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THE PROFESSIONAL EDGE

ISSUE 185 • MARCH/APRIL 2020

Geoscience

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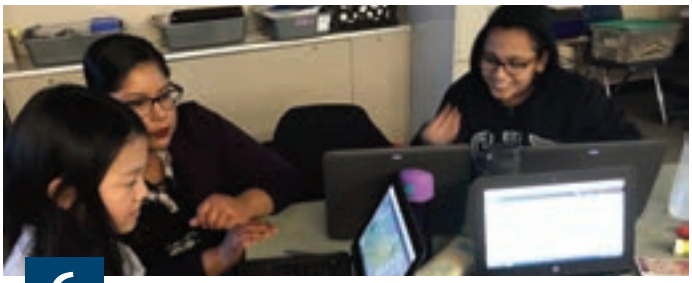
UNITED CANADIAN CONSULTING (VIA TWITTER)



CORRECTION

In Issue 184 of *The Professional Edge*, a photo in the Gems of Geoscience feature should have included this caption: A large folded mass of sillimanite (ivory white) overgrown by garnet (pink). We apologize for any confusion.

President's Message

Terry Fonstad, Ph.D., P.Eng., P.Ag., FEC

I'm excited to welcome everyone to this issue of *The Professional Edge* featuring Geoscience. You'll find articles highlighting amazing companies as well as one highlighting innovation in Saskatchewan and another that looks back to help us look forward.

Innovation by geoscientists, engineers and many others has helped us to develop Saskatchewan's rich natural resources for the benefit of the world. Since the 1950s, the world population has tripled. When you add climate change to this, it is clear that sustainability in further development of our resources must be the governing principle.

For geoscientists and engineers, this must include environmental and social responsibility, in addition to cost effectiveness. For me, this is more than minimizing environmental or social impact. There is true value in designs that improve the environment and we must find ways to allow our designs to achieve the social and cultural vision of the peoples where we work.

In this issue you'll find an article about how RESPEC shows girls and young women a bright future in mining. Dig a little deeper and you find a statement on RESPEC's website, "The answers to the problems we solve can't be found in the back of a textbook. We create smart solutions for even the most impossible of situations."

Any true geoscientist or engineer should find this an irresistible draw. To be able to "create smart solutions for even the most impossible of situations" - we live for this stuff.

Since we're digging deeper on the companies featured in the issue, have a look at the mission statement on the DIAS website, "adding value by delivering useful knowledge through innovation and resolve". What an impactful statement in less than a dozen works. "Adding value" and "delivering useful knowledge" should always be our mission, but "through innovation and resolve" is such insight. Combining innovation with resolve is unstoppable.

There is a growing trend related to the need for society to consider the circular flow of energy and materials. It is my understanding that this concept of circular flows is deeply rooted in Indigenous culture.

This is such a timely topic as we search ways "of integrating scientific information and Indigenous knowledge into decision-making processes" (*Canadian Impact Assessment Act*, 2019) as we continue on the path of sustainable development of Saskatchewan's resources.

Girls in the Classroom

Unearthing Career Opportunities in Mining

BY MARTIN CHARLTON COMMUNICATIONS

Deb Shewfelt, M.Sc., P.Geo, grew up in oil and gas country along the border of the Saskatchewan potash basin. As a young girl she watched several men from her hometown of Birtle, MB make the daily drive to work across the provincial border into Saskatchewan's southeast mining corridor. Though she was unaware these world-class natural resources held promise for her future career.

"For some reason, I didn't even know about geoscience," she said. "I didn't know about geology or that it was a legit career opportunity that I would later discover as my life's passion at the University of Manitoba. I wish I would have had female mentorship to support the awareness of geoscience earlier in my educational journey."

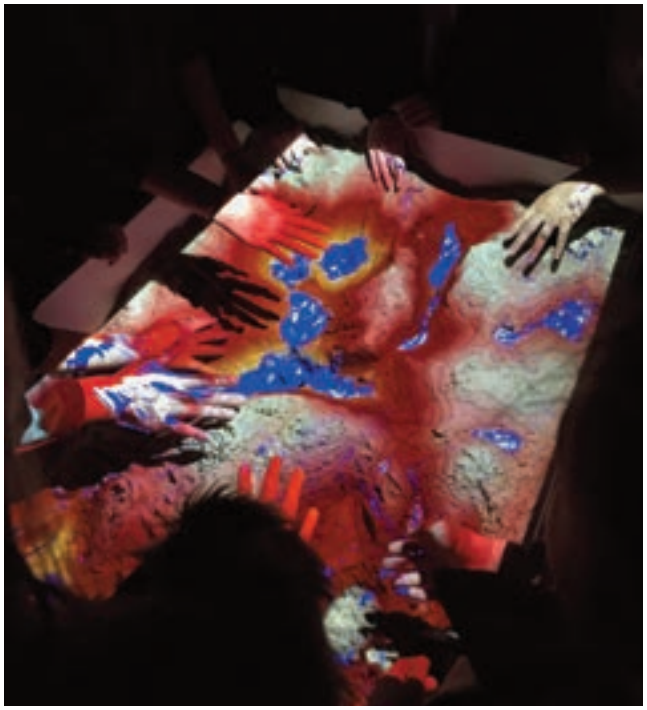
"I was fortunate to find my calling – but what if I hadn't stumbled upon it? I can't imagine my life now without the great satisfaction that I have working as a geologist in Western Canada."

That memory was something that inspired Shewfelt to introduce Girls in the Classroom – Unearthing Career Opportunities in Mining, an educational outreach project that engages elementary and high school girls.

The aim of the project is to raise awareness around unconventional STEM-related career opportunities in the mining and mineral sector through unique engagement with exemplary women from the industry.

"It is an easy assumption to make that, of course, young women know about mining and these diverse career opportunities in the province, but we still have a lot of work to do to promote the unconventional careers at which women are excelling," said Shewfelt, a professional geoscientist with APEGS, EGM (MB) and NAPEG (NWT and

Program heads discuss the many innovative programs, including 3D printing lab and related technologies at the Girls In The Classroom Trades and Technology Exploration event in Saskatoon.



Nunavut) and senior geoscientist, co-president and director of RESPEC Consulting Inc. in Saskatoon. Shewfelt also volunteers on the APEGS Student Development Committee, where she champions student-industry engagement.

"Mining and all of the supporting industries are such a major part of our economy. We need to continue to advise and support the consideration of this sector by female students and Indigenous youth."

TOP: GITC Swale Map Making - Natalie Shepherd of the Saskatchewan First Nations Natural Resource Centre of Excellence, supports Brevoort Park School Grade 6 students with map making using the field data collected at the Northeast Swale Geo-Tracking event.

BOTTOM: Students learn about contour maps, flood simulations and 3D topographic representations at the AR Sandbox station at the Girls In The Classroom Trades and Technology Exploration event at the Saskatoon campus.

Shewfelt says the heart and soul behind the Girls in the Classroom program is career awareness, to highlight non-conventional STEM (science, technology, engineering and mathematics) careers through living examples of women working in this sector and debunking stereotypes about what kind of careers women can or should have.

"Top to bottom, Saskatchewan is such a geological wonder. It makes sense for us to stay and work here in this province and to attract other people to come and work here," she said. "Yes, we do need more women working in these careers. We need more diversity on our teams."

Shewfelt received funding to launch the two-year pilot program from the International Minerals Innovation Institute. While the pilot phase concluded on Dec. 31, 2019, Shewfelt has been asked to plan several 2020 events and hopes to gain further support from industry, education, government or other like-minded organizations to make these events happen.

She has enjoyed engaging with similar projects, such as the WIM/WIN SK mentorship program, MentorSTEP, as well as the Women's Mentorship Luncheon series, put on jointly by The Ron and Jane Graham School of Professional Development, U of S College of Engineering and APEGS 30by30 committee. Shewfelt is also involved as a mentor in these programs and has recruited women from these programs to support the Girls in The Classroom initiatives.

An example of one the projects undertaken by Girls in the Classroom over the past two years was 'Forces and Simple Machines' for Grade 5 students and 'Rocks, Minerals and Erosion' for Grade 4 students.

Before their work on forces and simple machines, the students learned about various rocks, minerals and erosion. The students investigated elements of these three things as well as how they connect to Saskatchewan's land and economy, industry and environmental sustainability.

The students welcomed a female geologist from industry to the classroom who introduced her education and career path and showed them elements of mining in Saskatchewan. The students were shown pictures and videos of different machines that are used to dig, haul and clean ore from different forms of mining.

For a final project, the students were asked to combine the thinking of these ideas and building a machine that could be used in the mining industry.

Assisting Shewfelt with this program are women who have carved careers in the mining and minerals professions. They volunteer their time to connect with teachers and students to share their stories and experiences and connect these themes to the Saskatchewan Public School curriculum, with hopes of inspiring the next generation.

Several women from Saskatchewan companies like

Cameco, BHP and K+S Potash gave their time to the program, as have educators from the University of Saskatchewan College of Engineering and Saskatchewan Polytechnic.

"It's women like that who we want to hold up as great role models for these young women to aspire to and use their unique skill sets as a woman to really help support and enhance STEM in general."

"Most of what I do comes from a desire to open young minds about what a career in mining can look like. Women have significant, diverse and relevant ideas to share and the mining and minerals sector knows it."

The industry has made strides in diversifying its workforce from leadership roles to underground mining. Jessica Theriault, P.Eng. in 2019 wrapped up her term as chair of the board of directors for the Saskatchewan Mining Association. It was the first time in its 50-plus-year history the association had a female chair. Karen Swager is the first female potash business unit senior vice-president.

The women who volunteer for the Girls in the Classroom program also highlight the courses in high school that are pre-requisites and post-secondary training avenues to explore. Inspiring and mentoring youth, in particular female and Indigenous students, and encouraging them to explore a career in STEM is a goal of the Girls in the Classroom initiative. Its premise is targeted at that demographic, but Shewfelt admitted she gets a lot from the program as well.

"There's a huge satisfaction in sharing your story and potentially inspiring someone else," she said. "You're being a mentor in an informal way. How can I help somebody find their unique path? If our stories help girls and young women discover their passion, in particular one that they had not previously considered, then we've succeeded."

www.girlsintheclassroom.org

TOP: Saskatchewan Polytechnic alumni female volunteers from various programs, including electrical, chemical technology, mining engineering technology and GIS, supported the Girls in The Classroom Trades and Technology Exploration event at the Saskatoon campus.

