ORE RESOURCES

### 7TH NORTH AMERICAN IRON ORE SYMPOSIUM

Chairs: Serge Perreault, SOQUEM; Lyall Workman, Barr Engineering Company

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**10:50 PAPER 448**

**Les hauts et les bas des prix et de la production du minerai de fer**

Serge Perreault, SOQUEM

**11:15 PAPER 429**

**The Mesabi Iron Range: Past, present, and future**

Rodney Johnson, Natural Resources Research Institute, University of Minnesota, Duluth

**11:40 PAPER 311**

**De-commoditization of iron ore – now what?**

Biswajit Chanda, Change Management and Mining Project Development

**12:05 PAPER 390**

**Mineralogical variations within the Bloom Lake iron ore deposit**

Hugues Longuépée, Champion Iron Mines

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## MONDAY, APRIL 29 | 14:00 - 16:05

**ROOM: 513A**

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## AUTONOMOUS MINING

### INNOVATION, AUTOMATION AND DATA

Chair: Glenn Johnson, Teck Resources Limited

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**14:00 PAPER 455**

**The pragmatic evaluation of AHS for Goldcorp's Century Project**

Gertjan Bekkers, Goldcorp, Mark Sawyer, Peck Tech Consulting Ltd.

**14:25 PAPER 116**

**Toward an open standard in autonomous control system interfaces: Current issues and best practices**

Devon Wells and Martin Politick, Wenco International Mining Systems

**14:50 PAPER 357**

**Securing autonomous systems**

Rob Labbe, Mining and Metals Information Sharing and Analysis Centre

**15:15 PAPER 388**

**Functional safety + cybersecurity: A case for collaboration on safety and security**

Kevin Connelly, CSA Group

**ROOM: 513C**

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**AI AND MINING**

INNOVATION, AUTOMATION AND DATA

Chair: Mark O'Brien, CITIC Pacific Mining

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**14:00 PAPER 242**

**Truck payload optimization by IoT and machine learning**

Matias Pinto and Ilija Miskovic, Norman B. Keevil Institute of Mining Engineering, University of British Columbia

**14:25 PAPER 82**

**Artificial intelligence using real time data**

Louis-Pierre Campeau and Michel Dubois, Newtrax

**14:50 PAPER 277**

**Haul cycle truck productivity improvement utilizing advanced analytics**

Chris Ison, Abra Gurnett, and Mohammad Babaei, Teck Resources Limited

**15:15 PAPER 396**

**Implementing 3D ore control at Red Dog Mine**

Brian Hall, Teck Alaska Red Dog Mine; Will Hunt, OreControl Blasting Consultants

**15:40 PAPER 379**

**How a Chilean copper mine used an AI-based solution to prevent 144 hours of lost production**

Shahram Tafazoli, Saeed Karimifard, Bahram Sameti, and Caitlin McKinnon, Motion Metrics International Corp.; Jose Oliva, Motion Metrics Latin America S.p.A.; Derek Cooper, Motion Metrics International Corp.

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**ROOM: 514B**

**ROCK ENGINEERING I (UNDERGROUND)**

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Doug Milne, University of Saskatchewan

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**14:00 PAPER 79**

**Numerical model for predicting rock bolt corrosion**

Paul Lee and Ilija Miskovic, Norman B. Keevil Institute of Mining Engineering, University of British Columbia

**14:25 PAPER 94**

**Reducing dilution at Pine Cove Mine by accounting for blast movement**

Jordan Cramm and Gordana Slepcev, Anaconda Mining; Harrison Ingham, Blast Movement Technologies

**14:50 PAPER 143**

**Installation of a thin spray-on liner ground support system at the Cote Blanche mine production shaft**

John Larsen, Cementation Canada



**15:15 PAPER 326**

**Blasting in soft rocks: Technical considerations and case studies in rock salt mines**

Jonathan Aubertin, Morton Salt - Weeks Island Mine; D. Jean Hutchinson and Mark Diederichs, Geological Sciences and Geological Engineering, Queen's University

**15:40 PAPER 337**

**Radius of influence in a potash mine**

Darren Neely and Matthew Swerhone, Nutrien

**ROOM: 515A**

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**PROCESSING**

**OPERATIONS: CASE STUDIES AND BEST PRACTICES**

Chair: Stefanie Vo, Hatch

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**14:00 PAPER 16**

**Online gold analysis using X-ray fluorescence**

Erfan Sharifi, Outotec (Canada) Ltd.; Juha Timperi, Tommi Koskinen, and Antti Pelli, Outotec Finland Oy

**14:25 PAPER 19**

**Start up, commissioning and optimization of the gravity circuit at Atlantic Gold's Moose River Project in eastern Canada**

Alex Frey, Sepro Mineral Systems Corp.; Craig Hudson and Daniel Tremblay, Atlantic Gold Corporation

**14:50 PAPER 195**

**Kibali Gold Mine ultrafine grinding circuit: Case study from commissioning to optimized operation**

Thamsanqa Mahlangu, Randgold Resources, Kibali Gold Mine; Craig Brickhill, FLSmidth (Pty) Ltd.; Guy Ngombe Kalenga, Kibali Gold Mines; Byron Sirchia, FLSmidth South Africa, Process Department; Beddy Mukonkole Sindani, Patrick Mande, and Gustav Du Toit, Kibali Gold Mine

**15:15 PAPER 101**

**Control of declassified particles in classification and their impact on the business**

Debra Switzer and Eduardo Cepeda, Weir Minerals; Mark Schmidt, Weir Minerals Canada

**15:40 PAPER 208**

**The amenability of the Jameson Cell for pre-rougher applications in base metals**

Cesar Gomez, Rodrigo Araya and Virginia Lawson, Glencore Technology

**ROOM: 516A**

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## CANADIAN MINING EDUCATION FORUM: INTEGRATING SOCIAL RESPONSIBILITY

PEOPLE AND COMMUNITIES

Chair: Anne Johnson, Queen's University

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**14:00 – 16:05**

### PANEL DISCUSSION ON SUSTAINABILITY EDUCATION

- Speakers:
- Markus Timusk (Laurentian University)
  - Hani Mitri (McGill University)
  - Laeque Daneshmend (Queen's University)
  - Scott Dunbar (University of British Columbia)

Followed by a panel discussion

**ROOM: 516D**

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## RISK MANAGEMENT FOR PRACTITIONERS

FROM ROCKS TO RESOURCES

Chair: Nathan Stubina, Sherritt International

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**14:00 Introduction and overview; reporting requirements**

Nathan Stubina

**14:25 PAPER 293**

**Resolving the impasse between operational risk and investor risk**

Douglas Morrison, Centre for Excellence in Mining Innovation (CEMI)

**14:50 PAPER 238**

**Integrating social factors into asset valuations**

Carolyn Burns, NetPositive

**15:15 PAPER 380**

**Red flags: A hit list of significant impact risks in mineral project evaluations**

Lawrence Devon Smith, Lawrence Devon Smith & Associates

**15:40 PAPER 384**

**Evaluating mining projects using Monte Carlo Simulation**

Nathan Stubina, Sherritt International

**ROOM: 513E**

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## A FRESH TAKE ON MAXIMIZING VALUE

SUSTAINABLE MINING

Chair: Karen Chovan, Enviro Integration Strategies

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**14:00 PAPER 115**

**Changing the game: An environmentally, socially, and market sustainable approach to potash mining**

Paul Neufeld, Gensource Potash Corporation

**14:25 PAPER 221**

**Mining value from waste: Building a pan-Canadian effort**

Bryan Tisch and Janice Zinck, Natural Resources Canada

**14:50 PAPER 15**

**Maximizing Value and Minimizing Waste Through Ore Sorting**

Brent Hilscher, DRA

**15:15 PAPER 202**

**Developing a process to recover rare earth elements and scandium from coal fly ash**

Rory Cameron, Yves Thibault, Rolando Lastra, Alain Bilodeau, and Jean-Michel Bondy, CanmetMining

