

# GeoConvention 2020



**geoconvention**

Calgary • Canada • May 11-13 **2020**

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## Technical Session Guide

**May 11 - 13, 2020**

Calgary TELUS Convention Centre  
Calgary, Alberta, Canada



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# OUTLINE

GeoConvention 2020 is proud to host a wide variety of content from our non-profit Earth Science partner societies for what may be our largest technical program ever. The following outline will act as a reference to the sessions that will be hosted at GeoConvention 2020. Session **chairs and descriptions are accurate as of January 10, 2020**. If you have any questions at all, please let us know via [abstracts@geoconvention.com](mailto:abstracts@geoconvention.com).

All abstracts are to be submitted to <https://www.geoconvention.com/submitabstract>  
Abstract submission closes at 11:59pm Mountain Time on Wednesday, January 31.

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Session Title	Chair 1	Chair 2
<p><b>AAPG Canada Discovery Thinking Forum</b> Discovery Thinking Form - This will be a four talk (double session) with two international talks and two western Canada talks on Tuesday afternoon focused on oil and gas.</p>	<b>John Hogg</b>	<b>Marty Hewitt</b>
<p><b>Advancements in Operations</b> New techniques in: geosteering, improvements in well planning (licensing and processes), better bits, mud, logging, etc.</p>	<b>Kurt Armbruster</b>	<b>TBD</b>
<p><b>Advances from regional to microscale: Geochemical, Geophysical and Engineering Applications to Duvernay Formation Evaluation</b> This session will focus on covering the advances of current and new studies of the Duvernay Formation. It will look at presenting the most innovative geoscientific models to shed some light on the study of the complex systems within the Duvernay. This session will depict how useful inorganic, as well as organic geoscientific tools, can be complemented with engineering approaches for assessing practical problem-solving task that may lead us to improve, and even challenge the way we study these systems.</p>	<b>Gabriela Gonzalez Arismendi</b>	<b>Shona Clarke</b>
<p><b>Advances from regional to microscale: Geochemical, Geophysical and Engineering Applications to Montney Formation Evaluation</b> This session will focus on covering the advances of current and new studies of the Montney Formation. It will look at presenting the most innovative geoscientific models to shed some light on the study of the complex systems within the Montney complex systems. This session will outline how useful inorganic, as well as organic geoscientific tools, can be complemented with engineering approaches for assessing practical problem-solving task that may lead us to improve, and even challenge the way we study these systems.</p>	<b>Gabriela Gonzalez Arismendi</b>	<b>Shona Clarke</b>
<p><b>Advances in micro-analytical methods in the study of economic deposits</b> Characterizing the mineralogy, modal abundances and textures of ore deposit lithologies is critical to understanding any mineral paragenesis, timing of fluid expulsion, mineralization window, and ultimately the origin of such deposits. In the case of deposits hosting critical metals, minerals can be small and phase identification can be problematic. This interdisciplinary session focuses on advances in micro-analytical methods and instrumentation, highlighting any novel approaches in the study of economic mineral deposits. Given the importance of metals and native elements in the development of renewable technologies we invite a wide range of ore-mineralization researchers to present their investigations and insight concerning best practice in micro-analytical studies of economic deposits.</p>	<b>Ian Coulson</b>	<b>Katharina Pfaff</b>
<p><b>Applied Structural Geology and Tectonics in the Evaluation of Petroleum Systems</b> This session focuses on the application of structural geology and tectonics in the evaluation of petroleum systems. Research and industry case studies and techniques that provide new structural interpretations of reservoirs are welcome. Submissions that emphasize how structural analysis in different tectonic settings contribute to fluid circulation, hydrocarbon exploration and production for conventional and unconventional hydrocarbon systems are of particular interest.</p> <p>Subthemes:</p> <ul style="list-style-type: none"> <li>• Application of structural geology in conventional and unconventional reservoirs</li> <li>• Faults, natural or induced fracture systems: Imaging, modeling, interaction with reservoir hydraulic and mechanical properties</li> <li>• Advances in structural understanding of geothermal, waste and CO2 storage projects</li> </ul>	<b>Catherine Huff</b>	<b>Elena Konstantinovskaya</b>
<p><b>Approaches for Developing Integrated Geological Site Models</b> Understanding the 3-dimensional geological conditions of a site is important in a range of fields including mining, exploration, hydrogeology and the long term management of used nuclear fuel in a deep geological repository. Although acquiring new geoscientific data is important, and often most costly, developing a robust strategy for integrating data is critical for advancing the site understanding. This session covers best practices as applied to geoscientific data integration, and the development of 3D geological site models. Presentations should focus on data integration and modelling methodologies, workflows, and how uncertainties are addressed.</p>	<b>Andrew Parmenter</b>	<b>Aaron DesRoches and Martin Sykes</b>
<p><b>Back to the Basics: Geophysics</b> This session will involve presentations about the basics of: survey design (reflection, VSP, microseismic, etc.), foundational techniques (Tie-ing wells, interpretation pitfalls, synthetic modelling, etc.), and advanced techniques (depth conversion, AVO principles, prestack inversion, Rock-Physics, Geomechanics, etc.).</p>	<b>Dennis Ellison</b>	<b>Nathan Fester</b>

### **Beyond the talk: Non-Lecture-based teaching strategies that really work** Glenn Dolphin TBD

Research in post-secondary institutions shows that the vast majority of geoscience courses are taught in a traditional, lecture-based style, regardless of class size. Research also shows that lecture-based instruction has limited efficacy for enhancing students' understanding of geoscience concepts. There are multiple strategies that, when incorporated into instruction, can improve students' conceptual development. These strategies include team-based learning, inquiry, model-based learning, experiential learning, case studies, among others. This session seeks examples of teaching strategies implemented beyond traditional, lecture-based instructional strategies to foster geoscience conceptual development.

### **Business and Financial** Andy Evans TBD

It has been a volatile few last few years in our industry and this session will address a number of aspects of the business and financial side of the oil and gas industry in Canada. It will go from macro to the micro and take a top down and bottom up view.

### **Challenges and opportunities in characterizing groundwater's 'intermediate' zone** Brian Smerdon Grant Ferguson

The search for low salinity groundwater is leading to greater depths, where the most common characteristic is data scarcity. Characterizing this intermediate zone requires ingenuity and often a collaborative effort that combines multiple methods. This session seeks to learn how to better understand the hydrogeological connectivity between shallow aquifers often used by communities and agriculture, and deeper groundwater systems typically accessed by industry. This intermediate zone is becoming the focal point for projects related to unconventional oil and gas development and subsurface waste disposal, conversion of oil and gas wells for geothermal application, and large-scale abandonment of legacy infrastructure.

### **Clastic Sedimentology** Mark Caplan Jon Noad

This technical session focuses on showcasing new and improved sedimentological and stratigraphical concepts together with technological advancements that are applied to subsurface reservoirs. Understanding of reservoir characterization, geometry, internal reservoir architecture and the distribution and prediction of flow units is paramount to reducing subsurface uncertainty in exploration and development of conventional, unconventional and oil sands projects. This knowledge is acquired through detailed studies of modern processes and ancient analogues. This session invites papers from both modern research studies and ancient case studies, and need not be limited to petroleum studies.

