

GeoConvention 2022



geoconvention
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Session Guide

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In-Person and Virtual

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OUTLINE

GeoConvention 2022 is excited to host our first ever hybrid program, offering both an in-person and virtual experience for our attendees and a world-wide audience for our presenters. The following outline will act as a reference to the sessions that will be hosted at GeoConvention 2022 and will be updated as new sessions are added and chairs are named.

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Session Title

Session Chairs

A symposium in honour of Gerard V. Middleton

Andrew Miall

Robert W.
Dalrymple and
Janok Bhattacharya

Gerard Middleton was one of the founders of the discipline of sedimentology in Canada in the 1960s and 1970s. With his colleague Roger Walker he established a leading school of research and graduate training at McMaster University, and helped to establish there a world-class school of facies studies. His contributions in the study of sediment gravity flows and hydrodynamic structures were fundamental. This symposium will review his work and that of his former students and colleagues, and will consist of invited and submitted papers.

Advances in Near-Surface Geophysics: Environmental and Engineering

Applications

Alastair McClymont Susanne Ouellet

Innovative techniques in the field of near-surface geophysics are increasingly being considered to address societal challenges and improve characterization of the shallow subsurface. Electrical resistivity methods, georadar, induced polarization (IP), electromagnetics, magnetics, gravimetry, distributed acoustic sensing (DAS) fibre optics, nuclear-magnetic resonance, and seismic methods can provide broad spatial characterization of the near-surface (e.g. the uppermost tens of meters) in comparison to point-based sensors. Notable recent advances from the past decade in near-surface geophysics include the use of DAS with passive seismology to monitor groundwater levels and the adaption of geophysical sensors to drone-based platforms. We invite contributions that incorporate geophysical techniques to investigate the near-surface for a wide range of applications, including natural and anthropogenic hazards (e.g. volcanos, landslides, permafrost, dam failures), hydro- and hydrogeological processes, rock mechanics, geomorphology, glaciology, structural engineering, earthquake engineering and environmental remediation.

Applications of Geomechanics in Western Canada

Amy Fox

Jason Tucker

Rock mechanical properties are important in all subsurface projects, with specific properties being more important depending on the project type or problem being addressed. For example, the Biot coefficient is critical to problems involving effective stresses and poroelasticity. In geothermal projects, thermal conductivity (or coefficient of thermal expansion) needs to be understood. In unconventional oil and gas projects, Poisson's ratio and Young's modulus have received most of the attention, but there are other important properties such as tensile strength and fracture toughness.

Despite the importance of rock mechanical properties, they are rarely scrutinized as much as they should be, and seldom are laboratory testing programs created with special consideration given to the project type. In fact, rather than determining properties directly, assumed values are often used, or simple calculations are performed from existing data without much justification. This session is designed to highlight the importance of rock mechanical properties beyond Young's modulus and Poisson's ratio, through case studies from the field to the lab scale. All abstracts that clearly demonstrate an in-depth consideration of rock mechanical properties are welcome.

Back to the Basics: Geophysics

Dennis Ellison

Nathan Fester

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.), and 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.

Canadian Lithium Brines

Mark Caplan

Eric Pelletier and
Courtney Reimert

With a global race to bring new critical mineral resources online, this session will focus on the geoscience evaluation of novel lithium-rich brine 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 brines.

Marie Macquet

Brendan Kolkman-
Quinn

Carbon capture, utilization and storage

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 CO₂ 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.

Carbon Sequestration - What to expect beyond 2022

Francis Morin

Marcia Coueslan

With a lot of new CCS 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 is meant as a forward-looking half day to show case some of the exciting recent announcements.

Clastic Sedimentology

Jon Noad

Mark Caplan and
Jesse Schoengut

Range of talks on the theme of clastic sedimentology, ideally some will be oil and gas related

Duvernay

Mahbub Alam

TBD

With several hundred producing wells drilled in the last 7 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.

Enhanced Oil Recovery

Andy Williams

Draga Talinga

Maturing basins and the need to unlock bound hydrocarbons means what was once considered Enhanced (Tertiary) Recovery is now often the Primary Recovery effort. This session is dedicated to the geological and geophysical reservoir characterization efforts foundational to successfully implement any recovery technique such as fracking, injection of steam/chemical/water/CO₂, infill drilling, pressure maintenance, recompletions, workovers, capturing bypassed pay and accessing stranded resource.

Future of Integrated Geosciences in Energy Transformation

John Duhault

Julia McElgunn

Invited panelists (6) recruited from all of the Energy Transformation worlds: Oil and Gas, Geothermal, Hydrogen, AI and ML Apps, Politics, etc. Panel discussions would be divided into two sessions with the initial focus on three initial questions:

1. How has integrated Geoscience increased the value of your company?
2. Where do you see the future of Energy Transformation geoscience in Canada and beyond?
3. What would you advise a young person considering GeoScience as a career?