**15:40 PAPER 142**

**Recovery of residual silver bearing minerals from low grade tailings by froth flotation: The case of Zgounder Mine, Morocco**

Drif Boujemaa, Laboratoire de Chimie des Matériaux et de l'Environnement, Université Cadi Ayyad

**ROOM: 516B**

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**J.T. RYAN AWARD WINNERS 2017**

**HEALTH AND SAFETY**

Chair: Michael Winship, International Business Advisor

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**14:00-16:05**

Presenters:

**DeBeers Canada, Victor Mine**

*"Reinforcing and supporting Victor Mine Safety Culture during a time of dramatic change"*

Karen Osadchuk, Health and Safety Manager DeBeers Canada Group

**Mosaic Potash Esterhazy**

*"Mosaic's Safety Journey"*

Neil Hungle, P.Eng, Environmental, Health, Safety & Security Sr Manager, Mosaic Potash Esterhazy

**Goldcorp, Eleonore Mine**

*"Integrating Innovation to the Safety Culture"*

Suzanne Larouche, Directrice santé-sécurité-environnement, Goldcorp Inc.

**Vale, Voisey's Bay Mine**

*"Voisey's Bay - Our journey toward Zero harm"*

Ian Coles, Manager, Maintenance, Vale Labrador Operations

**Westmoreland Coal – Genesee Mine**

Wesley Meyerink, CRSP

Safety Manager, Westmoreland Mining Holdings LLC. - Genesee Mine

**ROOM: 516C**

## PROJECTS OVERVIEW

### 7TH NORTH AMERICAN IRON ORE SYMPOSIUM

Chairs: Guy Saucier, Consultant; George Hudak III, University of Minnesota

**14:00 PAPER 449**

**Integrated operations – Leveraging value from mine to market**

Chantal Lavoie, Iron Ore Company of Canada

**14:25 PAPER 391**

**Bloom Lake restart: Capitalizing on opportunities**

Alexandre Belleau, Minerai de Fer Québec

**14:50 PAPER 366**

**Les technologies au service du chemin de fer**

José Riopel, Rio Tinto IOC

**15:15 PAPER 410**

**Lessons learned along three decades of iron ore projects**

Angel Pelegru Cuesta and Alejandro Lopez Ferrer, Duro Felguera

**15:40 PAPER 405**

**BlackRock Metals: A future vanadium and high quality pig iron producer**

Jean Rainville, BlackRock Metals

**16:05 PAPER 313**

**Valuation of iron ore with vanadium but low titanium**

Pierre-Jean Lafleur, PJ Lafleur Geo-Conseil Inc.



#CIMTL19

## Keep up-to-date

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Technical Program **LIVE** Schedule

**convention.cim.org**



# TECHNICAL PROGRAM TUESDAY

## PROGRAMME TECHNIQUE MARDI

| AM (10:50)                                         |                                                 |      |
|----------------------------------------------------|-------------------------------------------------|------|
| <b>Innovation, Automation and Data</b>             | Underground Innovation                          | 513A |
|                                                    | Geology and Technology                          | 513C |
| <b>Operations: Case Studies and Best Practices</b> | Rock Engineering II (Surface)                   | 514B |
|                                                    | Water Treatment Technologies                    | 515A |
| <b>People and Communities</b>                      | Training for Now & Future                       | 516A |
| <b>Sustainable Mining</b>                          | Best Practices & Standards in Closure           | 513E |
| <b>From Rocks to Resources</b>                     | Designing Sustainable Prosperity                | 516D |
| <b>Health and Safety</b>                           | Occupational Health                             | 516B |
| <b>7th North American Iron Ore Symposium</b>       | Mining Operations                               | 516C |
| PM (14:00)                                         |                                                 |      |
| <b>Innovation, Automation and Data</b>             | Interoperability and Integration                | 513A |
|                                                    | Smart Mineral Value Chains                      | 513C |
| <b>Operations: Case Studies and Best Practices</b> | Operational and Project Updates                 | 514B |
|                                                    | Some Aspects of More Effective and Safer Mining | 515A |
| <b>People and Communities</b>                      | Advancing Diversity & Inclusion                 | 516A |
| <b>Sustainable Mining</b>                          | Tailings Management                             | 513E |
| <b>From Rocks to Resources</b>                     | Designing Sustainable Prosperity Continue       | 516D |
| <b>Health and Safety</b>                           | Strategic Risk Management                       | 516B |
| <b>7th North American Iron Ore Symposium</b>       | Concentration & Pelletizing 1                   | 516C |

**TUESDAY, APRIL 30** | 08:30 - 10:30

**ROOM: 710**

**KEYNOTE TUESDAY |  
CONFÉRENCIERS D'HONNEUR DU MARDI**

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**Resources Matter!**

Resource management, whether natural, human or financial, is at the heart of sustainability and top-of-mind in the changing mining world. Tuesday's general keynote speakers are striking chords at every level. Diversity, inclusion, innovation, technology and sustainability are top triggers in planning for the next generation and the future of mining.

Two industry leaders will have the audience "digging deeper" to marry social and environmental values with industry practices. Kick off your morning with fresh and thought-provoking solutions to today's resource industry challenges and opportunities.

**Les ressources avant tout !**

*La saine gestion des ressources naturelles, humaines et financières est au cœur des pratiques durables et de la priorité dans notre monde minier en mutation. Le leadership des conférenciers d'honneur du mardi coche chaque case à tous points de vue. La diversité, l'inclusion, l'innovation, la technologie et la fiabilité sont des éléments clés dans la planification du futur de l'industrie et formeront l'essence des discussions. Ces orateurs invités vous captiveront par leurs réponses aux questions et défis de l'évolution du monde minier.*



Janice Zinck

**Crushing the Consumption Conundrum**

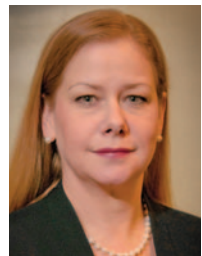
Janice Zinck

Director, Green Mining Innovation, base/precious metals, rare earths, chromite CANMET, Natural Resources Canada CIM President 2018-2019.

**Harness diversity dividend and  
mitigate diversity debt: the business case  
for diversity in mining**

Cathy Gallagher-Louisy

Senior Director, Consulting and Partnerships  
Canadian Centre for Diversity and Inclusion



Cathy Gallagher-Louisy

**ROOM: 513A**

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**UNDERGROUND INNOVATION**

INNOVATION, AUTOMATION AND DATA

Chair: George Darling, Sandstorm Gold

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**10:50 PAPER 117**

**Improving scenario analysis capabilities at Agnico Eagle**

Pierre Matte, Agnico Eagle

**11:15 PAPER 121**

**Underground truck dispatching using real-time data analytics**

Sihong Peng and Greg Yuriy, Vale

**11:40 PAPER 375**

**Raglan ConnectedMine project – Change management through 72 easy steps**

Kenny Cheong, Glencore - Mine Raglan

**12:05 PAPER 33**

**Kidd operations: Challenges and advantages of Wi-Fi at the face**

Ryan Roberts and Kyle Buckoll, Kidd Operations, A Glencore Company

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**ROOM: 513C**

**GEOLOGY AND TECHNOLOGY**

INNOVATION, AUTOMATION AND DATA

Chair: Michelle Levesque, CanmetMINING

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**10:50 PAPER 273**

**Geological modelling using a recursive convolutional neural networks approach**

Sebastian Avalos and Julian Ortiz, The Robert M. Buchan Department of Mining, Queen's University