### **Completions Technology and Geomechanics in Hydraulic Fracturing** Julia McElgunn Bill Goodway Lee A. Groa, David R Lentz and Robert Linnen

Critical metals and raw materials are crucial to Canada's economy and security. This is also true to many other countries. Both the European commission and the USGS publish lists of these critical metals subject to a regular review and update. These critical metals fuel our society and have a variety of uses in industry, manufacturing, modern technology, and the environment due to the use of raw materials in the so called clean or low carbon technologies (e.g., solar panels, wind turbines, electric vehicles). Critical metals and raw materials are mineral commodities that have important uses and no readily available substitutes, and can face potential disruption in supply. Graphite, cobalt, lithium, rare-earth-elements and tantalum are a few examples. Their importance also varies with time since a mineral commodity may have been considered critical 20 years ago but may not be critical now, and one considered critical now may not be so in the future. For this session, we call for a pooling of critical and raw materials expertise to outline the current status of Canadian and international research, exploration and production projects. We would like to have a mix of contributions from all research fields, from field-based, analytical to experimental or theoretical.

### **Deep Groundwater Sourcing and Wastewater Disposal** Brent Bowerman Brad Hayes

Deep groundwater aquifers containing saline waters not suitable for domestic or agricultural use are becoming increasingly important, both as water sources and as disposal zones for contaminated wastewater. Exploring for and testing water source wells in the intermediate zone (>150 m depth) are expensive, and effective use of water-related data from oil and gas wells can reduce the risk of drilling a dry hole. Wastewater disposal must be in deeper (>750m) aquifers, and work on the geology, hydrogeology and rock mechanics is required to characterize these zones to minimize risks such as aquifer discontinuities, limited injectivity, and induced seismicity.

### **Design, construction, & early development of reclaimed wet landscapes in the Alberta Oil Sands area** Carla Wytrykush Jan Ciborowski

This session will cover a broad range of topics relating to the design, construction, materials, capping, functional assessment and early succession observed on the first wet landscapes built in or on former open pit mines in the oil sands mining region of northeastern Alberta. Forty years of reclamation science and engineering has greatly expanded understanding of the properties and behaviour of the soils, water and constituents of parent and mined materials. The first full-scale demonstration wetlands and catchments to be built from former tailings pits are almost 10 years old. This session will showcase the findings and challenges of reclaiming a boreal landscape dominated by wetlands and peatlands.

## Diagenesis and Sedimentology of fine-grained unconventional reservoirs: Omid Haeri

### Current understanding

Ardakani

Per Pedersen

Sedimentology and diagenesis are among major controls on reservoir properties of conventional and unconventional hydrocarbon resources. However, as fine-grained sediments such as shale and mudstone traditionally considered as source and cap rock, their diagenesis process(s) is generally overlooked. With the emergence of unconventional hydrocarbon resources where both source and reservoir rocks are the same the diagenesis of fine-grained sediments has recently attracted significant attention. Due to their fine-grained nature, diagenetic and isotope geochemical studies of shale and mudstone are more challenging than those conducted in sandstone and carbonate reservoirs. In this session, the latest technical and scientific advancements in diagenetic studies on major Canadian and global unconventional resources will be discussed.

## Diagenetic approaches in Grand Bank

Ehsan Daneshvar

TBD

Reservoir quality analysis is one of the most valuable studies in all reservoirs/basins to quantify the reservoir/basin characterization. Between RQ parameters, recognition of diagenetic processes has received a lot of attention recently in clastics and carbonates. Analytical approaches such as chemostratigraphy, detailed quantitative mineralogy, isotope analysis can help to identify the diagenesis progress and reservoir quality analysis. In detail, identifying and quantifying clay mineral contents along with elemental abundance data and measurements of physical properties of cuttings/core will lead us to a quantifiable reservoir quality analysis in clastic sediments. Similar methodology in carbonate mineralogy along with isotope analysis and microfacies studies will help to support studies of reservoir quality in carbonates. Diagenetics studies will also help us to understand the provenance and source of the sediments. This provenance will be useful in basin characterization as well.

## Digital Geoscience (Oil and Gas)

Stan Cena

Dustin Borotsik

Core analysis requires a higher degree of sophistication today than ever before. Spectral analysis not only digitizes core but and pull attributes from core on a scale never seen before. Digitizing core is faster, affordable and at higher resolution. Applicable to oil sands, conventional and shale cores, archived or fresh cores, and drill cuttings.

## Diverse Post-Secondary Geoscience Course Offerings: Sparking Non-Science Students' Interest

Jennifer

Cuthbertson

Robin Cuthbertson

The need for a geoscience-literate public is greater than ever. Global issues such as climate change, access to fresh water, soil erosion, and supply of natural resources require that the general public be able to identify reliable sources of data, and recognize the difference between observation and interpretation. It is important for the public to understand that while scientific understandings are subject to change based on new evidence; the theories that geoscientists have built are peer-reviewed and represent our best attempt to explain natural phenomena. However, non-science students may have a perception that science is unimaginative, methodical, and not particularly relevant to their daily lives. This session invites submissions by educators who would like to share an example of a geoscience-based, post-secondary course that is aimed at engaging non-science students. Examples of such courses might be those that include a historical or societal aspect, those that deal with contemporary Earth issues as mentioned above, or those that have learning outcomes that are geared towards non-science students.

## Duvernay

Marco Venieri

Levi Knapp

With several hundred producing wells drilled in the last 6 years, the Duvernay Formation is currently one of Alberta's hottest plays. This session will showcase novel studies that improve our understanding of the exciting and challenging Duvernay source rock reservoir, with particular focus on how to deploy old and new techniques for multi-scale characterization. How have syn- and post-depositional processes influenced present day rock and fluid properties and their distribution? What are the most effective techniques for mapping and predicting reservoir properties? How does geology influence drilling, stimulation, and production strategies and effectiveness? Which criteria should be considered to determine the most suitable landing zone for horizontal wells? How can geological, geophysical, and engineering data be correlated for multi-disciplinary characterization? This session aims to address these and other issues that are of interest to both industry and academic audiences.

## East Coast Canada

Catherine Huff

Ivan Pasechnik

The Atlantic margin of Canada has a long history of exploration. New geoscience work and recent changes in how bidding rounds are conducted has resulted in an increase in activity in offshore work commitments. Areas slated for exploration are further offshore than current active projects indicating a shift to challenging deepwater environments. Submissions that focus on basin architecture and the application of new technologies in de-risking exploration, particularly in deepwater settings, are of particular interest.

## Economic resources associated with impact structures

Erin Walton

John Spray

This session focuses on economic resources associated with impact structures. This includes hydrocarbons hosted by sedimentary rock targets, and metals hosted by crystalline (igneous-metamorphic) targets. We welcome contributions that discuss the thermal and structural responses of soft- versus hard-rock targets to impact, and their respective potential for economic resource development.

## Embracing Subsurface Uncertainty Through New/Novel Applications of Statistics - an Interactive Session

Amy Fox

Scott McKean

This session highlights the use of statistics to deal with uncertainty in subsurface workflows. Submissions must clearly and prominently include the use of statistical methods.

IMPORTANT: This will be an interactive session. Presenters will engage with multiple small, rotating groups throughout the session. Presenters will have approximately 20 minutes to engage with each group, but through interactive discussion rather than a lecture. Available will be a large monitor for a LIMITED number of prepared graphics plus a flipchart for real-time explanation of goals, methodologies or results. Presenters should feel free to highlight challenges in implementing their ideas and solicit feedback from attendees. At the end of the session we will assemble all attendees and presenters for a panel-style Q&A period.

## Emerging Opportunities and Methodologies (Oil and Gas)

Draga Talinga

Dennis Ellison

Technological innovation in all geoscience disciplines is the most important factor of our resource industry remaining competitive, by helping to reduce operating costs and environmental impact. In this session we hope to see the application and impact of new evolving ideas in a wide-range of geophysics, geology and engineering related fields, such as data acquisition and processing, drilling and completion, in-situ recovery technologies, reservoir modelling, capture and storage of carbon dioxide emissions, etc.

## Emerging Seismic Technology

Robert Gunning

Svetlana Bidikhova

We live in exciting times when geoscience pushes its boundaries every day and expands its capabilities to come up with new robust methodologies in surveying, acquisition, processing, imaging and modeling. Furthermore, modern seismology is unearthing new horizons in the realms of engineering, mining and even medical research.

