

PDAC 2024 course information:

Friday, March 1, 2024

Concepts and application of machine learning to mining geoscience: A practical course (2 days)

New innovations in mineral system approach and mineral predictive mapping applied to critical raw materials exploration and assessment SOLD OUT

Till geochemistry and indicator mineral methods for exploration in glaciated terrains (1.5 days) SOLD OUT

A practical guide to the fundamentals of mineral resource estimation (2 days) SOLD OUT

ESG materiality, strategy, and disclosure: Practical approaches for explorers and developers SOLD OUT

Saturday, March 2, 2024

Know your risks: Safety, wellness and leadership in mineral exploration SOLD OUT

Lithium brine characterization: Resources and reserves (0.5 days) SOLD OUT

Lithocap formation, epithermal gold deposits, and transition to the tops of porphyry Cu-(Au) deposits: Exploration and assessment SOLD OUT

The influences of tectonics and crustal architecture on gold and base metal endowment in Archean terranes compared with modern oceanic arcs SOLD OUT

Sunday, March 3, 2024

NI 43-101: A quick start guide to following the disclosure standards for mineral projects (0.5 day) SOLD OUT

Concepts and application of machine learning to mining geoscience: A practical course (2 days)

DATE

Friday, March 1, 2024 -
Saturday, March 2, 2024

LOCATION

Room 716

8:00 AM - 5:00 PM

2 day course

ORGANIZER: SRK Consulting (Canada)

LEVEL OF COMPREHENSION: Entry level or Intermediate. No prior coding or data science knowledge is required, but a strong interest in either statistics, modelling, or data analysis is recommended.

Over the last 10 years machine learning has been a growing subject of conversation in the mining industry. From the targeting of mineral deposits to connected mining environments, there is no doubt that artificial intelligence plays a growingly important role in the industry. However, the subject can still seem obscure and is often hard to grasp, which creates apprehensions from geoscientists. This workshop will introduce the participants to the applications and evaluation of machine learning in mining geoscience. The main concepts and best practices for applied machine learning to exploration and mining will be reviewed.

TOP TAKEAWAYS:

- The basic principles of machine learning
- How to best apply machine learning to different datasets related to exploration and mining geology
- The ability to evaluate and use the results produced by the machine learning algorithms

The course will be set in a practical framework with a focus on the understanding and usage of different algorithms without detailing the mathematics behind each algorithm. Through a series of case studies, examples, and hands-on exercises the attendees will learn how to best apply machine learning to different datasets and, most importantly, evaluate the results produced by the algorithms. This includes the most recent applications of machine learning in the mining industry such as computer vision and natural language processing.

Each aspect will be presented by a recognized domain expert with practical experience and experience in presenting to an audience and training peers. Time for questions and discussions is included.

Exercises will be completed using a user friendly and intuitive interface for data mining and machine learning.

Attendees will need their own laptop and to install software prior to the course.

COURSE FEES:

Includes course material, continental breakfast and lunch

New innovations in mineral system approach and mineral predictive mapping applied to critical raw materials exploration and assessment

DATE

Friday, March 1, 2024

LOCATION

Room 801A

8:00 AM - 4:30 PM

1 day course

ORGANIZERS: Beak Consultants GmbH in cooperation with Geological Survey of Finland (GTK), French Geological Survey (BRGM), U.S. Geological Survey (USGS), Luleå University of Technology (LTU) and University of the Free State (UFS)

Many of the defined critical raw materials are not forming their own mineral deposits, but are often found as by-products, associated with other primarily mined commodity targets. This generates the need for a new way of doing things in exploration activities and economic geology surveys in general, as mineral systems nowadays have to be looked at from a different, more integrated point of view. This is done by approaching and assessing the exploitation potential of a mineral deposit more comprehensively when it comes to potentially minable commodities.

