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The IMDEX Xploration Technology Symposium is the annual forum for sharing big ideas, new technologies and new processes in exploration. This was a **SELL-OUT EVENT** in 2019, attracting the top thought leaders in exploration from the US, Canada and around the world.

In advance of AME Roundup 2020, the symposium provides an opportunity to hear about the latest technologies, tools and innovative approaches to fast-track discovery.

Join us for what promises to be an exciting opportunity to liaise with some of the best technical and creative minds from across the industry.

VENUE:
Morris J Wosk Centre for Dialogue
580 W Hastings St,
Vancouver, BC V6B 5K3, Canada

DATE:
17 January, 2020

TIME:
8.00am-5.00pm

CLICK HERE TO REGISTER
xtech2020.eventbrite.com

XPLORATION TECH SYMPOSIUM

WHO IS THIS SYMPOSIUM FOR?

This seminar is designed for geologists, technical staff, vice presidents, managing directors and management of exploration and mining organizations.

WHAT'S INCLUDED?

Sixteen presentations and full catering over the course of the day. As well as two complimentary drink tokens and catering for our #xplorationtech Sundowner at Malone's Social Lounge & Taphouse after the event.

PRESENTED BY

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SYMPOSIUM PROGRAMME

8:00 AM	Welcome	Gervais Perron

SESSION 1: INTEGRATION OF MULTI-ELEMENT DATA
BROUGHT TO YOU BY CORESCAN

8:10 AM	Extracting geotechnical rock properties from drill core – advantages of automated methods	Cassady Harraden
8:35 AM	Extracting more information out of geochemical datasets and alteration footprinting using unsupervised learning	Jean-Philippe Paiement
9:00 AM	Using seismic reflection to shine a new light on mineral systems	Greg Turner
9:25 AM	The International Caving Research Network (ICaRN) - Advancing cave mining	Bern Klein

MORNING TEA - BROUGHT TO YOU BY MALVERN PANALYTICAL

SESSION 2: ARTIFICIAL INTELLIGENCE FOR MINERAL EXPLORATION
BROUGHT TO YOU BY GOLDSPOT RESOURCES

10:20 AM	The use of machine learning for mineral exploration in greenfield areas	Vincent Dubé-Bourgeois
10:45 AM	Myths and maths of gold grain dispersions	Réjean Girard
11:10 AM	Future proofing exploration through the use of infrared spectra and machine learning	John Carter
11:35 AM	Spectral mineralogy from hand-held spectrometers, new analysis methods driving a revival	Sasha Pontual

LUNCH BREAK - BROUGHT TO YOU BY CORESAFE

SESSION 3: EXPLORATION INSTRUMENTATION
BROUGHT TO YOU BY IMAGO

1:00 PM	Realising the value of your geological images	Federico Arboleda
1:25 PM	Improving the fundamental parameters algorithm for better pXRF results on exploration samples	Jennifer Caban
1:50 PM	Virtual-mixed reality data collection and analysis	Wayne Barnett
2:15 PM	A new wave of drilling optimization	Nick Payne

AFTERNOON TEA - BROUGHT TO YOU BY IOS SERVICES GÉOSCIENTIFIQUES

SESSION 4: EXPLORATION CASE STUDIES
BROUGHT TO YOU BY NEVADA EXPLORATION INC

3:00 PM	An integrated, mineral systems approach to generating and advancing blind Carlin-type gold projects	Simon Griffiths
3:25 PM	Core values - Core shack optimisation	Jessica Keast
3:50 PM	An integrated approach for modeling the alteration of the Quebrada Blanca Cu-Mo Porphyry, Collahuasi District, Chile	Iain Dalrymple
4:15 PM	The spatially aware database: An open source alternative to exploration data management	Chris Gallagher
4:40 PM	Conclusions and Comments	Gervais Perron

5:00 PM #XPLORATIONTECH SUNDOWNER

#xplorationtech

OUR PRESENTERS

FEDERICO ARBOLEDA

Realising the value of your geological images

Founder / Imago

About the presentation: Workflows based on imagery are becoming a key component of how we do our jobs. Photographs have always been taken of diamond core and sample cuttings. However, these images to date have only been captured as insurance for the future and supporting validation and verification tasks. They are rarely considered valuable sources of immediate data. This presentation will discuss why better images must be taken while drilling, why we should view them as a valuable source of data and how they can be used to support a continuous modelling process.

About the presenter: Federico has a Masters Degree in Geology, but as he puts it he was not a very good geologist so he had to focus on computers. He has spent his career building, deploying and innovating software for the mining industry. He has worked for MineSight, acQuire and two years ago he founded Imago.

