

Virtual event

March 20 to 24

AGAT Laboratories 

tech talks 2023

ENVIRONMENTAL SCIENCE AND TECHNOLOGY



Welcome to the 2023 AGAT Science and Technology Talks!

As Chief Executive Officer of AGAT Laboratories, it is once again my distinct pleasure to welcome you all to the 2023 edition of our Science and Technology Talks. This year we are focused on celebrating innovation, advancements in science and environmental successes coast to coast to coast.

These sessions are hosted each year as they align with our company purpose “Service Beyond Analysis”. For us our purpose means that we are more than just analytical data, beyond the analysis we provide our ultimate goal is to serve. In that respect, our purpose is upheld by the three pillars critical to our business: Our People, Our Clients and the communities that surround us. Being able to host these technical sessions for you all allows us to showcase our commitment to serving you, our valued clients, while also providing us a chance to highlight the incredible work going on in our communities.

Throughout the year we will continue to stand behind our purpose and prove to you all what an important part of our company you play within our structure. The support that you continue to provide us gives us the stability to remain strengthened and resilient across all operations.

We look forward to this year’s sessions as they are filled with insight from industry leaders looking to share their knowledge and passion. I am delighted that you have chosen to partake in these sessions and to support one another in furthering our professional development.

To our distinguished speakers, please accept a very sincere thank you on behalf of all of us at AGAT as well as our attendees. Without your involvement and support these events would not be possible, and for that we are truly appreciative.

Sincerely,



Marissa Reckmann
Chief Executive Officer



Supporting Initiatives that Save Lives

Dear Tech Talks Participant,

Thank you to all of the returning attendees and welcome to all who are new to this webinar series!

Once again, we have a fantastic lineup of amazing speakers and some new innovative topics and broad-spectrum subjects that will appeal to all. We are excited to have upgraded our broadcast venue to AGAT's Michael DeSanti Centre for Excellence and we look forward to meeting special guests, having a few laughs, and most importantly, enabling all attendees to walk away well-versed in the vast array of great topics featured in our program.

The AGAT Foundation, in collaboration with AGAT Laboratories, will be using this year's funds to directly support the **Alberta Cancer Foundation's Patient Financial Assistance Program**. A diagnosis of cancer comes with many challenges, including financial hardship for the patients and their families and many are often forced to cash in their retirement funds and use up their savings to make ends meet during their treatment. This program provides these patients access to financial assistance to cover the out of pocket expenses for items such as medication, medical supplies, transportation, accommodations, and child care.

For those of you who are new to our virtual AGAT Tech Talks, the AGAT Foundation was formed as a natural progression of AGAT Laboratories' historical and ongoing participation in charitable endeavours for over 42 years. The Foundation's purpose is to unite people who share a common vision of building, creating and healing through knowledge and scientific advancements. The AGAT Foundation is committed to bridging the gap between industry, communities and different disciplines of science.

Recent endeavours of the AGAT Foundation include sizeable funding initiatives in Alberta aimed at improving patient care in our province, namely: \$700,000 raised for the Prostate Cancer Centre's November "Keep It in Alberta" campaign, a \$600,000 donation to the Rockyview and Peter Lougheed Hospitals for the procurement of breast-conserving surgical equipment, a \$350,000 donation to procure the first PSMA-PET CT device for the Tom Baker Cancer Centre, and funding for the procurement of a new Cyclotron in Alberta.

The AGAT Foundation represents an ever-growing number of private and public partners that help us to achieve goals that were previously not possible. We encourage you to view more information about the Foundation and its projects on the website www.agatfoundation.com.

On behalf of all our collaborators, the AGAT Foundation and AGAT Laboratories, thank you for your support in this endeavour and we look forward to showcasing some great presentations!

Program

March 20

- 8:00 AM** **Tech Talks Kickoff**
Kelly Howard, Director - National Accounts, Strategic Growth
AGAT Laboratories
- 8:05 AM** **Emergency Spill Response: Realistic Remediation Targets during the Emergency Phase**
Calvin Murphy, B.Sc., PAg, Director of Operations
SWAT Consulting
- 8:35 AM** **Case Studies in Enhanced Anaerobic Bioremediation for PHCs: A Sustainable, Passive, and Cost-Effective Remediation Alternative**
Ryan Riess, M.Sc., P.Eng – Senior Remediation Specialist and Ty Van Camp, P.Eng. – Site Assessment and Remediation Lead
PINTER & Associates Ltd.
- 9:05 AM** **The Role of Carbon Offsets in Meeting Decarbonization Targets for the Energy Transition**
Dani Urton, Director - Energy Transition & Climate Change
Vertex Resource Group
- 9:35 AM** **Microplastics in the North Saskatchewan River: The Challenge of Finding Microneedles in a Haystack**
Jeremiah Bryksa, Applied Chemist, and Patric McGlashan, Microplastic Technologist
Northern Alberta Institute of Technology (NAIT)

March 21

- 8:00 AM** **Tech Talks Introduction**
Kelly Howard, Director - National Accounts, Strategic Growth
AGAT Laboratories
- 8:05 AM** **Canada's Energy Transition: Energy Policy, Not Emissions Policy**
Brad Hayes PhD, P. Geol., President
Petrel Robertson Consulting Ltd.
- 8:35 AM** **The Feasibility of Repurposing Alberta's Hydrocarbon Wells for Geothermal Energy**
Emily Smejkal, Geologist
Terrapin Geothermics
- 9:05 AM** **Rock Testing and Subsurface Analysis for Deep Closed-Loop Geothermal Systems**
Peter Bauman, Geoscience Manager, and Anna Rogers, Geomechanics Specialist
Eavor Technologies Inc.
- 9:35 AM** **Decarbonizing Heat: The Role of Geothermal and Natural Gas**
Catherine Hickson, CEO
Alberta No. 1

*All presented times are on Mountain Standard Time (MST). Presentations schedule/timing listed is currently tentative and will be updated following registration.

****Please note:** the presentation timings listed on the schedule are all an approximation; talks vary in length (average 25-30 min). We have done our best to estimate each based on the video lengths however the live question periods will also vary in time; therefore please tune in for the 8:00am start to make sure you catch the talks in their entirety and not miss out!