The aim of this short course is to provide an introduction to the theory and practical application of mineral systems approach (MSA) and mineral predictive mapping (MPM) for exploration and assessment of critical raw materials. The course will showcase a range of case studies from Northern America, Europe and Africa that demonstrate the practical application of the mineral systems approach for mineral prospectivity mapping and exploration targeting, offering valuable insights into the challenges and opportunities in different contexts. In addition to the theory on defining mineral systems for critical metals, the short course will cover a diverse set of additional topics, including advances in data acquisition and processing, machine learning algorithms, practical considerations for implementation and future directions for MSA and MPM.

Specific topics include:

- Defining mineral systems of selected critical raw metals for prospectivity modeling
- Practical considerations for implementing mineral system approach in mineral exploration targeting
- Case studies of mineral system approach from Northern America, Europe and Africa
- Overview of machine learning algorithms for mineral prospectivity mapping and target generation
- Demonstrations of selected open source tools for mineral predictive mapping, such as MPM Online Tool, GisSOM and MapMark4
- Future directions and opportunities for innovation to integrate mineral system approach into mineral exploration and prospectivity mapping

This short course will provide best practices, new ideas and insights in mineral exploration, especially with regards to application of the mineral systems approach for mineral predictive mapping. The course will consist of a series of presentations and demonstrations. The presentations will be informal and fluid to maximize engagement of the participants. Open question and discussion throughout the presentation sessions will be an integral part of the short course. Between these sessions, the audience will be engaged through a brainstorming session about different mineral systems and commodities. In addition, software demonstrations of and hands-on training for selected open-source software packages and tools will be provided.

The short course is a joint effort by the EU-funded project "EIS – Exploration Information System" (<https://eis-he.eu/tool/>), lead by the Geological Survey of Finland (GTK), the DARPA-funded project "CriticalMAAS" (<https://www.darpa.mil/program/critical-mineral-assessments-with-ai-support>) and the US Geological Survey (USGS).

Attendees will need their own laptop and to install software prior to the course.

COURSE FEES: SOLD OUT

Includes course material, continental breakfast and lunch

Till geochemistry and indicator mineral methods for exploration in glaciated terrains (1.5 days)

DATE

Friday, March 1, 2024 -
Saturday, March 2, 2024

LOCATION

Room 717B

Friday, March 1, 8:30 AM - 4:00 PM & Saturday, March 2, 8:30 AM - 12:00 PM

1.5 day course

ORGANIZER: Geological Survey of Canada

LEVEL OF COMPREHENSION: A basic understanding of glacial or Quaternary sediments (e.g., till), a basic understanding of the more common mineral deposits (e.g., VMS), and a basic knowledge of pathfinder elements or minerals of interest for mineral exploration. Designed for exploration geologists and students.

In this course we will explore the following:

Glacial erosion, transport, and deposition has formed trains or fans of metal-rich debris down-ice from mineral deposits that are much larger exploration targets than their bedrock sources. Dispersal patterns may be the result of one or more phases of ice flow and vary in length from a few tens of meters to >100 km. Recognizing the complexity of continental ice sheets and ice-sheet dynamics is essential to understand the variation in glacial dispersal patterns and successfully searching for mineralized sources. Till sampling methods have evolved considerably since the diamond rush in Canada and are now tailored for specific regions or even commodities. Pathfinder elements for varying types of mineral deposits and being able to detect a noise:signal ratio has been refined considerably. Geochemical and isotopic studies of recovered heavy minerals can now be used to provide information on sources of the grains, deposit types and potentially a vector towards mineralization. Indicator mineral chemistry has evolved considerably since the garnet classifications for diamondiferous kimberlite exploration and is now applied to a variety of mineral deposit types. New technology, like machine-learning applications to large datasets and using LiDAR for terrain analysis, are also emerging as important exploration tools in glaciated terrain.