WAYNE BARNETT PHD, PGEO.

Virtual-mixed reality data collection and analysis

Principal Structural Geologist / SRK Consulting

About the presentation: The EasyMap MR software application designed and field tested for use with the Microsoft HoloLens headset, incorporates 3D scanning and holographic projection technology. As a geologist or geotechnical engineer, imagine using augmented visual powers to automatically measure surface orientations, and drawing your geological interpretation directly onto the rock face using virtual painting tools. Mixed reality technology is changing best practices in data collection and analysis, not just visualization and communication.

About the presenter: Dr. Barnett is a Principal Consultant at SRK Consulting with over 23 years of global experience in mining and exploration. He has a PhD in structural geology and certification in rock mechanics, and has been employed as a geotechnical engineer on two mining operations, underground and open pit, over a period of 8 years. Teaching appropriate geological mapping and 3D interpretation in mining has become a mission, finding new technological solutions a passion.

JENNIFER CABAN

Improving the fundamental parameters algorithm for better pXRF results on exploration samples

Market Application Specialist / Olympus

About the presentation: This presentation will examine recent enhancements to a fundamental parameters (FP) based analytical method used by portable X-Ray Fluorescence (pXRF) devices to calculate elemental concentrations. Cross-beam correction and general background reduction have improved analyses across different matrices. The addition of a third excitation energy has expanded the number of elements that can be calculated in a single test. Together, these tools have improved the accuracy of the method on a variety of sample types.

About the presenter: Jennifer Caban has 10 years' experience working with X-ray fluorescence and X-ray diffraction technologies in pre and post-sales support functions. In her current role, Jennifer travels extensively throughout the United States, Latin America, and the Caribbean, training the Olympus sales force, and working with customers in a wide range of industries. She specializes in soil and geology-based applications. Jennifer holds a Bachelor of Arts degree in Environmental Economics from Bates College.

JOHN CARTER

Future proofing exploration through the use of infrared spectra and machine learning

Global Technical Manager / Bureau Veritas Minerals

About the presentation: Infrared spectroscopy exploits the difference in chemical composition and lattice structures to produce a characteristic mineralogical response from a sample. The key to successful utilization of infrared spectra, however, is the interpretation methodology. Specific spectral features can be associated to limited properties, but with the power of machine learning, predictions for a wealth of elemental, mineralogical, physical characteristics and metallurgical responses are unlocked. This talk introduces machine learning into the routine analytical space and enables exploration programs to add significant value to downstream resources.

About the presenter: John Carter is Global Technical Manager for Bureau Veritas Minerals. John holds a Diploma of Business, a Bachelor of Engineering, and a PhD in Applied Physics. John joined Bureau Veritas in 2008 as Operations Manager of the Ultra Trace geochemical laboratory in Perth, WA, one of the largest mining testing facilities in the world. He now provides technical management and support across the Bureau Veritas Global minerals network in addition to driving innovation and technology for new services.

IAIN DALRYMPLE PHD

An integrated approach for modeling the alteration of the Quebrada Blanca Cu-Mo Porphyry, Collahuasi District, Chile

Principal Geochemist, Geoscience Services, Exploration / Teck Resources Limited

About the presentation: The Quebrada Blanca Cu-Mo sulfide system has a complex magmatic and hydrothermal history including: an Eocene-Oligocene intrusive complex; hydrothermal breccia complex and at least three temporally related hydrothermal stages. This presentation summarizes the workflows implemented in order to resolve the alteration domains which impact grade and geometallurgy, by the integration of multiple quantitative, semi-quantitative and qualitative datasets. These domains are modeled in 3D with consideration given to all available data to optimally characterise the deposit and de-risk production.

About the presenter: Iain Dalrymple is a geochemist working as a member of the Geoscience Services group in Teck. He has been working in this role across a range of commodities for the past 4 years and worked for Teck Exploration in Australia for 5 years before that. Before this, Iain was the General Manager of Actlabs Pacific in Perth, Australia.

VINCENT DUBÉ–BOURGEOIS

The use of machine learning for mineral exploration in greenfield areas

Chief Operating Officer / GoldSpot Discoveries Corp

About the presentation: Machine learning and artificial intelligence generally require large amounts of data, so-called big data. While greenfields exploration projects do not have the variety of data that might be considered useful for machine learning, there are ways to add value using commonly available data. Innovative workflows, e.g. those used by GoldSpot, assist explorers by efficiently adding geoscience interpretations for exploration campaigns through machine learning.