In our session, we will offer a diverse program that includes the latest developments in cross discipline and cross industry seismic applications with emerging technology success stories.

The session will also include examples of high resolution, low cost, low imprint and high impact seismic solutions designed to address modern onshore and offshore E&P challenges.

## Energy Advocacy

Victoria Wallace

Ken Wallace

Global energy demand is growing, and Canada should be the global supplier of choice for oil and natural gas. The Canadian energy industry has faced many challenges in the last few years; many of which the individual geoscientist cannot influence. However, there is one aspect that professionals and members-in-training can have an impact on: the energy discourse. We can change the way others around us see our industry and chosen career paths, but we must proceed intelligently, tactfully, and respectfully.

Advocacy is the act of pleading for, supporting, or recommending. Energy advocacy can come in many forms. Examples of energy advocacy include but are not limited to: public outreach opportunities, K-12 programs, media content, corresponding with energy influencers, addressing investor concerns in Canadian energy, demonstrating technological improvements and sustainability, communicating with politicians, and perhaps most importantly talking with family and friends.

The objective of this session is to get geoscientists thinking about strategies, methods, and approaches that may help change the conversation revolving around the Canadian energy industry. What we do at work may play a small role in helping solve the world's energy challenges, but how we advocate for our industry is how the general public will remember us.

## Engaging 21st Century Geoscience Learners with Technology in the Classroom

Jennifer

Cuthbertson

Annie Quinney

Post-secondary students today are more connected with each other, and have more access to scientific information, than ever before. One challenge that educators face is to harness the power of technology to engage students in geoscience knowledge and skills development, rather than technology becoming a distraction. Many post-secondary institutions now use online learning management systems (e.g. D2L, Blackboard, Moodle) that allow the instructor to post course content, assign online quizzes, host discussion threads, and maintain a virtual dropbox for assignments. In addition, it is now commonplace for instructors to use active learning platforms such as Top Hat in the classroom. This session invites submissions from educators who would like to share their experience with using technology in the classroom, where technology might include laptop computers, tablets, cell phones, or other electronic means. Examples of innovative integration of technology might involve online interactions between students, audio or video sharing, creative use of online textbook resources, and virtual field trips.

## Environmental and Groundwater Applications of Geophysics

Rachel Lauer

Paul Bauman

This session welcomes novel applications of traditional and innovative geophysical methods to environmental and hydrogeology applications. Field studies and case histories are especially welcome.

### **EON-ROSE and Canadian Cordillera Array**

**Katherine Boggs**

**TBD**

This meeting and social event will provide an update on the exciting new pan-Canadian EON-ROSE (Earth-System Observing Network - research initiative). Inspired by the US EarthScope program, using the transdisciplinary model of LITHOPROBE, the ~1400 Earth System Observatories for EON-ROSE will monitor entire Earth Systems from the ionosphere through the crust deep into the mantle across the Canadian land mass. Starting with the Canadian Cordillera Array (CCArray; ccarray.org), an integrated plate boundary observatory is being developed to bridge critical gaps in seismological and GNSS station coverage along the North American plate boundary region. Attendees are encouraged to contribute ideas to the design and implementation of the CCArray and EON-ROSE networks and become involved in this research program.

### **Evolution of cratons and cratonic margins: the role of microscale techniques to unravel Precambrian tectonic processes.**

**Daniele Regis**

**Eric Thiessen and  
Jillian Kendrick**

This session will highlight research that investigates the geochemical, petrological, and geochronological evolution of Precambrian cratonic lithosphere irrespective of its geodynamic setting. This session welcomes advances in understanding petrogenesis, orogenesis, and/or crustal growth made using combined microscale observations and new analytical methods to inform macroscale tectonic processes. Microscale observations may include petrologic and in situ geochronologic analysis, grain-scale geochemical and isotopic compositions of accessory and major minerals that can be used to investigate the structural history and compositional evolution of cratons and their margins globally.

### **Evolution of northwest Laurentia: Taking stock after fifty years of progress**

**Robert**

**MacNaughton**

**Karen Fallas**

**Beth Fischer**

**David Moynihan**

The mainland Northwest Territories and adjacent Yukon record a lengthy history of sedimentary and tectonic processes on the present-day northwestern margin of Laurentia. From Proterozoic beginnings, this history spans the lengthy and controversial break-up history of Rodinia, eventual establishment of a passive margin, and the development of the northern Canadian Cordillera. As of 2020, it has been fifty years since regional-scale reconnaissance operations led by the Geological Survey of Canada painted the broad strokes of this history. This multidisciplinary session will focus on recent advances in understanding the region's evolution. The session has been spurred by the work of federal and territorial geological surveys and academic colleagues, leading to developments in bedrock geological mapping, stratigraphic correlation, dating using fossils and radiometric methods, and new interpretations of geophysical data. A key goal of the session is to encourage discussions that clarify the timing of tectonic, thermal, and fluid-flow events, and the interplays among tectonics, structure, stratigraphy, metallogeny, and petroleum systems. Student presentations are especially welcome. If there is sufficient interest, the organizers intend to pursue publication of contributions as a special issue of a journal or a special publication.

### **Evolution of the Canadian Arctic Geodynamic models and the potential for resources**

**Keith Dewing**

**Elizabeth Turner**

Exploration for hydrocarbons and minerals in the Canadian Arctic during the 1960s-1980s made some spectacular discoveries, including the largest conventional gas fields in Canada on Melville Island, and the Polaris and Nanisivik Zn-Pb deposits. Since that time, the understanding of the geological history of the region has changed enormously, and continues to evolve. This session will focus on advances in geodynamic models, tectonics, stratigraphy and igneous history, especially as they apply to understanding the resource potential. The goal of the session is to better understand the interplay between tectonics, thermal events, climate-ocean-atmosphere, and stratigraphy and how they affect ore and petroleum systems.

### **Fluid and melt inclusions**

**Matthew Steele-  
MacInnis**

**Pilar Lecumberri-  
Sanchez, Wyatt M.  
Bain, Vanessa Elongo,  
Ben Tutolo and  
Simone Pujatti**

Fluids are key drivers of geologic processes, and fluid and melt inclusions are commonly the best available tools to determine the properties and roles of fluids in the geologic record. This session aims to bring together researchers from a variety of fields - from surficial environments to Earth's deep interior - who study geologic fluids and use fluid and melt inclusions to address geologic problems. We welcome diverse contributions featuring theoretical, analytical and applied studies of fluid and melt inclusions as well as their implications for broader geologic questions.

### **General Hydrogeology**

**TBD**

**TBD**

This session will consider all manner of hydrogeology-related papers that do not fit clearly into other sessions.

### **Geomodelling: Uses Beyond Reservoir Understanding**

**Alexandra Ashrafi**

**TBD**

Sophisticated geo-models can do more for us than just integrate large quantities of data to gain reservoir understanding. Consumers of geo-models use them daily in their respective disciplines to improve their field. In this session, recent improvements and innovative techniques in the field of geomodelling will be explored. The use of such models can contribute to improving geosteering and engineering practices, business workflows, and teaching strategies. This session is intended to inspire new uses for geo-models across disciplines.

## Geophysical Constraints on Geological Structures and Processes

Mostafa

Naghizadeh

Ian Ferguson

Geophysical images of 3-D spatial variations in physical properties, integrated with geological and geochemical information, can elucidate processes and structures from the near-surface to the deep lithosphere. This session is devoted to the application of geophysical methods to geological studies including, but not limited to, tectonic, mineral exploration, and geo-environmental targets, at scales ranging from continental to local. Examples from past and present large-scale projects such as Lithoprobe, POLARIS, Metal Earth and EON-ROSE are particularly welcomed.

