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*Association of Professional Engineers  
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THE PROFESSIONAL

# EDGE

ISSUE 182 • SEPTEMBER/OCTOBER 2019



## Food and Food-Processing

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<sup>3</sup> Statistics Canada, "Average spending on goods and services and shares of spending of major categories by province, 2016," 2017.

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## On the cover:

Amie Harrison, Engineer-in-Training  
 Prairie Agricultural Machinery Institute (PAMI)



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## Feeding the Masses

### Letter to the Editor

Dear Editor,

I very much enjoyed the article “*Compassionate Professionalism and Social Sustainability*” in Issue 181 of *The Professional Edge*. However, I would like to clear up one misconception. The article contends that Saskatchewan was the birthplace of the cooperative movement. The cooperative movement actually started in Europe and my home town, Rochdale, UK claims to be the birthplace of the modern movement.

Regards,  
Linda Bray

## President's Message



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

This issue of *The Professional Edge* is dedicated to food and food processing in Saskatchewan.

The driving forces of Saskatchewan's economy are often referred to as agriculture, mining and energy. Saskatchewan is home to over 40 per cent of Canada's arable land, but combined with adjacent lands in Alberta and Manitoba, the total represents approximately 82 per cent of Canada's arable land.

If these numbers don't give you an idea of the importance of our area for food production, consider the United States and Canada have approximately 2.8 acres per capita and 4.3 acres per capita of arable land respectively while Manitoba and Alberta contain approximately 13 acres per capita but Saskatchewan has approximately 55 acres per capita.

Add to this the estimate that Saskatchewan has approximately 60 per cent of world potash reserves, and the importance of this area to national and world food production becomes even more significant.

Canada passed the *Dominion Lands Act* of 1872 that granted ownership of a quarter-section of land in Western Canada if the individual could "prove up" on that land by cultivating at least 40 acres and building a residence within the first three years. This was done partially to settle Western Canada and develop farming (food production) and partially to ensure the United States did not claim the area.

This was accomplished through treaties with the First Nations of the area for settlement and farming of the land but there remains today disagreement over sharing of other natural resource and delivery on promises made in those treaties. The harsh conditions proved too much for many settlers and those remaining were allowed to purchase up to an additional two quarters of land.

When Saskatchewan became a province in 1905, there were approximately 95,000 farms. By 2016, this number had reduced to less than half that number but involved over \$94 Billion of on-farm capital.

At the time of settlement, farming was powered by actual horse power and transportation of grain was difficult over long distances. As such, rail systems and elevators were established approximately every 10 kilometres or so along the rail line to gather grain. To get this grain to market, farmers took advantage of the rates imposed on the CPR, referred to as the "Crow Rate". This resulted in processing of grains closer to the more populated areas. This also resulted in the benefits of processing by-products being realized in those areas.

By the mid 1990s this transportation rate program was eliminated and it started to make sense to process agricultural commodities closer to the location of production, although bulk transportation of processed material still makes the most sense. Today we see food processing facilities in the area like McCain Foods, AGT and Bioriginal to name a few.

Mechanization of agriculture by engineers was named one of the greatest achievements of the 20th century that has changed our lives. In addition to mechanizing agriculture, engineers built 20 per cent of Canada's roads in a province with two per cent of the population to facilitate food production. They also developed an extensive distribution system of natural gas and electrical power along with wireless communication to support farming.

At the same time, geoscientists and engineers developed groundwater resources and irrigation to provide water security in an arid climate along with coal mining for energy and potash mining to provide the world with fertilizer.

Many of the innovations we see today have been initiated by farmers themselves and developed with the assistance of engineers. Many of the innovations in airseeders for zero-till production were developed in the small soil bin at the College of Engineering at the University of Saskatchewan.

Add to these innovations the advances in crop development by the College of Agriculture and Bioresources at the University of Saskatchewan and Agriculture and Agri-Food Canada research centers, and we now produce three times the quantity of food on the same area of land as we did in 1950. Coincidentally, this is the same rate increase as world population growth, bringing up the question of whether or not we will be able to continue to match food production increases with world population growth.

Development of zero-till seeding technology has resulted in numerous world-leading seeder manufacturers locating

in Saskatchewan. One which has just been released is the first autonomous seeder to the market.

A great example of Saskatchewan innovation feeding the world is the development of the crop canola. Canola was developed in Western Canada to provide an edible variety of rape seed oil. Today, over 23 million acres of canola is grown. Cargill's canola processing facility east of Saskatoon is the largest softseed crush plant in the world processing over 50 rail cars (4500 tonnes) of canola daily into food grade edible oil.

As the world population continues to grow, protein production will need to be increased. Canada has facilitated the establishment of Protein Industries Canada in Western Canada through the Innovations Supercluster Initiative to position us to meet this world protein need.

APEGS members will continue to provide world leading solutions to food production and processing. Feeding an ever increasing population may well prove to be our greatest challenge.

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# Meaty But Meatless

## Protein Industries Canada Delivers Lucrative Innovation

BY MARTIN CHARLTON COMMUNICATIONS

**W**hen Protein Industries Canada (PIC) was selected as one of the new federal research superclusters in early 2018, few people had yet heard of Beyond Meat. When PIC's proponents talked about a growing global trend towards plant-based proteins, some might have thought they were a little crazy.

But Meghan Gervais, P.Eng. was not one of those people. With a long history in food processing and biotechnology, Gervais jumped at the chance to join the supercluster's senior staff this summer.

Today, Gervais is PIC's Intellectual Property Manager, helping to support PIC's mission to inspire innovation and support collaboration to transform Canada's agriculture and food processing sectors.

### **A Gathering of Minds, Not Offices**

A common misconception about the supercluster concept is that they are huge research centres that gather together many scientists. In fact, aside from administration offices, the supercluster doesn't occupy significant physical space.

"Our job is to bring people together, including researchers, entrepreneurs, large companies and others. We help break down silos and industry-wide barriers to build better value-chains," Gervais said.

The organization is focused on cooperative technology development and requires all project consortiums to include a commercialization component. The goal of the supercluster is to challenge Canadian businesses to collaborate with other businesses, and post-secondary and research institutions to create projects that have the potential to transform the food processing sector in Canada, creating jobs and stimulating local economies.

### **The Opportunity**

Western Canada and agriculture are practically synonymous terms. According to PIC, the region has more than 28 million hectares of arable land, accounting for more than 85 per cent of Canada's production base.

This capacity for food production will be desperately needed in the coming years, according to Gervais.

"By 2050, global food demand is expected to rise by 70 per cent on the back of three billion more middle-class consumers – mostly in Asia – whose diets are shifting to include more protein. Think about it this way: the world will need to produce as much food in the next 45 years as in the previous 10,000 years," Gervais says.

And then there are all those consumer trends that PIC predicted. The word "flexitarian" – mostly vegetarian but not obsessive – had not even been coined in early 2018 but



Meghan Gervais, P.Eng.

today is an increasingly common diet choice. Hardly a month goes by without another chain restaurant launching a plant-based meat substitute product. As well, PIC’s projects help to meet growing demand for high protein but lower cost products for livestock feed, pet food and aquaculture.

According to PIC’s five-year strategy, the global plant-

based protein market is expected to nearly double in the next five years, growing from an estimated \$8 billion US today to \$14.8 billion US by 2023.

### PIC Your Project

PIC administers a \$150 million fund to co-invest in projects that cut across four main focus categories.

**Create** – Projects that focus on advanced breeding technologies and germplasm development.

**Grow** – Projects that concentrate on primary production and sustainability, including technologies such as data and predictive analytics, artificial intelligence, automation and sensor technology.

**Make** – The Holy Grail of Western Canadian agriculture: value-added processing. These projects centre on improving current processes, developing new technologies or developing entirely new products from existing commodities.

**Sell** – These projects focus on developing new markets for human, livestock, aquaculture and pet food products.

According to Gervais, 16 projects were invited to full proposal from 38 applicants to the first round of expressions of interest. The second round that closed in September has seen similar levels of interest.

She notes that, from the first round, 17 per cent are in the Create category, 11 per cent in Grow, three per cent are in Sell but a whopping 69 per cent are in the Make category.

“Seeing that overwhelming interest in value-added production really speaks to our mandate of putting processing closer to production. It shows what a strong desire there is for those enterprises in Western Canada,” Gervais says.

### Managing the Value of Ideas

At present, Gervais is the only engineer working at PIC. She holds two roles with the organization. First and foremost, she is the Intellectual Property (IP) Manager, a role that brings her into contact with every project under PIC’s wing.

“All projects must have an IP strategy. That’s to ensure that there is value for Canada, that we are creating products with economic value that will accrue here. Some of our members are early-stage entrepreneurs – people with an idea – who may not have had previous experience protecting their IP. So, I work with members to provide them with IP training and support to ensure they can meet this requirement,” Gervais says.

“My second role is as a program specialist and project lead for a selection of projects. In that role, I work with the proponents from start to finish – from helping them to develop an expression of interest to working with them on a full proposal and down the road, participating on project steering committees.”

In both roles, Gervais’s engineering background has been an asset.

“As IP Manager and project lead, I’m expected to have knowledge of the technologies proposed to make sure they align with our mandate. My engineering background is very useful in helping me ensure the design and engineering is sound on every project.”