Program

March 22

- 8:00 AM** **Tech Talks Introduction**
Kelly Howard, Director - National Accounts, Strategic Growth
AGAT Laboratories
- 8:05 AM** **COVID-19's Effects on the Sex Gap**
Dr Elsa Wagdy, IMD, DNM, PhDx2, Change & Inclusion Specialist
Elsa Wagdy
- 8:35 AM** **Update from the Metis Nation Canada on Self-Government, Transition, Economic Growth**
Lawrence Gervais, Region 3 President
Métis Nation of Alberta - Region 3
- 9:05 AM** **Canadian Economic Outlook 2023**
Craig Wright, Chief Economist, Royal Bank of Canada
RBC Wealth Management

- 9:35 AM** **Mental Health in Today's Workplace**
Trudi Chalmers, PhD, VP of Impact, *Headversity*, Sean Surerus, President, *Surerus Pipeline* and Kirk Elliot, Health and Safety Manager, *Trace Associates*
Moderated by: Laura Rathgeber, Vice President - National Accounts, *AGAT Laboratories*

PANEL

March 23

- 8:00 AM** **Tech Talks Introduction**
Kelly Howard, Director - National Accounts, Strategic Growth
AGAT Laboratories
- 8:05 AM** **Stakeholder Engagement and Planning to Overcome Reclamation Challenges in Critical Sage Grouse Habitat**
Samantha Price, RT (Ag.), Strategic Environmental Planning Specialist
Orphan Well Association
- 8:35 AM** **From Awareness to Action: Transforming ESG in Canada**
Olivier Joyal, Geologist, Executive Vice President, Strategy & Execution, Earth & Environment/Canadian Executive Leader ESG
WSP Canada Inc.
- 9:05 AM** **Death of Aroclor Measurements for Polychlorinated Biphenyls (PCBs)**
Court D. Sandau, PhD, Principal
Chemistry Matters
- 9:35 AM** **The Potential for Using Native Plants in In Situ Remediation**
Elizabeth Murray, Ph.D., P.Biol., R.P.Bio., Senior Scientist
Earthmaster Environmental Strategies

March 24

- 8:00 AM** **Tech Talks Introduction**
Kelly Howard, Director - National Accounts, Strategic Growth
AGAT Laboratories
- 8:05 AM** **Taking CO2 Sequestration Projects from the Concept Stage Through to the Permitting Stage**
Ken Glover, Reservoir and Geomechanics Consultant
Respec Canada
- 8:35 AM** **Using InSAR Satellites to Monitor and Optimise CCUS, and Fracking Operations**
Russell (Stan) Stancliffe, Founder GeoR.E.D., and Marco van der Kooij, Remote Sensing Consultant
SkyGeo/GeoR.E.D.
- 9:05 AM** **Canada's Oil Sands Have a Plan to Net Zero**
Robert K. Mugo, Ph.D., Director, *Greenhouse Gas Environmental Priority Area Pathways Alliance*
- 9:35 AM** **Climate Targets: A Path to Reality**
Robert K. Mugo, Ph.D., Director, *Greenhouse Gas Environmental Priority Area*, Erik Petursson, Director of Commercial, *Entropy*, Graham Spray, Geosciences Manager, *AGAT Laboratories*
Moderated by: Marissa Reckmann, CEO, *AGAT Laboratories*

PANEL

Your **techtalks2023** host

Kelly Howard, Director – National Accounts, Strategic Development

AGAT Laboratories



Kelly Howard

Bachelor of Science – Biology;

University of Lethbridge, AB

Kelly began her career at AGAT in 2005 and has worked extensively in the environmental analytical field with additional experience in AGAT's production, reservoir characterization, core, oilsands, mining, food, and air monitoring divisions throughout her career. She currently coordinates AGAT's Nationwide Technical Seminars and works with AGAT Laboratories executive team to facilitate constructive and unique marketing opportunities; facilitating brand development, seminar expansion and key company initiatives for growth in these areas.

She has acquired and facilitated some of AGAT's largest and most significant analytical contracts throughout her career at AGAT and continues to work with the senior management team creating long term sales initiatives, tools and growth for all laboratory divisions.

She continues to ensure consistent and professional levels of service, coordinates key target initiatives within client accounts and aids in the generation of consistent market growth and service expansion education. Her client focused experience along with a background in the science field has helped facilitate the production, hosting and ongoing development of AGAT's hugely successful National Technical Seminars, the `AGAT Tech Talks` educating clients on new technologies and interesting advancements and other important topics in the energy, environmental science and professional development fields.

Emergency Spill Response: Realistic Remediation Targets during the Emergency Phase

Calvin Murphy, B.Sc., PAg, Director of Operations

SWAT Consulting

Abstract

Emergency management and spill response planning and education often focuses on the emergency phase. Having a strong emergency response team is foundational to an effective operation for ensuring both protection of the environment and regulatory compliance. However, the emergency response phase is only the beginning in what will typically become a full life-cycle remediation and reclamation project. Far too often we get lost in the weeds solely dealing with the emergency situation and lose sight of the bigger picture. Seeing the full picture of a site from start to finish, best obtained through experience, is beneficial from both a logistical and financial standpoint.

Foundational to this being the need to step-back during the emergency phase and find an endpoint to the emergency works with a realistic and attainable target can be established that sets the project up for success in the subsequent remediation and restoration stages.

Remediation tactics and final reclamation plans should always be planned alongside the initial emergency response. In this presentation, SWAT will provide a few case studies demonstrating the full project life-cycle of a spill event, from the emergency response phase through to final reclamation and restoration.

With the goal being to demonstrate the importance of site closure planning upfront, the case studies will highlight initial response tactics and how they were made in consideration of future remedial endpoints and restoration objectives for the site. Foresight and proper planning upfront will lead to a more effective and efficient response, minimizing both the duration and net impact of environmental exposure and the cost of the project.

An important piece to remedial planning during an emergency response is setting realistic and attainable endpoints that make sense in the context of net environmental benefit. Endpoints can often be receptor risk-based, using real and measured data in place of generic regulatory criteria. Endless monitoring is not the solution, rather monitoring should be focused on validating specific data requirements and used as a tool to support decision making for an endpoint. Key to this is the need to set closure timeframes with realistic and achievable objectives that can be measured. The case studies presented will provide context on the division of sites into manageable units, each with their own risk-based closure targets, and will demonstrate the use of focused assessment and monitoring methods to validate receptor risk evaluation efforts and achieve site closure.



Calvin Murphy

Calvin Murphy (B.Sc., PAg) has been in the environmental industry since 2011 and is currently the Director of Operations for SWAT Consulting Inc. He has been involved in emergency spill response and emergency management for over 10 years, with experience in numerous incident command roles and as a response manager. Through his career he has gained valuable perspective on the response requirements for varying magnitudes of release events, allowing for implementation of solution-focused and pragmatic response tactics under any scenario.