TOP TAKEAWAYS:

- An improved knowledge base on the complexity of glacial erosion, transport, and deposition, to form dispersal trains in glaciated terrain
- Case studies whereby these techniques have been successfully applied and led to discovery of buried mineralization
- Geologists will learn a toolbox of techniques, that can aid mineral exploration programs, such as identification of ice flow indicators, till sampling methods and strategies, and indicator minerals that can be used to determine mineralization potential and even fertility

LAPTOPS REQUIRED TO VIEW DIGITAL MANUAL

COURSE FEES: **SOLD OUT**

Includes course material, continental breakfast and lunch

A practical guide to the fundamentals of mineral resource estimation (2 days)

DATE
Friday, March 1, 2024 -
Saturday, March 2, 2024

LOCATION
Room 701A

9:00 AM - 4:30 PM

2 day course

ORGANIZER: SLR Consulting (Canada)

LEVEL OF COMPREHENSION: All levels

Mineral resources, and their subsequent conversion to mineral reserves, are of key importance to mining companies and to the mineral industry. Their reliable estimation is critical to the confidence in a project, its underlying economics, and the day-to-day operation of a mine. There is a requirement for high quality interpretation and estimation of mineral resources to make sound investment and operational decisions. This short course builds and improves upon the 2021 PDAC short course with updated and expanded modules on 3D modelling to support resource estimation and mineral resource reporting guidelines. It is designed to share best practice guidance with practitioners, as well as relevant upstream and downstream stakeholders.

This short course focuses on the practical aspects of resource estimation, and includes easy to follow guidelines for navigating the principal decision points in a resource estimation workflow, including:

- The resource database
- 3D modelling including geological and resource domain building techniques and considerations
- Exploratory data analysis
- Outlier restriction tools (including capping)
- Compositing
- Trend analysis
- Incorporation of conceptual mining inputs (minimum thickness, cut-off grade)
- Interpolation design (search ellipse size and orientation, sample restrictions, etc.)
- Classification considerations
- Model verification tools
- Mineral resource reporting

TOP TAKEAWAYS:

- Important considerations, techniques, and approaches when building 3D models to support mineral resource estimation.
- Understand the steps involved to estimate mineral resources
- Build a basic tool kit to estimate mineral resources and identify, navigate, and mediate common risks and gaps in the estimation process
- Apply practical considerations of resource estimation with reference to end users (miners, investors, etc.) and data generators
- How to report mineral resources to the public

All principles presented build upon or are consistent with the November 2019 Mineral Resources and Mineral Reserves Best Practice Guidelines developed by the Canadian Institute of Mining (CIM). The course modules will be delivered by a diverse and engaging speaker line-up and complemented by real time surveys and polls, supporting exercises, and robust Q&A and discussion components.

COURSE FEES: **SOLD OUT**

Includes course material, continental breakfast and lunch

ESG materiality, strategy, and disclosure: Practical approaches for explorers and developers

DATE
Friday, March 1, 2024

LOCATION
Room 714A

9:00 AM - 4:00 PM

1 day course

ORGANIZER: Sympact Advisory

LEVEL OF COMPREHENSION: All levels

Environmental, social, and governance (ESG) factors are increasingly shaping the mining industry's investment and regulatory landscape. As explorers and developers navigate these changes, it becomes crucial to understand emerging expectations and trends in ESG risk management, materiality, and disclosure. This course is designed to provide a comprehensive understanding of the rapidly evolving ESG landscape, focusing on both existing and emerging voluntary and mandatory frameworks and standards for ESG performance and disclosure (such as GRI, SASB, TCFD, TNFD, and IFRS S1/2). It is ideal for professionals in small to mid-sized mineral exploration and development companies, particularly in late-stage exploration and beyond, looking to embark on their ESG disclosure journey or enhance existing reporting cycle practices to develop a fit-for-purpose strategic approach to sustainability.