## Geophysical Applications to Influence Business Decisions and/or

### Optimize Capital Efficiency

Doug Uffen

Matt Ng

This session will hopefully inspire geoscientists with numerous examples of potential geophysical applications that are focused upon oil and gas business problems. Geophysics can do much more than map areas of sub-surface closure and geo-steer horizontal wells. Proactive geophysicists can get involved and add value to numerous technical discussions around topics associated with real business decisions. Opportunities exist for geophysicists to take part in conversations associated with frac port placement, completion design, hazard avoidance, DFIT analysis, inter-well spacings, micro-seismic analysis, induced seismicity, etc....

Each speaker will present 3 unique situations in which seismic data was used as part of the solution to these real business issues and decisions. Effort will be made to showcase the value of that contribution. The purpose of this session is not to go through each geophysical application of technology in minute detail, but to showcase the opportunity and the value of the geophysical contribution to the solution. The session is intended to provide ideas and inspire action.

## Geoscience and Society

Tanya Yeomans

Stacia Skappak

As a society we have more access to information than we ever have in the past, and as geoscientists we have an interest in communicating our scientific information effectively to the public.

Talks may include subjects such as: the role of today's geoscientist in the public sphere, the perception of the public on issues related to geoscience, best practices for communicating with non-scientists, how to raise geoscience literacy, the role of outreach organizations, citizen science and crowdsourced data and Geoscience in the media

## Geoscience Teaching & Learning: Application of Creative Teaching for Effective Learning.

Rudi Meyer

Brandon Karchewski

We invite contributions that illustrate examples of teaching that appear or can be shown to enhance effective student learning, that is, learning that promotes student's retention of content knowledge alongside the skills that will enable them to think and learn about the Earth. Presentations may include: 1) Applications of teaching & learning approaches that engage students in lecture or lab classes e.g. team-based or collaborative learning, active or enquiry-based learning, and; 2) Examples of approaches to facilitate the learning of critical geoscience concepts, such as the nature of temporal and spatial scales, 3D visualization of geobodies and geology in the field. Presentations are also invited on broad aspects of geoscience program curricula designed to accommodate evidence-based teaching & learning approaches. Submissions to this session are invited from across all fields of geoscience, at post-secondary introductory and advanced levels, in both oral and (paper or digital) poster formats.

## Global Carbon Capture, Storage, Utilization, Monitoring and Mitigation

Anne Halladay

David Hills

Carbon sequestration into the geological domain is gaining traction as workable solution to the global problem of greenhouse gas emissions. Advances in capture technology, investment in CO<sub>2</sub> infrastructure, identification of storage zones, and better monitoring techniques are incrementally removing the barriers, scientific and economic, to enable this emerging sector to become prominent in the coming years.

Adoption of carbon accountability through the implementation of a credit system has also changed the economic landscape of CCUS, prompting development processes and technologies to verify injection volumes. This session addresses the current state of the sector, challenges that are being overcome and projects both planned and in operation.

## Groundwater in Mountain Regions

Diana Allen

Masaki Hayashi

Mountain regions encompass a diverse range of physiographic settings, from high relief alpine terrain to low relief valleys. Throughout these settings, groundwater contributes to mountain and valley bottom streams and aquifers, and is an important component of the water cycle. Increasing demand for water, coupled with the effects of climate change and land use change, are significantly altering mountain hydrologic systems, yet the effects of these changes on mountain groundwater remains poorly understood. This session will explore fundamental and applied studies on groundwater in mountain regions, encompassing field and modeling studies. We welcome studies across the full range of mountain settings, from headwater catchments to valley bottoms, at regional to local scales, and spanning a diverse range of topics, such as how changes in water use, land use and climate change might impact water resources and aquatic environments, and the interactions between groundwater and surface water.

### Groundwater issues associated with energy development

Ken Hugo

Erik Quattero and  
Alanna Felske

This session invites contributions discussing the interaction between the resource industry and groundwater including the effects of oil and gas production on aquifers, the effect of groundwater withdrawal in support of energy developments, effects of water production on oil and gas reservoirs and the effect of oil and gas migration within aquifers. Specific topics could include well testing, multi-phase groundwater modelling, deep aquifers and/or oil and gas reservoirs, aquifer depletion or contamination due to oil and gas activities.

### Hydrogeological Impacts of Winter Road Salt Use/Application

Heather McLeod

Tammy Middleton

Road salts are a growing environmental issue in urban watersheds, negatively impacting surface water and groundwater quality. Target topics for this session span from the latest research on this issue, with a special focus on hydrogeological impacts, to management and/or mitigation strategies applied to help reduce the environmental impacts associated with winter road salt use. Overall, this session wants to generate insights and share knowledge about road salt impacts to groundwater resources across Canada and the world.

### Hydrogeology: Applications in Exploration

Shane Bossaer

TBD

### Hydrothermal Systems: From ore deposits to global elemental fluxes, and everything in between

Benjamin Tutolo

TBD

Oceanic and continental hydrothermal systems have profoundly impacted the chemical composition and oxidation state of Earth's lithosphere-hydrosphere-atmosphere system and shaped biological evolution throughout Earth history. Furthermore, they provide key societal benefits by producing ore deposits and concentrating geothermal heat for energy extraction. Over the past decade, our ability to quantitatively evaluate and predict the geochemical and hydrogeological evolution of these systems has rapidly evolved through the application of novel, high-resolution characterization techniques and important new field and experimental constraints on the geochemical, geologic, and geophysical processes. In this session, we invite contributions focusing on measurements of active and ancient hydrothermal systems, experimental exploration of (bio)geochemical interactions, and integrative geochemical and/or reactive transport models that provide constraints on hydrothermal systems.

### Improving geological interpretations through remote sensing, virtual reality, and digital outcrop models

Janice Allen

Alexander Braun

Remote sensing approaches facilitate detailed, novel, and rapid data collection in variably accessible locations. New sensors (LiDAR, hyperspectral, radar) and platforms (UAV, satellite, autonomous vehicles) provide potentially high resolution and accurate geological information (e.g., digital elevation data capable of documenting spatio-temporal change). Incorporating this underutilized information into holistic geological models presents challenges that range from assessing the quality of new technologies to the integration of diverse data types with different resolution, coverage, and quality. This session explores how various remote sensing technologies can inform our understanding of geological systems, including through integration with other data sources (field and analogue studies, core and log analyses, seismic, etc). In particular, this session invites, but is not limited to, studies exploring the integration of remotely collected data, the use of innovative sensor platforms, or development of geological models addressing regional to reservoir and outcrop scales. Investigations of remote sensing and/or digital outcrop models as a tool for teaching are also encouraged.

### Industry 4.0: Advanced upstream production optimization

Giovane Cesar Da  
Silva

Kristi Collin and  
Crystal Liu

Optimization of the end-to-end oil and gas value chain, where multiple plants, processes and assets are interdependent, has been a complex challenge for the upstream oil and gas industry. Industry 4.0, the application of advanced AI and machine learning and data science methodologies have opened up opportunities to solve this problem and scale across upstream operations. The goal of this session will be an in depth case study which will showcase how upstream operators can optimize across siloes, flag upsets early for timely response and identify and action opportunities in real-time. By continuously monitoring production every two to three minutes, we will demonstrate how identification of gaps between current and most effective and achievable “not theoretical - variables can be achieved and how AI-driven recommendations to maximize business objectives such as production volume, quality, inventory levels, profitability etc. can be achieved. Most importantly, we will cover how advanced data science projects should be undertaken within an organization, how identification of high-value business cases can be the key difference for executive buy in and how critical it is for operations focused professionals and data scientists to work together to understand a common language to drive high-value outcomes.