Case Studies in Enhanced Anaerobic Bioremediation for PHCs: A sustainable, passive, and cost effective remediation alternative

Ryan Riess, M.Sc., P.Eng – Senior Remediation Specialist and Ty Van Camp, P.Eng. – Site Assessment and Remediation Lead
PINTER & Associates Ltd.

Abstract

Anaerobic bioremediation is often excluded from discussion of remedial alternatives, or only thought of as part of the Natural Source Zone Depletion considerations during design for other alternatives. This presentation will cover several current case studies demonstrating the effectiveness of enhanced anaerobic bioremediation, including remediation beneath an actively used commercial building.

Although the timelines to completion are usually longer than most other alternatives, the approach can be very sustainable and cost-effective. The time required for completion depends on several site-specific factors, but most often falls between 2 and 4 years. Overall costs to complete remediation can be significantly less than other alternatives and additional flexibility provided by extended timelines can reduce, eliminate, or optimize the location and duration of any necessary site disturbances.



Ryan Riess

Ryan is a senior remediation specialist who has been focused on creative remediation strategies since his master's thesis work in bioremediation. He has more than 18 years of experience in the design and implementation of innovative remedial strategies, with a specific focus on enhanced anaerobic bioremediation.



Ty Van Camp

Ty is an Environmental Engineer with PINTER & Associates Ltd. Ty has over 5 years of experience on environmental assessments and remediation projects. Ty has been involved with the implementation of innovative remedial strategies including enhanced anaerobic bioremediation everywhere from remote northern areas to active commercial sites.

The Role of Carbon Offsets in Meeting Decarbonization Targets for the Energy Transition

Dani Urton, Director - Energy Transition & Climate Change

Vertex Resource Group

Abstract

Canada has made a number of domestic and international commitments to achieve ambitious goals related to climate change and energy system transformation. In alignment with these goals, many emissions-intensive industry players are making their own commitments to reduce their methane and carbon emissions to net zero. Initial actions related to emission avoidance through energy efficiency improvements and operational updates to reduce emissions support these goals, but some emissions sources are cost prohibitive or impossible to eliminate entirely. So how can net zero be achieved? Enter carbon offsets.

Carbon markets allow for greater climate ambition at a global level, providing incentives for the development and implementation of lower-cost emissions reduction or removal projects that would not have otherwise occurred. Companies, countries, or individuals looking to offset their hard-to-abate emissions can leverage carbon credits, where a unit of CO₂ that has been reduced or removed elsewhere can offset these emissions.

Carbon offsets come in many forms, including nature-based solutions which leverage natural carbon sinks to avoid or remove CO₂ from the atmosphere. Nature-based projects include avoided logging of forested land, regenerative agricultural land management practices, and marine and coastal carbon sink enhancement. By selecting nature-based carbon credits to offset those hard-to-abate emissions, industrial emitters can realize a greater, holistic ESG impact in their net zero ambitions. These projects produce many co-benefits beyond emissions impacts, from enhancing local ecosystems and biodiversity to creating employment opportunities for local communities.

This session will include a high-level look at the role of carbon markets in managing global greenhouse gas emissions, an overview of how these markets function and continue to evolve, as well as a discussion around the important role that nature-based solutions will play in a net zero future. The presentation will outline the role of carbon markets in meeting the targets of the Paris Agreement, and the opportunities this presents for Canada's energy industry on the pathway to 2050.



Dani Urton

Dani Urton is a senior leader with Vertex Professional Services, a leading provider of environmental services for the North American energy industry. Dani works to implement growth strategies related to energy transition and climate change initiatives across the organization to support the energy industry in meeting ambitious targets for sustainability. She has a decade of experience in the environmental sector of the energy industry including experience in environmental regulatory compliance, liability management, greenhouse gas emissions management, and strategic development of emerging growth opportunities. Dani holds a master's degree in Environment and Business from the University of Waterloo, an Environmental Management Certificate from the University of Calgary, and a bachelor's degree in Commerce from the University of Victoria.

Microplastics in the North Saskatchewan River: The Challenge of Finding Microneedles in a Haystack

**Jeremiah Bryksa, Applied Chemist, and
Patric McGlashan, Microplastic Technologist**

Northern Alberta Institute of Technology (NAIT)

Abstract

Plastic waste is a growing concern for governments, industry, and society. Specifically, microscopic plastic particles, called microplastics, have been found to be universally present in the environment, throughout food webs, and are considered a contaminant of emerging concern. Microplastics are a challenging environmental analyte to measure. On the lower size range, these small plastic particles cannot be seen by the naked eye and often require complex, thorough extraction and clean up procedures to isolate them from the sample matrix. From literature, common challenges to microplastic researchers range from sampling freshwater systems for microplastics smaller than 333 μm , under reporting microplastic numbers because of low extraction/ recovery efficiencies from the target matrix, and over reporting through inadvertent contamination from laboratory or field sources. Historically microplastic science has struggled from the absence of strong quality control and assurance framework and lack of standardized methods for sampling, extraction, and analysis of microplastics.

Plastics Research In Action (PRIA) is a ten-year research partnership between Heartland Polymers, and the Northern Alberta Institute of Technology (NAIT), focused on identifying opportunities for society to reuse, recycle, and study plastic waste. In collaboration with Dow Chemical Canada, we are undertaking one of the largest freshwaters microplastic studies ever conducted in Canada, looking at microplastics in the North Saskatchewan River within the Edmonton

municipal region over a multi-year period. The project encompasses a strong focus on method development with the end goal of producing a robust, reliable data set of micropolitics occurrence in the North Saskatchewan River and how it changes over time. We have designed and tested a high throughput prototype sampling system, based on the standardized method ASTM D8332, that allows us to take large, representative 1500 L samples and filter particles out as small as 45 μm to bring back to the laboratory. We have applied and adapted a standardized laboratory procedure based on ASTM D8333 to extract and isolate microplastics out of the North Saskatchewan River matrix and validated it through many spike recovery trials. We have also developed strict quality control and assurance protocols to minimize contamination of microplastics from our laboratory and field processes through extensive contamination investigations and process improvement audits.

Here we present a subset of data microplastic generated from the PRIA study from 12 different sites along the North Saskatchewan River in the Edmonton Municipal region. This data has been generated by analysis on the Agilent 8700 LDIR chemical imaging system for 8 target microplastics including: PP, PE, PET, PVC, PS/ABS, PA, PMMA, and PC. Alongside this we will present QA/QC data representing our field and laboratory contamination and show that a strict QA/QC system is crucial for generating high quality data.