BOTTOM: Danielle Faris, Mining Engineering Technology Program Head; Allison Zerr, Women In Trades and Technology Coordinator and Newcomer Program Coordinator; and Brittany Grimsdale, Women In Trades and Technology Acting Program Head, supported the creation and implementation of the Girls In The Classroom Trades and Technology Exploration event at the Saskatoon campus.

Engineering and Geoscience Scholarships and Bursaries

Undergraduate Scholarships

These academic performance- and community participation-based scholarships are aimed at recognizing leadership and volunteerism among students currently enrolled in engineering or geoscience.

Six scholarships of $1,875 (three for each university) for current students of any field of engineering.

Two scholarships of $1,875 (one for each university) for current students of any field of geoscience.

Entrance Bursaries

These bursaries are aimed at encouraging and assisting high school graduates entering the study of engineering or geoscience, particularly Indigenous students.

Two bursaries of $3,625 (one for each university) to be applied towards first-year tuition in any field of engineering for a self-identified Indigenous student.

Two bursaries of $2,750 (one for each university) to be applied towards first-year tuition in any field of geoscience for a self-identified Indigenous student.

Two bursaries of $3,625 (one for each university) to be applied towards first-year tuition in any field of engineering for a student of any background.

For more information, refer to the APEGS website: http://www.apegs.ca/Portal/Pages/Scholarships-Bursaries-Grants

Our Newest Professional Members

Join our 13,500 members in congratulating our newest professional members –

dedicated professionals who have completed a minimum of eight years of university study and work experience to earn the designation of Professional Engineer (P.Eng.), Professional Geoscientist (P.Geo.), Engineering Licensee or Geoscience Licensee. Pictured below are some of the 1,000 professionals who have received their license to practice engineering or geoscience in Saskatchewan in the past year.

Ahmed, Hafiz Faizan, P.Eng.

Antymniuk, Eric, P.Eng.
P.Machibroda Engineering Ltd

Bahr, Katrina, P.Eng.

Barrett, Justin, P.Eng.
JCB Engineering Ltd.

Barteski, Malcolm, P.Eng.

Brazeau, Julien C., P.Eng.

Centina, Nimtz, P.Eng.

Dreger, Sydney, P.Eng.

Frehlich, Sara, P.Eng.

Geissler, Tegan, P.Eng.
PCL Construction

Habing, Kaila, P.Eng.
KGS Group

James, Martin, P.Eng.
DDC Engineering Corp.

Jaradat, Naser, P.Eng.

Jeirani, Zahra, P.Eng.

Loi, K. C. Cinnati, P.Eng.
Calian SED

Martin, Alex, P.Eng.
Brandt Industries

Martin, Paige, P.Eng.
K+S Potash Canada

McLaughlin, Ellen, P.Eng.

Ong, Ron, P.Eng.

Paterson, Taija, P.Eng.

Reimer, Curtis, P.Eng.
CENGYS LTD.

Sawatzky, Keira, P.Eng.

Shrivastava, Prakhar,
P.Eng.
Altus Group

Stepan, Jordan, P.Eng.
WSP Canada Inc.

Thakur, Suchander, P.Eng.
Canadian Light Source

Tilford-Shaw, Michelle,
P.Eng.

Xia, Tiantian (Tessie),
P.Eng.

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Zap to It!

DIAS Geophysical Puts the Charge in Surveying

BY MARTIN CHARLTON COMMUNICATIONS

You might think a flying electro-magnetic SQUID is something out of science fiction, but it is actually a (literally) down-to-earth innovation in geophysical surveying.

"The term SQUID stands for Superconducting Quantum Interference Device. That's an intimidating term and not a lot of people know what it means. But as acronyms go, it sure sounds cool," says Glenn Chubak, Geoscientist-In-Training, the vice-president of technology at DIAS Geophysical.

Dias specializes in geophysical surveying technologies, in particular its DIAS$_{32}$ system that Chubak calls the company's "bread and butter technology." Dias is active on six continents, with Saskatoon serving as the operational base for all projects. Dias has grown quickly and employs approximately 25 full-time employees and a similar number of field staff who work on a rotating project basis.

Its focus is on research to develop new, safer and more effective technologies. Recently, it has partnered with Supracon AG in Germany to develop a new airborne SQUID system for geophysical surveying.

Getting a Charge Out of Surveying

The DIAS$_{32}$ system is based on relatively simple and well-known principles of physics and geoscience.

"Different minerals have different levels of electrical conductivity. Systems like DIAS$_{32}$ send an electrical charge into the earth and then measure the resulting voltage. This allows us to take an educated guess at the minerals below the surface."

"The technology is not new and we have several competitors. What sets us apart is that our technology is wireless and collects much larger data sets."

"The 'big data' aspect – tens of millions of data points – means our surveys can be much more accurate and cover a larger area. The wireless component means that our system is less costly and safer. Our system involves less than one-sixth of the amount of wiring and equipment of competing systems. Imagine doing a survey in a mountainous area, our system can allow operators to carve back as much as 10 kilograms of equipment weight per station which can make a significant difference for crew safety in treacherous areas."

The Flying SQUID

With Supracon AG, Dias takes its surveying technology to a new level with the German company's magnetic-based SQUID system.

"Think of SQUID as the world's most accurate compass. It measures magnetic patterns under the earth. Geoscientists know minerals formed at the same time have an identical or similar magnetic alignment. If you were exploring for diamonds and you knew other diamonds from that area had a particular magnetic alignment and you detected other minerals in the same area with the same alignment, there's a better chance that those deposits would also be diamonds."

Since the magnetic patterns can be detected above the surface, the DIAS$_{32}$/SQUID system can detect them through airborne surveys, which increases the speed, efficiency and cost-effectiveness of the exploration process.

Struck by Lightning

At a recent Prospectors & Developers Association of Canada meeting, Dias unveiled this new generation of SQUID in an airborne system they have developed with Supracon AG. This system is entirely passive using natural field energy from the sun and distant lightning strikes to investigate potential subsurface mineral deposits.

"Lightning creates an electromagnetic pulse. As that pulse travels, different structures in the Earth cause the pulse to twist and warp. By measuring these distortions, we can find important information about mineral deposits, geologic faults and many other things," Chubak says.

Gems of Geoscience

Chad Sorba, P. Geo.

In this regular section of *The Professional Edge*, we learn about geoscientists and their profession through their favourite rocks. In this issue, we talk with Chad Sorba, P.Geo., a technical services manager at Denison Mines Corp.

Phoenix- Arising from the Ashes

The Phoenix deposit is the world's highest-grade, undeveloped uranium deposit located on Denison Mines Wheeler River Project in the eastern portion of the Athabasca Basin in northern Saskatchewan.

The Wheeler River property had been extensively explored since the late 1970s, but it was not until 2008 when the Phoenix deposit was discovered.

Denison's former vice-president of exploration dubbed the deposit "Phoenix" because of extensive previous exploration that resulted in this deposit seemingly rising from the ashes.

The Phoenix deposit straddles the sub-Athabasca unconformity approximately 400 metres below surface and comprises three zones which cover a strike length of 1.1 kilometres.

The deposit consists of an exceptionally high-grade core surrounded by a lower grade shell.

Mineralization within the Phoenix deposit is dominated by massive to semi-massive uraninite (also known as pitchblende) associated with an alteration assemblage comprising hematite, dravitic tourmaline, illite and chlorite. Secondary uranium minerals (including uranophane) and sulphides are trace in quantity.

The deposit had a relatively complex history as it formed by an extensive hydrothermal system. This created a vast array of alteration surrounding the deposit within the Athabasca Basin sandstones above.

The alteration system, structural setting and mineralization has always intrigued me to learn more about uraninite and the deposit itself. Notably, the density of the mineralization, which is not uncommon to be up to three times that of the surrounding sandstones. The shear weight of holding up a piece of mineralized core from the Phoenix deposit is something that will never cease to impress me.

It has been a great privilege to work on the Phoenix deposit for more than a decade. The high-grade nature of the deposit has always been a drawing point for me to learn more about the deposit and how it might be economically extracted considering its world-class grades.

Photo credit: United Canadian Consulting (via Twitter)

Canada's Little-known Geological Wonder

BY: THE BBC

The last time Candice LaFaver spotted the purple grains of sand along the shoreline at Candle Lake Provincial Park was in 2018.

That July, La Faver and her family had taken out their boat for a leisurely summertime cruise on this freshwater lake located in northern Saskatchewan when she glanced over to a deserted stretch of beach and couldn't believe what she saw.

Near the lake's north-eastern edge, an area that can only be reached by boat, LaFaver noticed a thick stripe of vibrantly coloured sand wrapping across the shoreline like a ribbon on top of a present.

"I hadn't seen that big of a ribbon in a long time," recalled LaFaver, who works as the park manager for this government-protected landscape that spans 78 square kilometres and has become a recreational haven for outdoor enthusiasts.

"Some years you can't see it until you're on it. Other years, just a band of it appears," she said.

This particular band, she added, measured about 60cm wide and spanned the entire length of the beach, and was one of the largest she had ever seen.

For 25 years, LaFaver has lived in the tiny resort village of Candle Lake, a community of 850 full-time residents that falls within the provincial park boundary lines. She's seen how the hue and length of the coloured sand fluctuates with the changing of the tides and the seasons.

So, on that afternoon, knowing that next year it may not appear in the same illuminating fashion, or at all, LaFaver and her family seized their opportunity.

"We got off the boat and hung out there the whole day," she said. "I didn't know when I would get to see it that distinct along the whole shore [again]."

Known simply as "Purple Sands Beach", this secluded expanse of land has earned a reputation around Canada for its awe-inspiring geological feature.

Photo credit: United Canadian Consulting (via Twitter)

The grains of sand can appear in a spectrum of chromatic hues, ranging from lavender to magenta and sometimes even pink. Vivid particles can appear smeared down the shore like an artist's brushstroke, scattered in clusters across rocks and rippled beneath the water's surface in the lake's shallow bays.

Seeing this natural phenomenon in person has become a pilgrimage for naturalists, geological fanatics and out-of-town visitors.

While the imagery of purple sand may appear like something from a fairy tale, there is a geological explanation behind it.

> According to Dr. Kevin Ansdell, P.Geo., FGC, FEC (Hon) professor of geology at the University of Saskatchewan, all beaches attribute their colouring to the minerals, rocks and shells that comprise their various sand particles.