### A Personal Career Journey

For Gervais, PIC is the culmination of many of her career goals.

“Although my field is in process engineering, I always wanted to work in the value-added agriculture sector. In the early 2000s, the job





opportunities for Saskatchewan’s engineers in that field were very limited so I was looking at the prospect of having to move to Ontario,” Gervais says.

“I was very lucky to get a job in Saskatoon with POS Bio-Sciences (now known as KeyLeaf Life Sciences) who were leaders in this field in Saskatchewan at the time. Now, of course, there are so many more opportunities in areas like pea and lentil processing – so many, in fact, that we’re seeing process engineers from the oil and gas sector crossing over to the food sector.”

Gervais subsequently held various jobs at POS and at the Saskatchewan Research Council. In the course of these jobs, she picked up experience in biotechnology and intellectual property management. Along the way, she also earned her MBA. Her job at PIC allows her to combine and expand on all of that experience and training, she says.

## Looking Ahead

Technically, PIC’s mandate and funding only runs until 2023 but Gervais sees a world of opportunity beyond that.

“One thing our team talks about a lot is co-products of the food applications such as cosmetics or industrial applications of the plant fibres. We are also still in early days in the Sell category of developing export markets and establishing a global brand for Canadian plant proteins,” Gervais.

“So, there will still be a lot of exciting work to be done after 2023. We know the opportunities for plant protein and Western Canada are vast. Our focus now is building a sustainable sector that is able to meet global demand.”



# PAMI – Food Process Scale Up

BY MARTIN CHARLTON COMMUNICATIONS



**P**ulse crops are a multi-billion-dollar industry in Saskatchewan and a team at Prairie Agricultural Machinery Institute (PAMI) recently helped design a process that may add more dollars to this province's economy by means of its top export.

More than 25 engineers of various backgrounds, technologists and technicians at PAMI adopted a food process scale-up production project as their baby. After two years of engineering and testing, close to 7,000 labour hours and a few sleepless nights the team finally achieved success.

Amie Harrison, Engineer-in-Training and various colleagues at PAMI worked with a client (for confidentiality reasons will remain anonymous) to help amplify an original process idea for pulses into a full-scale commercial process.

The client knew they wanted to extract protein from the pulses but didn't have the steps needed to get from the raw product to the final product. Thus, they sought PAMI's engineering expertise to help get them to a point where they could get to work in their own building with what PAMI designed.

This project was completed in PAMI's Crop Processing Development Centre (CPDC), a flexible and configurable space that can be used to support primary processing of crops and by-products.

"We were the one-stop shop for this whole project," said Harrison, a chemical Engineer-in-Training who served as the project manager for this undertaking.

"From the engineering design, to the fabrication of equipment, to the actual operation of the test plant. We applied all of the necessary resources to execute the project within the given scope, budget and schedule, getting the client to where they wanted to be."

And where they wanted to be was a major leap from the original starting point. The client first presented a small Ziploc bag of the raw commodity to the team at PAMI and indicated they wanted one metric tonne per hour to be processed.

"You could imagine what we were up against," explained David Yee, vice-president of Saskatchewan operations at PAMI.

"Someone hands you a small bag and tells you they want a metric tonne per hour processed. And they want those physical characteristics with these particular features and this level of moisture content and so on. This was a huge engineering endeavour."

"In order to get to a consumer market, someone has to scale it up."

Delivering pulses to market is big business in western Canada. Saskatchewan is the largest exporter of chickpeas and lentils and a significant producer of beans and dried peas. In recent years, agri-value companies have stepped in to make significant investments into further processing these crops.

Which translates into job opportunities. This project supported the Government of Saskatchewan's value-added strategy target of increasing revenue from \$3.5 billion in 2012 to \$6 billion in 2020.

"One thing I found with this project was how challenging it is right now in western Canada to find highly qualified people, especially in the engineering discipline, to help support process engineering in the food and agri-food sector. More importantly, how valuable they are to the overall process of creating a food ingredient," Yee said.

"Engineering plays a significant role and that role is about making a business proposition and a business plan actually

**"In order to get to a consumer market, someone has to scale it up."**





**Amie Harrison, Engineer-in-Training**

work. In food ingredient processing, process flow and cost-per-tonne is a huge part of the solution.”

Transforming a raw pulse into an intermediate product that could eventually be used for commercial purposes was the goal for the PAMI team of engineers and technologists.

They started with bench-scale testing in a lab. Once they had proven the concept of taking their raw product (pulses) to the intermediate product they were looking for, it was time to design the equipment specific to this project.

The first days of the project saw the team experimenting with crude methods and equipment like microwaves and rolling pins in the lab to gain a better understanding of the type of commodity they were working with and what its characteristics entailed.

“At one point in working with this product, you could walk into the processing facility and it was as if it was snowing on you. That was all of your pulse dust, your product turning into dust ... you’re losing money,” Yee explained.

“When we were finally done with the process you could walk in and go to a wedding afterward. You wouldn’t have one flake of dust in your hair. We were able to preserve all of the product.”

Eventually, a pilot plant was designed to test the process more completely. The pilot plant was still very manual and required manual labour to process the pulses into the intermediate product.

The next part of the project involved the design and fabrication of process equipment to be incorporated with the previously verified process equipment. Custom-made conveyors were designed and needed food-grade belting. Angles needed to be adjusted so the pulses would travel correctly. Cleats were added to help the pulses climb.

Once this equipment had been developed, a new process was created that was able to manage commercial scale with minimal labour.

“Food ingredient processing isn’t done by hand. It’s done by machinery. If you don’t have machinery support then most often, you don’t have a business plan that will work in the marketplace,” Yee said.

“If you think you can just go out and buy food processing machines from wherever and you think you can just plug them in and have the whole system work perfectly then you’d be deluded in that concept. The machines do not integrate. It’s the humans who do that integration. The integration we did within this project involved multiple machines that had to connect and deliver process flow. We had to look at bottlenecks and feed grades, things that could deliver the types of properties they wanted in their food ingredients and deliver it fast enough and at a quantity large enough so they could meet their business plan.”

Once the equipment was verified, the team was ready to jump to a commercial scale process that was less manual and more automated. One-metric-tonne bags were emptied into the process using a forklift. An optimized bagging system was used to fill the mini bulk bags at the end of the process.

The PAMI team worked a few campaigns with the client and never ceased operation during a two-week stretch that had machines running around the clock.

“It was a continuous and optimized process,” Harrison said. “You could see the inlet and you could see the outlet. You could watch these pulses travel through the process from the start line to the finish.”

One of the main goals was to reduce the cost per tonne while they were processing. The way to do that was to automate the process as much as possible. So, eventually conveyors moved the pulses instead of people.

“You want to be as efficient as possible and that means not shutting down the process unless absolutely necessary and dealing with obstacles as efficiently as possible when they come your way,” Harrison said. “There were quite a few sleepless nights where we were trying to solve a problem before the next work day, so as soon as the suppliers opened at 8 a.m., we could make the right call and get things moving.”

Harrison estimated the team processed hundreds of tonnes of pulses that were delivered to the PAMI facility via semitrailers.

Nearly two years later, the process was successfully completed. A project of this scale is rare, though it presented several learning moments for the team for future purposes.





**Hundreds of tonnes of pulses travel through an assembly line before they reach the bagging stage. PAMI engineers designed custom-made conveyors to allow the pulses to move down the line.**

“We went from a loosely defined idea and we turned it into something (the client) could really make money with,” Harrison explained. “A project like this involved so many elements – from fabricating parts, working with the pulses, meeting all of the food grade requirements – and so to complete all of these different aspects in one building with one team was very satisfying.”

One takeaway for Yee was the employment opportunity when it comes to similar projects.

“There is a huge role for process engineering beyond the original equipment manufacturer machinery,” he said. “What we’re finding out in the food ingredient world is that process optimization is probably one of the big values

that makes the food ingredient business run. The margins are so tight that quality process engineers who really understand their craft are highly valued. The people with these skills and this knowledge will become more important as the agri-value ecosystem grows.”

# Feeding the Masses

## GIFS Aims to Grow Food Better and Faster

BY MARTIN CHARLTON COMMUNICATIONS

Scientists estimate that the world's population to 9.6 billion by 2050. That's a lot of hungry mouths to feed. In fact, to meet this demand, agricultural productivity will have to increase by 70 per cent over this time.

**T**his is the challenge that led to the formation of the Global Institute for Food Security (GIFS), a partnership of Nutrien, the Government of Saskatchewan and the University of Saskatchewan. Founded in 2012, GIFS aims to perform research that will help deliver transformative innovation to agriculture in both the developed and the developing world.

Meeting this challenge requires a lot of brainpower. GIFS works with the best talent from around the world, including more than 60 researchers and affiliates from 21 countries.

Two of those researchers are Grant Tingstad, Engineer-in-Training and Karim Panjvani, Engineer-in-Training. Both are electrical engineers but, as Tingstad says "we have to be multi-faceted jacks-of-all-trades."

With a rapidly innovating and interconnected world, traditionally trained scientists need to collaborate across disciplines to address global challenges in areas like food security. GIFS recognizes this importance and is intentionally working with cross-disciplinary teams including biologists, engineers like Tingstad and Panjvani, physicists, mathematicians, computer scientists and others, to empower agricultural research.

