

# GeoConvention 2023



**geoconvention**

Calgary • Canada • May 15-17 **2023**

## Session Guide

**May 15 - 17, 2023**

Calgary TELUS Convention Centre

Guide Revision Date: 6 December 2022



[www.geoconvention.com](http://www.geoconvention.com)

# OUTLINE

GeoConvention 2023 is excited to host a wide variety of content from our non-profit Earth Science partner societies. The following outline will act as a reference to the sessions that will be hosted at GeoConvention 2023 and will be updated as new sessions are added and chairs are named.

## 2023 SESSIONS

Active and Passive Seismic Monitoring of CO2 Storage and Plume Migration .....	3
Atlantic Canada Offshore Exploration.....	3
Back to Basics: Geophysics .....	3
Bridging the Gap: Engineering and Geoscience .....	3
Canadian Oil Sands .....	3
Carbon Capture Utilization and Storage .....	3
Core logging through the lens of Machine Learning and Deep Learning .....	3
CCUS - A Path Toward Sustainability.....	4
CCUS – Technical Issue Focus .....	4
Decarbonizing heat; the role of geothermal and oil and gas.....	4
Decision strategies, tactics, and case studies in new industries, including Carbon Capture and Sequestration, Helium, and Cleantech .....	4
Duvernay.....	4
Emerging Canadian Oil Resource Plays .....	4
Epic Fail!.....	4
Exploration and Development of the Geothermal Resources .....	5
Fracture Identification from Seismic data.....	5
Geocommunication & Geotourism .....	5
Geothermal Energy: A Promising Outlook .....	5
Helium .....	5
Hydrogeology.....	5
Indigenous Partnerships in Science .....	5
Induced Seismicity .....	6
Induced Seismicity: Managing Industry Risks & Technical Developments.....	6
In Situ Stress in the Western Canada Sedimentary Basin .....	6
Lithium .....	6
Machine Learning and AI .....	6
Methane Emission Reductions: Success Stories and Trends.....	6
Microseismic monitoring: Technology and case studies.....	6
Montney .....	7
Mountains to Margins - Global Exploration and Development Case Studies .....	7
Petroleum Geochemistry .....	7
Petrophysics.....	7
Reservoir Characterization.....	7
Sedimentology, Stratigraphy and Paleontology.....	7
Seismic Acquisition .....	7
Seismic Imaging – Full Waveform Inversion .....	7
Seismic Inversion for reservoir and subsurface characterization .....	8
Seismic monitoring for mining applications.....	8
Seismic Processing .....	8
Society Awards Session.....	8
Water Disposal.....	8
Western Canada Sedimentary Basin Atlas 2027 .....	8

## Session Title

## Session Chairs

### Active and Passive Seismic Monitoring of CO<sub>2</sub> Storage and Plume Migration

**Rob Kendall**

**Don Lawton**

Carbon Capture and Sequestration (CCS) or Carbon Capture Utilization and Storage (CCUS) is a rapidly developing worldwide phenomenon. The global carbon capture and sequestration (CCS) market is expected to have a market value totaling 5.6 billion U.S. dollars by 2026 under the momentum of initiatives undertaken by governments to reduce global greenhouse gas emissions.

Active 3D seismic is necessary for building adequate reservoir models, 4D seismic is necessary for monitoring CO<sub>2</sub> containment and CO<sub>2</sub> plume migration and Passive Seismic Monitoring is necessary for measuring induced seismicity related to high pressure CO<sub>2</sub> injection.

### Atlantic Canada Offshore Exploration

**Wen Lin**

**TBD**

Despite recent downturn transitioning into an industry upswing, there have been encouraging exploration efforts (new, appraisal, and ILX) in offshore Atlantic Canada in recent times. Although with high risk, conventional offshore E&P with low carbon emissions and no pipeline requirement becomes more appealing to the energy industry.

This session is proposed to share perspectives and for further insights into the subsurface resources (proven & yet-to-find) in the offshore East Coast Canada basins - previous exploration discoveries recorded and recent activities in the Orphan, Carson, Flemish & offshore Nova Scotia basins, not ignoring the relatively better-known Jeanne D'Arc basin. A holistic evaluation of the petroleum systems (models) in these basins is anticipated. Discussions on stratigraphic plays and ILX (infrastructure-led-exploration) surrounding the existing producing fields are expected as well.