**11:15 PAPER 393**

**Why geometallurgy matters to Teck**

Anelda Van Staden, Teck

**11:40 PAPER 137**

**Improving multivariate geostatistical modelling with data transformations**

Maria Bolgkoranou, and Julian Ortiz, The Robert M. Buchan Department of Mining, Queen's University

**12:05 PAPER 240**

**A portable LIBS analyzer for in-situ measurement of low gold grade in ore**

Paul Bouchard, Christian Padioleau, Francis Boismenu, André Beauchesne, Mohamad Sabsabi, and Alain Blouin, National Research Council Canada

**ROOM: 514B**

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**ROCK ENGINEERING II (SURFACE)**

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Ferri Hassani, McGill University

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**10:50 PAPER 1**

**Design and operating practices of the waste rock stockpile: Part I – optimization and safe operation guidance**

Colin Hardie and Vahid Marefat, BBA

**11:15 PAPER 2**

**Design and operating practices of the waste rock stockpile: Part II – risk assessment**

Antonio Vides, Colin Hardie and Luciano Piciacchia, BBA

**11:40 PAPER 300**

**Mining beneath arctic lakes – The journey from development to commercial production of the A21 kimberlite pipe at Diavik Diamond Mine**

Branwen Price, Adan Olivares Castro, and Marko Pudar, Rio Tinto - Diavik Diamond Mines Inc.

**12:05 PAPER 302**

**Providing practical geotechnical and geomatics solutions for small mine operators – Slope failure and successful remediation at the Enchanted Designs ammolite mine in Alberta**

Lucy Philip and Alex Amies, Stantec; Tom Chant and Connor Emigh, Enchanted Designs Ltd.

**ROOM: 515A**

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**WATER TREATMENT TECHNOLOGIES**

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Luciano Piciacchia, BBA

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**10:50 PAPER 122**

**Application of SAGR bioreactors for ammonia treatment in mining effluents**

Tanner Devlin and Francis Bordeleau, Nexom

**11:15 PAPER 168**

**Evaluation of different membrane separation processes for treatment of acid mine drainage and mine effluents**

Saviz Mortazavi, Natural Resources Canada, CanmetMINING; Sanaz Mosadeghsedghi and Lucie Morin, Natural Resources Canada

**11:40 PAPER 255**

**In-situ application of batch treatment for water management at closed mine sites**

Sarah Barabash and Ron Nicholson, EcoMetrix Incorporated; Mike Aziz, Goldcorp Inc.; Tyler Provencal, Goldcorp - Porcupine Gold Mines



**12:05 PAPER 309**

**Bioelectrochemical systems for metal removal and recovery from mining effluents: Technology overview and a case study**

Boris Tartakovsky, Dominic Manno, and Louis-B. Jurgia, National Research Council Canada

**ROOM: 516A**

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**TRAINING FOR NOW & FUTURE**

**PEOPLE AND COMMUNITIES**

Chair: Holly Gardner, Ontario Centres of Excellence

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**10:50 PAPER 27**

**Preparing front-line supervisors for success: Getting them up to speed and off to a great start**

Joseph White, AEU LEAD

**11:15 PAPER 38**

**Managing operational conflicts under uncertainty**

Biswajit Chanda, Change Management and Mining Project Development

**11:40 PAPER 266**

**Mining through the digital divide**

Sharon Marshall, Cree8iv Collaboration

**12:05 PAPER 275**

**Continuous soft skill development in the mining industry**

Theresa Nyabeze, Women In Science and Engineering; Samantha Espley, Vale, Technology & Innovation Centre; Miranda Rocca-Circelli, Creative eLearning Design

**ROOM: 516D**

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**DESIGNING SUSTAINABLE PROSPERITY**

**FROM ROCKS TO RESOURCES**

Chair: Doris Hiam-Galvez, Hatch

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**10:50 PAPER 234**

**Designing sustainable prosperity**

Doris Hiam-Galvez, Hatch

**11:10 PAPER 401**

**Building technology ecosystems**

Helge Seetzen, TandemLaunch

**11:30 PAPER 402**

**Rio Tinto: A catalyst for regional development**

Alexandra Guaqueta, Rio Tinto

Followed by a panel discussion

**ROOM: 513E**

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**BEST PRACTICES & STANDARDS IN CLOSURE**

**SUSTAINABLE MINING**

Chair: Gabriel Castillo, Aquatic Life Ltd.

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**10:50 PAPER 100**

**Adoption of mining standards: An ounce of prevention is worth a tonne of regulatory pain**

Richard Butler and Victoria Chai, Willms & Shier Environmental Lawyers LLP

**11:15 PAPER 209**

**Mining standards roadmap for the Canadian mining sector**

Paul Steenhof, CSA Group

**11:40 PAPER 356**

**Progressive mine closure – Define this sustainable development practice for your mine rock storage facilities**

Michael O'Kane and Phil Garneau, O'Kane Consultants

**12:05 PAPER 318**

**Remediation of legacy uranium mines in northern Saskatchewan**

Patty Ogilvie-Evans, Saskatchewan Research Council

**ROOM: 516B**

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**OCCUPATIONAL HEALTH**

**HEALTH AND SAFETY**

Chair: Guillaume Lachapelle, Agnico Eagle Mines

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**10:50 PAPER 315**

**Laboratory evaluation of diesel oxidation catalysts for NO2 formation potential in mining applications**

Brent Rubeli, Natural Resources Canada

**11:15 PAPER 389**

**Embracing ergonomics in mining: A look back and forward at the positive impact ergonomics has and can have on health, safety, and productivity**

Tammy Eger, Centre for Research in Occupational Safety and Health, Laurentian University

**11:40 PAPER 343**

**Managing occupational hygiene hazards across multiple sites**

Bryan Wilson, Golder Associates Ltd.

**12:05 PAPER 408**

**How does adopting Industry 4.0 automation strengthen mining's health and safety record?**

Winnie Chu, Nanozen Industries Inc.

ROOM: 516C

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## MINING OPERATIONS

### 7TH NORTH AMERICAN IRON ORE SYMPOSIUM

Chairs: Daniel Gagnon, DRA Americas; Dennis Murr, Barr Engineering Company

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**10:50 PAPER 363**

**Cost sensitivity analysis of operating cost versus production tonnages in mining and milling**

Ryan Cunningham and Nalini Singh, DRA Met-Chem

**11:15 PAPER 236**

**Blast fragmentation impact on crushing & grinding energy consumption**

Lyall Workman, Barr Engineering Company; Jack Eloranta, Eloranta & Associates; Boyd Eisenbraun and Dennis Murr, Barr Engineering Company

**11:40 PAPER 54**

**Implementation of new technologies to control the iron ore grades at Peña Colorada Mine**

Christian Calderon-Arteaga, Hexagon Mining; Jose Portugal, Peña Colorada Mine; Maria Rocha, Rocha Blast Engineers SL; Hector Hernandez and Mariel Marin, Peña Colorada Mine

**12:05 PAPER 381**

**KPI Tree – A tool for empowerment of managers**

Arnab De, Resurgent Montreal Inc.

**TUESDAY, APRIL 30 | 14:00 - 16:05**

ROOM: 513A

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## INTEROPERABILITY AND INTEGRATION

### INNOVATION, AUTOMATION AND DATA

Chair: Peter Wan, Teck Resources Limited

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**14:00 PAPER 362**

**Rubber tired trains – Digital future mass transport in mining**

Christoph Mueller, MineTronics GmbH

**14:25 PAPER 55**

**Data-driven autonomous haulage systems simulation**

Hooman Askari, University of Alberta; Mohammad Tabesh, Teck Resources Limited; Shiv Prakash Upadhyay, Canadian Natural Resources Limited; Mohammad Mahdi Badiozamani, University of Alberta

**14:50 PAPER 283**

**Interoperability of mining systems – An Industry 4.0 approach**

Christopher Doran, Mitacom Pty Ltd.