### Integration of GIS Technology

Alyson Birce

Chris Harrison

Geographic Information Systems (GIS) is a powerful tool that is becoming increasingly more popular in many different industries. The analysis capabilities can increase efficiency and reduce costs. The display capabilities can assist with communication between professionals with different expertise. As technology advances, the application of GIS technology becomes limitless. In the context of geoscience, GIS can have many applications from simplifying analysis of the subsurface to storing and distributing large amounts of data. These applications can simplify workflows, create a safer environment for field workers, and assist with analysis to create more accurate models to represent the study area.

### International Case Studies (Hydrocarbon Exploration)

**Mahbub (Bob) Alam** TBD

International Case Studies covers a huge area of geoscience and/or broadly oil and gas related topics, which occurred outside of Canada. All the geoscientific activities and hydrocarbon potential of the rest of the world in different geomorphological settings will fit under this category, such as structural, hydrogeological, environmental, geophysical, geochemical, sedimentological or seismic activities are among many. Topic may vary from conventional to unconventional exploration, field development and enhanced hydrocarbon recovery strategies. The broad range of international activities also includes all the branches of research in geoscience either in Corporate level or in the University level.

### Latest advances in geothermal exploration and development in Canada

**Stephen Grasby**

**Grant Ferguson**

The session invites speakers working on active geothermal projects in Canada, including both energy and heat, with a focus on sedimentary basins but also including new work on volcanic belts of western Canada and other parts of the Cordillera.

**Eva Enkelmann, Hersh Gilbert, William Matthews, and Lydia DiCaprio**

### Lithospheric deformation: from terrane accretion to continent collision

**Eva Enkelmann**

This session aims to attract contributions from geologists, geophysicists and modelers that investigate the processes associated with continental lithospheric growth.

### Machine Learning / AI / Big Data I

**Brian Emmerson**

**Don MacNeil**

This session focuses on case studies and practical applications of machine learning and data science techniques to the oil and gas industry, across geology, geophysics, petrophysics, and subsurface operations. Case studies will deal with use of the associated technologies to solve new problems, to solve existing problems in a novel or more efficient way, or to deal with data at scales not feasible in the past. Submissions are welcome demonstrating specific case studies applying machine learning workflows, highlighting their benefits over conventional methods, or addressing common problems presented by subsurface data. Also of interest are examples dealing with the deployment of machine learning tools to broader teams, and overcoming barriers (cultural, technological) to their adoption.

### Machine Learning / AI / Big Data II

**Anton Biryukov**

**Volodymyr Vragov**

This session will focus on the presentations that highlight recent developments in the application of machine learning techniques and leveraging of big datasets to improve the accuracy and efficiency of geoscience, petrophysics, and other subsurface operations workflows. We also encourage submissions of the abstracts that showcase new and previously unexplored applications of machine learning and data science techniques to subsurface data. Finally, adoption of AutoML tools is growing worldwide and examples of successful use of such tools in subsurface domain are of interest as well.

### Machine learning applications for subsurface characterization

**Satinder Chopra**

TBD

Machine learning applications on seismic data hold immense promise for reservoir characterization and the recent applications have focused on neural networks, deep learning, unsupervised learning and clustering methods for subsurface characterization. In this session, machine learning applications as aids in processing of seismic data, determination of facies classification, geomechanical moduli in shale formations and analyses of complex relationships within subsurface signals, and others, are encouraged as submissions.

### Meeting groundwater resource management challenges

**Edwin Cey**

**Jon Jones and Gordon MacMillan**

Water resources are critically important to life on Earth, yet are increasingly stressed due to pollution, population growth, and changing climate and land use. Groundwater plays an important role in the hydrologic cycle and, thus, successful water management will require an integrated understanding of hydrological processes and human interactions to develop practical, effective and scientifically defensible solutions. Within this framework, fundamental information on aquifer/aquitard units, recharge/discharge rates, flow and storage dynamics, and water quality are required, alongside strategies for addressing societal and environmental needs, to achieve sustainable management goals. This session will discuss current and future groundwater resource management challenges, identify innovative strategies for managing groundwater quality and quantity, and highlight areas of need to strengthen decision-making. Topical areas of interest include studies on quality and quantity of groundwater supplies, ecohydrological impacts, (ground)water resource allocation, surface water-groundwater connectivity, water governance and policy, resource management modelling studies, and advances toward sustainable water management. Submissions utilizing field and numerical techniques to explore these issues are welcome. We also encourage interesting hydrogeological case studies documenting lessons learned for water management.

## Metamorphic processes and their tectonic implications: constraints from nature and modelling

Fred Gaidies

Dave Pattison and  
Chris Yakymchuk

Contributions are invited that highlight advances in our understanding of metamorphic processes and their tectonic implications. Contributions based on theory, experiment and natural rocks are welcome. Possible topics include: field constraints, chemical analytical techniques/zoning, qualitative and quantitative textural analysis, phase equilibria modelling, kinetic modelling, petrochronology, P-T-t paths, tectonic inferences that derive from the foregoing. The session will be complemented by a one-day, pre-meeting short course "Phase equilibria modelling: approaches and pitfalls", and a four day, post-meeting field trip "Metamorphism and tectonics in the Omineca belt, southeastern British Columbia".

## Microseismic

Jieyu Zhang

Barry Fish

This session invites people to share their findings and ideas about innovative applications of microseismicity monitoring. Microseismicity has been an important part of oil and gas exploration for years. But have we fully explored the potential in microseismicity? Will DAS fibre recording open up new fields of investigation? How about passive recording of carbon sequestration sites? No matter whether it is theoretical or applied case-study, any creative ideas demonstrating the application of microseismic data are welcomed.

## Mineral chemistry and igneous processes

Zeinab Azadbakht

Shannon Zurevinski

This session is dedicated to the usage of mineral geochemistry in different aspects of the igneous process including but not limited to the estimation of physicochemical characteristics of the parent magma, its evolution history, and ore potential as well as the secondary hydrothermal processes and their effect on mineral chemistry.

## Mineralogy and Crystallography

Mashrur Zaman

TBD

This general session invites contributions exploring the structures, composition and behaviors of minerals. We particularly welcome contributions that addresses minerals and their environments of formation, understanding the temporal evolution of minerals and the roles minerals play in the formation and evolution of planets.

## Montney Reservoir Characterization

Andrew Iverson

Victoria Biersteker

The Montney formation extends from British Columbia to Alberta covering approximately 130,000 km<sup>2</sup> with multiple target intervals. Vertical drilling and production began with conventional targets along the northeastern edges of the Montney. With the advent of horizontal drilling and multi-stage fracturing, development has shifted downdip. First into the overpressure fairway and more recently into the oil window, propelling the Montney to become a competitive unconventional resource. Due to its regional extent, the Montney has many play types, differentiated by lithology, structure, pressure and fluid regimes. Completion and pad design are variable among play types with variations in, fluids, size, and spacing. Parent child well relationships are increasingly recognized with the transition from single well tests to full field development.

Data driven examples of reservoir characterization to explain key drivers and ultimately production is shown. With a focus on data from geology, geophysics and petrophysics, and the relationships among them as we upscale these learnings using the various tools. Novel analysis techniques display the varied methods used for a given dataset to characterize the reservoir.

## New Concepts for formation of Million ounce gold deposits advances Exploration in South B.C.

Bill Howard

TBD

Re-analysis of stream sediments and the characteristics of mined deposits show two types of large, commercial gold-silver deposits in South B.C. They differ in the specific, gold-associated trace mineral assemblages present:

Type [1] native gold with gold + silver tellurides, e.g. sylvanite or calaverite;

Type [2] native gold with native bismuth + varied bismuth (sulpho)telluride minerals, commonly bismuthinite joséite-A joséite-B hedleyite tetradymite & others.