The (break-even) economics and sustainability of the hydrocarbon resources in these offshore basins have not had sufficient attention in geosciences fora. This session will also discuss and evaluate the commerciality of these offshore resources.

### Back to Basics: Geophysics

**Andrew Mills**

**Kelsey Mah**

We have learned many if not all of the basics of our discipline at one point in our career. Can you remember them?

The session intends to be both a refresher and an introduction to geophysical methods, including:

- survey design (reflection, VSP, Microseismic, etc.)
- foundational techniques and tools (well-ties, interpretation pitfalls, synthetic modelling, time/depth processing, non-seismic methods, etc.)
- advanced techniques (AVO principles, prestack inversion, Rock-Physics, geomechanics, machine learning etc.).

The talks will cover the nuts and bolts of various methodologies and the associated assumptions. We will discuss aspects of the assumptions, the implications, where can they go wrong, and how to mitigate the risk. We also aim to include subjects involving where we should be doing more to add value to the development of exploitation of resources.

### Bridging the Gap: Engineering and Geoscience

**Brian Schulte**

**TBD**

The Bridging the Gap - Geoscience & Engineering session has a series of technical talks that covers aspects of integration between petroleum geoscientists and engineers and related energy resources. Examples of collaborative work that was done between the disciplines in the renewable energy sector will also be discussed. The talks will entail work done from initial exploration through field appraisal, development, production & optimization. This session will provide well rounded multidisciplinary talks for a wide range of audiences with interest in subsurface energy resource industries.

### Canadian Oil Sands

**Lindsey Abbott**

**TBD**

Advances and developments in the energy form the Canadian Oil Sands will be discussed.

### Carbon Capture Utilization and Storage

**Marie Macquet**

**Brendan Kolkman**

Monitoring technologies for CCUS, projects overview, best practices for CCUS, what do we need to move forward.

### Core logging through the lens of Machine Learning and Deep Learning

**Shervin Azad**

**Shervin Manzuri**

In this session, we discuss the latest research and development to log the core using computer vision, Machine Learning and Deep learning. Also we will evaluate how much we can expedite and automate this step.

### **CCUS - A Path Toward Sustainability**

**Francis Morin**

**Richard Baker**

With so many CCUS projects getting off the ground, this will be a tremendous opportunity for attendees to hear from a series of proponents on their upcoming operations in Western Canada. The session will be a forward-looking half day to show case some of the exciting recent announcements.

### **CCUS – Technical Issue Focus**

**Dave Hills**

**Anne Halladay**

A CCS session and focus on MMV and other technical issues

### **Decarbonizing heat; the role of geothermal and oil and gas**

**Catherine Hickson**

**Emily Smejkal**

Presented by Geothermal Canada. The majority of Canada's current energy usage (more than 50%) is for space and water heating at both the commercial and residential scale. If geothermal heating systems could be deployed there is the opportunity to offset heat provided by natural gas (or electricity on carbon intense grids) thus reducing GHG from heating. This offsetting potentially could liberate some of Canada's cleaner hydrocarbons to be sold to foreign, coal dependent markets. This would enable Canada to decarbonize locally, while also contributing to global decarbonization. Papers that explore the economic aspects of this offset; how to reduce the high CAPEX of geothermal system development (e.g. high drilling costs); regulatory hurdles to geothermal heat development; local capacity building; district heating systems; hybrid energy systems, waste heat recovery, co-production, geoechange and heat storage solutions are all welcome.

### **Decision strategies, tactics, and case studies in new industries, including Carbon Capture and Sequestration, Helium, and Cleantech**

**Eric Street**

This session will explore decision processes, both theoretic and case history in Carbon Capture, Helium, and Cleantech. It will compare and contrast the business models and technical strategies in these developing industries. In some cases this session will examine the extension and modification of methods from established industries to new ones. It will consider questions such as: what is different about the geoscientific aspects of Helium exploration from oil and gas, cleantech and CCS? How do the business needs and preferences change between these new and old industries? How do the similarities and differences affect geoscientific methods? How does this affect the action items and priorities of executives and line professionals?