Jeremiah Bryksa

Jeremiah Bryksa, Applied Chemist in NAIT's Clean Technologies team, has over 10 years of academic and industrial laboratory experience in spectroscopic and chromatographic analysis of environmental samples, deep knowledge on water quality analytical protocols, and expertise in field sampling and logistics. Over the past 36 months, Jeremiah has established subject matter expertise in microplastics science at NAIT where he leads a team focussing on studying the occurrence of microplastics in the North Saskatchewan River within the Edmonton Municipal Region. As part of this work, his team has optimized laboratory techniques to extract and characterize microplastics from freshwater samples, established quality assurance protocols, and has developed high throughput sampling techniques applicable to freshwater systems.



Patric McGlashan

Patric McGlashan is a senior research assistant within the Clean Technology team at NAIT, with strong experience in all aspects of laboratory testing. In 2019 as a student at NAIT, in the Chemical Technology program, Patric completed a full-time CO-OP term diving into research of oil sand tailing pond reclamation. Patric's expertise over the last 3 years has been focused directly on the method development, validation, and execution of microplastic sampling, extraction, and analysis via spectroscopy techniques, with the broad goal of quantifying microplastics within the North Saskatchewan River focusing on the Edmonton region. Part of his work incorporates supervision and training of students and staff alike to achieve highly accurate and repeatable results within the bench-scale setting of the microplastic laboratory.

Canada's Energy Transition: Energy Policy, Not Emissions Policy

Brad Hayes PhD, P. Geol., President

Petrel Robertson Consulting Ltd.

Abstract

When most people talk about the future of energy today, their thinking is couched in terms of greenhouse gas emissions and pollution, not in terms of actually providing the energy required to support a prosperous, growing society. For example, the International Energy Agency addresses future energy sources with their "Net Zero by 2050" report, and the Canadian Energy Regulator's Energy Future series is built around models of GHG emissions, not scenarios of energy production.

While climate change and greenhouse gas emissions are pressing issues in the world today, can they be the basis for sound planning of future energy production?

In a word, no.

The United Nations has encapsulated human needs in 17 Sustainable Development Goals (SDGs); SDG #7 is "Ensure access to affordable, reliable, sustainable and modern energy for all". This is perhaps the most important goal, as we cannot achieve any of the other goals – food, education, clean water and more – without sufficient energy to create those things for the eight billion people alive today. Billions of those people, most in Africa and Asia, don't have access to sufficient energy to live a modern life that includes achieving the Sustainable Development Goals. Hundreds of millions more in Europe are now facing energy shortages because of unforeseen geopolitical circumstances – but also because the European Union has mistaken emissions policy for energy policy for more than a decade.

European nuclear-, coal- and gas-fired power plants with plenty of remaining lifespan were retired early in anticipation of "greener" wind and solar taking on electricity generation. In fall 2021, unseasonably calm winds made it obvious that wind was not ready to shoulder the load, leading to energy shortages and rapid price increases for power and heat. Russia's subsequent invasion of Ukraine in winter 2022 made the situation much worse, exposing fundamental policy errors – relying far too heavily on Russia for oil, natural gas and coal, and discouraging domestic development of these essential energy commodities.

Many in Canada prefer to believe that the Russian war is completely responsible for Europe's energy woes, and don't think energy shortages could happen to us. In fact, Canadian (and American) energy policies are little better than Europe's, but we have so much domestic energy – oil, gas, hydro, nuclear, and a little wind and solar – that we haven't yet suffered energy shortages arising from emission-focused federal policies.

As I write this in December 2022, Canadians (at least well-off Canadians) have no worries about accessing sufficient energy to get through the winter. But federal policies have been announced that will cap GHG emissions from oil and gas production with no regard for the amount of energy produced. If enacted, those policies will prove disastrous for our economy and the well-being of people at home and abroad that depend upon our energy.

Canada (and the world) must embrace focused sensible energy policy. Focusing on emissions and hoping that energy will be OK isn't working.



Brad Hayes

Brad Hayes is President of Petrel Robertson Consulting Ltd., a geoscience and engineering consulting firm providing professional advice to clients working in oil and gas, helium and lithium exploration, water resource management, and geothermal energy.

Brad holds a PhD in geology from the University of Alberta, and has 40 years of diverse experience applying subsurface geoscience in resource industries. He is Outreach Director for the Canadian Society for Evolving Energy, and a Past-President of the Canadian Society of Petroleum Geologists. He is a member of the Energy Resources Technical Advisory Committee for Geoscience BC and a Fellow of the Balsillie School for International Affairs.

Brad is an Adjunct Professor in the University of Alberta Department of Earth and Atmospheric Sciences, and a sessional lecturer in Earth and Environmental Sciences at Mount Royal University. He is a prolific media commentator, writing for a variety of technical and business publications as well as engaging actively on social media talking about energy.

The Feasibility of Repurposing Alberta's Hydrocarbon Wells for Geothermal Energy

Emily Smejkal, Geologist

Terrapin Geothermics

Abstract

Approximately 450,000 hydrocarbon wells have been drilled in Alberta since exploration began in the early 20th century. Many of these wells produce high water cuts with reported high bottomhole temperatures, making them suitable to assess for geothermal potential. Further, wells that are suspended or orphaned have high liability and reclamation costs, and repurposing of wells and associated infrastructure has been suggested to offset a portion of these costs.

However, there are significant differences between hydrocarbon and geothermal energy exploration, therefore existing wells must be thoroughly screened for the ability to produce geothermal energy. Here we propose a three-phase multidisciplinary study to assess existing wells for geothermal potential. The objective is to create a shortlist of wells for community-owned geothermal repurposing projects. The assessment will first screen candidates for geologic and engineering requirements such as downhole well problems, fluid production, and downhole temperature. Candidates that pass will then be screened for geographic and regulatory requirements and assessed for their potential geothermal uses.

Candidates that meet the requirements of both phases will be proposed to local communities; those interested may begin the next stage which involves re-entering and testing the wells. Associated infrastructure may also be repurposed and data from unsuitable wells may be useful for future geothermal projects. If this feasibility assessment is granted funding, the study could result in some of the first geothermal energy projects in Canada while simultaneously offsetting reclamation costs and utilizing existing infrastructure.



Emily Smejkal

Emily is a professional geologist with over 10 years of experience in the Oil and Gas sector. Her work has been primarily with the Western Canadian Sedimentary Basin, where she spent the first portion of her career working on heavy oil deposits. There, she planned and executed drilling programs for both new and existing oil fields. While working on SAGD (steam assisted gravity drainage) heavy oil projects, Emily was a geologic specialist for both wellbore integrity and surface facility geochemistry projects. Over the past two years, she has transitioned her subsurface expertise to geothermal energy development and is currently working for Alberta No.1 and Terrapin Geothermics.