Type [1] epithermal deposits formed at high crustal levels. Gold is associated with tellurium-bearing minerals without bismuth. Resources are smaller, to 1/3 Million oz gold. Exploration for these can be challenging as lower base metal contents means less content of gold pathfinder elements in surficial geochemical media.

Type [2] Intrusion-related gold skarn or mesothermal vein deposits formed at moderate depth levels. Bismuth is the key gold-associated pathfinder element. Type [2] deposits are larger, with commercial resources about one-half to 3 Million oz. gold. Experiments have proven bismuth can scavenge or sequester gold from dilute hydrothermal solutions. Metallic lead as well, under certain favourable conditions, may concentrate gold. This session revises the belief that only water-based fluids form economic gold deposits.

## New Technologies for Frontier Plays and Unconventional Resources

Valentina Vallega

Dragan Andjelkovic

This session focuses in sharing experiences where new technologies have relevance to wide range of applications such as drilling, evaluation and completion of Unconventional reservoirs and frontier plays. The history of the volatile oil price illustrates how important new technologies are as frontier exploration shifts from wildcat drilling through oil and gas development into production. Inventiveness is needed to drill in those unfriendly areas, and the challenges explorers sometimes face are usually overcome by new and creative approaches.

To explore and develop such reservoirs the application of innovative technologies has revealed to be a success: from digital technologies, to innovation in drilling practices, in core recovery improvement, in refining evaluation workflows and data interpretation analysis, to the completion and production of these reservoirs.

This session seeks contributions on innovative workflows that have been proven to be cost-effective in unconventional reservoirs evaluation allowing the gathering of additional information in a cost-effective scenario.

We encourage discussions about Frontier Plays, their challenges and the role played by utilization of new technologies in the various life cycle steps of the field life.

Stories where digital transformation as acted as a new technology and has been fundamental in analysis of frontier plays and unconventional reservoirs are also sought

We welcome examples from both Canada and abroad.

## Nitrate in Groundwater

Cynthia McClain

Yefang Jiang

This session focuses on the status of monitoring, research and policies related to nitrate in groundwater across Canada to summarize the distribution and trends of nitrate groundwater, identify opportunities for improved information sharing, and use of science to inform land use and water quality management and regulation in Canada. Nitrate is one of the most prevalent groundwater contaminants globally, often derived from agricultural fertilizer and manure sources. As approximately 30% of Canadians rely on groundwater for domestic uses, nitrate in groundwater is a concern for human health (e.g., specific cancers and birth defects). Groundwater-sourced nitrate may also influence freshwater or marine aquatic ecosystem health, contributing to eutrophication. We welcome national to local scale studies on monitoring and occurrence of nitrate in groundwater, source characterization (fertilizer, manure, geologic etc.) including use of isotopic techniques, and nitrate fate and transport within soil, vadose zone sediments, and groundwater systems (e.g., lag times, denitrification). Nitrogen budget and modelling studies at farm to national scales can provide a framework for evaluating stores and fluxes of nitrate, and effectiveness of best management practices or policy scenarios. The risks of nitrate contamination in groundwater can be mitigated by land use planning, groundwater management and source water protection.

## Oil Sands and Integrated Oil Sands Case Studies

Sahar Ghannadi

Calin Dragoie

Currently, the Steam Huff and Puff (CSS), the Steam Flooding, the Steam Assisted Gravity Drainage (SAGD) and In Situ Combustion technologies with their diversified supporting technologies and processes have been successfully developed and applied in oil sand and heavy oil projects in Alberta and Saskatchewan. The primary goal of this session is to promote continuous improvements to all aspects of oil sand projects and technology development through it. Sharing of recent project data, case studies and technical discussion. This session will seek to discuss the operational learnings from the application of multi-lateral, Flow Control Devices, Solvent Aided Processes, CHOPS, In Situ Combustion technologies.

## Ore Deposits and Models

TBD

TBD

## Organic Geochemistry

Martin Fowler

Barry Bennett

Andy Mort

We invite contributions related to both the petroleum geochemistry of conventional and unconventional resources, and the environmental geochemistry of hydrocarbon production. Ideally there will be a mixture of new approaches and new ways of using older techniques. Amongst the specific topics that could be covered, determining optimum locations for shale plays, production or reservoir allocation of produced hydrocarbons, optimizing production from heavy oil plays, new approaches to conventional O&G exploration, monitoring oil spills and monitoring remediation of oil sands tailings.

## Petroleum Geochemistry

Zied Ouled Ameer

Trevor Dufresne

## Petrophysics

Nazmul Haque

Mondol

Nasir Rahim

### Quantitative Interpretation of 4D Seismic Monitoring Methods

Dmitri Skorinski

Luc Gravel

Advantages and challenges of 4D seismic monitoring data sets, including theoretical and practical applications and the description to be. This session demonstrates the general use of 4D seismic as an integral part of monitoring the subsurface from design, processing, interpretation to 4D case studies.

### Quaternary stratigraphy of Canada, in honour of Earl Christiansen

Daniel Utting

Roger Paulen

In many regions in Canada, thick successions of Quaternary sediment have been identified from outcrops, water well and geotechnical logs, exploration drilling, open pit mining, oil and gas drilling, and geophysical surveys. Dr. Earl Christiansen was a pioneer in mapping the Quaternary subsurface and stratigraphy in the western plains of Canada. His work and legacy, laid a foundation on which additional research has been expanded and modified throughout western Canada. This session will focus on studies of Quaternary stratigraphy in Canada, including correlative stratigraphic chronologies as well as other research including mapping buried bedrock topography, investigating thick packages of Quaternary sediment, and applying new (and old) techniques to discriminate Pleistocene units. We also invite submissions of a more general nature related to surficial geology mapping, glacial sedimentary processes and Quaternary palaeo-ecology.

### Regional groundwater flow: from conceptual models to implementation

Judit Deri-Takacs

Jessica Liggett

The session focuses on the theory of regional groundwater flow and how it can be utilized in regional-scale hydrogeological characterizations. The application of regional groundwater flow and topography-induced nested groundwater flow systems in hydrogeological studies is far-reaching. Qualitative applications are used to establish conceptual understanding of the subsurface flow regime, while more quantitative applications, for example numerical groundwater flow models, can characterize groundwater flow conditions and hydrogeologic environments; assess groundwater resources and groundwater development potentials; analyze groundwater-response to stresses; predict future effects of natural and anthropogenic processes on aquifers and groundwater dependent ecosystems. Regional groundwater flow theory can also support decision-making in groundwater policies and regulations. The session welcomes national and international studies that demonstrate the versatile applicability of the 3D theory and nested groundwater flow systems in hydrogeological and hydrological studies, from building hypotheses and interpreting data to carrying out quantitative assessments.

### Reservoir Engineering and Hydraulic Fracturing in Unconventional Plays

Ali Ziarani

Robyn Swanson

This session covers the latest research and development, case studies and applications of reservoir engineering as well as hydraulic fracturing topics into development of unconventional resources. Example topics include but not limited to flowback and production data analysis, well test analysis, minifrac and diagnostic injection tests, fracture design optimization, fracturing modelling, application of Core, Log and PVT data in reservoir / fracture engineering studies, reservoir simulation and modelling, and integrated reservoir development and optimization studies.

### Risk management and geo-hazard mitigation in oil sands

Khalis Ahmed

TBD

Risk management and geo-hazard mitigation in oil sands production activity is a big concern to the involved industries. Sub-Cretaceous unconformity beneath the McMurray Formation has been further affected by structural deformation triggered by sub-surface Paleozoic salt dissolution. Delineating the activity of faulting/collapse from pre-Cretaceous to present day is vital to develop an understanding of the possible hazards of water flow from deep aquifers during oil sands production. This session is intended to focus on the procedures that identifies geological cause associated with the sub-surface collapse features in and around the oil sands production areas both in in-situ production and open pit mining. It also will summarize the risk models that is being in use by different companies in oil sands production. Sharing knowledge and experiences will benefit the industry to minimize the risk during production activity.