### **Duvernay**

**Krista Beavis**

**Andrew Cook**

With over 1,200 producing wells drilled in the last 11 years, the Duvernay Formation continues to be an active and attractive play. This session will showcase novel studies that improve our understanding of the exciting Duvernay source rock reservoir, with particular focus on how to deploy old and new techniques for optimization while mitigating risks from induced seismicity and parent-child well relationships? What are the most effective techniques for mapping and predicting reservoir properties? How does geology influence drilling, stimulation, and production strategies and effectiveness? 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.

### **Emerging Canadian Oil Resource Plays**

**TBD**

**TBD**

Advances and developments in the energy form the Canadian Oil Sands will be discussed; advances in drilling has unlocked significant bypassed oil in conventional oil-bearing reservoirs such as the Charlie Lake and Clearwater.

### **Epic Fail!**

**Allan Chatenay**

**Arjan G. Brem**

This workshop is focused on learning through sharing failures. While most conference papers will focus on sharing positive outcomes, we learn more from failure than from success.

The risk of failing is often the biggest impediment to innovation and progress, yet the biggest leaps forward come from embracing the potential for failure and overcoming adversity.

This workshop will invite speakers to share their stories of having tried something and failed, followed by analysis of the lessons learned.

### Exploration and Development of the Geothermal Resources

Louis Chabot

Catherine Hickson

The intent of this session is to focus on the challenges (and possible path to solutions) associated in the exploration and development of geothermal resources in different temperature fields. Canada's geothermal resource endowment lies mostly in low enthalpy systems like the Western Canada Sedimentary basin. Economic and technical challenges exist in this environment that are being tackled by a small number of projects. These projects are leveraging both electrical and heat generation to create commercially viable projects. More recently geothermal projects have begun exploring ways of combining injection with carbon sequestration. Other novel applications for geothermal, such as closed loop systems, mineral extraction from produced brine, green housing and vertical farming are also being explored. Papers are solicited from those projects either in activity development or still in their infancy, that are moving forward in Canada.

### Fracture Identification from Seismic data

Debasis Chaudhuri

TBD

With so many CCUS projects getting off the ground, this will be a tremendous opportunity for attendees to hear from a series of proponents on their upcoming operations in Western Canada. The session will be a forward-looking half day to show case some of the exciting recent announcements.

### Geocommunication & Geotourism

Simon Haynes

TBD

Earth and Science Communicators are engaging the public in new and innovative ways as the demand for effective science communication and education continues to rise. Similarly, Geotourism is an excellent mechanism for cultivating interest in the Earth Sciences and contributing to geodiversity conservation. Geoscientists are creating opportunities and setting industry standards as leaders and influencers in both fields.

### Geothermal Energy: A Promising Outlook

Robinson Olugbemiro

Catherine Hickson

Geothermal, as the most sustainable of the green alternatives to fossil fuel-based energy sources is increasingly gaining global recognition. In Canada and around the world, several geothermal projects and research initiatives are ongoing in the private and public sectors towards realizing net zero carbon future. Governments at provincial and federal levels have become increasingly supportive. Building upon this positive trend and awakening, this session will further look at geothermal power generation as one of the most reliable baseload clean energy sources. Papers are solicited that explore:

- Innovative ideas & technologies for exploration, drilling, fluids, heat optimization and waste management of medium to high enthalpy systems
- Comparative full life cycle advantages of geothermal compared to other renewable alternatives
- Strategies and incentives for accelerated investors & off-takers buy-in for electrical power generation

### Helium

Calin Dragoie

TBD

### Hydrogeology

Carmen Richard

TBD

Hydrogeologic characterization, aquifer testing, and geochemical systems focussing on the subsurface and groundwater-dependent environments are the primary themes for this session. Topics include: geology of aquifer systems, hydrostratigraphy, aquifer mapping, aquifer testing, isotopic analysis, age dating, modeling, naturally occurring contaminants, reactive contaminants, emerging contaminants, contaminant fate and transport, groundwater-surface water interaction, and wetlands. This session focuses on characterization of the subsurface and differs from the Groundwater Resource Management session which is focused on sustainable water management. Contributions from academia and industry are encouraged.