"If you go around the world, there's all sorts of different coloured beaches," explained Ansdell, whose work includes public outreach and education about the diversity of geological landscapes within Saskatchewan.

"Obviously, the most common are the typical white sands that you think about. Those are typically made of lots of rounded grains of quartz."

As the second-most common mineral found on Earth, quartz is the reason why so many shorelines have white sand, he said.

However, white is not the only hue to decorate a coastline. Iceland and Hawaii, for example, each have a collection of black-sand beaches, which owe their dark and moody tones to volcanic lava rock. There are other examples around the world where minerals and sediment have transformed bodies of water into surreal-looking landscapes. Peyto Lake in Banff National Park in Alberta owes its turquoise colour to glacial sediments suspended in its water; while the Yellow River in western China, which originates in the province of Qinghai, has accumulated so much silt and sediment that the river remains a constant shade of blonde.

The environment of northern Saskatchewan, however, owes its colouring to a mineral that has been discovered all around the world but is found in large quantities across northern Canada.

> "With the purple-sand beaches, of which Candle Lake is one example," Ansdell said, "the most likely mineral is the mineral called garnet."

For thousands of years, this colourful and resistant mineral, one that comes in a variety of shades but which is mostly seen as dark red, has been discovered in rocks across the Canadian Shield, a large section of the North American continent that encompasses a majority of the northern half of Canada.

This mineral-rich landmass extends from Labrador in the east all the way north into the Northwest Territories, including most of northern Saskatchewan.

Because of this landscape's vast size and ancient history, the resources found in the Canadian Shield have become valuable components of the nation's economy.

"In the Canadian Shield overall, there's lots of different mineral deposits," said Ansdell, of the gold, copper, nickel and even diamonds that are often uncovered, in addition to minerals like garnet.

Found inside rocks that date back more than a billion years, garnet is created during metamorphism, a chemical and mineralogical process that happens when rocks become buried deep inside the Earth's crust as its tectonic plates shift.

Through various processes, these rocks change their internal compositions to adjust to higher pressures and temperatures, Ansdell explained.

"Obviously if you've got garnet in the sands, the garnet must have come from somewhere," he said. "It's almost certainly the metamorphosed rocks in northern Saskatchewan."

These rocks were transported across the province during the most recent Ice Age, which ended approximately 12,000 years ago, when large sheets of ice slid across exposed sections of the Canadian Shield, scattering their contents in places like Candle Lake.

Member Profile

Tonny Dithobane, Geoscientist-in-Training

In this issue, *The Professional Edge* talks with Tonny Dithobane, Geoscientist-in-Training, a geophysicist at Discovery International Geophysics.

Tell us about your personal and professional background.

I am the oldest of five siblings - two younger brothers and sisters. I grew up in Botswana, eventually completed two years at the University of Botswana before I came to Canada in 2007 to pursue my undergraduate geophysics degree. I graduated in 2011. I have been a geophysicist at Discovery International Geophysics since August 2012.

Why did you choose to go into geophysics?

My uncle asked me to become a geologist so I could work with him in South African mines. I didn't like geology that much on its own. I liked calculations, so physics and geology

Did you have any geoscientists in the family who influenced you?

My uncle is a geoscientist.

What do you feel is your single greatest accomplishment as a geoscientist?

I've been able to do what I do for about eight years now with the same company. I've been able to lead a crew of more than 20 people to complete surveys in remote areas with very limited resources.

What are your interests outside of work?

I like playing soccer and playing video games. I like the outdoors and hiking. Just trying new things always scares and excites me.

What is your favourite vacation spot?

If I had to pick a favourite, it would be any place I have never been to. I will always choose that before any place I have been to regardless of how awesome my last place was. For me, it's all about the new experiences.

What is your favourite book?

The Seven Habits of Highly Effective People, by Stephen Covey. It's a life changer. You should read it.

What do you do for continuing professional development?

Toastmasters, mainly. I also attend and give presentations at open houses and special events.

The greatest influence on your life and career?

Growing up I did not have one single person who inspired me more than the other. Many people influenced me differently. Right now, my life is influenced by my family.

Is there anything else that you would like to share?

Success is a measure of time. You get what you put in. I say you can't blame anybody else for the things we did not achieve. We just didn't put in enough time.

Innovation in Practice

SUBMITTED BY SHAHID AZAM, PH.D., P.ENG., PROFESSOR, FACULTY OF ENGINEERING AND APPLIED SCIENCE, UNIVERSITY OF REGINA

Shahid Azam, Ph.D., P.Eng

Engineers and geoscientists are known as problem solvers. The issue is that today's problems have become quite complex and, as such, require highly skilled people and multi-disciplinary teams.

Our knowledge economy is based on using various thought processes: Analytical to simplify complicated information, critical to evaluate alternative options and creative to imagine new approaches.

Through several years of formal training and supervised experience, these thinking habits are thoroughly instilled in engineers and geoscientists and prepare us to help develop innovative solutions, products and processes.

> In a fast-paced world, how can we practise engineering and geosciences while we are required to hold paramount the safety, health and welfare of the public and the protection of the environment?

The main purpose of this article is to highlight the role of innovation in practice by providing a general conceptual understanding as well as a Saskatchewan-focused historical background and future opportunities and challenges.

The first task is to define innovation. Innovation is defined as the introduction of something new, such as a new idea, method or device. However, this definition is limited and restrictive.

The word can be better appreciated by understanding the various components and processes involved (Boyer, 1990): Discovery (creation of new knowledge to improve products and methods); integration (collaborations across disciplines to address system level issues); application (interactions with industry and public to ensure usage and acceptance); and teaching (dissemination in various settings to refine and upgrade knowledge).

This broader concept is more akin with our role in society which, according to our Code of Ethics, is to "keep themselves informed in order to maintain their competence, strive to advance the body of knowledge within which they practise and provide opportunities for professional development of their subordinates".

The triple helix framework was put forward to highlight the crucial interactions between the university, the industry and the public for economic growth (Etzkowitz and Leydesdorff, 1995).

A version of this framework is the Canadian public-private-partnership model that has served well, particularly the infrastructure sector, by providing improved facilities at reduced costs.

In this model, the risks are minimized by considering the entire lifecycle (design, construction, operation and maintenance) of the project and incorporating extensive stakeholder engagement (taxpayers, end users, private companies and government agencies).

Such an arrangement naturally supports innovation because of the need to continuously generate, share, evaluate and upgrade knowledge in a multi-disciplinary environment.

Historically, engineers and geoscientists have played a key role in the agriculture-based economy of Saskatchewan. A good summary of the notable achievements was provided by our President, Dr. Terry Fonstad, Ph.D., P.Eng., P.Ag.,FEC in the 182nd issue of *The Professional Edge*.

The learned professor discussed the development of arable lands through managing surface and groundwater resources and the innovations in chemical fertilizers, farm machinery, storage facilities, communication networks and transportation systems to support agriculture.

In addition, resource extraction (coal, uranium, potash and

oil), power generation (hydro, wind, fuel and geothermal), infrastructure upgrades (highways, railways, waterways and pipelines) and industrial development (oil refineries, fibre optics, mechanical equipment and material products) have remained the primary fields where APEGS members have immensely contributed to economic growth in the province.

The two research intensive universities have led innovation and guided technology transfer through their graduate programs in engineering (civil/environmental, mechanical/industrial, electrical/electronics, chemical/petroleum, and software/computer) and in geosciences (geology).

Their main involvement has been the training for specialized expertise and the development of valuable products and processes. Some of the graduates of these programs have become entrepreneurs in their respective fields thereby creating new job opportunities.

In this context, Innovation Place (with on-campus presence in both Regina and Saskatoon), has been useful in providing support for start-up companies of small and medium sizes. It is satisfying to see that innovation has served the people of Saskatchewan and beyond quite well in terms of university-industry collaborations, value-added solutions, highly qualified professionals and spin-off companies.

> The future demands more from us in terms of supporting and exploiting the food-water-energy nexus.

First, innovation will have to capture critical issues related to climate change (extreme floods and prolonged droughts), infrastructure systems (aging facilities and urban growth), energy management (smart grids and renewable resources) and waste disposal (mining slimes and municipal landfills).

Second, we need to ensure that our activities are cost effective, environmentally friendly and socially acceptable. In this regard, guidance from the United Nations Sustainable Development Goals and learning from First Nations practices will be crucial.

Third, the public must participate in the innovation process from idea development to project deliverables and from policy formulation to decision making.

The Johnson Shoyama Graduate School of Public Policy, a collaboration between the two universities, can serve as a vehicle to lead intellectual discourse between academia, government, industry and society.

And fourth, innovation must be practised and converted into business opportunities to contribute to and diversify our economy.

It will be critical to realize this impact and strategically re-adjust with respect to shifts in corporatization of agriculture, extension of urban centers, population demographics and geo-political realities.

Our engineers and geoscientists will have to address some interesting challenges in the coming years. For example, how can we encourage and enhance participation of under-represented members (women, aboriginal and international) to practise the professions?

How can we improve industrial work opportunities for our students in research-based degrees thereby supporting technology transfer and entrepreneurship?

How can we appreciate the role of intellectual property (patents, copyrights, trademarks and trade secrets) in an era of increased competition on the one hand and the availability of open source software and courses on the other?

And, what will be the legal framework and safety considerations of an innovative design – technical publications (open book) or design codes (by the book)?

APEGS members have led innovation in the past and will continue to advance our economy in a meaningful way while we practise to "...safeguard human life and welfare and the environment".

> The conversion of ideas into innovations and further into practice is a life journey and we have always remained poised to earn public confidence.

Notes from APEGS Council

The APEGS Council met February 6 - 7, 2020 in Saskatoon. The meeting was attended by 15 of 19 councillors and the directors to Engineers Canada and Geoscientists Canada. Three additional councillors joined the meeting via teleconference during the voting on proposed bylaw changes. Council will meet on April 7 - 8, 2020 in Regina.