**15:15 PAPER 327**

**How can resource companies use spatial business intelligence to unlock data interoperability to improve productivity, speed up growth and lead Industry 4.0**

Nevin Thompson, Charles Lavigne, and Kevin Oke, LlamaZOO Interactive Inc.

**15:40 PAPER 49**

**Gains in mucking efficiency by using short interval control at Hudbay 777 Mine**

Mike Jankowski, Hudbay Minerals; Ken Schroeder, Epiroc; Asim Khan, Analyze and Improve

**ROOM: 513C**

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**SMART MINERAL VALUE CHAINS**

**INNOVATION, AUTOMATION AND DATA**

Chair: Roussos Dimitrakopoulos, McGill University

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**14:00 PAPER 414**

**Smart optimization of mining complexes: Developing dynamic models for long- and short-term plans**

Fernanda Del Castillo, Ashish Kumar, and Roussos Dimitrakopoulos, McGill University

**14:25 PAPER 413**

**Behind the mining productivity upswing: Technology-enabled transformation**

Jeremy Marston, McKinsey & Company

**14:50 PAPER 373**

**Optimization of capacities under supply uncertainty**

Iain Farmer, Osisko Gold Royalties

**15:15 PAPER 386**

**Mine planning optimization under uncertainty: Implementation in a multipit gold operation**

Luis Montiel Petro, Promine

**15:40 PAPER 412**

**Incorporating geological and equipment performance uncertainty when optimizing short-term mine production schedules**

Matthew Quigley, Osisko Gold Royalties



**ROOM: 514B**

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## **OPERATIONAL AND PROJECT UPDATES**

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Adam Hesse, Ausenco

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**14:00 PAPER 278**

**Hecla Greens Creek filtered tailings disposal**

Aaron Marsh, Hecla Greens Creek Mining Company; Mary-Jane Piggott, Klohn Crippen Berger Ltd.; Sturgis George, Hecla Mining Company; Margaret Smith, Klohn Crippen Berger Ltd.

**14:25 PAPER 361**

**The Clean AER Project – An environmental and project execution success story**

Patrick Sikka and Benjamin Rankin, SNC-Lavalin

**14:50 PAPER 186**

**Fire Lake Mine: Expanding from 7 to 16.8 mtpa using an operation integrated approach in project execution**

Marc-Olivier Vachon, ArcelorMittal; Félix Gravel Gaumond, ArcelorMittal Exploitation minière Canada

**15:15 PAPER 248**

**Operational and technical update on Goldcorp – Éléonore Mine**

Luc St-Arnaud, Goldcorp - Éléonore

**15:40 PAPER 339**

**Glencore Mine Raglan Phase 2 : Génèse de la phase 2, après 20 ans d'activités, 25 autres années examplaires en vue**

Jean-Francois Verret, Glencore Raglan Mine

**ROOM: 515A**

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## **SOME ASPECTS OF MORE EFFECTIVE AND SAFER MINING**

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Peter Edmunds, Epiroc

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**14:00 PAPER 77**

**Artificial intelligence applied to the control of the underground mining dilution**

Luis Montiel Petro, Promine; Kilian Bao, DT Solutions Services; Yvan Dionne, Promine

**14:25 PAPER 53**

**Cut-off grade – The impact of getting it right!**

Gary Poxleitner and Joe Rowland, SRK Consulting

**14:50 PAPER 85**

**Hydrostatic pressure resisting steel liners for mine shaft rehabilitation projects**

Suresh Sivanantham, Cementation Canada Inc.

**15:15 PAPER 67**

**SIC – As Safe Informed Crews vs Short Interval Control**

Sean McCarthy and Neha Singh, PACE – Partners in Achieving Change Excellence

**15:40 PAPER 303**

**Mapping the way to Zero-Emission-Vehicle (ZEV) implementation**

Travis Battley, Andre Barriault Franck Boudreault and Anders Lindkvist, Epiroc

**ROOM: 516A**

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**ADVANCING DIVERSITY & INCLUSION**

**PEOPLE AND COMMUNITIES**

Chair: Mohammed Ali, Kirkland Lake Gold

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**14:00 PAPER 351**

**Striving to attain a diverse and inclusive workforce**

Tammy Van Lambalgen, Orano Canada Inc.

**14:25 PAPER 376**

**Perceptions in the Canadian mining industry**

Jocelyn Peltier-Huntley, University of Saskatchewan

**14:50 PAPER 91**

**Enhancing mining operations by embracing diversity & inclusion**

Laura Methot and Jamile Cruz, I&D 101; Jocelyn Peltier-Huntley, University of Saskatchewan

**15:15 PAPER 140**

**Opening new doors – IMII's Diversity & Inclusion Challenge Program and Projects**

Al Shpyth, IMII

**15:40 PAPER 244**

**Culture shifts required for success: Breaking silos, inclusivity & collaboration**

Karen Chovan, Enviro Integration Strategies

**ROOM: 516D**

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**DESIGNING SUSTAINABLE PROSPERITY CONTINUE**

**FROM ROCKS TO RESOURCES**

Chair: Doris Hiam-Galvez, Hatch

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**14:00 PAPER 399**

**Challenges in education for sustainable mining**

Michel Jébrak, Université du Québec à Montréal

**14:20 PAPER 403**

**Serving tomorrow's economy by valuing today's natural resources**

Éric Desaulniers, Nouveau Monde Graphite

**14:40 PAPER 251**  
**Leveraging impact investing tools to support community economic development in mining**  
Ka-Hay Law, Lundin Foundation

**15:00 PAPER 395**  
**Developing integrated natural resource models**  
John Thompson, PetraScience Consultants

Followed by a panel discussion

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**ROOM: 513E**

## **TAILINGS MANAGEMENT**

### **SUSTAINABLE MINING**

Chair: Alistair Kent, Merit Consultants International

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**14:00 PAPER 323**  
**Expanding tailings stewardship to include towards sustainable mining verification**  
Jason Cumbers, Stantec

**14:25 PAPER 330**  
**Public guidelines and tailings dam stewardship**  
David Bleiker, Wood Environment & Infrastructure Solutions

**14:50 PAPER 147**  
**Tailings management – Strategy and site selection process in the context of an urban mine, the example of Horne-5 Mine Feasibility Level Design**  
Mayana Kissiova, Osisko Gold Royalties, H  l  ne Cartier, Falco Resources Ltd.

**15:15 PAPER 297**  
**Designing waste rock inclusions to improve the global behavior of tailings impoundments**  
Michel Aubertin, Polytechnique Montr  al

**15:40 PAPER 132**  
**PASS: A new technology solution for oil sands tailings management**  
Dipo Omotoso, Suncor Energy Inc.