### Indigenous Partnerships in Science

Jordan Phillips

Dave Eaton

This session includes a series of presentations stemming from the UCalgary's graduate (REDEVELOP) and undergraduate (NIYAK) programs, involving energy-sector and hydrology projects with a number of Indigenous communities in Alberta and BC. REDEVELOP is a multi-university program (UCalgary, UAlberta, UToronto, UWaterloo, Western) that helps students learn to combine Indigenous perspectives, Traditional Knowledge, science, and public policy in their solutions to current resource development and utilization challenges.

## Induced Seismicity

Adam Baig

Courtney Lucente

The prevalence of induced seismicity from industrial operations such as hydraulic fracturing, wastewater disposal, geothermal stimulation, carbon capture and sequestration, mining and other activities is a source of public concern and risks the “social license to operate” if not regulatory sanctions. The occurrence of these larger induced events need not only be rapidly characterized and reported, but the geomechanical conditions of the reservoir or rock mass need to be well understood to mitigate the occurrence of future events. In this session, we invite case studies and developments showcasing approaches to characterizing and managing induced seismicity.

## Induced Seismicity: Managing Industry Risks & Technical Developments

Jonathan Winsor

Neil Taylor

Induced seismicity (IS) remains an issue of concern related to oil & gas development, CO<sub>2</sub> sequestration and geothermal projects (among many other industry activities). This session aims to highlight successes/learnings from IS monitoring, its role in an integrated Measure/Monitor/Validate (MMV) program and how it has contributed to risk management. We welcome contributions from case studies as well as technical focus areas such as geomechanics, numerical modeling, forecasting and risk assessment techniques.

## In Situ Stress in the Western Canada Sedimentary Basin

Pat McLellan

Chris Hawkes

Presentations on recent developments in the determination of in situ stress orientations and magnitudes in the WCSB are sought for this session. New technologies and analysis methods, field case histories, modelling studies, and applications to induced seismicity, exploration, reservoir characterization, hazard assessments, well design and construction, hydraulic fracturing, and wastewater disposal are welcome. This session will also include a status update on the revamped in situ stress chapter in the 2027 CSPG Geological Atlas of the WCSB.

## Lithium

Eric Pelletier

Yongyi L

With a global race to bring new critical mineral resources online, this session will focus on the geoscience evaluation of novel lithium-rich resources throughout Canada and abroad. This session will investigate exploration methods and case studies and may include company activity, reservoir characterization, production optimization, government and academic research, land development, regulatory considerations, and other related topics on lithium.

## Machine Learning and AI

Akshay Gulati

TBD

## Methane Emission Reductions: Success Stories and Trends

Negar Nazari

TBD

The impacts of atmospheric methane on global warming are 25 times that of carbon dioxide, making methane emissions reductions one of the most important issues faced by many industries today. Many advances in emissions offsets, technology, and research have been made over the past 5 years. In this panel discussion, we'll share examples of what companies are doing (and have already done) to reduce methane emissions. We will take you through a variety of topics, including pneumatics in the oil and gas sector and combustion work, capping orphaned and abandoned wells, and technology advances and research taking place within the methane space. We'll also provide some insight into some greenhouse gas (GHG) accounting basics and how the emissions markets work.

## Microseismic monitoring: Technology and case studies

Adam Baig

TBD

As microseismic monitoring becomes more of a trusted diagnostic technology for various applications, the location and characterization of these data can be leveraged in new and creative ways to better constrain in situ geological and geomechanical processes. In this session, we invite abstracts detailing advances in microseismic monitoring technologies and case studies that showcase microseismic at the heart of interpretations of stimulation and extraction processes

## Montney

Sochi Iwuoha

TBD

The Montney Formation is one of the most prolific producers in Canada. Both conventional and unconventional development opportunities exist in the Montney, with a significant portion of the activities over the past decade focused in the unconventional portion of the play.

The unconventional activities are driven by horizontal drilling and multi-stage hydraulic fracturing. Large unconventional development projects are taking place in British Columbia and Alberta alike, with stacked wells targeting multiple stratigraphic horizons for gas and condensate.

This Montney session will seek answers from multiple disciplines on what drives productivity in the Montney

Abstracts addressing reservoir characterization, drilling, completions strategies, and other related topics are welcome.