Rock Testing and Subsurface Analysis for Deep Closed-Loop Geothermal Systems

Peter Bauman, Geoscience Manager, and Anna Rogers, Geomechanics Specialist

Eavor Technologies Inc.

Abstract

The production of heat and electricity from conventional geothermal energy is an old concept, and this resource has been exploited since the early 1900's. However, geothermal projects are often plagued by high up-front exploration costs and have difficulty with financing because of the geological risk, namely low permeability. Many projects do not make it past the exploration phase.

True closed loop systems extract heat through the process of heat conduction, rather than convection or fluid flow like in a conventional geothermal system. Eavor Technologies Inc. is a closed-loop geothermal energy start-up founded in Calgary, Alberta, in 2017. Multilateral closed-loop systems are novel geothermal solutions for power generation and district heating. A prototype of the first-generation close-loop system was successfully built and tested at the "Eavor-Lite™" facility in 2019. The commercial scale Eavor-Loop™ systems will be able to produce heat and power at temperatures up to 180 °C. Closed-loop challenges include limited conductive heat transfer through rock and high drilling costs of multilateral wells, which means Eavor-Loop™ resource development requires detailed mineralogical and geomechanical knowledge of the subsurface.

This presentation introduces the geoscience analysis for closed loop heat harvesting. Here we utilize methods that include QEMSCAN, XRD, XRF, Uniaxial/Triaxial Tests, thermal conductivity measurements and geomechanical modeling. This presentation outlines the workflow of that analysis and the application to closed loop geothermal resource development, focusing on feasibility in western US.



Peter Bauman

Peter Bauman is a Professional Geologist registered with the Association of Professional Engineers and Geoscientists of Alberta (APEGA). For more than 20 years, he has held various technical and managerial roles at major, intermediate and junior energy companies with a successful track record of growth and value addition. His passion and strengths lie in new country entry, exploration, and development. His geographic experience includes North America, South America, Europe, Australia, Western Asia, North Africa, and Middle East. Peter holds a B.Sc and M.Sc from the University of Calgary in Geology and Geophysics.

Peter is a Director of the Canadian Global Energy Forum, the Past-President of the AAPG Canada Region and is an active member of the CSPG. He has authored numerous presentations at domestic and international energy conferences.



Anna Rogers

Anna Rogers holds a Physics Major, Geology Minor B.Sc from Queen's University and a Geophysics M.Sc from the Massachusetts Institute of Technology (MIT). Anna's experience includes microseismic monitoring on unconventional assets with ESG Solutions, and seismic interpretation for the Deepwater Gulf of Mexico with Shell Oil Company in New Orleans. After studying and working out of the province for over a decade, she returned home to Calgary in 2021 when she joined Eavor Technologies Inc. as the Geomechanics Specialist.

Decarbonizing Heat: The Role of Geothermal and Natural Gas

Catherine Hickson, CEO

Alberta No. 1

Abstract

What if there was an abundant source of non-greenhouse gas producing heat right below our feet? What if that heat was sufficiently abundant that it could meet not only our present heat needs but also allow for expansion of heat intensive industries such as green houses, vertical farming and animal husbandry? How do we know this heat exist? What would the economics of tapping this source of heat look like? How deep do we need to go?

The Northwest Territories is blessed with both a significant amount of heat and a rich hydrocarbon resource. Sparsity of population and distance to markets are challenges for both these commodities. As the world sees increasing amounts of coal burned to create electricity for growing populations, industrialization and electrification, GHGs will only continue to rise, despite our best efforts to decarbonize. Who would deny electrification to populations not already served by a robust electrical grid? What might the future look like?

A dystopian vision would be a significant portion of the world covered by solar panels or not a view without the horizon punctuated by wind turbines.

The low hanging fruit to ward off this dystopian vision is geothermal energy. Canada's energy budget uses over 55% for space heating. Of this, 62% is provided by Natural Gas (NG). NG is 50% cleaner burning than coal. What if Canada were able to provide cleaner burning NG to those countries increasing their use of coal? What if Canada were able to replace that 62% NG burned in the domestic market for heat with geothermal, liberating more NG to be sold internationally?

All of these questions have significant economic as well as geopolitical and political ramifications. Explore some of the option and possibilities for NWT with our keynote speaker.



Catherine Hickson

Dr. Hickson is a globally respected geothermal resource development expert. She was born and raised in Alberta. She received her PhD from the University of British Columbia in 1987 and now makes Burnaby her home. She was a research scientist with the Geological Survey of Canada for 25 years.

After her retirement she joined Magma Energy Corp. (later to become Alterra Power Corp., now Innergex) in 2008 as VP Exploration and Chief Geoscientist. She led Magma's exploration and advanced resource assessments globally, spending significant time on projects in Chile, Iceland, Italy, Peru and the U.S.

Project highlights include greenfield exploration in eight countries, discovery of resources ~320 MW (inferred) and resource management of operating plants:

Soda Lake (15 MWe), Svartsengi (75 MWe) and Reykjanes (100 MWe). Following her departure from Alterra, she joined Terrapin Geothermics, where she is Chief Geologist. She is also CEO of Terrapin's flagship project, Alberta No. 1. A green field geothermal project south of the City of Grande Prairie.

COVID-19's Effects on the Sex Gap

Dr Elsa Wagdy, IMD, DNM, PhDx2, Change & Inclusion Specialist

Elsa Wagdy

| Abstract

This presentation highlights the findings on Covid's effects on the sex gap pertaining to Canada, focusing on Alberta, with explanations of why such issues exist, common misconceptions and some solutions to address the problems organizationally and personally.



| **Dr Elsa Wagdy**

Dr. Elsa Wagdy has over 20 years in various therapies, psychologies, sociologies, psychotherapies, quantum physics, neuroscience, epigenetics, neuropsychology, neuroendocrinology, psychoneuroimmunology, personal training, nutrition and business/change/program/project management. Her approach to therapy is unique and utilizes several treatments and counselling methods, grounded in scientifically validated tools.

Canadian Economic Outlook 2023

Craig Wright, Chief Economist, Royal Bank of Canada

RBC Wealth Management

Abstract

Global economic backdrop becoming more challenging as the impact from higher food and energy costs erode household purchasing power against a backdrop of significant interest rate increases and elevated levels of geo-political and financial uncertainty.

The Canadian economy is slowing and expected to dip into a mild recession this year. Exports and investment are expected to eke out modest gains while consumer spending slows sharply. The federal government will be managing the economic risks with the need to spend in a few areas: supporting low income households, investing in health care and supporting the economy's transition to a cleaner, greener, smarter future.