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**ROOM: 516B**

## **STRATEGIC RISK MANAGEMENT**

### **HEALTH AND SAFETY**

Chair: Roy Slack, Cementation Americas

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**14:00 PAPER 411**  
**Anglo American's taskforce for the elimination of fatalities**  
Brian Maynard, Anglo American

- 14:25 PAPER 224**  
**Application of digital risk management technology in safety critical control management**  
Michael Hartley, Minetell; Sean Dessureault, MST Global; Glenn Lyle, MIRARCO
- 14:50 PAPER 58**  
**Challenges and success factors when deploying tablet and IoT based fleet management systems and digital forms**  
Sean Dessureault, MST Global
- 15:15 PAPER 295**  
**Implementation of a critical controls management program – A mining contractor's journey**  
Steve Wrixon, Cementation Canada Inc.
- 15:40 PAPER 84**  
**Safe choice: Understanding how human performance impacts decision making**  
Jason Weibel and Larry Belik, Imperial Oil

**ROOM: 516C**

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**CONCENTRATION & PELLETIZING 1**

**7TH NORTH AMERICAN IRON ORE SYMPOSIUM**

Chair: Maxime Couillard, BBA; Nick Sosalla, Barr Engineering

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- 14:00 PAPER 282**  
**Recent developments in spiral testing facilities for iron particles recovery**  
Simon Goudreau and Marilène Renaud, COREM
- 14:25 PAPER 108**  
**Balling circuit modifications to improve pellet sizing**  
Erik Lacksonen, US Steel
- 14:50 PAPER 119**  
**The use of a simulator to improve the performance of an iron ore gravity concentration circuit**  
Maryam Sadeghi and Claude Bazin, Université Laval
- 15:15 PAPER 177**  
**High-efficiency flotation collectors for magnetite ores**  
Peter Zhou, Nouryon; Shashi Rao, University of Minnesota–Natural Resources Research Institute; Joseph Zachwieja, Jan-Olof Gustafsson, and Henrik Nordberg, Nouryon
- 15:40 PAPER 387**  
**Bloom Lake flowsheet assessment, one year into operations**  
François Lavoie, Quebec Iron Ore



# TECHNICAL PROGRAM WEDNESDAY

## PROGRAMME TECHNIQUE MERCREDI

| AM1 (08:30)                                        |                                                                                        |      |
|----------------------------------------------------|----------------------------------------------------------------------------------------|------|
| <b>Innovation, Automation and Data</b>             | Mineral Processing 1                                                                   | 513A |
|                                                    | Advances in Drilling                                                                   | 513C |
| <b>Operations: Case Studies and Best Practices</b> | Underground - Access, Recovery and Haulage                                             | 514B |
|                                                    | Maintenance and Reliability                                                            | 515A |
| <b>People and Communities</b>                      | Innovation in Social Responsibility                                                    | 516A |
| <b>Sustainable Mining</b>                          | Adapting with Climate Change: A Panel Discussion                                       | 513E |
| <b>From Rocks to Resources</b>                     | Mineral Exploration Best Practices                                                     | 516D |
| <b>Health and Safety</b>                           | New Trends in Employee Care                                                            | 516B |
| <b>7th North American Iron Ore Symposium</b>       | Perspectives: Moving Forward                                                           | 516C |
| AM2 (10:30)                                        |                                                                                        |      |
| <b>Innovation, Automation and Data</b>             | Mineral Processing 2                                                                   | 513A |
|                                                    | Water, Tailings and Technology                                                         | 513C |
| <b>Operations: Case Studies and Best Practices</b> | Rock Engineering III                                                                   | 514B |
|                                                    | Surface Mining                                                                         | 515A |
| <b>People and Communities</b>                      | Economic Opportunities Beyond the Mine                                                 | 516A |
| <b>Sustainable Mining</b>                          | Renewable Energy Integration                                                           | 513E |
| <b>From Rocks to Resources</b>                     | CIM's Draft Guidance for Environmental and Social Disclosure under NI-43-101 Reporting | 516D |
| <b>Health and Safety</b>                           | Employing New Technology                                                               | 516B |
| <b>7th North American Iron Ore Symposium</b>       | Environment and Water Management                                                       | 516C |
| PM (14:00)                                         |                                                                                        |      |
| <b>Operations: Case Studies and Best Practices</b> | Mine Electrification                                                                   | 514B |
|                                                    | Maintenance Management Best Practices                                                  | 515A |
| <b>People and Communities</b>                      | ESRS: Stakeholder Dialogue                                                             | 516A |
| <b>Sustainable Mining</b>                          | Nature's Resilience & Footprint Reductions                                             | 513E |
| <b>From Rocks to Resources</b>                     | Sustainable Innovations in Energy Metals                                               | 516D |
| <b>Health and Safety</b>                           | Practical Hazard Control                                                               | 516B |
| <b>7th North American Iron Ore Symposium</b>       | Concentration & Pelletizing 2                                                          | 516C |

## WEDNESDAY, MAY 1 | 08:30 - 10:10

ROOM: 513A

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### MINERAL PROCESSING 1

INNOVATION, AUTOMATION AND DATA

Chair: Rob Stephens, Teck Metals Ltd.

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**08:30 PAPER 106**

**Mineral quantification by laser-induced breakdown spectroscopy: towards on-stream mineral characterization**

Francis Vanier, Elton Soares de Lima Filho, Josette El Haddad, Aïssa Harhira, Christian Padioleau, and Mohamad Sabsabi, National Research Council Canada; Greg Wilkie, CRC ORE; Alain Blouin, National Research Council Canada

**08:55 PAPER 288**

**Online conveyor belt moisture analyzer at Barrick Cortez**

Pamela Moyo and Ceren Bozbay, Barrick Cortez

**09:20 PAPER 151**

**Evaluating uncertainty of laboratory-scale particle sorting amenability tests**

Christopher Baxter, Andriy Plugatyr, Francis Vanier, and Sevan Bedrossian, National Research Council Canada

**09:45 PAPER 245**

**Selection and implementation of a modern model predictive controller for furnace slag composition control**

Philip Nelson and Napoleon Reata, XPS Expert Process Solutions, A Glencore Company

ROOM: 513C

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### ADVANCES IN DRILLING

INNOVATION, AUTOMATION AND DATA

Chair: Jonathan Peck, Peck Tech Consulting Ltd.

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**08:30 PAPER 44**

**Automation in blasthole drills: Enabling optimization**

Tyler Berens, Epiroc Drilling Solutions

**08:55 PAPER 152**

**Optimizing while drilling – Autonomous control of drilling parameters**

Peter Johansson and Tim Peco, LKAB Wassara AB

**09:20 PAPER 160**

**Results from advanced measurements while drilling technologies on blasthole drill at a Canadian iron ore mine**

Daniel Palmer, DataCloud International, Inc.; James Rector, UC Berkeley; Doug Kirkby and Emmanuel Bize, DataCloud International, Inc.; Marc-Olivier Vachon, ArcelorMittal; Jonathon Peck, Peck Tech Consulting Ltd.; Riccardo Del Bosco, BBA; Curtis Watson, Peck Tech Consulting Ltd.

**09:45 PAPER 183**

**Improvements to fracture detection from monitoring while drilling data**

Curtis Watson, Peck Tech Consulting Ltd.