Geosciences in Alternative Energy - International

Stephen Longfield

Adam Fraser

Geoscientists around the world are driving the energy and skill transition to Alternative or Renewable energies. Geothermal, Carbon Capture and Storage (CCUS) and rare element extraction (Hydrogen, Lithium, Helium) offer ample opportunities for subsurface professionals to adapt their skill sets to alternative applications. This session will focus on global alternative energy projects and methodologies for subsurface professionals.

Geothermal as the Ultimate Renewable Energy Solution

Robinson
Olugbemiro

Zied Ouled Ameur

The recognition of geothermal energy as the ultimate solution towards a net zero carbon future has been gaining traction recently. Being a consistent abundant baseload supplier, multiple usage with CCUS, minimal environmental footprint, geothermal delivers where other renewable options fall short. Pushed to its limit, geothermal energy could achieve negative carbon contribution.

The challenges though, remains recognizable proof of life-cycle concept and break-even economics, scalability, insufficient awareness from off takers and government incentives. This session will explore geothermal technologies, success stories and prognosis for future developments. The session will share innovation & technology, increase awareness and set future agenda around geothermal energy as the most sustainable renewable energy alternative towards a zero-carbon future.

Technical contributions will also cover Geothermal Plays Resource Exploration and Development, Drilling, Fluids & Heat Optimization Technologies and Full Lifecycle Economics. The role of Government, Private Enterprise and the Academia will come into focus as well as strategies for enabling the global awareness of the promise that geothermal energy offers plus incentives for investors and off-takers"

Hydrocarbon Exploration in Fold and Thrust Belts, Where Style Still Matters

Andrew Newson

Elena
Konstantinovskaya
and Thomas Kubli

The session will be an inter disciplinary session with discussions on the use of geological cross sections , seismic interpretation and image logs to establish the structural style. The focus will be on the fold and thrust belt of the Western Canadian Fold and thrust Belt and how the oil and gas industry has explored for and developed reserves in the past.

Hydrodynamics: From Petroleum to Carbon Storage

Allison Gibbs

Gavin Phinney

Hydrodynamics is the study of the how fluids interact with rock environments though rock characterization, examination of reservoir conditions and analysis of fluid chemistry. While we continue to use hydrodynamics to help understand how petroleum fluids and water are hosted in reservoirs, hydrodynamics is also key to understanding the complexities of injecting fluids such as CO2 back into reservoirs.

Hydrogeology

Steve Sturrock

Blake Hiebert

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

David Eaton

Jordan Phillips

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 Indigenous communities in Alberta and BC. REDEVELOP is a multi-university program (UCalgary, UAlberta, UToronto, UWaterloo, Western).

Induced seismicity and risk mitigation

Sepideh Karimi

Neil Taylor

Mitigating risk of seismicity induced by human activities (eg; wastewater disposal, hydraulic fracturing, CCS, mining, geothermal stimulation) is a major challenge. Traffic light protocols are implemented to reduce the seismic hazard, however, these protocols are reactive, predicated on the occurrence of an event larger than a threshold magnitude or measured ground motion. Predictive tools and models have strengths and also pitfalls in providing early warning to mitigate against large, potentially felt induced events. In this session, we will discuss how to manage the risks involved in these activities and what the industry can do to address public concern. We welcome contributions on geomechanics, numerical modeling, case studies, induced seismicity forecasting, and risk assessment techniques.

International Case Studies and Exploration

Nanna Eliuk

Patricia Gavotti

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.

Machine Learning and AI

Akshay Gulati

Dennis Ellison

Managing Transition in a Changing Industry

Karena Brawley

Carrie Youzwishen

This session is devoted to presentations aimed at supporting, teaching, and coaching executives and professionals in a changing industry, whether they have lost employment, are adapting to a new role within their company, or leading their company through a transformation. The topics will include managing a career pivot, shifting corporate culture, as well as inspiring leadership, performance, morale, and motivation.

Methane Emission Reductions: Success Stories and Trends

Travis Brookson

Maren Blair

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 and Strain

Barry Fish

TBD

A follow-on to the traditionally popular Microseismic sessions, with the inclusion of DAS strain processing, which is rapidly becoming common in frac monitoring.

Microseismic Integration

Adam Baig

Tom Eyre

Monitoring reservoirs for microseismicity during hydraulic fracturing, mining, cyclic steaming, CCS, or geothermal (to name a few) operations is seen as critical to understanding the dynamics of rockmass/reservoir as it responds to industrial processes. Frequently, integration of microseismic data with other datastreams or analyses adds additional insight into the geomechanical response of the medium. In this session, we solicit abstracts discussing how microseismic response can be understood in the context of other observations to yield higher-order insights on the dynamics of injection or extraction processes.

Mining Geophysics

Robert Hearst

TBD

Montney

Sochi Iwuoha

Bruce Palmer

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.

Offshore Atlantic Canada Resource Exploration & Economics

Michael

Wamsteeker

TBD

Despite recent downturn and in anticipation of pending industry upswing, there have been encouraging exploration efforts (new & appraisal) in offshore Atlantic Canada in recent times.