### Research Areas

GIFS' work is focused in three main areas:

**Root-Soil-Microbial Interactions** – this research examines the interaction between and among roots, soil and its micro-organisms, which has a substantial effect on soil fertility and crop health.

**Seed and Development Biology** – this division seeks to develop new technologies to enhance the quality of seeds and make them more robust and resilient, thereby improving the value of seeds to farmers and producers.

**Digital and Computational Agriculture** – GIFS' newest area, this division focuses on accelerating plant breeding and optimizing farming practices through high-performance computing.

In addition to its own research areas, GIFS manages the Plant Phenotyping and Imaging Research Centre (P2IRC), a separate digital agriculture research centre of excellence at the University of Saskatchewan that is funded by a major grant from the Canada First Research Excellence Fund. P2IRC, has several multi-disciplinary researchers investigating techniques to improve seed and plant breeding of large-area crops essential to global food security, including wheat, canola and lentils.

### Personal Dreams Come to Fruition

Tingstad's and Panjvani's backgrounds and career paths to GIFS reflect the diversity of science talent working at the institute. Both are relatively new to Saskatchewan and both started at GIFS within the past year.







**Karim Panjvani, Engineering-in-Training**



**Grant Tingstad, Engineering-in-Training**

Tingstad hails from British Columbia where he originally planned to become a biologist.

“But then one day I passed some engineering students in the hall working on robots which captured my interest so I decided to switch,” Tingstad says.

He never lost his fascination with biology and plants, however. Throughout his academic and professional career, he has enjoyed tinkering with gadgets to tend to his plants at home.

Panjvani is originally from India where he applied his electrical engineering degree to working on Advanced Driver Assistance System (ADAS) for a major automotive active safety manufacturer. He developed an interest in using autonomous vehicles and other automation for agriculture. The work at GIFS seemed like an attractive entrance into that field. He has also completed his master’s degree based on a project he has been working on at P2IRC.

When they arrived, Tingstad and Panjvani joined the Root-Soil-Microbial Interactions research group at GIFS and found the institute was ready and eager to integrate the engineering perspective in with the plant and especially the root biology research focus.

“The lab manager is a biologist who had been assigned to be the go-to guy for systems and process management. That was a bit out of his field, and we were pleased that our training as engineers has helped GIFS with this aspect,” Tingstad says.

### **Ideas Taking Root**

Both engineers enjoy the opportunity to work with multidisciplinary teams.

“I find that agriculture-related fields are more accepting of engineering contributions as well people from other disciplines. Our whole goal is to break down silos and bring together different types of expertise so that problems get solved more quickly,” Panjvani says.

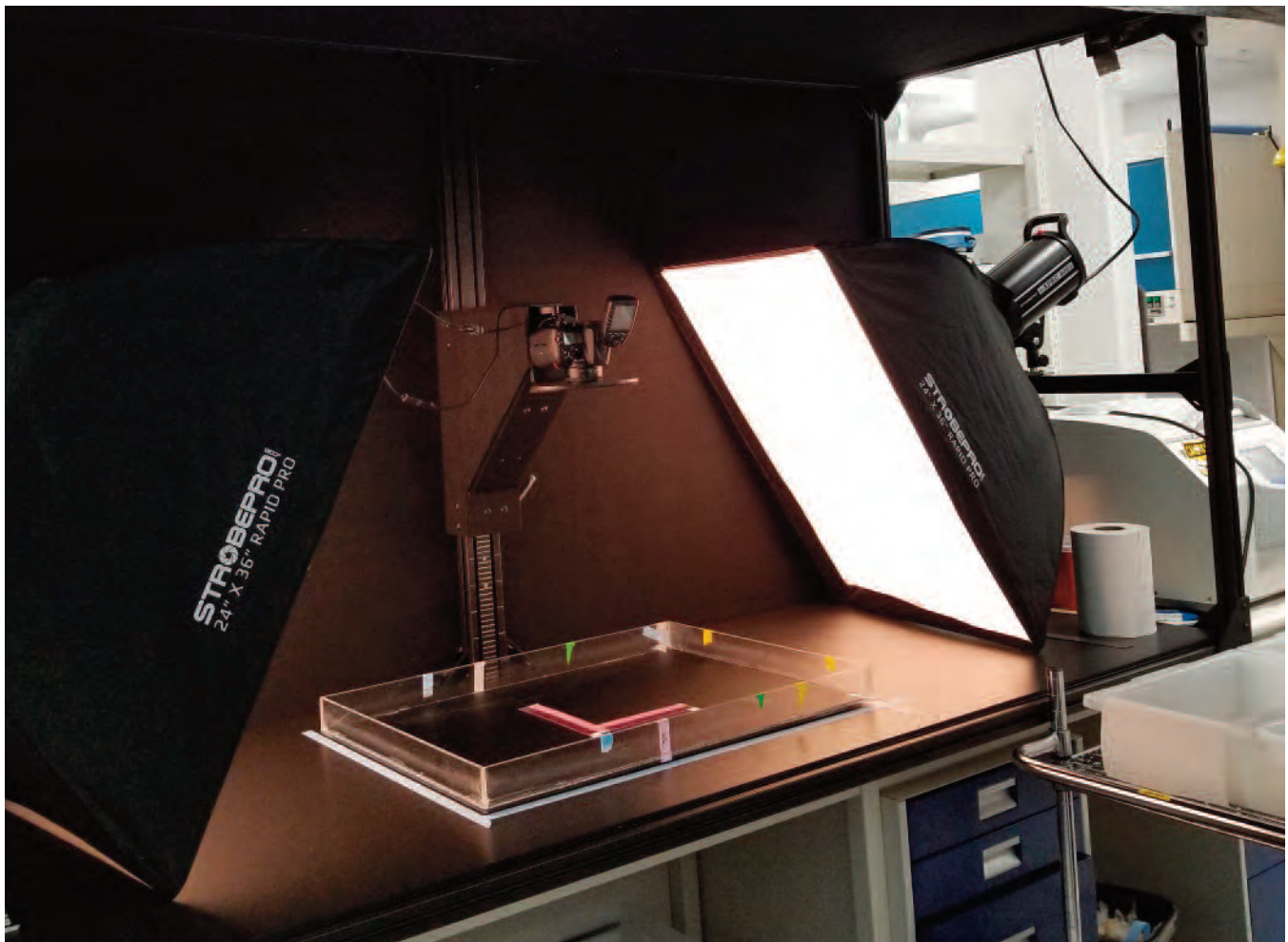
The engineers’ job is to help other scientists develop tools to carry out their research more effectively and efficiently. Most of their work has focused on the research in the Root-Soil-Microbial Interactions team, although there will be more collaborative opportunities with the Digital and Computational Agriculture division as it expands.

One of Tingstad’s projects involves the study of root behaviours.

“Roots tend to grow deeper or larger when they are faced with certain kinds of stress. The biologists are looking for ways to trigger these behaviours to create custom crops for different environmental conditions. We try to find artificial ways to replicate the specific stress like low mineral nutrients (fertilizers) or drought conditions in the soil. We have also built automated watering systems to save researchers the time of watering by hand,” Tingstad says.

Panjvani’s projects have included work on data acquisition and analysis for two- and three-dimensional plant root and shoot imaging systems.





One of GIFS's two-dimensional imaging systems.

“My role is developing software for data acquisition, analysis and machine learning for imaging systems. For example, when root systems are imaged, they are typically placed against a thin fibre paper for contrast. But the paper itself can create a sort of visual ‘noise’ that distorts the root image. I’ve worked on developing tools for cleaning and labelling the images for machine learning tasks that help spot and filter out this distortion so that scientists get better data about the root systems,” Panjvani says.

He has also worked with P2IRC and continues to collaborate with the centre’s engineers and other scientists. His work has included developing user-friendly plug-and-play software interfaces for LiDAR, thermal cameras, sonic sensors and other sensors and imaging equipment. Among the areas of the centre’s imaging studies is the study of leaf architecture.

“If a leaf area is larger, it has better photosynthesis capability and may have better seed production. These kinds of data

points, more commonly known as phenotypes, are really useful for plant scientists,” Panjvani says.

### Wish List

While Tingstad and Panjvani are proud of the contributions they have made to GIFS so far, like all engineers they are constantly striving to do better.

“I got into engineering because I liked robots so of course I’d like to see more automation for the growing, imaging and other routine tasks of the researchers. Right now, much of our imaging is done with a conventional Nikon camera. I’d like to develop a fully programmable, positionable camera. Likewise, the more we can automate the routine plant management tasks, the more time we can save the researchers and the more efficient their work will be,” Tingstad says.

# Member Profile



This month *The Professional Edge* chats with Alena Sherwood, P.Eng., an electrical engineer working for PWA Engineering.

## Tell us about your personal and professional background.

I was born and raised and have lived almost my whole life in Saskatoon. I went to Walter Murray High School and to the University of Saskatchewan.

## Why did you choose engineering?

In high school, I wasn't specifically looking at engineering but I wanted something that involved math and science as those were my strong subjects and engineering seemed to be a good fit.