Council received the following presentations and information items:

- Activity updates from the constituent society liaisons, the ACEC-SK liaison and the 30by30 Champion's Group liaison.
- The Executive Director presented the preliminary continuing professional development reporting compliance statistics. Approximately 80 per cent of the membership reported their 2019 CPD activities, and approximately 50 per cent of those were compliant with the requirements of the program.
- The Manager of Communications updated council on the geoscience ad campaign.
- The Director of Special Projects presented council with a business case to engage a change management consultant to assist with the evaluation and implementation of those recommendations resulting from the governance review and approval by Council.
- The Director of Special Projects briefed council on the progress with the implementation of the member database.
- The APEGS Director to Engineers Canada reported on the activities of the national organization.
- The APEGS Director to Geoscientists Canada provided a written report and verbal update on the activities of the national organization.
- The Director of Registration reported on the Pacific North West Economic Region winter meetings.

Council passed motions as follows:

- Approving the geoscience ad concepts and radio script.
- Approving the business case and associated budget for a change management consultant.
- Creating a Nominating Criteria Task Group made up of Past Presidents: Peter Jackson, P.Eng., FEC, FGC (Hon.), FCSSE, Dwayne Gelowitz, P.Eng., FEC, FGC (Hon.), Margaret Kuzyk, P.Eng., FEC, FGC (Hon.) and Steve Halabura, P.Eng., FGC, FEC (Hon.).
- Revising the terms of reference for the Audit Committee to include one Public Appointees as a member.
- Revising policy PD2.0 PD Days Pricing and Cancellation Policy to include an administration fee to be charged for cancellations.
- Approving the new design for the Student Gold Medals and lapel pins.
- Approving a one-year extension to two members-in-training who had reached the seven-year maximum.
- Approving the reassessment of an application from an international engineering graduate.
- Approving waiver of the reinstatement fee for a member for the 2019 membership year.
- Approving changes to the online competency-based assessment system and business process to accommodate the Canadian environment equivalencies.
- Adopting the geoscience competency-based assessment framework, including the assessment rubric, geoscience competencies and workplace examples.
- Approving amendments to the Competency Assessment Guide for Applicants, Validators and Assessors.

- Approving amendments to Appendix 4 of the Regulatory Bylaws (Geoscience Work Experience).
- Accepting the high level competency-based assessment project plan for licensee applicants.
- Approving changes to policy CPD5.0 CPD Variation Policy to implement a deadline of September 30 for the submission of variation requests for the reporting period.
- Approving the addition of Regulatory Bylaw 30 – Online Register.
- Granting staff the discretion to waive late fees in the circumstances where members ability to pay was impacted by the coronavirus.
- Approving Life Membership for 65 members.

Council noted and received the following reports:

- Registrar's reports for November and December 2019.
- The unaudited financial statements for October (revised), November and December 2019.
- Executive Committee minutes, board minutes and the reports from the committees and task groups, and abridged Investigation Committee minutes.

2020 Council Election

The individuals listed below have agreed to stand for election in the offices indicated. Group/District Councilors serve a three-year term. The term for members of the executive is one year.

EXECUTIVE

President: (one-year term)	Andrew Lockwood, P.Eng., FEC Saskatoon
President-Elect: (one-year term)	Kristen Darr, P.Geo. Deer Valley
Vice-President (one-year term)	Cory Belyk, P.Geo. Corman Park
	John Desjarlais, P.Eng. Saskatoon

COUNCILLORS

Group VI (Chemical, Metallurgical and Ceramic) (three-year term)	Patricia Lung, P.Eng. Humboldt
North District (three-year term)	Ian Farthing, P.Eng. Prince Albert
	Md Yousuf, P.Eng. Prince Albert
Southwest District (three-year term)	Aaron Phoenix, P.Eng. Swift Current
	Naser Jaradat, P.Eng. Moose Jaw
Geoscience North District (three-year term)	Alix Cruickshank, P.Geo. Martinsville
	David (Drew) Heasman, P.Geo. Saskatoon

Continuing Professional Development

The Continuing Professional Development (CPD) Program requires APEGS members to complete ongoing professional development activities as a way to maintain and improve their competence. It encourages members to engage in lifelong learning to protect public health, safety and welfare. The program provides tools for members to assess their current skills, knowledge and abilities, determine activities to maintain or enhance them and report completed activities online to APEGS as professional development credits. From more information, navigate to the CPD Tab on the APEGS Homepage at **apegs.ca**

Ethics Module #2

The next free APEGS online ethics module is launching in April 2020. Make sure you earn your ethics credit by December 31, 2020.

Upcoming

Professional Development Events

Get to the Point! A Practical Writing Course for Technical Professionals
Saskatoon, SK
April 29 – 30, 2020

2020 Fall Professional Development Days
Regina, SK
November 24 – 25, 2020
Registration opens in September.

For more details and pricing, visit **apegs.ca**.

Looking for Ethics Training?

Of the many ways to get ethics training, here are two options that APEGS provides:

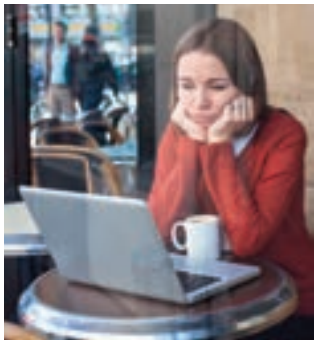
APEGS Online Ethics Modules

- Obtain your annual ethics credit today by completing one of our free modules.
- The topic for Module 1 is Professionalism and Ethics
- The topic for Module 2 is Conflict of Interest. This module will be available in April 2020.
- For more information and to access the module, please visit **www.apegs.ca**.

In-person Ethics Presentations

If your organization is interested in hosting an ethics training session for your employees or members, contact Jolene Arthur at **cpd@apegs.ca** to book.

Not Getting PD Opportunity Emails?



Go to your online profile. Under My Profile, scroll to the bottom to select Communications and when the next window opens check the preference for APEGS promotional emails.

Safety Training

Did you attend any of the following this year:

- First Aid Training
- Fall Protection Training
- WHMIS Training
- H2S Alive

These courses all count as Formal Activity for the CPD Program.

Snapshot of the 2019 Continuing Professional Development Program Compliance

2019 marked the first year for APEGS members to participate in the required Continuing Professional Development (CPD) Program.

Compliance with this program included obtaining a minimum number of CPD credits in a minimum number of categories depending on whether a member was licensed, on a license waiver or had an approved CPD variation.

The CPD Compliance Review preliminary results for the 2019 reporting year indicated that:

- Approximately 80 per cent of the APEGS members required to participate in the CPD Program reported their 2019 CPD activities to APEGS prior to the January 31, 2020 deadline; and
- Of those that reported, approximately 80 per cent were fully compliant with the requirements of the CPD Program.

Common reasons members reported they were not fully compliant included:

Reason	Remedy
1. **Checked the box that you reported elsewhere, even though your preferred address is Saskatchewan.**	1. If your preferred address is Saskatchewan, you cannot check the box that you reported elsewhere; you are required to report to APEGS. Alternatively, you can change your preferred address to one in a different jurisdiction if you live or work there and then check the box that you reported elsewhere, assuming you are a member there.
2. **Did not complete the annual verifiable ethics training, or at least did not check the box that you did so**.	2. APEGS offers a variety of ways for members to obtain the required annual verifiable ethics refresher training, including an online module that is free to all members and is accessible through the APEGS home page **www.apegs.ca.** The CPD program document and the CPD webpage also provide a number of suggestions for ways that members can achieve this requirement. Note that members are required to obtain at least one cumulative hour of verifiable ethics training annually and must report this in their CPD online reporting by: • Checking the ethics box; and • Claiming the time under Formal Activity

Reason	Remedy
3. **Did not report CPD credits in enough activity categories.**	3. Licensed members must obtain credits in at least three of the six categories. Waiver holders must obtain credits in at least two of five categories. Those with an approved CPD variation will have specific requirements.
4. **Did not report enough total credits.**	4. Licensed members must obtain at least 80 credits in at least three of the six categories. Waiver holders must obtain at least 30 credits in at least two of five categories. Those with an approved CPD variation will have specific requirements.

Members are also reminded that excess credits over the required annual amount can be banked for use in future years, for up to two years. Excess credits achieved over the values noted above should NOT be reported in the reporting year, but tracked for use in future years. If you reported more than the required amounts, please update your 2019 reporting and track your banked excess in a separate tracking tool, such as the spreadsheet provided on the APEGS CPD web page.

More detailed CPD compliance statistics will be published in a future issue of *The Professional Edge* when the 2019 compliance review cycle is completed.

For more information about the requirements of the CPD program, see the CPD program document by selecting Continuing Professional Development (CPD) under the CPD menu and click on the link.

Updates to the Competency Assessment Guide for Engineers-in-Training and Engineer-in-Training Applicants

All engineers-in-training and engineer-in-training applicants who are submitting their competency assessment should be aware that announcements on updates to the Competency Assessment Guide (for work experience reporting) are announced in *The Professional Edge* and on the APEGS website only. Please check to ensure that you are using the most recent version of the Guide any time you are updating your online submission. The Guide has a version number on the first page and it is also indicated in the file name under Related Attachments on the 'Work Experience Reporting – Engineering' webpage so you can check to make sure you are using the most recent version.

Two recent updates are the addition of Canadian environment competencies (see section 3.5.5 of the Guide) and a set of new indicators for Building Enclosure Engineering (see section 2.1 and Appendix 7 of the Guide).

If you have any questions, please contact: **experience-review@apegs.ca**

Western Inter-University Geoscience (WIUGC) Conference

WIUGC is an annual student-run conference that alternates between universities across Western Canada. It gives an opportunity for students from across Canada to share their research, ideas and more.

This year, the University of Saskatchewan hosted the conference and APEGS was a main sponsor. The conference was well-attended and the U of S planning committee did a great job delivering the conference.

Cory Belyk, P.Geo., attended as a council member of APEGS and delivered greetings advising future young professionals of the privilege and importance of self-regulation in Saskatchewan and in all jurisdictions across Canada.

TOP: Roundtable discussions. As part of Industry Day presented by APEGS, this event highlighted 10 separate topics related to geoscience, socio-economic factors and work-life balance. Students rotated every 15 minutes between each table to connect with industry participants. CENTRE: Dallan Perkins and Derek Bodnar participating in the Core Logging Short Course which was instructed by Dr. Meagan Gilbert and aided by John Schmyr and Ty Magee, Geoscientist-in-Training. BOTTOM: Organizing committee. From left to right, back: Gracie Brissaw, Kale Wood, Tyler Austin, Courtney Onstad, Josh Paulsen, Nevan Trombley, Matthew Fellwock, Rebecca Kupchinski and Aidan Mowat. Left to right, front: Markus Weir and Tony Wood.