Inflationary pressures will moderate this year, easing some pain on the economy and moving the Bank of Canada to the sidelines.



Craig Wright

As chief economist, Craig leads a team of economists providing economic, fixed income and foreign exchange research to RBC clients. Craig is a regular contributor to a number of RBC publications and is a key player in delivering economic analysis to clients and the media through the Economics Department's regular economic briefings.

A graduate of Wilfrid Laurier University and the University of Toronto, Craig was appointed Chief Economist in 2001 having joined RBC 1994 after working at another financial institution for seven years.

Craig is a participant in a number of the key RBC internal committees and is a member of the CD Howe Monetary Policy Council, Lazaridis School of Business and Economics Wilfrid Laurier University, Dean's Advisory Council at Wilfrid Laurier University and the British Columbia Economic Forecast Council.

Craig and his wife Susan live in Toronto with their three children Emily, Bradley and Jacob.

Mental Health in Today's Workplace

Trudi Chalmers, PhD, VP of Impact, Headversity, **Sean Surerus, President**, Surerus Pipeline and **Kirk Elliot, Health and Safety Manager**, Trace Associates

Moderated by: **Laura Rathgeber, Vice President - National Accounts**, AGAT Laboratories



Trudi Chalmers

Dr. Trudi Chalmers is an accomplished behavioural scientist and business leader.

Trudi chose to enter the business sector after gaining extensive experience in academia to apply her knowledge of behavioural science in solving business challenges. Trudi has since contributed to the development and growth of numerous technology firms. Currently, Trudi is the Vice President of Impact at headversity, a Calgary-based company that provides digital, preventative mental health solutions for the workforce.

Trudi's work at headversity focuses on ensuring that headversity's mental health content is grounded in science and positively impacts employers' and employees' mental health concerns.

Outside of work, Trudi enjoys adventuring outside and exploring the mountains with her husband and two daughters.



Sean Surerus



Kirk Elliot

Mr. Kirk Elliott is a Partner, Senior Environmental Scientist, and Health and Safety Manager with Trace Associates Inc. (Trace), and has been with Trace since 2007. Mr. Elliott is a demonstrated leader in Health and Safety, acting as both a staff supervisor and a site supervisor for primarily oil and gas assessment, remediation, and reclamation projects throughout Alberta.

Since March, 2021 Kirk has been the Corporate Health and Safety Manager for Trace. Mr. Elliott grew up on a ranch in southwest Saskatchewan and now resides near Didsbury, Alberta where he lives with his wife and 9-year-old daughter and works out of the Trace Didsbury field office.



Laura Rathgeber

With over 16 years of experience in the environmental and oil and gas sector and a degree in environmental studies and biology, Laura Rathgeber started her career as an environmental scientist with a small private firm working on site remediation and reclamation in remote areas around Alberta. After consulting, she moved into a business development role with AGAT Laboratories for the environmental division working closely with consultants and oil and gas companies.

To further her career, she also spent time with Stantec as a senior consultant focusing on strategic growth and Newalta as an Area Sales Manager, enhancing her knowledge in the environmental compliance and waste management field.

Now back with AGAT Laboratories as the Vice President of Business Development, Laura works closely with the senior sales and client services teams leading business development strategy across Canada.

Stakeholder Engagement and Planning to Overcome Reclamation Challenges in Critical Sage Grouse Habitat

Samantha Price, RT (Ag.), Strategic Environmental Planning Specialist

Orphan Well Association

Abstract

The Manyberries, Alberta area is home to a multitude of Species At Risk. In 2013, a Federal Emergency Protection Order was issued for the Greater Sage Grouse to address imminent threats to the survival and recovery of the species. Post 2019, hundreds of sites within the Manyberries area were turned over from AER to the OWA for Decommissioning and Reclamation activities.

Extensive reclamation challenges due to historical construction practices and edaphic factors make for a long road to recovery for the area. Working within a mandated Provincial work window, Federal EPO Prohibited activities, and engaging with varying regulatory and industry professionals is essential to future success of the area.

This presentation will showcase progression of this unique and challenging portfolio of sites and early OWA program achievements.



Samantha Price

Samantha Price is a Strategic Environmental Planning Specialist at the Orphan Well Association. She is a RT Ag with over 14 years of industry experience. Samantha holds dual diplomas from Olds College Surface Land Agent and Land & Water Resources programs, with a Major in Land Reclamation.

Samantha is passionate about working collaboratively with various facets of industry to achieve reclamation objectives under OWA's "Safe, Principled & Cost Efficient" mandate.

From Awareness to Action: Transforming ESG in Canada

**Olivier Joyal, Geologist, Executive Vice President, Strategy & Execution,
Earth & Environment/Canadian Executive Leader ESG**

WSP Canada Inc.

| Abstract

ESG (Environmental, Social, and Governance) has become a key factor in driving long-term value and sustainable growth for businesses. Canada is no exception, as businesses in the country are increasingly being held accountable for their ESG performance.

In this presentation, Olivier Joyal, EVP Strategy and Execution at WSP Canada and Canadian Executive Leader ESG, will provide an overview of the ESG landscape in Canada, including regulatory and market developments, investor expectations, and stakeholder engagement.



| **Olivier Joyal**

Olivier Joyal is the Executive Vice President, Strategy & Execution for the Earth & Environment sector in Canada. He is also the ESG Canadian Executive Leader. He joined WSP over 18 years ago. His vast experience with a wide range of stakeholders in Canada and around the world has led him to develop personal strategies to adapt to an ever-changing environment and culture.

Death of Aroclor Measurements for Polychlorinated Biphenyls (PCBs)

Court D. Sandau, PhD, Principal
Chemistry Matters

Abstract

Polychlorinated biphenyls (PCBs) have been widely studied and a part of environmental investigations since their first discovery in the environment was reported by Soren Jensen in 1966. PCB concentrations were increasing in the environment and were linked to commercial mixtures of PCBs that had many industry applications. These PCB mixtures were removed from the market and eventually banned in the late 1970s. Since then, PCB mixtures have been declining in concentrations in the environment due to their removal from the marketplace, replacement with alternative products, environmental degradation and remediation.

The original methods used for quantification of PCBs in the environment were based on electron capture detection using packed column chromatography whereby the PCBs were quantified based on the commercial pattern that was present in the sample and as total concentration of all PCBs in the sample. The common North American method uses the commercial Aroclor formulations and PCBs are reported in Aroclor concentrations of each commercial mixture present in the sample. This historical method of reporting PCBs, although the analytical technology has evolved, remains in place today.