## Did you have engineers in the family who influenced you?

Not at all. My family is mostly lawyers. My parents are both lawyers. One of my brothers and my sister are lawyers. Both my grandfathers were lawyers and I have an aunt who's a lawyer. So professionally I'm a bit of an oddball in the family.

## What was your first job after college?

I first worked for an engineering firm in Yellowknife doing building electrical design for new construction. I was still quite green and learned a great deal about things like AutoCAD and site inspection. But I only worked there for few months before coming back to Saskatoon in 2003 to work for PWA. I've been with them ever since.

## What was it like to live in Yellowknife?

It was basically like any other North American city except for the long days in summer when the sun hardly set at all. You would see people playing tennis at 11 pm. Aside from that, it reminded me of being in lake country in Waskesiu.

## What is your greatest accomplishment as an engineer?

I did the electrical design work for a new school and I was invited to the grand opening. Walking around, I overheard teachers talking about how they appreciated the attention to detail – how the light switches were well designed and the electrical outlets were all in convenient places. That was a proud moment for me because that's something I spend a lot of time thinking about – making sure buildings are designed to fit the needs of the people who are using them.

## What are your interests outside of work?

I volunteer for the Stonebridge community association, where I'm currently the president. I'm also very involved in a local organization called FEAT – Female Engineers, Architects and Technicians. It's a lunch group that lets us try out different restaurants while also networking and mentoring with our female peers in the technical professions.

## Have you ever met anyone famous?

My brother is friends with Brent Butt. He's wonderful person.

## Was your brother Brent Butt's lawyer?

No, this is my other brother who is a standup comedian, so they met on the comedy circuit.

## What is your favourite vacation spot?

Waskesiu. My parents have a cabin there so that is our main vacation spot. My other favourite vacation spot is Disneyworld. I'm a total Disney nerd and I've lost count of the number of times I've been there. I love planning the trips because the park is so overwhelming that you need a solid plan to optimize the trip.

## Who is your favourite Disney character?

Eeyore. His temperament appeals to me.

### What is your favourite book?

*A Pattern Language* is a book on architecture, urban design and community livability with contributions from a number of authors. Architecture and community design are side interests of mine since in my work I need to think a great deal about the layout of buildings and rooms. The book talks about designing public spaces so people will actually use them, so people feel truly engaged and drawn to those spaces.

### What do you do for continuing professional development?

I watch a lot of webinars especially about lighting. I regularly attend conferences as well as on-site and off-site training for new systems. I'm also involved in mentoring grade 12 students who are considering going into engineering.

### Who has had the greatest influence on your life and career?

My main mentor in my professional life has been Jeremy Halls, P.Eng., the president at PWA. He's taught me everything I know about design. I am also inspired by Tara Reichert, P.Eng. and Carleen Bartel, P.Eng., the two women engineers who founded FEAT.

In my personal life, my husband has been a great influence. He's also an engineer who works for Cameco. He has always been very supportive and I'm inspired by the work he does and how he has become a successful professional. I also owe a great deal to my mother. Even though she is a busy lawyer, she takes time off to help look after my two young boys which has given me the freedom to succeed in my own career.



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To explore more big ideas, apply for 1 of 3 **\$12,500 scholarships** from Engineers Canada and Manulife.

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- Canadian citizens or permanent residents of Canada
- Professional engineers returning to university for further study or research in an engineering field

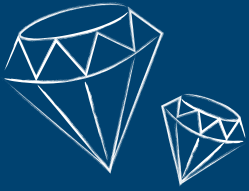
Visit [engineerscanada.ca/scholarships](https://engineerscanada.ca/scholarships) for more scholarship details and applications.

**Deadline to apply:** March 1, 2020.



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## Gems of Geoscience

Anyone who spends a minute talking to a geoscientist learns that almost all of them have a beloved rock collection. In this new regular section of *The Professional Edge*, we learn about geoscientists and their profession through their favourite rocks.



**The Geoscientist:** David Thomas, P.Geo, a “semi-retired consultant” who previously worked for Cameco.

**The Rock:** Drill core samples from the Kumtor gold mine in eastern Kyrgyzstan.

**Why It’s Special:** Even though I have had many geological adventures around the world and have seen many really cool rocks, the geology of the Kumtor mine has a special place in my geological memories.

There were many things about the geology of the Kumtor gold mine that were fascinating. It was located at over 4,000 metres elevation in the Central Tien Shan Mountains of Kyrgyzstan. The scenery was spectacular since the mine and mill are surrounded by alpine glaciers. In fact, the open pit excavation included removing part of a glacier lobe.

The study I was charged with was a fascinating exercise in unravelling the important structural and hydrothermal controls responsible for the gold mineralization. Much like birders who keep life-time lists, I think any ore deposit geologist who works with hydrothermal gold systems would love to add the Kumtor gold deposit and its rocks to their lifetime geology list.

However, these fascinating rocks also got me into a bit of trouble with the Kyrgyzstan authorities. When I was leaving the country after my study, I had accidentally forgot about several samples (not this particular one) that were buried in the bottom of my geology backpack.

The backpack had been checked in with my personal luggage at the airport and I had made my way through security to my boarding gate area. After a short time, a couple of security officers approached me and asked me to accompany them to another room where they interrogated me for what seemed like a significant time.

In order to take any samples out of the country I was required by law to obtain permits regardless of what type of rocks they were. Knowing I had just come from the Kumtor gold mine, they suspected me of trying to smuggle some gold samples out of the country. It was clear they took this very seriously and my answers didn’t seem to be alleviating my situation.

I could see my plane starting to board. I figured that for sure I was being bumped from the flight home. Eventually a very stern looking official came into the room, handed me my boarding pass and said I had better hurry out to the plane which was still waiting for me.



# 2020 Membership and Licence Fees

## Due on or before December 31, 2019



### Renewal notices will be mailed soon!

Renewal notices will be sent in mid-November and it is the responsibility of members and the official representative for a Certificate of Authorization to make sure contact information is up to date, including your email address.

If you don't receive your dues notice by December 1, 2019, contact APEGS. Fees are due on or before December 31, 2019 regardless of problems with delivery.

### Check your contact information in your On-Line Profile

To check your contact information, log into your On-Line Profile by clicking "Login" in the top right corner on the APEGS home page. If you have never used the system before, click on "New password / Forgot password" and follow the instructions.

Other things that can be done in your On-Line Profile are: all other fee payments, entering Continuing Professional Development (CPD) credits, renewing Permission to Consult, managing your email/mail subscriptions and volunteering for APEGS.

### What happens if I don't renew?

You would no longer have the privilege of practising within Saskatchewan or on properties or facilities located in Saskatchewan. Use of title in Saskatchewan is also a privilege of membership.

Members who do not retain their membership in APEGS and/or another Canadian association/ordre will lose coverage under the National Secondary Professional Liability Insurance Program. Also, failure to maintain your membership will result in ineligibility for benefits under the group life insurance program offered through Manulife and Engineers Canada if you have subscribed to this insurance.

### What if I am not working in Saskatchewan?

Members who are retired or not working (at anything) in Saskatchewan can retain membership and may be eligible for a waiver of the fees for the annual licence. More information can be obtained from the documentation accompanying the dues notice or from the APEGS office.

### What if my membership ceases and I need to reinstate?

Memberships that have ceased are subject to a 15 per cent fee to reinstate in the same calendar year. Members who notify the APEGS office in writing of their intent to resign their membership on or before January 31, 2019 may reinstate their membership and licence during the calendar year without the payment of a reinstatement or application fee. The late payment penalty for the holder of a Certificate of Authorization is 15 per cent of the annual fee.

For reinstatement procedures for subsequent calendar years, see the APEGS website under Apply, Reinstatement.

### Eligibility for life membership

Members who are 65 years of age and retired are eligible to apply for life membership. An application will come with your renewal notice in mid-November.





## Call for **APEGS Awards Nominations**

APEGS members do great work that benefit everyone in the province. Let's celebrate what we do!

The Awards Committee is seeking nominations for the APEGS Awards as well as other provincial and national awards. If you have a friend, colleague, employee or client who has done something outstanding, this year or over the course of their career, please make sure we hear about it.

You can even nominate yourself!

Our awards recognize both APEGS members and non-members who have made special contributions to the professions.

### **There are seven APEGS awards:**

- Exceptional Engineering/Geoscience Project Award
- Environmental Excellence Award
- Friend of the Professions Service Award
- Promising Member Award
- McCannel Award
- Brian Eckel Distinguished Service Award
- Outstanding Achievement Award

In addition to the APEGS Awards, the Awards Committee nominates APEGS members for awards presented by both Engineers Canada and Geoscientists Canada and numerous other provincial and national awards.

The nomination process is quick and easy!

### **You can do it online at:**

[www.apegs.ca/Portal/Pages/award-nomination](http://www.apegs.ca/Portal/Pages/award-nomination)

### **You can also send nominations to:**

APEGS Awards Committee

Email: [apegs@apegs.ca](mailto:apegs@apegs.ca)

# Call for Council Nominations



## Nominating Committee

The Nominating Committee is soliciting names for the council positions described below. You may contact staff support to the Nominating Committee, Shawna Argue, at [sargue@apegs.ca](mailto:sargue@apegs.ca) to propose names of potential candidates. Shawna may also be reached through the APEGS office in Regina by phone at 306-525-9547 (toll free 1-800-500-9547 North America), or facsimile 306-525-0851.