University of Saskatchewan

New B.Sc. in Environmental Geoscience program at the University of Saskatchewan

Matt Lindsay, Associate Professor, NSERC/Syncrude Industrial Research Chair, Department of Geological Sciences, in the field at the Diavik Diamond Mine.

The Department of Geological Sciences at the University of Saskatchewan is excited to announce that, beginning in May 2020, it will offer a new bachelor of science in Environmental Geoscience program.

This new program will complement the existing B.Sc. programs in geology, geophysics and palaeobiology and will provide new opportunities for undergraduate geoscience education at the U of S.

It has consulted with APEGS to ensure all graduates of this new program will have the opportunity to meet with APEGS' knowledge requirements for P.Geo. licensure.

Environmental geoscience is the scientific study of relationships between earth processes, human activities and the environment.

Consequently, environmental geoscientists integrate knowledge of physical, chemical and biological aspects of the earth system to investigate how geological processes have influenced the environment over geologic time.

They also study environmental impacts of human activities, including extraction of energy and mineral resources and investigate ways to minimize these impacts.

Environmental geoscience is one of three academic streams assessed for P.Geo. licensure with APEGS and the only category not currently covered by a B.Sc. program offered through the U of S Department of Geological Sciences.

Similar to the B.Sc. programs in geology and geophysics, students in this new program will develop a strong foundation in core geoscience topics including structural geology, mineralogy, geochemistry and sedimentology.

Additional coursework in the areas of geochemistry, mineralogy, hydrogeology and geomicrobiology, plus an environmental geoscience-specific field school, will provide graduates with knowledge required to succeed as practising environmental geoscientists.

The new program will also emphasize quantitative skills, which are increasingly critical in all geoscience disciplines.

The new program will allow students to pursue options that were previously available through the B.Sc. in Environmental Earth Sciences (EES) program offered by the Department of Geography and Planning.

Starting in May 2020, the EES program will be transformed into a new B.Sc. in Hydrology program. Minors in geomatics, water science and chemistry that are popular with students in the geology and EES programs will remain options in the new Environmental Geoscience program.

It is anticipated that graduates of the new program will have wide-ranging employment opportunities in both the private and public sector.

Growth of job opportunities in environmental geoscience with resource companies, consulting firms and governmental agencies will continue with increased emphasis on environmental management and land reclamation in the mining and energy sectors.

These factors make the new B.Sc. in Environmental Geoscience program an option for students with interests in geoscience and the environment.

For additional information on this program, visit **https://artsandscience.usask.ca/geology** or contact the program Faculty Advisor, Dr. Matthew Lindsay **matt.lindsay@usask.ca**.

GeoExplore Saskatchewan

Introduced for Engineering and Geoscience Week March 1 - 7

In March, APEGS and the Saskatchewan Geological Society (SGS) introduced GeoExplore Saskatchewan.

With this new website you can explore the province's extraordinary geoscience features like the Athabasca Sand Dunes and uranium in the north, potash in south-central Saskatchewan, and Castle Butte and the Cypress Hills in the south.

Photos and short explanations from about 80 geoscience points of interest are superimposed on a digital road map of the province. Additional thematic panels further explain geoscience in plain language.

While many of the features are accessible along highways and secondary roads, some are remote, like the Athabasca Sand Dunes, so the website also shows many unexplored geoscience treasures in places not easily reached.

To celebrate Engineering and Geoscience week with students, APEGS and the SGS demonstrated the website to over 600 Regina and area students and provided hands-on learning experiences March 3 - 4.

The idea for GeoExplore Saskatchewan began as a way to digitalize the printed Geological Highway Map of Saskatchewan, created in 2002. A working committee was formed of volunteer geoscience professionals from APEGS, SGS, Saskatchewan Geological Survey, Saskatchewan Mining Association, University of Regina and University of Saskatchewan. Other contributors of photographs or expertise were Tourism Saskatchewan and Royal Saskatchewan Museum.

The websites of APEGS, Saskatchewan Geological Society and Saskatchewan Mining Association all link to GeoExplore Saskatchewan.

Everyone involved hopes people use GeoExplore Saskatchewan to explore the province and discover new destinations.

The Saskatchewan Geological Society also looks forward to posting people's photographs of Saskatchewan's cool geoscience features and landscapes on its website. Email photos to sask.geol.soc@hotmail.com along with your consent and the photo's location.

Celebrating Our Own

Roy Billinton, P.Eng., honoured

University of Saskatchewan - When Roy Billinton was 16, he arrived in Canada and began working with his father as an apprentice electrician. At night, he studied to get his Grade 12, so he could go on to university.

Billinton's mother and the rest of his family arrived in Canada a year later and he ultimately achieved his goal of attending university, earning the bachelor's degree in electrical engineering that became the foundation of his remarkable career.

Dr. Billinton (DSc), a University of Saskatchewan (USask) distinguished professor emeritus, is recognized as a pioneer in power system reliability engineering. The book he published in 1970 is considered to be the first book in English on the subject. In total he authored or co-authored 10 books and more than 975 technical papers. He has a Google Scholar h–index of 91—which is considered exceptional—with more than 42,000 citations.

"He's a major figure in power systems engineering who's known worldwide. He pioneered the field and set the standards," said Dr. Safa Kasap (DSc), P.Eng., Billinton's longtime colleague in the USask Department of Electrical and Computer Engineering.

In his area of research—power system reliability, economics and performance—Billinton developed a range of techniques to evaluate the reliability of engineering systems including large electric power generation, transmission and distribution systems.

Billinton's impact on his field was recently recognized when he received the Lifetime Achievement Award from the Institute of Electrical and Electronics Engineers (IEEE) Power & Energy Society. The occasion became even more memorable as Billinton and his wife Joyce celebrated their 63rd wedding anniversary at the award ceremony in Atlanta.

"I have always been excited about the work I was doing. We created and developed many concepts and techniques that advanced power system reliability," said Billinton, whose quiet, courteous presence belies his larger-than-life reputation.

Billinton earned bachelor's and master's degrees at the University of Manitoba and PhD and DSc degrees from USask. But before beginning his career at the university, he spent four years at Manitoba Hydro, gaining valuable experience he said provided him with the vision to blend the theoretical and the practical.

When Billinton joined USask in 1964 he was tasked with establishing the Power Systems Research Group. It soon gained an international reputation and more than 55 years later, Billinton, now 84, is still an active member, attending on-campus meetings and staying busy in his home office.

He recalls with satisfaction and pride the work he did beyond the university – consulting with many large utility providers in North America and abroad – reaching out to exchange knowledge and ideas decades before boundless collaboration was a commitment in the university's strategic plan.

"My work and travel enabled me to meet many other people in the reliability world and develop lasting relationships," he said.

In all, Billinton delivered presentations or courses in 42 countries, along with 100-plus short courses to electric power utilities, flying more than a million airline miles in the process.

He did this work while making considerable contributions to teaching and learning at the engineering college, supervising more than 135 graduate students.

He also served as head of the Department of Electrical Engineering; associate dean responsible for graduate studies, research and extension; assistant dean; and acting dean.

Reflecting on his career and the lifetime achievement award, Billinton, though pleased with the recognition, offers a typically understated response: "It's a nice way to finish up".

Dr. Ajay Dala receives Distinguished Professor title

University of Saskatchewan - Dr. Ajay Dalai (PhD), P.Eng., has been granted the title "Distinguished Professor" by the University of Saskatchewan, recognizing that his research has significantly enhanced his field of knowledge.

Those who hold the title are nationally and internationally recognized for their impact and leadership and their sustained distinction in research.

Dr. Dalai, a professor in the Department of Chemical and Biological Engineering, is a Canada Research Chair in Bioenergy and Environmentally Friendly Chemical Processing.

Safa Kasap, P.Eng. and Roy Billinton, P.Eng., both of the Department of Electrical and Computer Engineering, also hold the title.

Recipients of the Distinguished Professor title must be nominated for the honour. The program is overseen by the Office of the Vice-Provost, Faculty Relations, in conjunction with the Office of the Associate Vice-President Research. A maximum of 30 professorships may exist at any one time. Distinguished Professors Emeriti are not included in this quota.

News Beyond Our Borders

Dr. Donald S. Mavinic, P.Eng.

UBC engineering prof named to Order of Canada

UBC Engineering - Donald Mavinic,P.Eng., a professor emeritus in UBC's Department of Civil Engineering and an internationally recognized expert in water treatment, has been appointed to the Order of Canada "for his contributions to environmental engineering science and technology in Canada."

One of the country's highest honours, the Order aims to recognize people "whose service shapes our society, whose innovations ignite our imaginations, and whose compassion unites our communities."

Mavinic joined the UBC Applied Science faculty in 1973 and has led numerous advances in the field of wastewater management over the course of his career. These include the development of a system that transforms harmful phosphates from municipal wastewater systems into a clean, continuous-release fertilizer known as Crystal Green, which increases crop yields and minimizes nutrient leaching and runoff.

In addition to helping wastewater treatment facilities keep their pipes and equipment free of costly mineral build-up, the technology may prevent toxic algae blooms in natural waterways and reduce the need for carbon-intensive phosphate mining.

Program named 'Entrepreneurial Powerhouse'

UBC Engineering - Rashmi Prakash, a master's student in UBC's School of Biomedical Engineering, placed first in the graduate track of the BMO Financial Group Apex Business Plan Competition, hosted in late January at the University of New Brunswick.

Gareth Kaczkowski, a fourth-year integrated engineering student, and Aaron Janz, a fourth-year engineering physics student, placed third in the competition's undergraduate track. UBC as an institution received the Entrepreneurial Powerhouse Award.

Prakash impressed the judges with Flutterlet, a startup that aims to help pregnant women by taking the stress out of tracking fetal activity.

The conventional tracking method, known as "kick counting", is manual, tedious and highly subjective. Prakash's technology would automate the process, increase its reliability and potentially enable doctors to intervene at the first sign of trouble.

Kaczkowski and Janz finished third out of all the undergraduate competitors with their company StoneOyster Biotechnologies, which would recycle waste oyster shells into sustainable artificial stone countertops.

Prof receives China's top award for foreign experts

Keith Hipel, P.Eng.

University of Waterloo - Keith Hipel, P.Eng., a systems design engineering professor, was recognized with the 2019 China Friendship Award.