## Mountains to Margins - Global Exploration and Development Case

### Studies

Nanna Eliuk

Kent Wilkinson

International plays and case studies will be explored in the context of Canadian contributions to exploration in conventional onshore and offshore exploration including unconventional resources. Integrated geoscience case studies focused on defining value to fuel the energy future.

## Petroleum Geochemistry

Zied Ouled Ameer

Baz Bennett

Topics that will be covered are: Time Lapse Geochemistry, Geochemical Characterization of Conventional Source Rocks and Unconventional Plays, Oil and Gas Geochemistry, Oil Seeps, Production Allocation, Reservoir Connectivity and Heterogeneities, Origin of Hydrogen Sulfide (BSR, TSR or other), Tracers in thermal recovery operations, Classical Biomarker applications.

## Petrophysics

Nasir Rahim

TBD

Petrophysics, Log Analysis. Data Science, Pitfalls in Reserve Evaluation

## Reservoir Characterization

Mahbub (Bob) Alam

Haitham Hamid

Rock physical properties analyses and interpretation to determine subsurface geological facies distribution for optimal production in existing development fields or utilizing this approach in new ventures.

## Sedimentology, Stratigraphy and Paleontology

Sean Fletcher

Erin Pemberton

## Seismic Acquisition

Andrea Crook

Howard Watt

Highlighting recent advances in the field of seismic acquisition

## Seismic Imaging – Full Waveform Inversion

Svetlana Bidikhova

TBD

Highlighting recent advances in the field of seismic imaging

### Seismic Inversion for reservoir and subsurface characterization

Carmen Dumitrescu

Jeff Larsen

Seismic inversion is the process of converting the seismic reflectivity data, from an interface property (i.e. a reflection) to a quantitative rock property of the reservoir and/or subsurface.

This session is about sharing experience, lessons learned and best practices on:

- PP or PP-PS prestack joint inversion (Deterministic, stochastic, and neural network inversions)
- Time or depth inversion
- Model based, facies based, and statistical rock physics inversion
- 3D or 4D inversion
- Azimuthal AVO (AVAZ) and Velocity Variation with Azimuth (VVAZ)
- Approaching uncertainty and risk analysis

We encourage you to submit the advancement in theories and applications of seismic inversion in oil and gas industry, along with carbon capture, utilization and storage (CCUS), and geothermal.

### Seismic monitoring for mining applications

Ben Witten

TBD

Safety for mining operations is of the utmost importance with numerous technologies deployed to minimize hazards. Seismic monitoring has historically been an important component to these safety protocols, primarily through microseismic monitoring. However, this is not the only application. We invite abstracts that cover any of the numerous seismic monitoring applications for mine sites including induced and microseismicity, tailings dam monitoring, earthquake early warning and associated workflows and case studies that highlight the breadth of applications of seismic technologies to the mining industry.

### Seismic Processing

Shabeer Ahmed

Waseem Javed

PSDM is used for lateral velocity variation, and doing it before stack is to account for non-hyperbolic move out caused by lateral velocity variation (anisotropy). Other than that by applying PSDM, effect of anisotropy decrease and also improve VTI data in far offset.

Reverse Time Migration is based on directly solving the wave equation in the time domain (as opposed to the frequency domain). RTM can accurately handle any variation in subsurface material properties, and has no limit in imaging steep dips.

### Society Awards Session

Alison Essery

TBD

**Not for general submission**

A selection of award winning talks will be featured.

### Water Disposal

Walter Loogman

Curtis Fairhurst

The Water Disposal Session will offer a wide range of perspectives and information relating to oil and gas waste and water disposal in Western Canada. Presentations from Provincial Regulators and industry will cover a wide variety of topics from induced seismicity, disposal caverns, to the geology of what makes a good disposal formation.

### Western Canada Sedimentary Basin Atlas 2027

Greg Lynch

Ben Mackenzie

Neil Watson

Alex MacNeil

The Western Canada Sedimentary Basin Atlas is being updated, with a target date of 2027 celebrating the CSPG Centennial. Over 170 authors are collaborating to bring this all together into the digital age, as one of the most ambitious and comprehensive geologic syntheses available.