This course offers a deep dive into ESG disclosure and reporting, focusing on the unique challenges and opportunities within the mining industry, especially smaller companies preparing for financing or acquisition. Participants will gain insights into the latest trends, including investor preferences and mandatory regulatory disclosures on the horizon, receiving practical hands-on support from seasoned experts, supported with a balance of theory and application. The course will cover a range of themes, including common industry material topics, materiality assessment, the main global reporting frameworks, and emerging obligations in Canada, Australia, the US and the EU that your company should prepare for.

TOP TAKEAWAYS:

- Understand the evolving role and importance of ESG in the mining industry
- Understand the difference and relationship between "performance" and "reporting" in ESG, including the most relevant industry standards and frameworks for each
- Understand the relevance of materiality assessment in your business strategy and ESG journey, as well as common and emerging ways to identify and prioritize material ESG issues for your company
- Understand the dos, don'ts, risks and opportunities that come with early-stage ESG disclosure
- Identify likely material ESG issues for your own company
- Be ready to develop a high-level roadmap for your company's ESG reporting journey
- Gain insights into emerging practices and trends to prepare your company to meet rapidly evolving ESG management, data collection and disclosure expectations
- Access seasoned industry experts with substantial global experience designing and implementing ESG risk management systems and reporting journeys across the project lifecycle

The course will employ a mix of lecture, report analysis samples, group discussions, hands-on individual exercises and practitioner Q&A to ensure an engaging and interactive learning experience. Participants will have the opportunity to learn from real-world experiences and examples, apply concepts to hypothetical scenarios, and share their experiences and perspectives. The use of digital tools such as polls will further enhance participant engagement. The course will provide external resources for further learning and tailored practical tools that participants can use in their own companies.

Attendees will need their own laptop for exercises.

Know your risks: Safety, wellness and leadership in mineral exploration

DATE
Saturday, March 2, 2024

LOCATION
Room 711

8:30 AM - 4:45 PM

1 day course

ORGANIZER: PDAC Health & Safety Committee

LEVEL OF COMPREHENSION: Entry-level, intermediate

The field-oriented health and safety (H&S) course is designed to provide participants of all experience levels with a strong understanding of the typical H&S risks in mineral exploration. Eleven years running, the course has recently been redesigned to emphasize the real-life applications of H&S tools like risk assessment and root cause analysis, with particular emphasis on high-risk activities including drilling and helicopter use. Through a series of comprehensive presentations and engaging breakout sessions, participants will draw links between the many aspects of H&S, including psychological health and safety, to develop a profound understanding of why accidents happen and how they can be prevented.

The course content is sufficient to start a simple H&S program, or, given an existing one, will enhance a participant's understanding of the goals and priorities of a successful H&S program. The course is suitable for all, from new hires wanting to ask the right questions about safety on the job to experienced H&S leaders wishing to refresh their field safety know-how or to dive deeper into psychological H&S. This course's diversity of content and attendees, from geologists to drillers, students and managers, provides a unique setting for participants to enhance their own understanding of safety culture and the role they play in keeping their workplaces safe.

TOP TAKEAWAYS:

- Knowing that safety is key to field work for all involved, from the individual to their team to the company or companies responsible, and understanding why
- Strong understanding of the main safety risks in mineral exploration, including hazards associated with helicopters and drilling
- Ability to identify, evaluate, and address hazards, to discuss the safety measures a company should have in place, and to effectively ask questions about unsafe protocols
- Recognizing the impact of psychological safety in the workplace and the links between physical and mental wellbeing, particularly in remote workplaces
- Confidence to strengthen or build safety culture and to demonstrate H&S leadership in the workplace

Lithium brine characterization: Resources and reserves (0.5 days)

DATE
Saturday, March 2, 2024

LOCATION
Room 715

8:30 AM - 12:30 PM

1/2 day course

ORGANIZER: Montgomery & Associates Consultores Limitada

LEVEL OF COMPREHENSION: All levels

Interest in lithium has grown substantially over the last decade. Although lithium can be found in hard rock deposits, vast amounts of lithium are also found in liquid form within subsurface brine aquifers that are commonly located in high altitude, closed-basin environments. This course is intended to explain the basic hydrogeology of brine systems, the methods utilized to characterize these deposits, and the estimation of lithium resources and reserves. Regardless of whether you are interested in lithium as an investment, a mining company interested in determining the value of your property, or a manufacturer needing a sustainable source of lithium for battery production, this course will help with the understanding of this valuable resource.