About the presenter: Vincent Dubé-Bourgeois is a co-founder and Chief Operating Officer of GoldSpot Discoveries Corp. B.Sc in Geology from University of Ottawa.

CHRIS GALLAGHER M. SC.

The spatially aware database: An open source alternative to exploration data management

President / Rogue Geoscience

About the presentation: Establishing spatial relationships between different geologic features is key to an effective exploration program. Spatially enabled databases, that store both attribute and 3D geometry data, are an alternative to traditional file based systems and offer virtually unlimited possibilities when it comes to exploring the relationships between different data sets. The talk will involve a live demonstration of how these systems automatically adjust to changing geologic information and provide multiple users with up to date, accurate data in a new light.

About the presenter: Chris Gallagher is a structural geologist and President / CEO of Rogue Geoscience. He has been involved in mineral exploration since 2003 after completing his Masters in structural geology and tectonics at Carleton University. Since then he has been instrumental in developing a number of exploration methodologies and geologic data management systems utilized in the industry. Chris also has a strong interest in integrating technology with exploration and his recent focus has been on developing spatially enabled multidisciplinary databases in exploration.

RÉJEAN GIRARD P.GEO

Myths and maths of gold grain dispersions

President and CEO / IOS Services Géoscientifiques inc

About the presentation: Gold grain counting in sediment "was" a well established, although artisanal, gold exploration method for regional. We say "was", since the technique recently went through a complete rethinking, trigged by the development of automated counting method. Improvements encompass the entire workflow, including sampling, processing, mineral concentration, SEM-based or optical-based automated grain counting, and interpretation. Automation removes most of the human factors and bias inherent to conventional artisanal approach, thus providing robust and replicable results. Find out how to reduce noise and achieve accurate anomaly thresholding based on probabilistic numerical modeling alloys false anomaly filtering. Gold deportment in mills even been accurately measured using these techniques… Unless you still prefer prospectors with their picks and pans…

About the presenter: Mr Girard is a seasoned geologist who graduated from Laval University in late Archean and subsequently attempted a Doctorate at UQAC and MIT. After a short career at Québec Department of Energy and Resources, he co-founded IOS in 1992. At the helm of the company since then, he has been involved in more than 1600 exploration projects in Québec and abroad. IOS since grew into a full-scale diversified services provider to the mineral industry, focused on offering out-of-the-box innovative solutions to an ever challenging industry.

OUR PRESENTERS

SIMON GRIFFITHS

An integrated, mineral systems approach to generating and advancing blind Carlin-type gold projects

Senior Technical Advisor / Nevada Exploration Inc.

About the presentation: South Grass Valley is a blind (covered) Carlin-type gold project identified as part of a hydrogeochemistry-driven generative exploration program. From regional, to camp, to prospect-scale exploration, Nevada Exploration has advanced the project by applying a mineral-systems approach, integrating conventional mapping, geophysics, stratigraphic core holes, and multi-element geochemistry. This systematic program has successfully defined a large classic Carlin-type mineral system, and Nevada Exploration is using this model to identify and advance specific exploration targets within this now camp-scale project.

About the presenter: Simon is a consulting economic geologist with 28 years of mineral exploration experience in major companies in varied commodities (Au, Cu, Ag, Pb-Zn, U, Ni, diamonds, coal, and coal bed methane), working in North America, South America, Australia, Asia and Africa. Simon spent more than 10 years at Barrick providing global technical leadership as Chief Geochemist and team leadership as Chief Geologist, which included significant contributions to mid and long-term exploration strategy planning.

CASSADY HARRADEN PHD

Extracting geotechnical rock properties from drill core – advantages of automated methods

Spectral Geologist, Geometallurgist / Corescan

About the presentation: Geotechnical models are used to determine how the rock mass will behave during the mining process as well as determine what ground support methods will be required. Geotechnical parameters collected through manual logging of drill core is often laborious and inconsistent. Automated geotechnical data collection allows for consistent, rapid assessment of key parameters as they relate to ground conditions. Advances in computer processing and precision robotics have contributed to the development of a new generation of high-speed core logging systems. The speed and objectivity provides the opportunity for comprehensive, drill core-based, mine-scale rock mass characterization studies, increasing the efficiency and accuracy of deposit scale geotechnical models.