The *Bylaws* require the Nominating Committee to nominate, whenever possible, the person holding the office of President-Elect for President, and one person for the position of President-Elect (typically the person holding the office of Vice President). Andrew Lockwood, P.Eng., FEC is the current President-Elect and Kristen Darr, P.Geo. is the current Vice President. The Nominating Committee is also required to nominate, whenever possible, at least two persons for Vice President and at least two persons for each vacancy on the Council.

## Submissions of Nominations

Any five members may nominate over their signatures an eligible nominee for any elective office, except that of President. Such nominations shall be in the hands of the Registrar at least forty-five days before the election is to take place. To meet this requirement, the nominations must be in the APEGS office no later than 5 p.m., Thursday, March 5, 2020, as the election will take place when ballots are counted on Monday April 20, 2020, the “polling day”.

## 2020 Vacancies & Terms of Office

### Officers

- President-Elect – one-year term
- Vice-President – one-year term

### Group and Electoral District Councillors – to serve a three-year term

- Group VI (Chemical, Ceramic and Metallurgical)
- South-West District
- North District
- Geoscience North District

## Terms of Office

Only members in good standing are eligible for nomination.

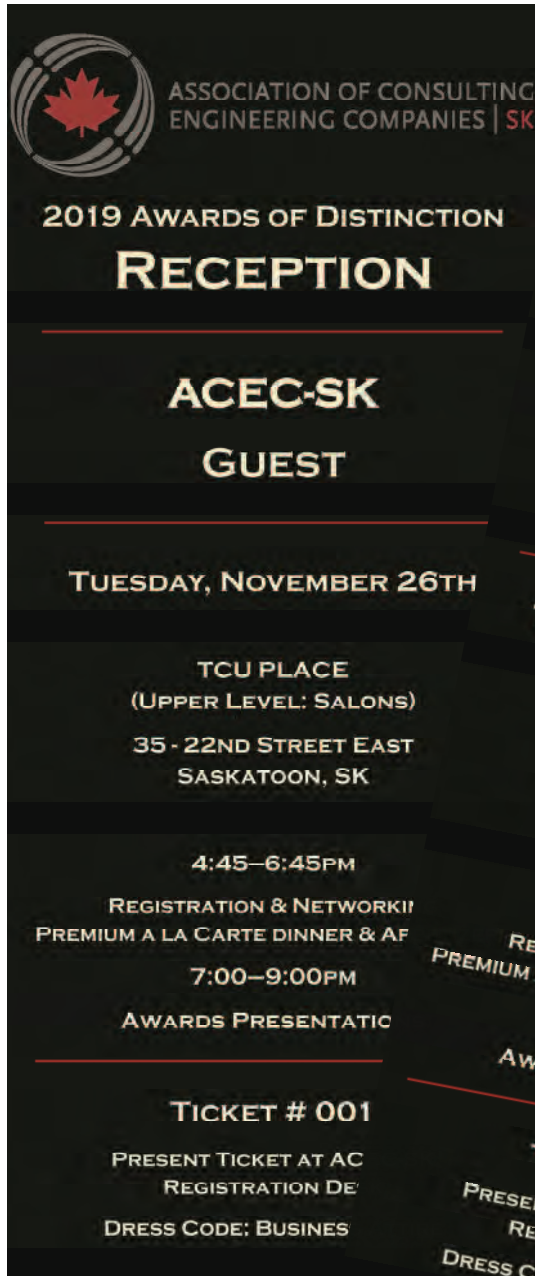
A person elected to Council may only hold office while a resident of Saskatchewan.

A person nominated for President-Elect must have served at least one full year (i.e. from the close of business at one annual meeting to the close of business at the next annual meeting) as a member of APEGS Council prior to the date on which they would assume office as President-Elect.

A person nominated as a representative of an electoral group must be classified with the association in that electoral group. The Councillor representing Members-in-Training can complete the term of office after obtaining his or her P.Eng., or P.Geo. status.

<http://www.apegs.ca/Portal/Pages/council-elections>





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# WORK CONTINUES ON APEGS Governance Review

In the May/June 2019 issue of *The Professional Edge* APEGS announced it was undergoing a review of its governance structure and activities.

“With self-regulation under scrutiny in Canada, and the changes we are seeing in other provinces such as more government oversight for professional associations, this review is coming at an opportune time,” said Stormy Holmes, P.Eng., APEGS Past President.

“APEGS wants to be proactive and ensure its governance and organizational structure support its focus on safeguarding the public by regulating the professions in the public interest.”

Over the spring and summer, senior staff and volunteers have provided a consultant with information and input regarding issues and potential improvements. Research has also been done to obtain information from other self-regulated professions. The final report is expected early in 2020 with any changes approved by Council to follow.

“While it is too soon to know the details of the recommendations that Council will be asked to consider, the consultant is examining the size and composition of council and the volunteer board and committee structure,” said Bob McDonald, P.Eng., APEGS Executive Director & Registrar.

“Based on the work done to date, we are anticipating the consultant will recommend some significant changes.”

## Consultant conducting the review

Regina-based T. Bakkeli Consultants Inc.

## APEGS Steering committee overseeing the project

Stormy Holmes, P.Eng., Past President (2018-2019)

Bob McDonald, P.Eng., Executive Director & Registrar

Shawna Argue, P.Eng., Director of Registration

Tina Maki, P.Eng. Director of Special Projects

## Questions?

If you have questions about the project, please contact APEGS project manager, Tina Maki, P.Eng., Director of Special Projects.



## PURPOSE

Review APEGS’ governance structure and activities and make any necessary changes to:

- Create a modernized structure aligned with regulatory responsibilities
- Increase role clarity
- Enhance APEGS’s ability to plan and prioritize volunteer and staff activities.



## SITUATION

- Growth in membership
- Changes in the regulatory environment
- Committee structure from the late 1980s, which is pre-internet and prior to the addition of geoscientists, engineering licensees and geoscience licensees.



## CHANGE TO THE REGULATORY TOOLKIT

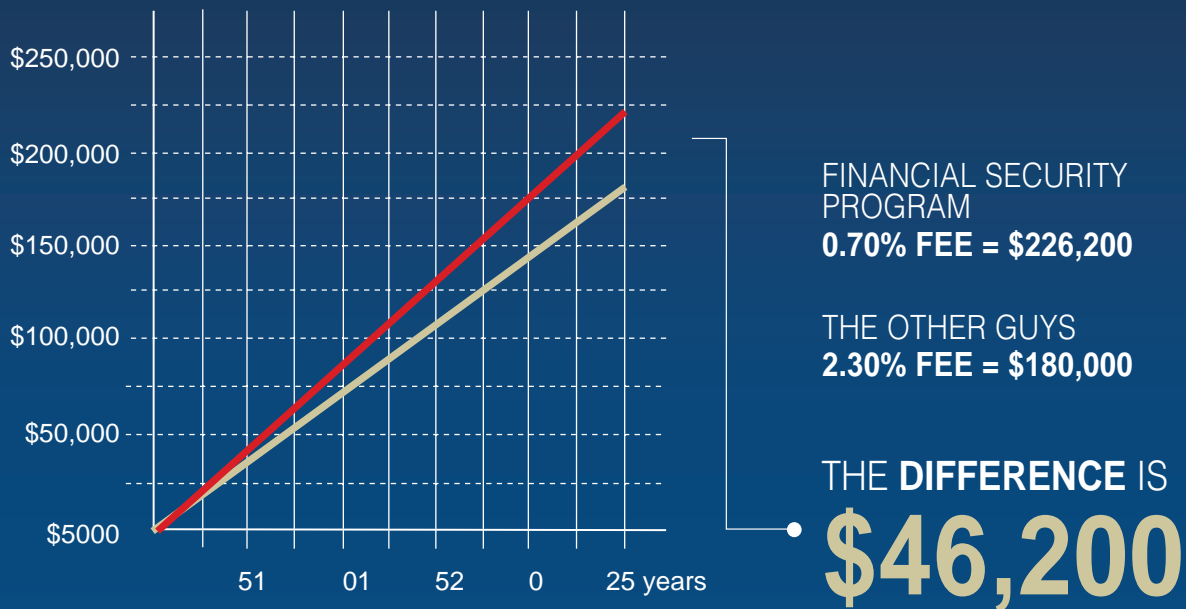
- Removal of the licence for permission to consult
- Introduction of a required Continuing Professional Development Program
- Introduction of online experience reporting (Competency-Based Assessment)
- Provincial governments around the country are making or considering significant changes to legislation for self-regulated professions.



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# CPD Record Keeping is Important

BY LUKE BRISEBOIS, P.ENG. – VICE CHAIR, APEGS CPD COMPLIANCE COMMITTEE



Continuing professional development (CPD) is an important facet of any professional's career. Although CPD has long been a feature of the professional obligations of APEGS members, it has only recently become a requirement to report individual CPD hours annually. At the 2018 Annual Meeting, members unanimously passed a bylaw about this. Due to new reporting requirements, it's a great time for members to brush up on their record keeping practices.