### Rural groundwater issues

Jana Levison

Elisha Persaud

Groundwater is the principal water source for rural residents, farms and many urban populations surrounded by agriculture across Canada. In rural areas, it is critical that groundwater quality is protected and that it is used in quantities adequate for sustainability of the shared resource. This must be done both in the context of changing land uses and a changing climate. Rural settings have unique concerns regarding non-point source pollution and water extraction for activities such as irrigation. This session will explore groundwater issues in rural settings, examining both groundwater quality and quantity.

### Sediment transport in alluvial rivers and streams: implications for contaminant migration pathways

Andrew Binns

Scott Gardner

Contaminants that enter the river system through groundwater-surface water exchange in the hyporheic zone, overland flow routes, or erosion processes in the stream can readily sorb to sediments and migrate downstream through sediment transport processes. The nature and temporal scale of the specific transport pathways are challenging to accurately predict and assess. Considerable uncertainty exists regarding the influence of specific hydraulic and morphologic factors responsible for the spatial and temporal distribution of sediment transport patterns, including the influence of site heterogeneity and unsteady hydraulic conditions. This knowledge is imperative for characterizing contaminated riverine environments and planning appropriate and effective remediation methods. This session explores the mechanisms responsible for the transport of sediment and contaminants in rivers and streams from field, laboratory or numerical modeling studies.

## Sedimentology, stratigraphy and paleontology

Erin Pemberton

Sean Fletcher

### Seismic Acquisition: Advances and New Tech

Andrea Crook

Michael Hons

Over the past few years, a “seismic” change has occurred in seismic acquisition. New technologies are enabling an exponential increase in trace density, resulting in significantly improved data quality. When combined with field efficiencies and reduced environmental impact, modern seismic acquisition has the ability to completely change oil and gas exploration and production.

In this session, we will be reviewing new seismic acquisition technologies and methodologies. Come out and discover how these technologies can change your seismic acquisition program.

### Seismic Interpretation Case Histories

Nawras Al-Khateb

Kathleen Dorey

Papers to be presented in this session will illustrate case histories of seismic interpretation in various basins around the world. Papers will be development or exploratory in nature and will emphasize technical methods and results for a given project. Integration of engineering and geological concepts/data will be included where possible. Papers may include seismic methods such as inversion, rock physics, complex imaging, stratigraphic and structural analysis and reservoir characterization.

### Seismic Interpretation in an Era of Artificial Intelligence

Rafael Sanguinetti

Raúl Cova

Some technical presentations showing the adoption of artificial intelligence (AI) techniques throughout the oil and gas industry, and how those have impacted (or not) our way of seeing and interpret the seismic data in diverse scenarios. It is expected to see examples where these techniques have improved the interpretation of prospects, complex structures, integrating seismic attributes and how they are managing the noise associated to the data.

### Seismic Inversion

Marissa Whittaker

Carmen Dumitrescu

This session demonstrates the range and usefulness of a variety of Inversion methods. Whether the inversion is performed post-stack, pre-stack or through FWI this session highlights proven techniques in case studies through innovative applications.

### Seismic Processing

Aaron Stanton

Svetlana Bidikhova

Seismic data processing is an integral component of geophysical exploration and production. The quality of processing results can either impede or aid in a successful interpretation. This session will include local and global developments in the world of processing including onshore and offshore processing examples, new techniques and methodologies, the latest achievements in noise attenuation, velocity model building, imaging, AI and machine learning for real time processing and much more. We invite you to come and equip yourself with the critical knowledge that will steer your exploration effort to a new horizon.

### Skill Fundamentals 101 and Case Studies

Shelley Leggitt

Brian Zaitlin

Kathleen Dorey

David Gray

In these two half-day sessions, three geology and three geophysics skill topics will be presented.

### Structure Interpretation

Ian Dawes

Bob Fuenning

### Taking Stock of Geology of Canadian Cordillera: A session in honor of

#### Philip S. Simony

Kevin Root

Margot McMechan

This session honours Philip S. Simony, Professor Emeritus at the University of Calgary, and recognizes his important contributions as a Cordilleran researcher and an educator. The major theme to be explored at this session is the somewhat controversial hypothesis that there is a major terrane boundary within the Canadian Rockies that separates North American from exotic Non-North American rocks. Published models include the Cordillera, SAYBIA, and Rubian ribbon continent hypotheses. We welcome data-based presentations that investigate the pros and cons of this topic. Presentations on other aspects of the geology of the Cordillera or other mountain belts, and presentations on general structural geology, are also welcome.

### The Evolution of the Industrial Use of Geophysics

David Gray

Rob McGrory and  
Louis Chabot

The focus of this session is the innovative use of the tools in the geophysical toolbox, both seismic and non-seismic, to solve the problems our companies and our country faces. There are data and tools available to you within your company today that can provide significant value in today's challenges in development, the environment, exploration, appraisal, abandonment, etc. in conventional and unconventional petroleum resources, environmental, engineering, mining, and other sectors. The key is to get results that communicate value and that means translating from geophysicalese and acronyms to the language of your end user. A limited number of panelists will have a 5-minute presentation to show an example of how they got value solving a different kind of problem using their geophysical toolkit. The key to this session is the discussion that ensues, with key questions provided from the audience and also the panelists querying each other.

## The geophysics of the built environment

Robert Ferguson

Mathew McDonald

Case studies and theoretical explorations of geophysical techniques and technologies applied to solving the efficiency and security problems in urban environments. Themes such as transportation safety and management as well as data security and privacy research are part of this session as well as coping with "big data" transfer, storage and analysis.

## The Human Element

Steven Lynch

TBD

Most geoscience research today is directed towards using machine learning and artificial intelligence to remove much of the grunt work associated with interpretation. The focus here is on algorithm development and whereas the techniques produced are certainly needed, the ultimate goal of having the machine do all the work and eventually generate drilling locations is decades away, if it, like fusion reactors, arrives at all. In the meantime, the interpreter's perceptions of their seismic and by extension the geology it represents, remains central to the exploration environment. For the foreseeable future, wells will still be drilled by geoscientists who will accumulate the bulk of their knowledge from seismic. So, what about them? What is the world doing to improve their day-to-day interactions with, and perception of, their most important asset? Given that most of the research focus is directed towards a.i., the answer is very little as it has been for decades. This session invites contributors dedicated to improving the day-to-day working experience of the much maligned and undervalued but essential interpreter.

## The Steamy Underworld: New Insights into the Behavior of Maturing

### Thermal Reservoirs

Graham Spray

Rob Paul

In-situ heavy oil and bitumen reservoirs have been producing in Alberta for 2-3 decades now, with big surges in in-situ investment in the mid-2000s and early 2010s yielding a current high in production of almost a quarter million barrels per day. The technologies involved in thermal in-situ bitumen exploitation have evolved tremendously over this time, and are still in development. Earlier projects are now maturing, nearing the end of their lifecycles and depletion of recoverable bitumen. As these earlier projects approach their conclusion or move to post-production phases of operation, we can take the opportunity to investigate how effectively these reservoirs have performed under the technologies applied.

Have models effectively captured reservoir behaviour? Did steam chambers develop as expected? Has oil been recovered through shale barriers? Can we dispose water or even CO<sub>2</sub> into depleted reservoirs?