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 interplay between the hydrocarbon systems (models) and structuration is anticipated.

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 discuss and evaluate the commerciality of these offshore resources.

Petrophysics

Nasir Rahim

TBD

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

Reservoir Optimization

Chris Bird

TBD

Reservoir optimization is now more important than ever for successful resource exploration and exploitations. This session invites people to share their ideas, experiences and practices on critical properties, phenomena and problems that detrimentally affect the performance of a reservoir for oil & gas exploitation (conventional, unconventional, tight-sand, shale, or oil sand reservoirs), geothermal development or wastewater disposal. Revealing challenging problems and then trying to understand them based on fundamental science and technologies are key steps towards mitigation of the problems and optimization of lifecycles of reservoirs. We encourage you to submit theoretical, laboratory and field case studies with the aim of advancing our understating of fundamentals that lead to optimized reservoir performance. The following topics are relevant ideas but should not limit potential ideas for talks:

1. Fundamental and advanced understanding of measurements of rock properties and associated techniques of routine and special core analyses that lead to better reservoir characterization and production optimization;
2. Fundamental and advanced understanding of hydrodynamics, geochemical and PVT properties of reservoir fluids to optimize reservoir management through stimulation, depletion, water flooding and EOR applications;
3. Fundamentals of formation damages associated to hydro-mechanical effects of stress or pressure changes and thermally-induced mechanical and chemical effects during drilling, stimulation and production, alterations of capillary pressures and interfacial tension and relative-permeability, scaling and other detrimental or beneficial effects of incompatibility between foreign fluids and reservoir fluids and/or reservoir rocks.

Sedimentology, stratigraphy and paleontology

Erin Pemberton

Sean Fletcher

Seismic Acquisition

Andrea Crook

TBD

Highlighting recent advances in the field of seismic acquisition

Seismic Imaging – Full Waveform Inversion

Raúl Cova

Azer Mustaqeem

Seismic Inversion for Reservoir Characterization

Raúl Cova

Azer Mustaqeem

Seismic Inversion has been critical part of the exploration and development since its introduction in 70s. Seismic Inversion is extended and re-invented to take advantage of ever-increasing speed of computers. Deterministic, stochastic, probabilistic, and neural network inversions are now becoming everyday required tool for a seismic interpreter. This session intends to cover practical use of seismic inversion and new methodologies along with quantification of uncertainties.

Azimuthal AVO (AVAZ) and Velocity Variation with Azimuth (VVAZ) are proven to provide greater insight to the geomechanical framework and are extremely helpful in analyzing fracture anisotropy. We encourage you to submit the advancement in theories, applications of AVAZ and VVAZ, and new methods in integrating fracture characterization to quantitative interpretation.

Seismic Processing

Amsalu Anagaw

Bill Goodway

Highlighting recent advances in the field of seismic data processing including coherent and incoherent noise attenuation, interpolation, imaging, and more.

The Role of Geosciences in Nuclear and Alternative Energy

Brent Nassichuk

Raphael Wust

The demand and reliance on energy around the world is one of the most prevalent topics considered today. With focus shifting towards renewable energy, we need to consider the impact on potential supply and areas that can augment current fossil fuel use. Discussion continues to grow around increasing use of C-free nuclear power to present clean and efficient base-loads for other alternative energy source. Significant advancements have been made globally, not only in operational safety and long-term management of geological waste repositories, but also in new development of technology and project life-cycle which includes the use of Small Modular Reactors (SMR). SMR technology has seen significant financial and development support due to the promising future for delivering clean energy for remote communities. This session aims to provide insights into geological and technological advancements both in exploration of radioactive sources as well as nuclear waste disposal in order to protect future generations from any elevated radiation. This requires a strong multi-disciplinary approach of geology, physics, biology and technology. In addition, such transformations and development of such C-free energy sources requires large societal acceptance, which can only be achieved by sound waste disposal programs and waste solutions that will guarantee safe long-term geological disposals.

We encourage submissions of any topic surrounding nuclear energy including exploratory or waste disposal programs, SMR field trials, practical applications, numerical and theoretical simulations as well as input on government and regulatory requirements of current active projects.

Uncertainty, Risk and Decision Making

Alexey Romanov

TBD

This session will cover case studies and new approaches of dealing with risks and uncertainties for reservoir characterization, 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, probabilistic reservoir modelling etc .

Using organic matter in your reservoir

Stan Stancliffe

Michael Webb

It is envisaged that talks will include topics including palynology, bacteria, kerogen analysis and organic geochemistry. New research in these areas is being made in Calgary and nationally. Examples of talks could include sampling techniques, applications to reservoir issues, new technologies, and how CCUS and gas storage challenges can be overcome. These talks would be of interest to production geologists, researchers, stratigraphers, geochemists and reservoir engineers

Water Disposal

Krista Beavis

Sarah Schultz

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.