The new CPD program includes an individual record keeping requirement which ultimately benefits individual members and the Association. Accurate and up-to-date record keeping practices help members evaluate their current career progress and set future career goals. Additionally, record keeping assists members in expand or refine their current competencies. At the same time, verifiable records of ongoing and continued professional education help to maintain public confidence in self-regulating professions.

Members' CPD records should clearly document their individual scope of practice, annual CPD plan and a detailed record of completed activities throughout the year. Beyond those basic record keeping requirements, the new program does not require additional paperwork or specific forms. Individual professionals have the freedom to keep track of their annual CPD activity in a way in which they feel most comfortable and find most convenient.

Members may choose to use a traditional physical file system, electronic resources or some combination in-between. Ultimately, it is entirely up to the individual member so long as their records are clear, up-to-date and complete.

APEGS has developed a number of useful tools for record keeping including the APEGS Annual Activity Tracker spreadsheet. Using these tools is optional, but members can find them on the APEGS website through the members menu under Continuing Professional Development.

These tools are great for members to get started on their CPD plan, and begin recording their activities and they can also be easily tailored to fit individual needs. For example, the APEGS Annual Activity Tracker spreadsheet is open for editing and ready to be customized by members.

CPD activity records should include: the activity date(s), an activity description or title, the activity provider or organizer, the applicable activity category and the number of credits earned.

CPD activity can also be verified through earned certificates, receipts and other formal documentation, so it is important to keep track of these documents as part of your record keeping process.

Records must document each activity a member undertakes throughout the year. Additionally, members are required to maintain a complete record of their CPD activity for at least three years because the CPD program includes the ability to bank yearly credits and carry them forward to the following calendar year.

Keeping track of your annual CPD activities is quick and easy and it is of great benefit to the individual professional and the profession as a whole. The implementation of the new program is a learning process and APEGS welcomes members' feedback. For more information visit the APEGS webpage.



# 2019 Saskatchewan Geological Open House



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Saskatchewan 



# News Beyond Our Borders

## How can climate change impact Canadian concrete infrastructure?

*Postmedia News* - According to an engineer and researcher at the B.C. Institute of Technology (BCIT), global climate change is expected to lead to the increased deterioration of concrete infrastructure in Canada in the future.

Sudip Talukdar, civil engineering program coordinator in BCIT's School of Construction and the Environment, did computer simulations of the effect of climate change on concrete in Vancouver and Toronto.

Talukdar says researchers have identified three major climate change-related threats to concrete:

1. Increased concrete weathering and abrasion due to climatic stress and greater frequency of extreme weather events. Countries in low-lying, flood-prone areas, such as the Netherlands, will have their flood protection systems threatened more often, as water levels rise and storm frequencies increase.
2. Increased risk of chloride-induced corrosion. Global warming may cause chloride-induced corrosion (commonly caused by road salt) of steel reinforcement by up to almost one-fifth of the rebar area.
3. Increased risk of carbonation-induced corrosion.

Increases in carbonation rates of reinforced concrete structures (lowering the pH) are expected as a result of increased temperatures and concentrations of carbon dioxide in the air.

Talukdar says a number of measures can be taken to protect against degradation including increasing concrete covering when and where it is needed; improving concrete quality to reduce permeability; and adding surface coatings or barriers to inhibit the penetration of carbon dioxide.

## Alberta government includes two professional engineers

*APEGA* - In April, APEGA members Rick Wilson, P.Eng., and Prasad Panda, P.Eng., were sworn into the cabinet of the province's first United Conservative government.

Rick Wilson is the MLA for Maskwacis-Wetaskiwin and was appointed Minister of Indigenous Relations. Along with years of municipal council and school board experience, he has been a business owner and farmer in his constituency for decades.

Prasad Panda is the MLA for Calgary-Edgemont and was sworn in as Minister of Infrastructure. During his 28 years of experience in the energy sector, he has held senior management positions and has been a key member of teams that built \$100-billion, world-scale projects.



The iCetana facility at Mount Royal University

## Mount Royal University puts AI on security detail

*The Canadian Press* - Post-secondary institutions are sometimes called ivory towers, suggesting that they're untouched by the real world. But everybody knows that those hallowed halls aren't isolated from crime, and therefore that improving security systems is usually welcome.

This spring, Calgary's Mount Royal University replaced its 20-year-old closed-circuit system with 360-degree, high-resolution cameras. But this was way more than a hardware upgrade.

MRU also became the first Canadian organization to use iCetana, a blackscren artificial intelligence system that teaches itself what threats look like.

Developed in Australia and used throughout the U.S., the software system analyzes pixels of data from each camera to learn to differentiate between normal activity and potential threats. At the first sign of trouble, the triggered camera flags security staff to investigate, allowing for a real-time response. When all is well, monitors are black; hence, the technology is called black screen.



The university says the software removes the human error inherent in having a single member of a security team monitor, all at once, as many as 300 live feeds from across the 118-acre campus.



Hempcrete blocks

### Builders are swapping cement for weed pollution

*Bloomberg Press* - The hemp fields sprouting in a part of Canada best known for its giant oil patch show how climate change is disrupting the construction industry.

Six years after setting up shop in the shadow of Calgary's oil patch, Mac Radford says he can't satisfy all the orders from builders for Earth-friendly materials that help them limit their carbon footprints.

His company, JustBioFiber Structural Solutions, is on the vanguard of businesses using hemp — the boring cousin of marijuana devoid of psychoactive content — to mitigate the greenhouse gases behind global warming.

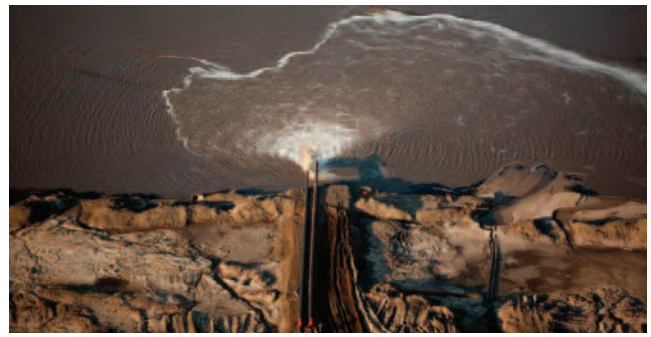
Around the world, builders are putting modern twists into ancient construction methods that employ the hearty hemp weed. Roman engineers used the plant's sinewy fibers in the mortar they mixed to hold up bridges. Early results indicate it's possible to tap demand for cleaner alternatives to cement.

Cement makers are responsible for about seven per cent of global carbon dioxide emitted into the atmosphere every year, with copious volumes entering via limestone kilns needed to produce the material. Manufacturers say they've struggled to find markets for greener alternatives, giving easy entree to entrepreneurs like Radford who cater to customers concerned about their impact on the Earth.

### Hungry bacteria could gobble up tailings pond

*University of British Columbia* - In five decades of oilsands mining, Alberta has accumulated more than a trillion litres of toxic tailings. That's about the volume of half-a-million Olympic-size swimming pools.

Naturally, it's an expensive problem—the cleanup cost is estimated at \$27 billion—and it comes with serious environmental risks. After all, toxic materials contained in the ponds include bitumen, naphthenic acids, cyanide and heavy metals.



Fort McMurray Today

But research coming out of the University of British Columbia may hold one key to solving the tailings puzzle. Researchers and students there have identified six types of naturally occurring bacteria that consume forms of naphthenic acid, one of the most toxic components of tailings ponds.

The team used bioengineering to upgrade the bacteria to rapidly devour the chemicals. The team will do field trials in simulated tailings ponds near the Athabasca oilsands, home to 19 large tailings ponds.

### Engineers Nova Scotia amends one-year Canadian experience requirement

*Engineering Dimensions* - In a move to help internationally trained applicants obtain their Nova Scotia engineering licence, Engineers Nova Scotia (ENS) will waive its required 12 months of Canadian engineering experience for those who participate in Immigrant Services Association of Nova Scotia's 18-week Orientation and Communication Skills for Engineers (OCSE) program and have amassed engineering experience largely outside of Canada.

"Engineers Nova Scotia has been concerned for many years with the difficulties that some of our applicants have in meeting the Canadian experience requirement," ENS Chief Executive Officer and Registrar Len White, P.Eng. (Nova Scotia), FEC, told *Engineering Dimensions*.

"However, there are a number of study programs that can assist engineering applicants who received most of their training and experience outside of Canada. Our association feels that some of these programs meet most or all of the goals of the Canadian experience requirement. Our recent announcement removes a significant barrier for many internationally educated applicants."

White notes that although those internationally trained applicants who have successfully completed the 180 hours of formal instruction in the OCSE program will be waived from completing the required 12 months of Canadian engineering experience, they still have to pass the Professional Practice Exam, accumulate 48 months of professional engineering experience either in Canada or abroad and have their education and professional experience examined by ENS's Board of Examiners.

# Fall Professional Development Days

November 14 - 15, 2019  
Saskatoon, SK

For full course listings and to register please visit:

[www.apegs.ca](http://www.apegs.ca)

## Call for PD Speakers

**Been to some really great professional development lately?**

**Attended an event with an inspiring keynote speaker?**

**Have something of your own to share that may interest others?**

APEGS is always on the lookout for great professional development sessions to offer members.