The honour is China's highest recognition bestowed upon foreign experts for "their important contributions to the promotion of China's modernization, friendly exchanges and mutually beneficial cooperation between China and foreign countries."

Hipel has visited China on many occasions as a foreign expert since 1982.

The author of five books and almost 600 academic papers and conference articles, his unique research covers areas including conflict resolution, multiple criteria decision analysis, time series modelling and other decision-making methodologies.

Hipel, who earned his three degrees at Waterloo before launching his academic career in 1976, also was named one of five recipients of

the 2019 Killam Prizes through the Canada Council for the Arts. He has been recognized with numerous other prestigious honours over his career including being named an Officer of the Order of Canada in 2018.

B.C. engineer inducted into Inventor's HoF

Dr. Jim McEwen, P.Eng.

Engineers Canada – B.C. biomedical engineer Dr. James McEwen, P.Eng., will be inducted into the U.S.-based National Inventor's Hall of Fame for his creation of the first microprocessor-controlled automatic surgical tourniquet system. Devices based on his innovations are used worldwide in close to 20,000 surgeries each day.

After completing doctoral research at Vancouver General Hospital, Dr. McEwen established its biomedical engineering department, where he investigated situations where patients suffered limb paralysis, nerve damage and other injuries due to surgical tourniquet use.

In the mid-1970s, McEwen's research had revealed problems with mechanical pneumatic tourniquets, including an unreliable pressure-regulating mechanism and no fail-safe feature to limit maximum cuff pressure.

Dr. McEwen received Engineers and Geoscientists B.C.'s Meritorious Achievement Award in 1999. He will be inducted to the National Inventor's Hall of Fame at a ceremony on May 7 in Washington, D.C.

Exceptional woman in aerospace

McMaster Daily News - Hira Nadeem's goal as an emerging aerospace engineer is simple: To "bring space down to earth."

In her final year of electrical engineering at McMaster University, she's now one step closer to making her mark in the aerospace industry as a Brooke Owens Fellow.

The fellowship recognizes 40 exceptional women and gender minorities in aerospace each year for their talent, competency, commitment to service and creativity, helping them grow into leaders in the field.

Nadeem is the first Canadian student awarded the fellowship since it began in 2017.

As a Brooke Owens Fellow, Nadeem will begin a 12-week internship in June 2020 working with satellites for earth observation at Planet Labs San Francisco office. Planet Labs is known for having the most cube satellites in space.

Andrea Bradford Ph.D., P.Eng.

Prof among Women of Distinction

University of Guelph - University of Guelph engineering professor Andrea Bradford is one of several women to be honoured at this year's YMCA-YWCA of Guelph annual Women of Distinction celebration.

Bradford is an internationally recognized water resource engineer who studies water management for wetlands and rivers. She researches urban water systems, low-impact development and stream and wetland restoration.

Innovation needed to meet oilsands threat

macleans.ca

University of Calgary - Sparking new ideas from a vibrant culture of innovation is vital to ensuring oilsands and heavy oil production continues in Alberta, said a University of Calgary researcher.

"If we do not find a clean way or a cleaner way to produce bitumen and then start to look at the end use of bitumen, if we don't find this, there is an existential threat here with respect to the oilsands industry," said Dr. Ian Gates, PhD, P.Eng., who is the director of the university's $75-million Global Research Initiative (GRI) in Sustainable Low Carbon Unconventional Resources.

"We are not going to be the Alberta of the '60s, '70s, '80s, '90s and 2000s … or 2010s," said Gates, who is also a professor in the department of chemical and petroleum engineering at Schulich School of Engineering.

"We're going to go beyond that and that's where I would put all the investment opportunities."

Gates co-founded Proton Technologies, an Alberta company that is field testing the commercial production of hydrogen gas directly from heavy oil and oilsands deposits while leaving the carbon in the ground.

Hydrogen is seen as a green fuel for potentially everything from powering cars to heating homes because its emissions only consist of water vapour.

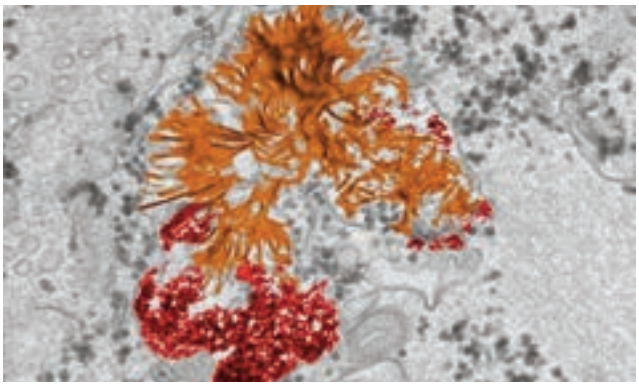
Proton's process is expected to produce about 18 gigajoules of energy per gigajoule invested.

Gates also co-founded Solideum, an Alberta company that is field testing a way to better transport bitumen by turning it into dry pellets.

The new method of railway shipment promises to substantially cut both carbon emissions and costs while improving safety.

Besides being turned into oil, the pellets could be a source of everything from carbon fibres to asphalt for roads, potentially creating new markets for Alberta's oilsands industry, said Gates.

Researcher sees gold in speed



phys.org/news/

University of Victoria - Somewhere between gold and glass lies a new material that could end a decade of stagnant computer speeds, suggests a University of Victoria engineer whose research is adding to that vision.

"Computers have changed our lives in ways we never imagined," says Reuven Gordon, Canada Research Chair in Nanoplasmonics.

"But they stopped getting faster in the last 10 years because silicon as a semiconductor has reached its limit."

"The world is going to change in ways that we're not going to recognize, but to get there, we need to overcome that silicon barrier."

Gordon's research involves finding ways to squeeze light to see molecules — work that has relevance in fields from health to energy.

A beam of light from the sun is 1/200th the size of a single strand of hair, but has to be squeezed down to a size 200 times smaller still in health research in order to make visible the tiny proteins responsible for virtually every function in the human body.

So, what's that got to do with computers?

Gordon and his research team frequently use gold surfaces and gold nanoparticles in their work and recently ended up creating an artificial material that can switch from the conductive qualities of gold to the insulating qualities of glass.

In another experiment, Gordon's team applied light to nanoparticles of gold to make them move 500 times faster than the "clock speed" of a computer, the millions or billions of pulses per second known as megahertz and gigahertz.

Gordon thinks that this extremely rapid movement of the nanoparticles could ultimately revolutionize the speed of future-generation computers.

Help needed in Canadian mining

Mining.com - Competition for skilled workers within the Canadian mining industry is already fierce, and with companies in other countries also actively recruiting Canadian graduates and workers, it creates a significant skills gap in the sector, according to The Mining Association of Canada's latest report.

talentegg.ca

Canada's mining industry is worth $47 billion, with $29.6 billion concentrated in Ontario, Quebec and British Columbia, according to *The State of Canada's Mining Industry, Facts and Figures 2019*.

Together, the industry's direct and indirect employment exceeds 626,000 jobs, accounting for one in every 30 jobs in Canada. The industry will need to hire 79,680 new workers over the next decade and this workforce shortage is compounded by the wave of the industry's skilled core of workers who are retiring.

By 2030, the Mining Industry Human Resources Council (MiHR) forecasts that more than 57,000 employees will retire from the sector, which represents more than 25 per cent of the industry's current workforce by MiHR definitions.

The federal government has taken some steps to help address these problems, including through the expansion of the Youth Employment Strategy, the proposed Post-Secondary Industry Partnership and Co-operative Placement Initiative and continued funding for the Indigenous Skills and Employment Training Strategy (ISETS).

Engineers Canada celebrates International Women's Day and National Engineering Month

Canadian Consulting Engineer - To acknowledge its commitment to International Women's Day, while also celebrating March as National Engineering Month, Engineers Canada participated in both the #EachforEqual global social media campaign and the #NEM2020 national campaign.

This year's theme for International Women's Day, #EachforEqual called for 'collective individualism' to help accelerate the achievement of gender equality.

National Engineering Month highlights gender (and other) diversity across the profession to let young Canadians know it offers a place for them.

On a longer-term basis—and as one of its top strategic priorities—Engineers Canada is working to increase representation of women in the field, primarily through its '30 by 30' initiative, which aims to raise the proportion of newly licensed engineers who are women to 30 per cent by the year 2030. The initiative also encompasses the retention and professional development of women already in the profession.

Having established the initiative's goals, action plans and support structure, Engineers Canada will undertake full implementation and a progress report this year.

Women in Construction

Canadian Consulting Engineer - Canadian Consulting Engineer joins sister publications *On-Site, Rock to Road and Crane & Hoist Canada* in celebrating women in the construction industry with a special new website, sponsored by John Deere.

Launched in time for International Women's Day, the site features both new and existing content from all four publications. More will be added over the next month.

Building a Sustainable World Needs More Women

spectrum.ieee.org

World Economic Forum – Women represent half of the world's population, need the same resources and face the same global challenges – often at a disadvantage – as men.

And yet, far fewer women are involved in designing and developing smart, sustainable technology-based solutions that would allow us all to live better lives.

With women making up just eight to ten per cent of engineers in countries like Kenya and South Africa, such gender-responsive insights are likely to be missed.

This is also true in more industrialized countries like Canada and New Zealand, where women continue to be under-represented in engineering, often accounting for less than a fifth of the engineering workforce.

As a result, we arrive at situations including car-crash tests carried out only with male dummies up until 2011, or medicines tested and produced with only male biology in mind.

Recruiting more female engineers can improve the design of new products and solutions to benefit both men and women.

Women engineers are also needed as role models to inspire more girls – as well as boys – to study science and technology-based subjects and foster a new generation of technical professionals.

Many countries worldwide are suffering from a shortage in engineering talent, which is often compounded by the prejudices that hold back half of the potential workforce.

Efforts to increase gender balance in higher education, such as the UK government-funded Athena Swan Charter and the UNESCO STEM and Gender Advancement Project (SAGA) for improved national policies, have helped to make a difference.

But even in countries such as Kuwait, where women make up to 60 per cent of university engineering students, many do not then go on to enter the workforce.

If we are to have any hope of delivering the UN Sustainable Development Goals by 2030, we must draw upon the skills and talent of men and women alike, and this means continually working to create a more supportive environment for women to study, work and thrive.

Women have an important contribution to make in building a more equal world. They just need an equal chance to do so.