This course will be presented by three qualified persons experienced in lithium brine characterization. Each of the three hydrogeologists will focus on different aspects of the concepts and methods associated with obtaining information needed to characterize the reservoir system, and will discuss the estimation of retrievable lithium brine from the subsurface. The course will discuss the factors involved in evaluating a lithium brine resource and reserve, requirements for a successful project, and potential problems associated with development of a lithium brine project.

TOP TAKEAWAYS:

This course will aim to increase understanding of the following:

- Methods used by hydrogeologists to characterize lithium brine deposits
- How and why lithium brine estimates are different from those of traditional hard rock deposits
- Factors needed to distinguish a viable project from a marginal, or unfeasible project
- Timelines associated with project advancement

The course will include three separate presentations with questions and answers during and at the end of each presentation. Actual project examples will be discussed, including review of similarities and differences between various projects.

Lithocap formation, epithermal gold deposits, and transition to the tops of porphyry Cu-(Au) deposits: Exploration and assessment

DATE

Saturday, March 2, 2024

LOCATION

Room 801A

8:30 AM - 5:00 PM

1 day course

ORGANIZER: Society of Economic Geologists (SEG)

LEVEL OF COMPREHENSION: Geologists involved in the exploration for epithermal Au and porphyry Cu deposits

Porphyry Cu (\pm Au) deposits account for ~70% of global Cu production. Increasingly, porphyry Cu deposits are explored for – and discovered – beneath cover, both syn-mineral lithocaps up to ~1 km thick, as well as post-mineral cover. Lithocaps form in the epithermal (<1 km deep) environment; permeable lithologic horizons are altered to residual quartz with halos of quartz-alunite and other advanced argillic minerals, and have structurally controlled feeder zones; they are coupled genetically to deeper potassic alteration of underlying porphyry deposits. Lithocaps are sterile in metals on formation, but some are subsequently mineralized with Au and Cu (as high sulfidation-state sulfides), related to ascent of post-potassic fluid that overprints the porphyry system.

This course will examine the formation of lithocaps, and discuss their characteristics and alteration zoning, and – in some cases – high-sulfidation mineralization; epithermal veins also form on the margins of lithocaps. The transition of lithocaps to the tops of underlying porphyry Cu \pm Au deposits will be examined, including controls on the mineralogical zonation. Numerous examples will be used, and features that assist with exploration and assessment will be stressed. This course is principally for geologists in exploration with experience working in the field.

TOP TAKEAWAYS:

- Porphyry Cu(Au) deposits form in volcanic arcs and are responsible for 70% of global Cu production, 50% of Mo, and significant Au, Ag, Re, In, Ge, Pd, Te, Se, Bi, Zn, and Pb
- Porphyry deposits form beneath a lithocap horizon of alteration up to ~1 km thick, masking the deposit unless deeply eroded
- Lithocaps have alteration characteristics that provide guides to exploration for porphyry deposits
- Such guidelines include: lithocaps form on the shoulders of porphyry deposits, and pyrophyllite to white mica defines the transition to the tops of porphyry deposits
- Although barren on formation, some lithocaps may become mineralized with Au and Cu, the latter as high sulfidation-state sulfides, with highest grades located in feeder zones of the lithocap

LAPTOPS REQUIRED TO VIEW DIGITAL MANUAL

The influences of tectonics and crustal architecture on gold and base metal endowment in Archean terranes compared with modern oceanic arcs

DATE

Saturday, March 2, 2024

LOCATION

Room 714A

9:00 AM - 4:00 PM

1 day course

ORGANIZER: Laurentian University

LEVEL OF COMPREHENSION: Intermediate

The timing and distribution of mineralization in Archean terranes was influenced by a variety of differing geodynamic environments. Volcanogenic Massive Sulfide (VMS) deposits were syn-volcanic occurring in extensional oceanic settings associated with high crustal heat flow. Orogenic gold deposits were formed by later collisional tectonics processes associated with the development of folding, late crustal-scale faults and syn-orogenic sedimentary units. The faults provided critical pathways for hydrothermal mineralizing fluids during repeated reactivations.