**ROOM: 514B**

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**UNDERGROUND – ACCESS, RECOVERY AND HAULAGE**

**OPERATIONS: CASE STUDIES AND BEST PRACTICES**

Chair: Peter Cain, DMT Geosciences Limited

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**08:30 PAPER 158**

**Pillar recovery at Excellon Resource's Platosa Mine**

Samuel Freitag, Denis Flood, and Francisco Rodriguez, Excellon Resources Inc. (TSX:EXN; OTC:EXLLF)

**08:55 PAPER 197**

**Soft ground tunnelling techniques for mine access development**

Joe Anderson and Ben Ablett, Golder Associates; Ed Gillard, Alan Auld Engineering; Jack Nolan and Gabino Preciado, Golder Associates

**09:20 PAPER 135**

**Optimizing underground mining transport in Sweden with three vehicles capacity alternatives: A discrete-event simulation based approach**

Mathieu Gosselin, Gosselin Mining

**09:45 PAPER 30**

**Optimized payloads and increased trucking factors with volume scanning**

Carey West, Loadscan

**ROOM: 515A**

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**MAINTENANCE AND RELIABILITY**

**OPERATIONS: CASE STUDIES AND BEST PRACTICES**

Chair: Jean Vavrek, American Biltrite

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**08:30 PAPER 34**

**Kidd Operations: Automation LHD journey and its effects on scheduling, design & operation**

Ryan Roberts, Kidd Operations, A Glencore Company

**08:55 PAPER 145**

**FLSmith – Cage brake system for use on steel guides – Development update**

David Strong, FLSmith Ltd. Mine Shaft Systems

**09:20 PAPER 192**

**Reduced cycle times with electro-mechanical skip dump mechanism**

Mark Dunseith, FLSmith Ltd Mine Shaft Systems

**09:45 PAPER 454**

**Leak prevention: Benefits, current technologies and state of the industry**

Jeff Fuller, ACR Fuller Group

**ROOM: 516A**

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**INNOVATION IN SOCIAL RESPONSIBILITY**

**PEOPLE AND COMMUNITIES**

Chair: Simon Thibault, Nemaska Lithium Inc.

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**08:30 PAPER 205**

**Cree Nation of Nemaska's community dialogue and planning project**

Carolyn Burns, NetPositive

**08:55 PAPER 292**

**Boréalis: Developing purpose-built software to help mining companies comply with TSM protocols**

Patrick Grégoire, Boréalis

**09:20 PAPER 48**

**Improving stakeholder partnerships with the help of 3D visual tools**

Janeth Pizarro, Stantec

**09:45 PAPER 113**

**Recent innovations to maximize Cree employment in Eeyou Istchee James Bay Region, QC**

Chantal Francoeur, Nemaska Lithium

**ROOM: 516D**

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**MINERAL EXPLORATION BEST PRACTICES**

**FROM ROCKS TO RESOURCES**

Chair: Serge Perreault, SOQUEM

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**08:30 PAPER 176**

**A case study on the use of geostatistical simulation to support drill hole spacing decisions**

Felipe Cabral Pinto and Clayton V. Deutsch, Centre for Computational Geostatistics, University of Alberta

- 08:55 PAPER 95**  
**Recent advances and integration of automated mineralogy for ore characterization**  
Tassos Grammatikopoulos, SGS Canada
- 09:20 PAPER 232**  
**New era in regional geological mapping: Multispectral satellites and advanced data processing**  
Ludovic Bigot, Michel Rheault, and Ludovic Legros, Effigis Geo-Solutions
- 09:45 PAPER 188**  
**Review of the 2018 CIM Mineral Exploration Best Practices Guidelines**  
Reno Pressacco, RPA Inc.

**ROOM: 513E**

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**ADAPTING WITH CLIMATE CHANGE: A PANEL DISCUSSION**  
SUSTAINABLE MINING

Chair: John Stewart, Natural Resources Canada

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- 08:30 PAPER 215**  
**Mining Climate Change Case Studies and Planning for a Changing Climate**  
Rachel Wyles and Sean Capstick, Golder Associates
- 08:40 PAPER 359**  
**Small modular reactors: Powering the future of mining**  
Diane Cameron, Natural Resources Canada
- Panel discussion with invited speakers

**ROOM: 516B**

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**NEW TRENDS IN EMPLOYEE CARE**  
HEALTH AND SAFETY

Chair: Tammy Eger, Centre for Research in Occupational Safety and Health, Laurentian University

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- 08:30 PAPER 26**  
**Improving safety at work for everyone: Me too mining association**  
Susan Lomas, Lions Gate Geological Consulting and Me Too Mining Association
- 08:55 PAPER 340**  
**The mental health and wellbeing of mining workers: Results and insights from Vale/USW's Mining Mental Health Study (2014-2019)**  
Michel Larivière, Laurentian University
- 09:20 PAPER 369**  
**Mental health: The importance of effective management in the workplace**  
Don Langlois, DMC Mining Services, KGHM Group

**09:45 PAPER 51**

**Zero harm: Critical insights for a safer contactor workplace**

Meg Shannon, Global Public Affairs; Anne-Sophie Tétréault, Cognibox

**ROOM: 516C**

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**PERSPECTIVES: MOVING FORWARD**

**7TH NORTH AMERICAN IRON ORE SYMPOSIUM**

Chair: Daniel Gagnon, DRA Americas

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**08:30-10:10**

Panelists:

- Armand Mackenzie - Tata Steel Minerals Canada
- David Cataford - Champion Iron Mines
- Tayfun Eldem - Alderon Iron Ore Corp.
- Clayton Walker – Iron Ore Company of Canada

Followed by a panel discussion

**WEDNESDAY, MAY 1 | 10:30 - 12:10**

**ROOM: 513A**

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**MINERAL PROCESSING 2**

**INNOVATION, AUTOMATION AND DATA**

Chair: Neha Singh, PACE-Partners in Achieving Change Excellence

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**10:30 PAPER 267**

**Wear monitoring in lined mine equipment**

Silvio Kruger, Zhigang Sun, Jimmy Jiang, Sevan Bedrossian, National Research Council Canada

**10:55 PAPER 268**

**The use of a dynamic simulation models in process plant design**

Juliana Parreira, Ausenco

**11:20 PAPER 258**

**Uncertainty assessment in an arbitrary volume without the use of geostatistical simulation**

Alvaro Riquelme and Julian Ortiz, The Robert M. Buchan Department of Mining, Queen's University

**11:45 PAPER 285**

**Near face solutions for oil sands mining and processing**

Mike Carniato, Syncrude R&D

**ROOM: 513C**

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## **WATER, TAILINGS AND TECHNOLOGY**

### **INNOVATION, AUTOMATION AND DATA**

Chair: Kristie Tarr, CanmetMINING

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**10:30 PAPER 187**

**Deployment of large-area radio-enabled tailings monitoring systems in open-pit mines**

Vincent Le Borgne, Alexandre Cosentino, Jean-Marie Br  h  , and St  phane-  ric Thivierge, GKM Consultants

**10:55 PAPER 219**

**Environmental intelligence in mine closure and reclamation**

Elizabeth Haack and Sarah Barabash, EcoMetrix Incorporated

**11:20 PAPER 239**

**Smart water management for mines**

Veronique Bourgier, Veolia Water Technologies

**11:45 PAPER 256**

**New sensor and portable technologies developed at NRC for measuring water contaminants**

Guy Lamouche, Patrick Mercier, Jun Shen, Wei Qu, Boris Tartakovsky, Ademola Adekunle, Bussaraporn Patarachao, Elton Soares de Lima Filho, and A  ssa Harhira, National Research Council Canada

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**ROOM: 514B**

## **ROCK ENGINEERING III**

### **OPERATIONS: CASE STUDIES AND BEST PRACTICES**

Chair: John Unrau, Mosaic Potash

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**10:30 PAPER 194**

**Investigations on the interaction between welded wire mesh and rock bolts**

Efstratios Karampinos, Universit   Laval; John Hadjigeorgiou, University of Toronto

**10:55 PAPER 307**

**One-step installation of rock bolts, a joint venture to improve productivity and safety in rock bolting**

Michael Hosp, Minova MAI GmbH

**11:20 PAPER 336**

**Moving towards mechanized rock bolting**

Ryan Lyle, Eric Smith, and Alex MacInnes, Cementation Canada Inc.

**ROOM: 515A**

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## **SURFACE MINING**

### **OPERATIONS: CASE STUDIES AND BEST PRACTICES**

Chairs: Allan Boddy, Consultant; Gene Tucker, Conuma Coal Resources Limited

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**10:30 PAPER 458**

**Conuma Coal – Reinventing northeast British Columbia coal**  
Gene Tucker, Conuma Coal

**10:55 PAPER 456**

**Operating surface mine haulage systems autonomously**  
Allan Boddy, Mark Sawyer, and Jonathon Peck, Peck Tech Consulting Ltd.