The technology has changed to allow the quantification of all PCB congeners. The mixture of PCBs in the environment no longer look like these specific commercial mixtures due to mixing and degradation. In addition, the presence of various by-product PCBs in the environment formed incidentally from chemical reactions in other industrial process makes quantification based on Aroclors passé and this presentation is suggesting that congener PCB data be used to allow more accurate representation and allocation of PCBs in environmental investigations. The congener data is more useful in examining sources of PCBs and doing PCB fingerprinting.



Court D. Sandau

Court Sandau is a PhD chemist that has been researching, measuring, interpreting, fingerprinting and source apportioning polycyclic aromatic hydrocarbons (PAHs) for over 20 years.

He works as an expert witness and subject matter expert on PAHs for litigation matters and is a sought-after expert for US superfund site litigation. He is principal and owner of Chemistry Matters Inc and Statvis Analytics Inc.

The Potential for Using Native Plants in In Situ Remediation(PCBs)

Elizabeth Murray, Ph.D., P.Biol., R.P.Bio., Senior Scientist, Safety Coordinator

Earthmaster Environmental Strategies

Abstract

Phytoremediation is a nature-based remediation method that uses plants to remove contaminants such as metals, salts, and petroleum hydrocarbons from soil. Phytoremediation is a sustainable way of remediating contamination to conserve the soil and reduce carbon emissions associated with hauling to a landfill or treatment using other energy intensive methods. Often phytoremediation is conducted using non-native high biomass producing agronomic species that are more tolerant of contaminants and easier to get established.

However, non-native species often require removal or eradication once remediation is complete as they are not suitable reclamation species. Using native species for remediation can serve an additional function in restoring the site, thereby reducing reclamation costs and the associated carbon emissions from reclamation related equipment use. Native species can be challenging to use in phytoremediation due to seed germination failure and poor establishment rates. For native species to be successfully adapted for in situ remediation, growth and survival of the plants must be improved.

Earthmaster has been working to expand its PEPSystems phytoremediation technology to include native species in addition to the agronomic species

currently being used commercially. Native species generally have bigger root systems that penetrate much deeper in soil; however, they often struggle to grow on contaminated sites. This can be overcome somewhat through agronomic practices such as irrigation, but this increases cost and emissions, and may not be viable given site location and accessibility. PEPSystems uses plant growth promoting rhizobacteria (PGPR) to stimulate plant growth in contaminated and/or poor-quality soil and facilitate plant growth in reclamation applications, where contamination may be left in place as a strategy for risk-based site management and/or where sites may have naturally elevated parameters such as salinity.

Earthmaster has conducted laboratory and field trials with seed and plugs of a variety of native species to evaluate the effect of PGPR on plant germination, growth, and survival. Laboratory seed germination studies \pm PGPR were conducted using up to 4 agronomic and 6 native grass species with varying concentrations of one of two types of PGPR in a range of produced water concentrations and in soil containing methanol. It was observed that, in general, PGPR had no effect nor were detrimental to germination of agronomic species in low salt concentrations but provided significant advantages in

high salt concentrations and when methanol is present. Surprisingly, for most species of native grasses, PGPR provided significant advantages in both conditions.

However, within both groups, there were some species where PGPR were detrimental in all conditions. Field trials were conducted in 4 locations in southern Alberta using 4 species of native grass plugs \pm PGPR. Plug health and height were evaluated during the growing season and the following spring. As with the germination studies, effects were variable and species dependent. These studies demonstrate the importance of testing PGPR/plant compatibility as well as optimum PGPR concentrations prior to site deployment and lay the groundwork for using native species in in situ remediation applications, potentially facilitating much deeper in situ soil treatment than with agronomic species.



Elizabeth Murray

Elizabeth Murray is a senior scientist with Earthmaster Environmental Strategies in Calgary, Alberta. She is a graduate of Lakehead University in Thunder Bay, Ontario and Queen's University in Kingston, Ontario. She has a Ph.D. in human genetics and she has worked for more than 20 years in medical related research and in plant based biotechnology, developing biologics as treatments for human diseases.

Elizabeth has worked in environmental sciences for over 10 years and plays a lead role in the analysis and reporting of phytoremediation research and results. She also manages the research and development of Earthmaster's PEPSystems® technologies.

Taking CO2 Sequestration Projects from the Concept Stage Through to the Permitting Stage

Ken Glover, Reservoir and Geomechanics Consultant

Respec Canada

| Abstract

Taking a CO2 sequestration project from the concept stage through to the permitting stage requires an understanding of certain critical features of the subsurface geology of a chosen site to evaluate whether the site has the characteristics needed to make CO2 injection and sequestration a viable option. The project process also requires a successful navigation of the regulatory guidelines and requirements of the jurisdiction that the site is in.

The requirements at each stage of the project can generally be divided into two categories: things that the project owner needs to know in order to move forward, and things that the regulator needs to know in order to allow the project to move forward. In this paper we summarize recent CO2 project permitting experiences and in so doing, attempt to describe the relevant questions that must be answered at each stage of the project development and the data and methods that are required to answer these questions. We do this by focusing on the aspects that directly pertain to the subsurface technical team, using examples from specific CO2 sequestration sites in North America.



| **Ken Glover**

Ken Glover is a senior consultant within RESPEC's Mining & Energy business unit and is based in Calgary, Alberta, Canada. He has 21 years of experience working in the technical subsurface domain with performing analyses of reservoirs and reservoir seals in more than 25 countries. Since joining RESPEC, Ken has been involved in the analysis of carbon dioxide injection, flow, and long-term containment within subsurface reservoirs.

Using InSAR Satellites to Monitor and Optimise CCUS, and Fracking Operations

Russell (Stan) Stancliffe, Founder GeoR.E.D., and Marco van der Kooij, Remote Sensing Consultant SkyGeo/GeoR.E.D.

Abstract

InSAR satellites have been used to resolve ground movements for over 40 years and the technology is now widely applied in the mining industry. However, the oil and gas industry in Western Canada has been a slower adaptor due to the use of substitute systems including seismic imaging of the subsurface and drones in the oilsands mines. These techniques can be costly, weather intolerant and slow to acquire/process the data. This presentation aims to show that modern InSAR can assist with the development, production and storage of fluids in reservoirs at depth.

Carbon Capture Utilisation and Storage technology has progressed significantly in recent years and there are a number of major active facilities in North America injecting and producing gases and liquids. The volumes stored are large and depths range from 1-3km subsurface. Initially it was thought that surface heave could not be resolved from such depths, but recent studies have succeeded in measuring heave along with the location and shape of the plume. Future projects in the Western Canada Sedimentary Basin will be able to use historic InSAR as well as the new high resolution, bi-weekly data now available.