Morning presentations will highlight Laurentian University's Metal Earth program where over 1,000 km of reflection seismic, magnetotelluric and gravity surveys have provided crustal-scale imaging from 13 areas with differing mineral endowment, including world class base metal and gold camps in the southern Superior Craton. Presentation will highlight the crustal architecture of endowed and less endowed transects in the Abitibi and Wabigoon terranes through geophysical studies integrated with geological, geochemical and geochronological data, followed by researcher presentations on the radiogenic isotopic characteristics of endowed and less endowed areas; architectural features of transects with variable metal endowment in the Beardmore-Geraldton area; and a model for hydrothermal fluid evolution and gold mineralization in orogenic deposits.

Afternoon presentations will be by Metal Earth's partner research groups at Laval and Ottawa universities. The Gold Fluid Window research group at Laval University will provide highlights from projects to define the P-T-t-X conditions of orogenic gold fluids from sedimentary source rocks, and the geodynamic settings where favorable conditions are met to form orogenic gold deposits by modeling the composition, volume and timing of fluid generation from the Pontiac terrane and the controls and timing of orogenic gold in the Val d'Or and Malartic camps. Presentations by the Metal Oceans group at the University of Ottawa will focus on crustal growth and mineral endowment in the modern Indo-Australian Arc-Back-Arc microplate environment, currently the fastest growing crust on earth hosting 3 of the top 10 Cu-Au deposits in the world. The focus will be on the timing and scale of pulses of crustal growth and associated magmatic and hydrothermal activity, currently being studied with the same geophysical, geochemical and geochronological tools used on Metal Earth's transects in the Superior craton. The presentations will compare features of rifting and auriferous faults in the Abitibi greenstone belt with those in a modern arc-back-arc environment most likely associated with VMS and gold mineralization.

NI 43-101: A quick start guide to following the disclosure standards for mineral projects (0.5 day)

DATE

Sunday, March 3, 2024

LOCATION

Room 716

8:00 AM - 12:00 PM

1/2 day course

ORGANIZER: Ontario Securities Commission (OSC)

LEVEL OF COMPREHENSION: All levels

Do you have questions about how to comply with the disclosure requirements of NI 43-101 Standards of Disclosure for Mineral Projects when reporting on your company's material mineral properties? Are you unsure how to prepare complaint disclosure for the different development stages of a mineral project? Are you being asked to act as a Qualified Person within the Canadian capital markets but are unsure about what is involved in self-assessing your relevant experience? This half-day short course is designed like a quick start guide covering the key aspects of NI 43-101 that a professional should know, including the common misconceptions. Of course, you still need to "read the full manual", but this course focuses on some fundamental aspects of the disclosure requirements that geoscientists, engineers, and mining company executives need to understand to provide compliant and decision-useful technical information for investors. Technical staff from the British Columbia and Ontario Securities Commissions and the Toronto Stock Exchange will discuss some of the common disclosure deficiencies observed during reviews and exchange listing applications including the top five disclosure deficiencies observed in technical reports which may require a technical report to be amended and refiled. Following the presentations there will be ample time to address attendee's questions.

TOP TAKEAWAYS:

- Canada's regulatory regime for mineral project disclosure
- Reliance on qualified persons, professional associations, and technical societies to maintain investor confidence in mineral project disclosure
- Frequently observed disclosure problems with technical reports, news releases, and websites