**11:20 PAPER 457**

**Evolution of an open digital architecture for mining**  
Dean Tanaka, Teck Resources Limited

**11:45 PAPER 163**

**Load-cycle optimization opportunities through operator assist technology**  
Braden Weisheit, Modular Mining Systems

**ROOM: 516A**

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## **ECONOMIC OPPORTUNITIES BEYOND THE MINE**

### **PEOPLE AND COMMUNITIES**

Chair: Lana Eagle, Lana Eagle Consulting

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**10:30 PAPER 287**

**The risk of assuming you know best**  
Marie Hélène Turgeon, Independent

**10:55 PAPER 193**

**Economic benefits from Kirkland Lake Gold operations**  
Mohammed Ali and Natasha Dombrowski, Kirkland Lake Gold

**11:20 PAPER 237**

**Sustainable partnering with Kiewit – A long-term perspective**  
Philippe Jünger, Petr Kiewit Sons / Construction Kiewit Cie

**11:45 PAPER 265**

**Empowering local contractors in the construction of hydropower plant:  
A case study in DR Congo**  
Mutonkole Kabila Arthur, Bombiti Nzanza, and Jannie Bekker, Kibali Gold Mine;  
Mike Newmann, Knight Piesold; Armand Salon, Kibali Gold Mine



**ROOM: 516D**

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## **CIM'S DRAFT GUIDANCE FOR ENVIRONMENTAL AND SOCIAL DISCLOSURE UNDER NI-43-101 REPORTING**

### **FROM ROCKS TO RESOURCES**

Chairs: Karola Tóth, SNC-Lavalin; Derek Riehm, Lundin Mining

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#### **10:30-12:10**

Overview of CIM's Draft Guidance for Environmental and Social Disclosure under NI-43-101 Reporting

The Environmental and Social Responsibility Society (ESRS) of the CIM undertook the development of a draft guidance document for Environmental and Social Disclosure of mining projects under National Instrument (NI-43-101), following a report by the Ontario Securities Commission, which indicated significant disclosure deficiencies in this area. This session will feature a presentation from the working group and will discuss the key areas that have been highlighted in discussions as needing improvement and will provide a suggested framework for future disclosure documents. An overview of key elements of environmental and social aspects of a mining project will be reviewed during the different phases of the project. This will be followed by a more detailed discussion of disclosure needs around environmental studies and management, permitting and approval requirements, social and community aspects, and closure planning. This session will kick off the consultation process that ESRS is planning to undertake on the draft guidelines for disclosure.

Speakers include:

Derek Riehm, Lundin Mining; Jenifer Hill, JLH Environmental; David Brown, Golder Associates; Alistair Kent, Merit Consultants; Richard Cook, Knight Piesold; Edith Garneau, Independent

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**ROOM: 513E**

## **RENEWABLE ENERGY INTEGRATION**

### **SUSTAINABLE MINING**

Chair: Laurel Acacia, University of British Columbia

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#### **10:30 PAPER 146**

##### **Sustainable energy roadmaps for remote mines in Canada**

Durjoy Baidya, Ali Madiseh, and Malcolm Scoble, University of British Columbia

#### **10:55 PAPER 169**

##### **Incorporating the use of renewable energy in the mining industry**

Camila Beltran and Roberto Belmar, University of Bio Bio; Nathalie Risso, The University of Arizona; Fabricio Salgado, University of Bio Bio

#### **11:20 PAPER 182**

##### **Solar power in the North: A bright future**

Ross Phillips, Michel Carreau, and Joel Guilbaud, Hatch

**11:45 PAPER 104**

**Results from prototype testing and feasibility studies of a cryogenic energy storage system with the capacity to provide co-generation of electrical power and chilling, compressed air and chilling and motive force with chilling**

Daniel Cluff, CanMIND Associates; Douglas Morrison, Centre for Excellence in Mining Innovation (CEMI)

**ROOM: 516B**

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**EMPLOYING NEW TECHNOLOGY**

**HEALTH AND SAFETY**

Chair: George Darling, Sandstorm Gold

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**10:30 PAPER 185**

**The digital tagboard – Solving tagboard incidents**

Yvan Brulé, TopVu (K4 Integration)

**10:55 PAPER 213**

**Deployment of FLIR thermal imaging cameras on heavy equipment**

Karly Winfield, Provox Inc

**11:20 PAPER 298**

**How can we deliver on safety for equipment repair trades?**

Peter Larsen, Kal Tire

**11:45 PAPER 407**

**Zero harm: A review of underlying principles, application, advantages and disadvantages**

Tom Hethmon, SSR Mining

**ROOM: 516C**

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**ENVIRONMENT AND WATER MANAGEMENT**

**7TH NORTH AMERICAN IRON ORE SYMPOSIUM**

Chairs: François Séguin, Envitech H2O Inc.; Ryan D. Siats, Barr Engineering

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**10:30 PAPER 392**

**Surface water management: The new challenge of Labrador Trough**

François Lafrenière, Minerai de Fer Québec

**10:55 PAPER 400**

**Fast track waste water treatment Design-Build-Operate (DBO) project: An example of reducing the owner's risk by using collaboration and innovation between mining suppliers**

Denis Cadoret, AXOR Expert-Conseils; Eric Lannegrace, H2Flow Equipment Inc.

- 11:20 PAPER 417**  
**Water treatment and sludge dewatering: The use of the Geotube® in the mining industry**  
Pascal Marcotte, ASDR Canada Inc.
- 11:45 PAPER 416**  
**Challenges in conducting a hydrogeological study and results on a potential iron deposit located in a remote site within the Labrador Trough**  
Vincent Mlakar and Rich Schmidt, BluMetric Environmental Inc.
- 12:10 PAPER 428**  
**Densadeg clarifier for metals removal of contaminated mine water**  
Evan Claytor, Suez

## WEDNESDAY, MAY 1 | 14:00 - 16:05

**ROOM: 514B**

### MINE ELECTRIFICATION

OPERATIONS: CASE STUDIES AND BEST PRACTICES

Chair: Mohammed Ali, Kirkland Lake Gold

- 14:00 PAPER 201**  
**Leading the charge in converting an existing mine to electric**  
Mohammed Ali and Natasha Dombrowski, Kirkland Lake Gold
- 14:25 PAPER 229**  
**Fleet electrification – Vale Base Metals**  
Alex Mulloy, Samantha Espley, and Trevor Courchesne, Vale, Technology & Innovation Centre
- 14:50 PAPER 32**  
**Critical enabling role of overland conveying in electrification initiatives in mining**  
Tony Barr, BEUMER Corporation, Conveying & Loading Division
- 15:15 PAPER 105**  
**European Union's sustainable intelligent mining systems – Battery powered mining equipment**  
Adrian Halim, Luleå University of Technology
- 15:40 PAPER 148**  
**Measuring the energy efficiency of battery electric vehicles in underground mining**  
Stuart Lister, Anthony Griffiths, and Jeff Anderson, MacLean Engineering

**ROOM: 515A**

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**MAINTENANCE MANAGEMENT BEST PRACTICES**

**OPERATIONS: CASE STUDIES AND BEST PRACTICES**

Chair: Ted Knight, Hatch

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**14:00 PAPER 257**

**Asset Reliability 4.0: A practical approach to making asset management more data-driven**

Adi Dhora and Fouad Habib, Spectris Advance; Adam Mettas, HBM Prensicia

**14:25 PAPER 281**

**The value of sustainable maintenance programs**

Roger Collard, Calumet Specialty Products Partners

**14:50 PAPER 291**

**Automated interactive inspection and conditional maintenance system**

**Metso**

Guadalupe Rodriguez, Metso Minerals

**15:15 PAPER 316**

**Maintenance planning and scheduling to overcome the manpower shortage in the industry**

Michel Cote, Norda Stelo

**15:40 PAPER 321**

**Reliable and cost-effective means for inspecting underground pipes in mines**

Pawel Gebiski, Denis Boudreau, and Ian Moore, Acuren Group Inc.