About the presenter: Cassady currently works as a spectral geologist and geometallurgist with Corescan now based in Vancouver, BC. Her current work is focused on spectral interpretation of hyperspectral data and developing new geometallurgical and geotechnical applications of data collected using Corescan's automated core logging technology. She recently finished her PhD in geometallurgy with the CODES group at the University of Tasmania in Australia.

JESSICA KEAST

Core values - Core shack optimisation

CEO / CoreSafe Core Trays Inc

About the presentation: Diamond drill core is expensive to obtain and should be treasured as a hugely valuable resource. I will share why I believe this and provide some thoughts on how to protect your core and maximise the value of your core long into the future. We will also explore safe core handling and efficient core shed work flows.

About the presenter: Jessica has over 10 years experience working with the mining industry supplying a wide range of geological equipment. More recently Jessica has focused on the supply of CoreSafe core trays, helping mines around the globe, optimise their core shed work flows, minimise work place injuries and protect and catalogue their core.

BERN KLEIN

The International Caving Research Network (ICaRN) - Advancing cave mining

Professor / University of British Columbia

About the presentation: Machine learning and artificial intelligence generally require large amounts of data, so-called big data. While greenfields exploration projects do not have the variety of data that might be considered useful for machine learning, there are ways to add value using commonly available data. Innovative workflows, e.g. those used by GoldSpot, assist explorers by efficiently adding geoscience interpretations for exploration campaigns through machine learning.

About the presenter: Dr. Bern Klein is a Professor of Mineral Process Engineering at UBC's, Norman B. Keevil Institute of Mining Engineering. His research focus areas are rheology, comminution, sensor based sorting and mine-mill integration. He is co-founder of MineSense Technologies Ltd, which produces sensor-based sorting technologies. He was the Head of UBC Mining (2008 to 2014), Acting Executive Director of the Canadian International Resources and Development Institute (2013 to 2014) and has Chaired several Organizations.

OUR PRESENTERS

JEAN–PHILIPPE PAIEMENT P.GEO., M.SC

Extracting more information out of geochemical datasets and alteration footprinting using unsupervised learning

Director Global Consulting / Director Global Consulting Mira Geoscience

About the presentation: Geochemical data has been used for a long time to analyze and map alteration patterns for mineral exploration. Methods used to recognize the various alteration patterns related to ore-forming systems are largely based on correlations between two elements or chemical element ratios, which can lead to false correlations and lack flexibility in the initial composition of host rocks and resulting alteration patterns in different environments. This presentation looks at automatic classification algorithms which take into account multidimensional relationships between geochemical elements. This allows for a better resolution in the correlations and distributions selected to interpret alteration domains and patterns.

About the presenter: Jean-Philippe is Director of Global Consulting at Mira Geoscience. He has a wide range of experience in modelling of diverse mineral system. Jean-Philippe has 10 years of experience in geostatistics applied to structural, geological and geochemical modelling; specializing in non-linear interpolation and simulation. He also seeks new methods and technologies to aid and de-risk interpretation of geological data sets. Before joining Mira Geoscience Jean-Philippe was also the scientific driving force behind the success of SGS team in winning the Integra GoldRush Challenge; by application of Machine Learning to mineral deposit targeting.

NICK PAYNE BSC.HONS (GEOLOGY)

A new wave of drilling optimization

Global Product Manager - Structural Geology / IMDEX

About the presentation: Imdex Limited has been developing several Drilling technologies products aimed at greatly improving diamond drilling productivity and efficiency. This presentation outlines IMDEX COREVIBE™ and IMDEX XTRACTA™ and how these are integrated with other technologies to significantly improve diamond drill program outcomes for both drilling and resource companies.

About the presenter: Nick is a geologist with over 20 years experience globally, working within exploration and mining geology roles for companies such as Anglogold Ashanti, BHP, Cliffs Natural Resources and Mount Gibson Iron. Nick has held positions such as Senior Exploration Geologist, Senior Mine Geologist and Exploration Manager. Nick has been with IMDEX for two years as the Global Product Manager - Structural Geology.

DR SASHA PONTUAL

Spectral mineralogy from hand-held spectrometers, new analysis methods driving a revival

Managing Director / AusSpec International

About the presentation: Hand-held infrared spectrometers remain the most rapid and cost-effective way of collecting project- and deposit-wide mineral data at all stages of activity from exploration to mining. These data complement geochemical surveys, add confidence and reduce risk when making decisions at all stages of project development. This presentation will discuss a new approach to analysis of these data, and will demonstrate how the routine application of this technology in a project allows geologists to improve their geological, geotechnical and geometallurgical models.