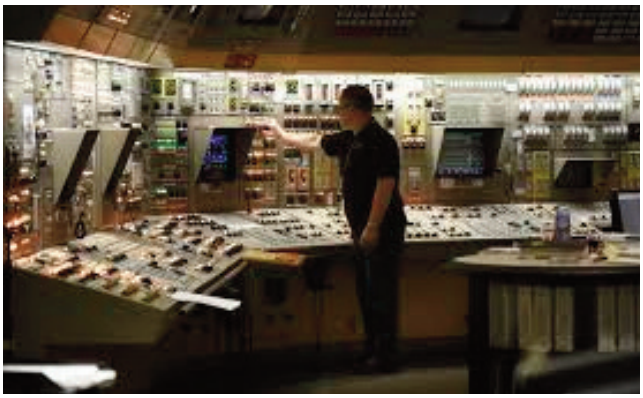
Small-scale nuclear reactors

BBC - In Corvallis, Oregon, engineers at the company NuScale Power hope to define the next wave of nuclear energy.

Glowing icons fill the screens, representing the power output of 12 miniature nuclear reactors. Together, these small modular reactors (SMR) would generate about the same amount of power as one of the conventional nuclear plants that currently dot the United States – producing enough electricity to power 540,000 homes.

NuScale is not alone in developing miniature reactors.

In Russia, the government has launched a floating 70MW reactor in the Arctic Ocean. China announced plans in 2016 to build its own state-funded floating SMR design. Three Canadian provinces – Ontario, New Brunswick, and



globalnews.ca

Saskatchewan – have signed a memorandum to look into the development and deployment of small modular reactors. And the Rolls-Royce Consortium in the UK is working on the development of a 440MW SMR.

Proponents say the time is ripe for this new wave of nuclear reactors for several reasons.

First, they maintain that if the global community has any hope of slashing CO_2 emissions by mid-century, new nuclear technologies must be in the mix.

Second, traditional nuclear power is beset with problems. Many existing plants are ageing, and new nuclear power construction is plagued by substantial delays and huge cost overruns.

Finally, advocates say that as supplies of renewable energy grow, small modular reactors can better handle the variable nature of wind and solar power as SMRs are easier to turn on and leave running.

News From The Field

MINING & EXPLORATION

?nationalpost.ca

Rising helium prices renew interest

Global Regina - The rising price of helium has brought renewed interest in the Saskatchewan industry.

"We're kind of at the equivalent of the oil and gas industry back in the '50s," said Melinda Yurkowski, P.Geo., chief assistant geologist at the Saskatchewan Geological Survey.

"We're just sort of learning the tricks and the tools that we need to explore… and develop helium", she said.

The price of helium has spiked in recent years, driven by decreasing supply and increasing demand. The U.S. government decided in 2015 to sell off its strategic reserves, limiting the amount available.

Increased production of products like microchips and fibre optic cables, in which helium is used, has increased the need.

Saskatchewan has exported helium since the 1960s and in the space race, NASA used Saskatchewan helium to help fuel rockets.

Yurkowski said there are now nearly 300 permits and leases to look for helium in the province, roughly 100 of which were received in the past year.

The Prairies are especially suited to helium.

"It's been a tectonically stable area for a very long time and the helium, that is a by-product of uranium and thorium, has been allowed to accumulate," Yurkowski said.

Canadian mining takes a hit

Financial Post - Global commodity investors are taking note as Canada grapples with cancelled projects and entrenched opposition to the development of its resources.

This was evident in the annual survey of mining executives by the Fraser Institute that shows Canadian provinces are no longer considered among the top 10 places in the world to invest for mining. Last year's survey had four provinces in the top 10.

Saskatchewan was the highest ranked province at 11th, down from third last year, followed by Ontario at 16th, Quebec at 18th and British Columbia at 19th, according to the survey. This is the first time in the past 10 years that no province has cracked the top 10 on the investment rankings.

The top three most attractive global mining jurisdictions for investment this year were Western Australia, Finland and Nevada. Alaska, Portugal, Idaho, South Australia, Republic of Ireland, Arizona and Sweden completed the top 10 list.

There were a few bright spots in the report for Canadian jurisdictions, however. Alberta, Newfoundland and Labrador and Saskatchewan all made the top 10 of the report's policy perception index which is separate from another index that is based purely on mineral value and geologic potential. The two indices combine to form the overall investment ranking.

Sask sets gold production record

forbes.com

CBC Saskatchewan - Gold production in Saskatchewan hit a record high last year, according to the province's Ministry of Energy and Resources.

In fact, the ministry said 2019 was the fourth straight year that a new record for gold production was set.

All of the gold produced in Saskatchewan comes from the Seabee Gold Operation, the province's only active gold mine. It produced 112,137 ounces of gold last year, a 17-per-cent increase over the previous year, the ministry said.

The Seabee gold operation is owned by SSR Mining and is located about 125 kilometres northeast of La Ronge.

Production takes place at the Santoy underground mine before the ore is processed at the nearby Seabee mill facility.

ENERGY

Nuclear energy top of mind

interestingengineering.com

CKRM - Saskatchewan's Minister for the Environment was at the Canadian Nuclear Association annual conference and trade show in Ottawa in early March.

With speakers and experts from the industry attending, Minister Dustin Duncan said the interest in nuclear energy is top of mind with people wanting to see greenhouse gas reduced.

"This is clean energy, a clean energy source that would be a good partner with renewable energy. In Saskatchewan, we are looking at a 40 per cent reduction of greenhouse gas emissions by 2030, by pairing renewable energy with natural gas. In order to move beyond that 40 per cent we would really need to look at technology like nuclear going forward."

Duncan said that in the past conventional large-scale projects have been looked at but often come with challenges like the public perception of not wanting to move forward with nuclear technology. With small modular reactors Duncan calls the technology next generation.

According to Duncan, this could be a $150-billion industry worldwide and he says any advancement for nuclear industry has a positive effect in the province, especially when it comes to mining employment.

Funding approved for inter-provincial power line

CTV News - The federal government announced funding for the Birtle Transmission Line.

The project will help Manitoba Hydro build a transmission line from Birtle South Station in the Municipality of Prairie View to the Manitoba-Saskatchewan border 46 kilometres northwest. Once completed, the new line will allow up to 215 megawatts of hydroelectricity to flow from the Manitoba Hydro power grid to the SaskPower power grid.

The government said the transmission line would create a more stable energy supply, keep energy rates affordable and help Saskatchewan's efforts to reduce cumulative greenhouse-gas emissions in that province.

Transitioning away from coal

CBC Saskatchewan - The Saskatchewan government is doling out $10 million to help two coal-reliant communities transition to cleaner energy industries.

Estevan will receive $8 million. Coronach will receive the remaining $2 million.

The funding comes with a catch. The money is to be spread to neighbouring municipalities to help them build up cleaner energy infrastructure as well.

Moe used the announcement to scold Ottawa, saying the need to make this transition was imposed "much earlier than planned by new federal regulations."

New federal regulations require all coal-fired power stations to be decommissioned after 50 years in operation, or by the year 2030, whichever comes first.

The province said this will impact three power stations, several mines and hundreds of jobs in southeast Saskatchewan.

ENVIRONMENT

Sustainable solid waste strategy unveiled

leaderpost.com

Regina Leader-Post - A goal of Saskatchewan's solid waste management strategy is to divert half of the annual 842 kilograms-per-person of trash from landfills.

The strategy is three years in the making and was talked about for more than a decade before that.

One of its main goals is to divert solid waste from landfills.

Solid waste covers anything solid – plastic packaging, paper, food scraps, electronics – and Saskatchewan people per capita send 842 kilograms of solid waste to landfills each year, according to data from 2014. That includes waste produced by businesses and institutions and does not include products diverted to recycling streams.

This is problematic because landfills are expensive to run and hazardous to the environment, with waste leaching into groundwater, and organics decomposing to release methane into the atmosphere. Methane is a more potent greenhouse gas than carbon dioxide.

SaskPower is working with landfills to harness methane to create electricity.

UNIVERSITIES

Conference focuses on Indigenous STEM

CTV Saskatoon - About 200 Indigenous students, teachers and professionals recently took part in a science, technology, engineering and math conference at the University of Saskatchewan.

Co-organizer John Desjarlais, P.Eng., who grew up in Cumberland House and is an engineer, said Saskatchewan needs more Indigenous people in those areas.

"In a province like ours, representation is incredibly poor. About 16 per cent of the population of Saskatchewan is Indigenous, however there's only one or two percent Indigenous people in my profession."

Kindergarten through Grade 12 students as well as post-secondary students and some teachers learned about STEM fields and careers. Delegates are coming from across Canada and the United States.

Another organizer, Micheala Merasty, a third-year environmental biology student from Pelican Narrows, has always been interested in biology, she said. Having this opportunity to meet other people like her is invaluable.

"I loved biology as far back as I can remember. I would bring home frogs and one time my mom came home and there were 30 frogs in the tub."

She wasn't sure how she could further this love of biology until she found out about a program in environmental science. She wanted to be a part of this conference so that representation of Indigenous people in her field and other areas would increase.

This is the first time the conference has been held in Saskatchewan. The idea was modelled after a similar event in the U.S. Two other such conferences have been held in Canada and delegates from Saskatchewan have attended. They wanted to bring the opportunity here and showcase Saskatchewan's strengths in the four disciplines.

Organizer Julia Doucette-Garr, a third-year physics student from English River First Nation, hopes this event will help others realize their strengths.

"I was interested in sciences, but I was never submerged into that environment and I feel that's very important for Indigenous youth to hear, 'hey you're smart enough to do this. I believe in you.'"

It's crucial for Indigenous people to see themselves represented in the fields like science and math so they have role models and know they can achieve success too, she said.

Greenhouses a possibility in north

The Arctic Institute

University of Saskatchewan - Imagine having sustainable, cost-efficient greenhouses in the far north growing fruits and vegetables.

Researchers at the University of Saskatchewan are trying to make this a reality.

Nazanin Charchi, a PhD student in chemical engineering at the U of S, is using the Canadian Light Source synchrotron to develop a method to remove the chemical ethylene from the air, to help make a greenhouse viable in harsh environments like Canada's north.

"Basically, when the plants grow they produce ethylene," said U of S professor Jafar Soltan, P.Eng.

Soltan said ethylene works like a growth hormone. In warm climates, excessive ethylene can easily be removed by opening the windows. That's not an option in colder, harsher areas.