**ROOM: 516A**

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**ESRS: STAKEHOLDER DIALOGUE**

**PEOPLE AND COMMUNITIES**

Chairs: Andres Recalde, Peruvian Canadian Chamber of Commerce; Lana Eagle, Lana Eagle Consulting; Holly Gardner, Ontario Centres of Excellence

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**14:00 – 16:05**

*Special registration is needed for this session.*

**Ixtaca Mine: Advancing community relations within the planning cycle**

The Ixtaca Gold-Silver Deposit is one of Mexico's premier precious metal discoveries. The deposit was discovered by Almaden in 2010 and acquired by staking has outlined a multi-million ounce deposit. The project is located 120 kilometres southeast of the Pachuca Mine, one of the largest gold and silver deposits in Mexico with a historic production of 1.4 billion ounces of silver and 7 million ounces of gold. The deposit is also well-located in the industrial heart of Puebla State. It is easily accessible from Mexico City Ixtaca, and 95 kilometres north of Puebla city. A rail-serviced industrial park is 25 kilometres away, and regional power is provided by the Laguna Verde nuclear power station, located 200 kilometres to the east on a deep sea port.

Almaden Minerals has made a commitment to community relations throughout the planning and development of this mining operation, representatives from the company, community and consulting services will participate in this year's multi-stakeholder dialogue.

Daniel Santamaria, VP Operations from Almaden Minerals, will lead an overview of their experience with early exploration through to the pre-construction phase with an emphasis on the using best management practices related to community relations and violence prevention. In particular, they will discuss their ongoing employee training program, community health and social welfare, community construction projects, and more.

Breakout sessions will be divided by different phases of the project, past and future, as the company approaches the construction phase. Based on the presentation provided, the participants will have an opportunity to discuss the legacy of community engagement that has been carried out to date and the foundation that has been built to maintain the social license, and potential future issues and challenges that may arise as the project advances.

*Agenda:*

5 minutes: Opening Remarks (Andres Recalde)

25 minutes: Presentation Daniel Santamaria, VP Operations, Almaden Minerals

30 minutes: Breakout Sessions based on project phase

25 minutes: Sharing Results (moderators)

15 minutes: Results/Discussion

5 minutes: Closing Remarks & 10th Anniversary Cake! (Holly Gardner)

**ROOM: 516D**

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## SUSTAINABLE INNOVATIONS IN ENERGY METALS

### FROM ROCKS TO RESOURCES

Chair: Simon Thibault, Nemaska Lithium Inc.

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**14:00 PAPER 13**

**Innovation in the lithium industry: From green technologies to financing strategy**

Guy Bourassa, Nemaska Lithium

**14:25 PAPER 47**

**The cycle of lithium: From mining to recycling**

Olga Mazur, Primero

**14:50 PAPER 181**

**Closing the loop – What to do with end-of-life (EOL) Li-ion batteries**

David Lyon, MEDATECH Engineering, Chih-Ting Lo, EELO Solutions

**15:15 PAPER 468**

**EV batteries, nickel and the Dumont Project**

Johnna Muinonen, RNC Minerals

**ROOM: 513E**

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**NATURE'S RESILIENCE & FOOTPRINT REDUCTIONS**

**SUSTAINABLE MINING**

Chair: Julie Champagne, National Research Council Canada

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**14:00 PAPER 120**

**Constructed floating wetlands to treat sulfate-dominated mine drainage**

Varun Gupta, John Gunn, and Nadia Mykytczuk, Laurentian University

**14:25 PAPER 385**

**An evaluation of silica-Bacillus microencapsulation for reducing acid mine drainage from sulfur waste rock in cold climates**

Katie Mitchell, Laurentian University

**14:50 PAPER 212**

**A promising approach to accelerate rehabilitation and generate value from sulfidic tailings**

Bryan Tisch, Suzanne Beauchemin, Sean Langley, and Juha Metsaranta, Natural Resources Canada

**15:15 PAPER 354**

**Genomics-driven optimization of the bio-recovery of refractory gold from arsenic-rich materials**

Madiha Khan, Laurentian University; Julie Champagne, National Research Council Canada; Paul Miller, BacTech Environmental Corporation; Nadia Mykytczuk, Laurentian University

**15:40 PAPER 331**

**Characterization of rhizosphere, soil and endophytic microbial communities of native vegetation on a disturbed alpine/tundra mine site**

Katrina Callender, Charles Greer, and Jessica Wasserscheid, National Research Council Canada; Sabine Martin, Laboratoire de Recherche en Sciences Végétales; Charlotte Begouen-Dumeaux, Marius Poulain, Qinhong Cai, and Stephanie Messina-Pacheco, National Research Council Canada; Martin Nadeau, Viridis Terra Innovations; Hugo Thibaudeau Robitaille, Tata Steel Minerals Canada, Loic Didillon; Stephane Boudreau and Damase Khasa, Université Laval

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**ROOM: 516B**

**PRACTICAL HAZARD CONTROL**

**HEALTH AND SAFETY**

Chair: Steven Bowles, IAMGOLD

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**14:00 PAPER 173**

**Operator fatigue monitoring – Case studies & best practice**

Daniel Bongers, SmartCap

- 14:25 PAPER 225**  
**Advancement of safety technology drives innovation and cost savings for the mining industry**  
Sean Martell, PRECO Electronics
- 14:50 PAPER 270**  
**How to improve effectively serious injury and fatality prevention? Feedback from mining sector field projects**  
Christian Roche and Alanna Aqvi, DuPont Sustainable Solutions
- 15:15 PAPER 304**  
**Mining tire recycling technology overview**  
Scott Farnham, Kal Tire
- 15:40 PAPER 170**  
**Guidance on developing sound security management plans to implement international security standards and the voluntary principles**  
Charles Dumbrille, Mining Security Working Group

**ROOM: 516C**

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**CONCENTRATION & PELLETIZING 2**

**7TH NORTH AMERICAN IRON ORE SYMPOSIUM**

Chairs: Michel Garant, COREM; Shashi Rao, University of Minnesota–Natural Resources Research Institute

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- 14:00 PAPER 246**  
**Efficient downstream processing of iron ores applying new analytical monitoring methods**  
Uwe Koenig and Nicholas Norberg, Malvern Panalytical
- 14:25 PAPER 231**  
**A Canadian perspective on the use of biochar in iron ore pelletizing**  
Olivier Lacroix and Mathieu Dubé, COREM
- 14:50 PAPER 165**  
**Use of small scale magnetized channels for high recovery separation of small diameter iron particles**  
Sebastian Cline, Sanja Miskovic, and Utkan Caliskan, University of British Columbia
- 15:15 PAPER 102**  
**Triple deck roller feeder – From scratch to results**  
Steve Beaudin, Metal7; Patrick Malenfant, ArcelorMittal Mines Canada
- 15:40 PAPER 11**  
**The challenges of beneficiation of low grade iron ores**  
Damian Connelly, Midas Engineering Group Pty Ltd.
- 16:05 PAPER 199**  
**Meeting the demand for DR-grade pellets in North America**  
Anton Bochkov, Legacy Hill Resources Ltd.