Email the Professional Development Committee at [apegs@apegs.ca](mailto:apegs@apegs.ca) with the name of the speaker, the topic, and what made the session standout.

APEGS may contact the speaker for professional development at our Spring PD Days, Fall PD Days, or Annual Meeting and Conference.

# Looking for Ethics Training?



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## APEGS Online Ethics Module

This module is free for all APEGS members.

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For more information and to access the module, please visit [www.apegs.ca](http://www.apegs.ca)

## In-Person Ethics Presentation

If your organization is interested in hosting an ethics training session for your employees or members, contact Jolene Arthur at [jarthur@apegs.ca](mailto:jarthur@apegs.ca) to book.



# News From The Field

## 4.1-magnitude earthquake shakes Esterhazy and area

*Global News* - A small earthquake struck just east of Esterhazy in mid-August.

The United States Geological Survey confirms a 4.1-magnitude quake hit the region 17 kilometres east of the town at 8:30 p.m., at a depth of five kilometres.

The epicenter of the quake was located just outside of Mosaic's K2 Potash mine.

A representative from the company said there were about 120 employees underground at the time of the tremor, spread across three sites.

No one had to go into refuge sites at the mine. Employees met at a muster point to be accounted for and there were no injuries. The miners returned to work once power was restored to the area.

According to miners at the scene, the tremors lasted about five seconds.

Mining can contribute to seismic activity, but University of Saskatchewan geological science department head Samuel Butler doesn't think the mine contributed to this quake. He said five kilometres would be too deep for mining to be a factor.

Earthquakes are uncommon in Saskatchewan, but small ones can happen. In the Esterhazy area, Butler said mining and underground salt deposits are the biggest contributors.

SaskPower reports several communities in the area including Esterhazy, Whitewood, Moosomin, Rockanville Wapella and Tantallon experienced power outages, but power was restored a few hours later.

SaskPower has since confirmed the quake caused the blackout. Safety mechanisms turned off three transformers at the Tantallon, Sask. switching station. The Crown corporation says there is no permanent damage to equipment.

## INFRASTRUCTURE



Wakamow Valley culvert bridge

Repairs to Wakamow culvert bridge in the works

### Repairs to Wakamow culvert bridge in the works

*Discover Moose Jaw* - The final link of the Wakamow Valley trail system will be under repair this fall.

The all seasons concrete culvert bridge that was installed through the waterway last November linking Paashkwow Park West and Kingsway Eco Zone has shifted due to winter runoff washing out the ground below and will require an update once water levels drop.

Todd Johnson, General Manager for the Wakamow Valley Authority says, the issue has been on Wakamow's radar for several months, but it's been a bit of a process to deal with it correctly.

The 20,000-pound concrete blocks were installed on frozen ground last November. It was a project that initially cost the Authority \$100,000. Johnson said the repairs will likely require another \$100,000 to complete that will be paid for using three different methods.

Johnson said engineers have already submitted their plans, so the next steps are securing a contractor, waiting for water levels to drop and obtaining the go-ahead from the Moose Jaw Water Security Agency.

Initial plans for the bridge included the installation of a handrail system, which Johnson said is built and ready to go and will be installed once the repairs have been completed.

### Washed away Northern Sask. highway causes cancellations

*CBC* - A resort in Northern Saskatchewan is dealing with visitors cancelling their stays due to a washed-out highway.

A large part of Highway 903 was washed out by heavy rainfall in late July.

Marianne Breault, the owner of Canoe Lake West Resort, said the washout has cost her business.

The highway is North of Meadow Lake and is the main route to



CBC

Highway 903

Canoe Lake and the surrounding areas, including many Indigenous communities.

Breault said people were able to travel right from Meadow Lake to her resort, but now people have to travel to Green Lake first, then to Beauval and then to Canoe Lake. Doing this adds about an hour and a half of travel time.

Doug Wakabayashi, the executive director of communications for the Ministry of Highways and Infrastructure, said there are plans to fix the road, but it doesn't involve a bridge.

Construction was expected to start in mid-September.

Breault said something very similar happened to Highway 965 last spring, but she says the province's response time was much quicker.

## ENVIRONMENT

### Funding for flood mapping projects

*Public Safety and Emergency Preparedness Canada* - Flooding is Canada's costliest and most frequent natural disaster.

In Saskatchewan, the five years from 2011- 2015 was the wettest period on record. Communities are looking for solutions to mitigate the costs and damages caused by flooding to businesses and residences.

Some \$560,000 in federal funding was invested to support work on two projects in Saskatchewan under the National Disaster Mitigation Program (NDMP). Additionally, Saskatchewan's Water Security Agency will invest \$500,000 and the City of Prince Albert will provide \$60,000 to support this pair of initiatives.

Both projects will provide flood mapping for 21 communities — representing over half the province's population — at high-risk of suffering recurrent flood damages, including Regina, Saskatoon, Moose Jaw and Prince Albert. These flood maps will provide the data needed to help mitigate potential damages caused by flood events and help plan for flood risk reductions.



### CIF receives \$194K to assess forests' vulnerability

*Canadian Forest Industries* - The federal government today announced \$194,000 for the Canadian Institute of Forestry (CIF), for the Northern Prairie Forests Integrated Regional Assessment, a regional case study on the forest sector's ability to adapt to climate change.

The project is valued at \$470,000 and will bring together public and private sector stakeholders, as well as local communities, to determine Saskatchewan and Manitoba forests' vulnerability to global warming.

Recommendations will be made for regionally appropriate climate change adaptation actions based on the project's finding. The assessment will also support more climate change considerations in planning and decision-making.

### City receives federal funding for gasification project to reduce greenhouse gas emissions

*Prairie Post* - Federal funding will help Swift Current develop a gasification project to generate power from recyclable materials.

Councillors approved a motion to enter into a funding agreement with the federal government.

The City made an application in 2018 to the Low Carbon Economy Fund, which is part of the federal government's Pan-Canadian Framework on Clean Growth for Climate Change. The purpose of the fund is to provide financial support for projects that will reduce greenhouse gas emissions and promote clean growth.

The City contracted the Saskatchewan Research Council (SRC) in 2016 to do a study on the best options for reusing recyclable fibres, which include cardboard, paper and clean wood.

The SRC study looked at various alternatives and proposed a small modular gasification unit as the most feasible alternative. The cost of a unit did not make it feasible for the City to continue with the project, but the City decided to apply for funding from the Low Carbon Economy Fund.

The development of this gasification project in Swift Current will probably be a first in Canada.

A typical gasification unit does not require a lot of space

and will fit into a 30-square-foot enclosure. The gasifier converts recyclable materials into synthetic gas, which will then be used by an internal combustion engine to power an electrical generator.

No atmospheric emissions will be emitted and all gas produced during the process will be used by the engine to generate power. The gasification unit will produce about one megawatt of power, which will supply electricity to about 1,000 homes in Swift Current.

The gasification project will help to reduce greenhouse gas emissions by 5,500 tonnes of carbon dioxide per year or 110,000 tonnes over 20 years. It will annually divert approximately 5,800 tonnes of lower quality recyclable fibres and woods from the landfill, which will help to increase the lifespan of the landfill.



### Project gives proof to new climate action plan

650 CKOM - Many people in Saskatoon raised concerns when a new municipal climate action master plan was recently introduced.

Of the many action items listed in the multiple phases of the 30-year plan, residents in the Bridge City had a hard time believing a cap on heating and electrical bills each year would work in a province that spends five months of the year in a deep chill.

Closer investigation shows that it's not only possible, but that it's happening already.

Radiance Cohousing, an energy-efficient townhouse building in Riversdale, is leading the way when it comes to efficient and sustainable living in Saskatoon.

What separates Radiance from other energy-efficient housing projects is its path to eventually be certified as a passive house. Passive housing, also known as net-zero housing, is an international standard that uses roughly a tenth of the energy a typical Canadian home would use.

Instead of a typical boiler system, Radiance uses electric heating pumps that use low amounts of energy while transferring outdoor cold air into hot air with temperatures as low as -20 C.

The townhouse complex was built airtight. Walls are 18-

inches thick with a more substantial insulation and high-quality triple pane windows — this makes the entire building thermal bridge-free to avoid any spots where air could escape or cause temperature to drop.

Using the latest technology also allows for a certain level of resiliency. Mold isn't an issue with passive housing standards and power outages won't drastically impact these draft-free homes.

Nemeth said all of those features only added six per cent to construction costs when compared to conventional construction. Residents at Radiance had to plug in electrical heaters when the winter temperatures dipped to -25 C.

Saskatchewan is the founder of this type of initiative in the country. Canada's first passive house was built in 1977 when the Saskatchewan Conservation House opened as a response to the energy crisis in the 1970s.

### Forest fires can contribute to depletion of soil carbon, increase global climate: UofS study

*Meadow Lake Now* - A new study on how forest fires contribute to depleting soil carbon in the boreal forest was published in the prestigious *Nature* scientific journal.

The research team included University of Saskatchewan adjunct researcher Jill Johnstone and recent USask PhD graduate Xanthe Walker. The study revealed why more frequent burning in the boreal forest due to wildfires is bad from a climate change perspective.