This session aims to permit a discussion of discoveries made by investigating maturing and depleted in-situ projects, ideally with a diversity of speakers and topics broadly in the following fields:

- Macro-Scale: steam propagation, chamber development, monitoring, reservoir modeling
- Meso-Scale: barriers/baffles actual outcomes, biomarker analysis, scaling issues, core capture and analysis
- Micro-Scale: Textural and mineralogical changes induced by SAGD conditions, formation damage sensitivity, impacts of high-T conditions on oil chemistry and biomarkers
- Management side: production optimization, SOR performance, reservoir management, wind-down, post-production applications of in-situ reservoirs

## The Uranium Fuel Cycle, Nuclear Energy and Climate Change

Mostafa Fayek

Guoxiang Chi and  
Julie Brown

As the population of the world grows so does the demand for electricity. The challenge is to meet the global need for affordable, reliable and clean energy. Failing to achieve this goal can have sweeping ramifications for economic prosperity, health care and communication. Nuclear power generation is one of the cleanest and most reliable forms of energy. However, before nuclear energy can be widely accepted by the public, scientists must overcome several hurdles: (1) efficient uranium exploration methods, (2) effective tailings monitoring and (3) nuclear waste disposal. Canada and its industries need to adopt a leadership position in the development of strategies for innovative and sustainable uranium resource extraction and disposal. This is particularly important in an era where climate change awareness has resulted in a heightened focus on efficient recovery and lower environmental footprint. The goal of this session is to gather recent advances in the uranium fuel cycle including new approaches to uranium deposit exploration, nuclear waste disposal, and the fate and transport of uranium in surface and near surface environments. Contributions on uranium deposits, uranium mineralization, uranium mine tailings, waste-rock, remediation of contaminated sites, and geologic disposal of nuclear waste are strongly encouraged.

## The Value of Integrated Geosciences Panel

John Duhault

TBD

## The Virtual Spring: effects and manifestations of discharging groundwater

Judit Deri-Takacs TBD

The session focuses on surface manifestations of flowing groundwater and their application in regional hydrogeological characterization. As flowing groundwater interacts with its environment through various chemical, physical and kinetic processes, it produces numerous in-situ effects detectable on the surface in the discharge area of groundwater flow systems. The concept of "virtual spring" is defined as all groundwater discharge phenomena together in the terminal area of a groundwater flow-system. Phenomena such as springs, distinct water chemistry, soil salinity and mineral deposits, phreatophyte and halophyte plant communities, geothermal anomalies, and certain karstic features carry information about the hydrogeologic environment and can be interpreted in the context of groundwater flow systems. Their observation, interpretation and integration into conceptual and numerical groundwater flow models represent a fundamental component of regional-scale hydrogeological characterizations. The session is organized by the RGFC-IAH and welcomes national and international examples of application of groundwater-related surface phenomena, as a tool to formulate hypotheses, build conceptual models and/or validate numerical simulations of subsurface flow regimes.

## Toward definition of archetypal aquifers

Hazen Russell Vincent Cloutier and Colby Steelman

There is an abundance of case studies on various aquifers, and aquifer settings with a full range of data support depending upon study objectives, scale, and funding. Near surface aquifers, particularly those in surficial sediment are commonly classified by a combination of sediment - landform terminology; whereas deeper aquifers are commonly referenced by geological formation. This fails to recognize that aquifers are formed of multiple components, which may include: lithofacies, transmissivity, storage, and quality. This session seeks to consider how aquifer classification can be advanced, particularly toward development of archetypal aquifer classes. Identification of archetypal aquifer classes would help support consolidation of knowledge from case studies and enhanced integration of empirical observations, model results and theoretical frameworks. Useful aquifer archetypes support both explanatory conceptual models and link such models with geometry, properties, heterogeneity, and process for the delineation of aquifer classes. Archetypes can provide an analogue for process understanding and the spatial extrapolation of properties and hydraulic responses in areas with sparse data support, or as a guide to data collection and characterization. Submissions are invited on classification, application, and case studies (data collection, characterization) that may support development / population of archetypes.

## Uncertainty, Risk and Decision Making

Alexey Romanov Thomas Jerome

This session will cover case studies and new approaches of dealing with risks and uncertainties for reserves and resources estimation and decision making. Possible topics may include: Seismic application for reserves booking (increased certainty when extrapolating away from wells), Risk management in exploration, interpretation of stochastic reservoir modelling results etc .

## Unconventional Enhanced Oil Recovery by Understanding Rock-fluid Interactions

Hassan Dehghanpour Mahmood Reza Yassin

This session will cover laboratory and field studies to evaluate different techniques to improve oil recovery factor from Duvernay and Montney reservoirs. The techniques include 1) adding EOR agents in fracturing and re-fracturing fluids, and 2) injecting natural gas into depleted shale reservoirs. The focus will be on understanding the oil recovery mechanisms for process optimization.

## Unconventional EOR I

Michael Muirhead Phyllis Pacchiano

Applications of Enhanced Recovery in unconventional is still in its infancy. Not only in western Canada but certainly in North America as a whole. The 2 sessions focusing on Enhanced Recovery at the 2020 GeoConvention will focus on a wide range of issues surrounding the application of Enhanced Recovery in unconventional reservoirs in North America and globally. The theme of these sessions will be to develop a historic understanding of Enhanced Recovery applications in these reservoirs including case studies, theoretical research, field level issues such as regulatory frameworks, source of injection feed-stock, economics, recovery factor estimations etc. The primary objectives of the 2 sessions will be to discovery and address a variety of issues and topics facing E&P companies who are implementing or thinking of starting Enhanced Recovery operations in unconventional reservoirs.

## Unconventional EOR II

Krista Beavis Ian Kirkland

Applications of Enhanced Recovery in unconventional is still in its infancy. Not only in western Canada but certainly in North America as a whole. The 2 sessions focusing on Enhanced Recovery at the 2020 GeoConvention will focus on a wide range of issues surrounding the application of Enhanced Recovery in unconventional reservoirs in North America and globally. The theme of these sessions will be to develop a historic understanding of Enhanced Recovery applications in these reservoirs including case studies, theoretical research, field level issues such as regulatory frameworks, source of injection feed-stock, economics, recovery factor estimations etc. The primary objectives of the 2 sessions will be to discovery and address a variety of issues and topics facing E&P companies who are implementing or thinking of starting Enhanced Recovery operations in unconventional reservoirs.

## Unconventional Plays: Improving Performance and Efficiency through Integration

Mehrdad Soltanzadeh Sochi Iwuoha

Innovative solutions to integrate data and interpretations from various sources and disciplines have proven to be essential to increase production, reduce cost, and mitigate risk of operations in unconventional plays. Please join us in this session to learn about some novel and practical integration techniques for improving the performance and efficiency of unconventional plays.

### **Volcanology, Igneous Petrology, Geochemistry**

**David Lentz**

**Xueming Yang**

This general session invites contributions that address physical volcanology, use of geochemistry to understand eruption mechanisms and magma evolution, spatial and temporal relations within igneous bodies, element partitioning during igneous processes etc. We invite contributions from both field based studies and experimental studies.

### **What's Shaking in Induced Seismicity?**

**Mehrdad**

**Soltanzadeh**

**Paige Mamer**

Over the last decade, there has been an increase in the number of seismic events induced by hydraulic fracturing and injection/disposal activities throughout North America. This has led to increased regulation, monitoring at local and regional scales, and focused research into the geological and operational causes of induced seismicity. Join us as we explore this important topic through new research and case studies.

### **Workplace Culture/Diversity**

**Alicia Bjarnason**

**Nadine Pearson**

This session seeks contributions focused on equity, diversity and inclusion in the geoscience workplace - best practices for creating a safe working environment - both mentally and physically (including fieldwork locations), how technology is changing the working environment, conflict resolution, GeoEthics, the importance of ERG's (Employee Resource Groups).