If you could somehow remove the excess ethylene without opening a window during cold winters, self-contained greenhouses become more cost efficient and sustainable.

That's where Charchi's research comes in.

Charchi is using the Canadian Light Source synchrotron to develop a method, or catalyst, to remove ethylene from greenhouses without needing outside air.

"The biggest impact of this research is on reducing energy consumption in those self-contained greenhouses," Soltan said.

"The technology that we have removes ethylene in the air inside the greenhouse so you do not need to bring in a lot of air from outside."

That offers the tantalizing prospect of making these greenhouses self-contained and energy efficient.

On top of that, Charchi said being able to remove the excess ethylene means greater longevity for fruits and vegetables that goes bad faster because of ethylene.

"This technology could make greenhouses more environmentally sustainable and less expensive to run. As a result, we could have more food grown in greenhouses in cold regions like Canada and more food security for our families," Soltan said.

Charchi said they have been successful in being able to use a catalyst to remove ethylene in the lab.

She said the next step is to partner with the air conditioning and Hvac industry to develop a commercial application for a new generation of greenhouses.

U of S partners with agriculture group

discoverweyburn.com

University of Saskatchewan - When your college is located in Canada's agricultural heartland, that shapes its research priorities.

"It's our responsibility to be the best at engineering for agriculture," says Terry Fonstad, Ph.D., P.Eng., P.Ag., FEC, associate dean research and partnerships at the University of Saskatchewan College of Engineering.

The college recently launched a partnership with Saskatchewan-based company VeriGrain to cooperate on research as the company develops technology to accurately sample grain in real time and digitize the data.

VeriGrain featured its technology recently at the Western Canadian Crop Production Show in Saskatoon, where Fonstad presented about the college's connection with the company.

The spin-off research opportunities created by these disruptive technologies are important to the college and the ag industry, he said.

Innovation group faces turning point

University of Saskatchewan - The student group SaskInvent is tackling bigger-scale projects, according to their president, Richard Gauvreau. He says that they have reached a point where their innovations are more than just "cool ideas".

SaskInvent is a multidisciplinary, student-run organization with a mandate to "[build] innovative biomedical technologies that help people".

With partnerships and a growing list of finished projects under their belt, the group has found success in designing innovative products by fusing together engineering principles and biological sciences.

The campus group was established in 2014 and has grown to 55 members. The members are divided into groups based on the project they are working on, which at the moment includes a hand rehabilitation device and a low-cost, repairable intravenous pump.

Another primary assignment the team has is a prosthetic arm project.

Perhaps the most popular project they have finished so far is a 3D model of a brain at the Royal University Hospital. The model was created to help diagnose a patient's condition as it is easier to navigate than with 2D prints.

Gauvreau, an engineering student, says the group is looking forward to building on this growth.

SaskInvent uses concepts such as mechanics and robotics to develop solutions to medical problems and they hope to add more subject areas to their multidisciplinary approach.

SaskInvent's growing popularity has brought the group to a turning point. With their size and variety of disciplines represented among members increasing, Gauvreau says the group has reached a new level.

Funding provided for livestock research

Global News - Researchers at the University of Saskatchewan received $7 million to study how to improve livestock's health and make farming more environmentally friendly.

The money is for 20 projects, including $3.2 million for seven projects at the university's Livestock and Forage Centre of Excellence.

The money comes from the province's Agriculture Development Fund and from "industry partners," according to the university.

The projects include breeding plants that cattle can more easily digest and growing better feed for cattle and sheep that would be able to be seeded and grow faster and potentially produce more food.

Terry Fonstad, Ph.D., P.Eng.,P.Ag.,FEC, associate professor at the university, is looking at how to better use manure in feedlots and how those lots can impact the environment.

He said when cows finish eating, the nutrients from their food need to go back into the field. He's looking at what methods have less of an environmental impact and are more sustainable.

Fonstad said his research will also help with permitting new feedlots in the province in the future by providing data on where and how they should operate to have the least impact on the environment.

Measuring pharmaceuticals in wastewater

setac.onlinelibrary.wiley.com

USask News - Five research projects at the University of Saskatchewan have been awarded a total of $100,000 through the Research Junction Development Grant program, a jointly funded university-municipal research partnership with the City of Saskatoon, announced in September of 2019.

The grants provide researchers with access to the City's resources, data and expertise and provide City staff with access to analyses and data resulting from the projects to inform decision-making.

One project of note: Measuring pharmaceuticals in Saskatoon's wastewater.

U of S toxicology researcher Markus Brinkmann, in collaboration with other researchers from U of S Toxicology Centre and the College of Engineering, will work with City's wastewater treatment plant operations manager Mike Sadowski, P.Eng., to conduct comprehensive measurements of pharmaceuticals – antibiotics, pain killers, beta-blockers, hormone-like substances and others.

The treated wastewater is discharged after an extensive treatment process at Saskatoon's wastewater treatment plant into the South Saskatchewan River.

Pharmaceuticals, while not officially regulated in wastewaters, have become an important class of wastewater elements that many treatment plants across Canada have worked to measure.

By sampling water in the wastewater treatment plant and downstream in the river, the researchers will work to better understand and stay current with technology and new solutions to treat wastewater.

OIL & GAS

Government looking at energy investment

cbc

Saskatoon Star Phoenix - On the same day an appeal court removed a major obstacle facing the federal government-owned Trans Mountain Pipeline Expansion, the Saskatchewan government signalled that it too is open to investing in pipeline projects.

The announcement came in the form of a new four-member cabinet committee tasked with reviewing pipelines to the U.S. and the Port of Churchill, MB as well as considering "possible government involvement" in such projects.

Details about potential government investment in a proposed pipeline are scarce, but Export and Trade Development Minister Jeremy Harrison - who sits on the committee - said overwhelming political risk meant considering options "beyond advocacy".

The committee reflects priorities in the government's new growth plan, which was released late last year and specifically mentions encouraging the development of pipelines to the U.S. and the possibility of shipping oil through Churchill.

Harrison said the government frequently talks to pipeline companies but admitted it has not reached out to the Manitoba government about a pipeline to Churchill.

"There's a lot of things that need to happen before we're at the point of announcing a project," he said.

Asked where the government - which aims to release a balanced budget next month after three years spent erasing a $1.2-billion deficit - would get the money to buy an equity stake in a pipeline, Harrison called funding it a "priority".

Searching for green hydrogen

moderndiplomacy.eu

Interesting Engineering – In February, a company planned to harvest green hydrogen by lighting underground oil reservoirs on fire, according to a report by Science Mag.

In the frozen plains of Saskatchewan, workers inject steam and air into Superb field, a 700-metre-thick layer of sand, which acts like a massive bottle cap to green hydrogen, and 200 million barrels of thick, black oil.

The goal isn't to pump out oil, but instead to burn it at a temperature hot enough to churn out hydrogen gas and carbon dioxide (CO_2).

The company behind this $3-million feat – Proton Technologies – intends to plug the subsequently infernal well with membranes that will allow clean-burning hydrogen to pass through for harvesting, at the surface.

The CO_2, which warms the climate, will remain buried deep underground.

The market for green hydrogen is growing because, as a fuel for power, heat and transportation, the by-product is nothing but clean water.

Most hydrogen is made from natural gas, via a chemical process that flings carbon into the air, or by electrolyzing water – both extremely expensive alternatives.

However, Proton Technologies believes it will cut costs by only mining oil reservoirs that drillers avoid such as those water-logged or with oil that's too thick to extract.

Aquistore's 4D seismic survey monitors CO_2 plume

Pipeline News - The last week of January had quiet thumps heard in the vicinity of the Aquistore wells, located approximately three kilometres west of Boundary Dam Power Station.

estevanmercury.ca

Roughly 400 of those thumps were shots of dynamite going off as part of an ongoing 4D seismic survey of the carbon dioxide injection into the Aquistore project.

Aquistore injects carbon dioxide captured at the Boundary Dam Unit 3 Integrated Carbon Capture and Storage (CCS) Project. CO_2 that is not used in the Whitecap Resources Inc.-operated Weyburn Unit for enhanced oil recovery (EOR) is instead injected 3.4 kilometres below the surface into deep saline aquifers.

The initial ones were done before the two Aquistore wells – an injection and an observation well – were drilled. They were meant to provide a baseline, prior to the injection of any CO_2.

The target is the Deadwood formation, which is about 200 metres thick, but it's not one big tank of sand.

The CO_2 injection has been pretty steady at 400 to 500 tonnes per day, but part of the plan is to ramp up the injection rate in an incremental manner from the usual to the maximum injection rate. That could possibly be up to the full production capacity of the plant, 2,800 to 3,000 tonnes per day to see that, if necessary, this injection well can handle that amount.

The PTRC and Deep Earth Energy Production Corp. (DEEP) have similar interest in the Deadwood formation. DEEP's interest is to use that formation as a source of geothermal heat.

Calendar Of Events

The Regina Engineering Society Annual Horizons Dinner
April 16, 2020
Regina. SK
regina.engineering.society@gmail.com

Law & Ethics Seminar
April 17 - 18, 2020
Saskatoon
www.apegs.ca/Portal/Pages/Professional-Practice-Exam

CIM Saskatoon Branch Social Networking Evening
April 23, 2020
Saskatoon, SK
https://www.cim.org/subsites/branches/saskatoon/

ConEx: The Builders Expo
April 29, 2020
Saskatoon, SK
https://www.conexsask.com/

APEEGS' 90th Annual Meeting and Professional Development Conference
April 30 - May 2, 2020
Saskatoon, SK
http://www.apegs.ca

Indigenous Awareness Training Sessions in Saskatchewan, Yorkton
May 05, 2020
Yorkton, SK
https://business.saskchamber.com/events/

Uranium 2020
May 10 - 13, 2020
Saskatoon
https://u2020.metsoc.org/registration/

GeoConvention 2020
May 11 - 13, 2020
Calgary, AB
https://geoconvention.com/

Indigenous Awareness Training Sessions in Saskatchewan, Swift Current
May 13, 2020
Swift Current, SK
https://business.saskchamber.com/events/

2020 CCWESTT Biennial Conference
May 21 - 23, 2020
Winnipeg, MB
https://ccwesttconference.org/

CIM Saskatoon Branch 41st Annual Golf Tournament
June 26, 2020
Saskatoon, SK
https://www.cim.org/subsites/branches/saskatoon/

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