About the presenter: Dr Sasha Pontual, a leading expert in spectral geology, is the MD and founder of AusSpec, a spectral geology solutions company founded in 1992. AusSpec has developed and sells the aiSIRIS cloud-based spectral interpretation solution to Minex companies. Sasha was one of the first independent consultants working in providing spectral analysis services to the Minex industry globally. In the last 25 years, she has played an important part in the industry take up of the technology. aiSIRIS is the realization of Sasha's desire to make spectral geology and mineralogy easily accessible to all geoscientists and embodies 25+ years of experience.

GREG TURNER BSC (HONS), PHD

Using seismic reflection to shine a new light on mineral systems
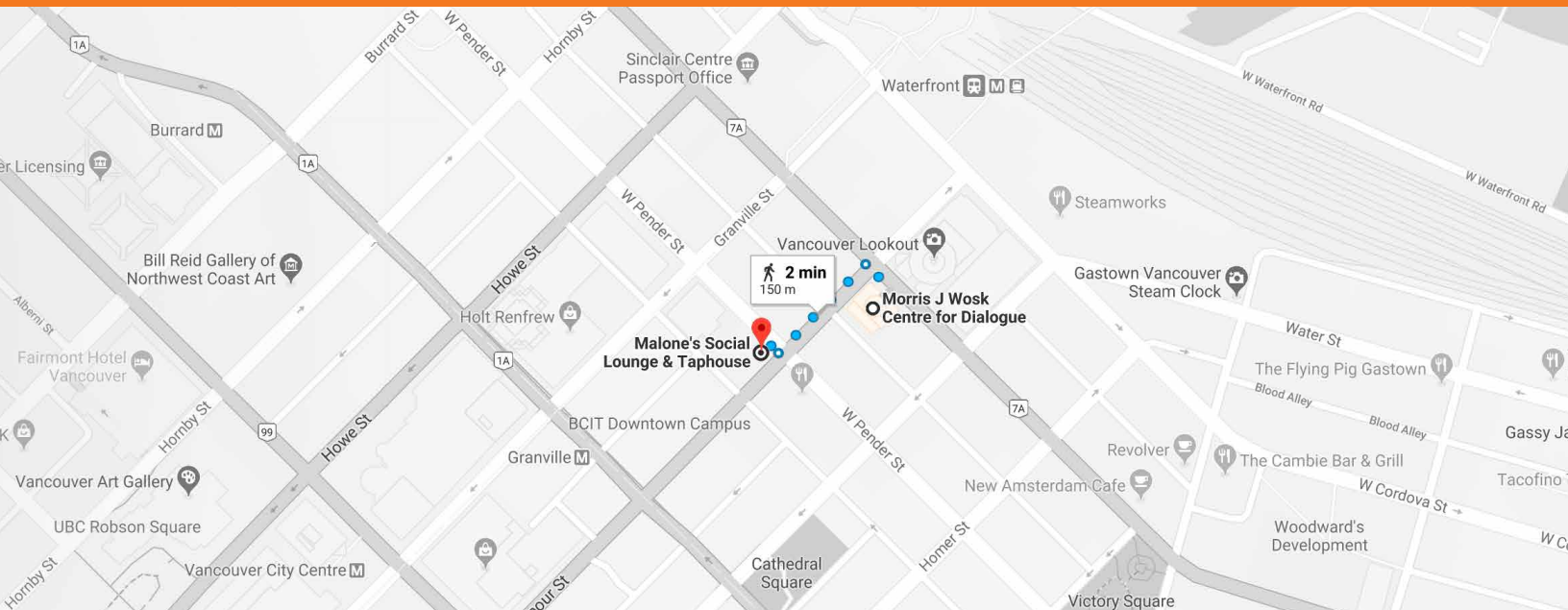
Principal Geophysicist / HiSeis

About the presentation: Minerals systems theory highlights the need to understand the geological environment at multiple scales. Minerals systems theory highlights the need to understand the geological environment at multiple scales. Most of the information used to generate minerals systems models has been based largely on data sets that have limited depth extent or limited resolution in the depth dimension. Consequently geometries in the third dimension have had to be largely inferred. We will present examples of how seismic reflection is providing continuous, high resolution images to better constrain the mineral system understanding and better target new mineralisation.

About the presenter: Greg Turner is currently a Principal Geophysicist at HiSeis. He graduated with a BSc(Hons) in Earth Science from Monash University in 1987 and received a PhD from Macquarie University in 1994. His previous roles have included being Geoscience Manager for WMC's Technology Group and a co-founder of the Geoforce geophysical service company.