Fracking in Alberta also occurs at significant depths (2-3km) but instead of from usually vertical wells, long horizontals are drilled. Significant volumes of frack fluid and sand are injected quickly followed by gas and fluid production over a number of years, initially producing surface heave followed by subsidence. InSAR can resolve these subtle movements over time along with changes to the rig pad, which can experience minor movements caused by its operations. Furthermore, InSAR can be used to locate fault movement before and after fracking, along with changes to surface topography over time including land slides and water course alterations.



Russell (Stan) Stancliffe

Russell (Stan) Stancliffe obtained his doctorate in palynology from the University of Saskatchewan before embarking on a career with Imperial Oil and Suncor.

For over 25 years he was active in exploration and development drilling, production, and technology selection for in situ and mine properties along with working plays in the WCSB. Recently he has been running the consultancy GeoRED which is developing and promoting new geoscience technologies and their application in both conventional and unconventional fields in Canada.



Marco van der Kooij

Marco van der Kooij joined SkyGeo in September 2021 as a Remote Sensing Consultant. He has more than 30 years of InSAR experience whilst working initially in the Netherlands as research scientist (TNO) and after 1994 in Canada and the United States.

He has held various senior positions in technology development, management, and business development at Atlantis Scientific, Vexcel, Microsoft, MDA and Maxar. He envisioned, led and managed the first commercial InSAR services business initiative while based in Canada in the mid 1990s. Marco holds an M.Sc. from Delft University, in Aerospace Engineering, 1988.

Canada's Oil Sands Have a Plan to Net Zero

Robert K. Mugo, Ph.D., Director, Greenhouse Gas Environmental Priority Area

Pathways Alliance

Abstract

The Pathways Alliance is a collaboration of Canada's six largest oil sands producers. Together, these companies represent about 95 per cent of current oil sands production. In June 2021 Pathways announced a comprehensive multi-phased plan to reduce current oil sands GHG emissions by about 22 million tonnes annually by 2030 on our path to net zero by 2050.

Our proposed foundational project is a carbon capture and storage (CCS) network and CO2 pipeline which would gather captured CO2 from more than 20 oil sands facilities and transport it to a hub in the Cold Lake area of Alberta for safe underground storage. The line would also be available to other industries in the region interested in capturing and storing CO2.

CCS is also a great enabler of other technologies. Pathways continues to work on over 80 technologies in addition to CCS in order to tackle this challenge from multiple angles, including hydrogen, electrification, renewables, and direct air capture. Join this presentation and panel discussion to learn more about the organization and the latest technology development efforts to identify, develop and de-risk next generation post-combustion capture technologies.



Robert K. Mugo

Robert K. Mugo is the Director, Green House Gas Environmental Priority Area with Canada's Oil Sands Innovation Alliance (COSIA). COSIA is the technology development arm of Pathways Alliance, a collaboration consisting of Canada's six largest oil sands producers. Together, these companies represent about 95 per cent of current oil sands production.

Robert holds a bachelor's degree from the University of Nairobi, as well as MSc, and PhD. degrees in environmental chemistry and geochemistry from the University of British Columbia, Vancouver, Canada. As Director, Robert's key responsibilities at COSIA include overseeing all strategic and operational activities relevant to the identification, evaluation and management of innovation and technology development activities to drive decarbonization of members' oil

sands assets, both mining and in-situ. Robert oversees a portfolio of technology development projects which includes CCUS, electrification, fuel switching, natural gas decarbonation/hydrogen use, process improvements and energy efficiency.

Robert has over 25 years of industry and consulting experience, and during his career has provided strategic, management, technical, stakeholder and regulatory expertise to projects in the oil and gas, mining, water supply and manufacturing sectors in north America, Asia and Africa.

Climate Targets: A Path to Reality

Robert K. Mugo, Ph.D., Director, Greenhouse Gas Environmental Priority Area,
Erik Petursson, Director of Commercial, Entropy and **Graham Spray, Geosciences Manager**,
AGAT Laboratories

Moderated by: Marissa Reckmann, CEO, AGAT Laboratories



Robert K. Mugo

Robert K. Mugo is the Director, Green House Gas Environmental Priority Area with Canada's Oil Sands Innovation Alliance (COSIA). COSIA is the technology development arm of Pathways Alliance, a collaboration consisting of Canada's six largest oil sands producers. Together, these companies represent about 95 per cent of current oil sands production.

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Erik Petursson

Erik is Director of Commercial at Entropy. Erik brings 18+ years of experience across the finance and commodities landscape with three mid-cap Canadian upstream producers (ARC Resources, Velvet and Spartan Delta); through roles in BD, Investor Relations, Risk Management and Marketing he has developed solutions and strategies, built strategic partnerships and successfully managed commodity price volatility and markets.

In a volunteer capacity, Erik also served as Chair of AthletesCAN – Canada's national team athlete association – providing leadership and advocacy for equitable representation, funding and a responsible sport landscape. He received a BSc in International Trade and Finance and an MBA from the E.J. Ourso College of Business at Louisiana State University.



Graham Spray

Graham is a professional geologist with wide-ranging experience in energy and metals exploration and laboratory geoscience. He completed his M.Sc. in tectonics and metamorphic geochemistry at the University of Calgary, then worked in uranium and gold exploration and mining for several years. Graham then moved into the world of petroleum, working in heavy oil with several producers before arriving at AGAT.

With AGAT Graham has led geologists in providing geoscientific support for projects in energy, mining, geotechnical, environmental, and materials science, as well as leading research initiatives and regularly presenting at energy industry conferences.



Marissa Reckmann

Marissa graduated from Lakehead University with a Bachelor of Science (Honors) degree in Chemistry. She gained experience working in an Inorganics Laboratory at Lakehead University as a Research Assistant prior to entering the private sector. She has over 16 years of experience in the Analytical Laboratory, Oil and Gas and Environmental Consulting industries across Canada.

In her current role as CEO of AGAT Laboratories, Marissa is focused on developing and leading the strategy and execution of continued growth plans across North America. In addition to her career responsibilities, Marissa has served as President and subsequent Past President of the Canadian Land Reclamation Association – Alberta Chapter, as well as a Board of Director of the National Canadian Land Reclamation Association, and President of the Environmental Interactive Committee in Alberta. She currently serves as an active volunteer and board member for the AGAT Foundation which current key focuses on supporting advancements in medical research and initiatives throughout Canada.

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