The research was launched in the aftermath of the severe 2014 fires in the Northwest Territories, the largest fire season in the region's recorded history. The N.W.T. government, along with other agencies such as NSERC and NASA, funded the project with aims at better understanding of what happened to the boreal forest soils during these fires.

This knowledge could help improve forest fire management and help northerners plan and adapt.

Carbon is critical to soil function and productivity. The boreal forest's soils accumulate carbon and are a globally significant carbon sink. Boreal forests store about one-third of the world's terrestrial carbon primarily in the soils.

These pools of carbon have historically been safe from combustion but with warming of the forest climate and larger and more frequent wildfires, more of this sequestered carbon is being combusted and released.

The research team hiked into the N.W.T. burn areas and sampled the soil at more than 200 burned areas that were identified by Laval University researchers.

In nearly half (45 per cent) of the young stands the researchers sampled, legacy carbon burned. And while the amount of legacy carbon did not alter total carbon emitted





battlefordsnow.com

from these fires, the pattern the researchers identified has global implications for future climate scenarios.

Johnstone said that the carbon emitted from the forest fires contributes towards Canada’s overall total carbon produced in accordance with the Paris agreement. As more carbon is released by the fires it contributes to warmer global temperatures, which in turn results in more fires. There is the potential for this to snowball into a fairly severe carbon source. It will be important for Canada to design policy around keeping these boreal forests acting as a carbon sink instead of it transitioning to a carbon source.

Saskatchewan also had a significant wildfire problem in 2015, the year after the N.W.T fires. Johnstone said that they have started to develop the same type of research, with a similar research team, studying the effects on the boreal forest in northern Saskatchewan and will be releasing their findings in the future.



zimo-greenroof.com

### Green roof advocates have high hopes

*Global News* - A couple of times per month Julie Barnes climbs on top of her detached garage to check on her green roof.

Barnes and her husband installed it after they finished building their Saskatoon home in 2014.

After an online search, Barnes hired Higher Groundwork Horticulture owner and green roof consultant Michael Molaro and started planning.

It took five people three hours to manually plant more than 700 plants — all drought-resistant.

Besides that, she said the maintenance on the roughly 550 square-foot garden is minimal.

On top of aesthetic appeal, Molaro said there are a number of environmental and economic benefits.

He says green roof projects like Barnes’ can extend the life-cycle of the roof itself — from 15 or 20 years to almost 50.

Like a green roof, the rooftop garden at the University of Saskatchewan serves a similar function. Rain is intercepted using above-ground containers, but there’s the added value of food production.

He said the idea of growing things on a rooftop is a non-traditional practice and Saskatchewan is “catching up to the rest of the world in using this.”

The garden on campus is going on year five. Wood said using the space reduces “food miles” — the distance food travels from production to consumption.

For Barnes, the initial investment was pricey despite doing a lot of the work themselves and the project needs an engineer’s approval in order to get a permit.

Four types of sedum are among what’s planted on Barnes’ green roof.

Saskatchewan is home to approximately 12 green roof projects.

## ENERGY



www.estevamercury.ca

Minister of Advanced Education Tina Beaudry-Mellor, in red, was toured around the DEEP geothermal site by DEEP president and CEO Kirsten Marcia, right, and reservoir engineer Claude Ghazer on Aug. 26.

### Deep Earth enters next phase

*Estevan Mercury* - With a recent \$5-million private placement of funding in place, in addition to previously announced federal and provincial government money, Deep Earth Energy Production Corp. (DEEP) has begun flow testing its first well for a geothermal electrical power production facility south of Torquay.

The first well, drilled in late 2018, was put on production

August 25. But it's not producing oil or gas. It's producing hot briny water. The intention is that water from a hot aquifer will be used in an Organic Rankine Cycle power plant to produce electricity.

But long before they get to that point, DEEP needs to get a few things sorted out and that's where August's test comes into play.

Dave Brown, P.Eng. is the project engineer for drilling and completions. He said the approximately 220 metres of core retrieved from the 3,530-metre vertical hole was analyzed during spring breakup.

He noted this phase confirms the resource is there. Furthermore, data collected will be analyzed to identify other brine constituents that may be extracted to be of additional value to the Williston Basin Geothermal Power Facility.

A second well is expected to be drilled adjacent to the first well, but instead of going straight down, they will use directional drilling to go off at an angle such that the toe of the well will be at roughly the same vertical depth, but end up 1 1/2 kilometres to the southwest.

The result will be something of a triangle. The second well will be the producer, pulling hot brine from the ground. When the power plant is in place, the brine will run through the plant. But for testing purposes, it will be reinjected into the first well, which will function as an injector. That test is expected to take 60 days.

That will create something approximating a closed loop in that they will re-inject into the same formation they are drawing from.

Claude Ghazer, P.Eng. is a reservoir engineer working on the project. He said the core had been one piece of the puzzle and now all the pieces need to come together.

By pumping fluid out of the formation, the resulting pressure drop will help map the boundaries of the reservoir.

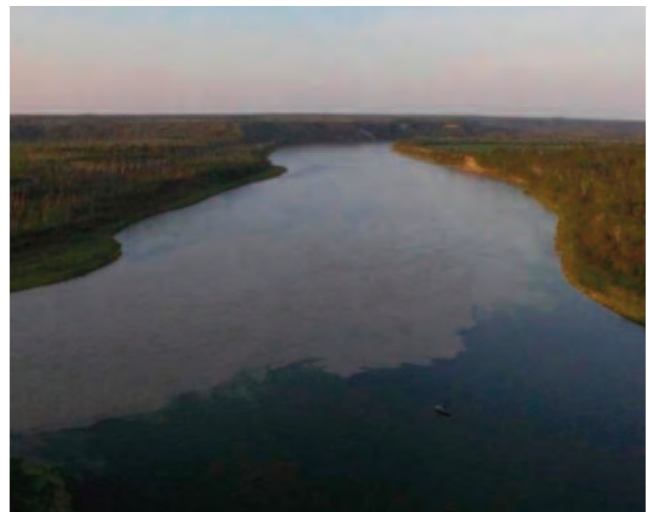
Ghazer offered an analogy, saying, "You've got a pond and you're dropping a stone into the middle. It creates ripples and when it hits the boundaries, it can come back."

Understanding that response is important to developing the geothermal field.

### First Nation planning hydro-electric facility

*Global News* - A memorandum of understanding (MOU) was signed to provide technical consulting services for the development of a hydro-electric power generating facility on James Smith Cree Nation.

The proposed project is for a 200-250-megawatt facility on reserve land located east of the Forks where the North and South Saskatchewan rivers merge.



The James Smith Cree Nation is looking to build a hydro-electric power plant along the North Saskatchewan River, which runs through that community in Saskatchewan's east-central region.

James Smith Cree Nation chose to partner with AECOM and Tesla Energy to help bring the project to fruition, which aims to create employment and opportunities for Indigenous peoples.

James Smith Cree Nation is roughly 175 kilometres northeast of Saskatoon.

## OIL AND GAS

### Husky starts production at Dee Valley project

JWN - Husky Energy Inc. has started production at its Dee Valley thermal project in Saskatchewan, the second of six 10,000 barrels per day (bbl/d) thermal bitumen projects to be brought onstream between 2018-2022.

The company's Saskatchewan production is not subject to government-mandated production quotas. The company has diverse investment options, including the Atlantic region, a large Downstream presence in the U.S. and high-netback growth production in Asia.

Dee Valley will ramp up through year end, increasing Husky's thermal production in Saskatchewan to 90,000 bbls/d.

Dee Valley follows Husky's Rush Lake 2 Lloyd thermal project, which began production in October 2018 and achieved its 10,000 bbls/day design capacity the following month. Current Rush Lake 2 production is approximately 11,000 bbls/day, with a steam-oil ratio of 2.1, among the best in the industry.

Four additional Saskatchewan thermal projects are being advanced through 2022, with a combined design capacity of 40,000 bbls/day.

# Engineering and Geoscience Member Grants, Scholarships and Bursaries



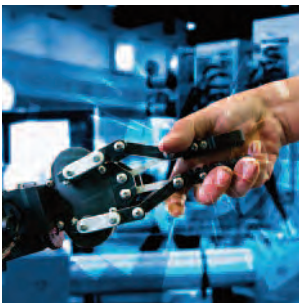
APEGS offers six member grants and 14 annual scholarships and bursaries to be awarded at the University of Saskatchewan and University of Regina.

## Member Grants

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These merit-based grants are aimed at encouraging existing APEGS members to further their education.

Up to six grants of \$7,500 each for current APEGS members returning for post-graduate studies (either university) in fields of engineering, geosciences or an MBA program.



## Undergraduate Scholarships

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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

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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>



# Calendar Of Events

## Premier's Awards of Excellence in Design

October 25, 2019, Saskatoon, SK  
[designcouncil.sk.ca/](http://designcouncil.sk.ca/)

## Practical Implementation of the National Energy Code

October 29, 2019, Regina, SK  
[www.acec-sk.ca/](http://www.acec-sk.ca/)

## Practical Implementation of the National Energy Code

October 30, 2019, Saskatoon, SK  
[www.acec-sk.ca/](http://www.acec-sk.ca/)

## Fall PD Days

November 14 – 15, 2019, Saskatoon, SK  
(Registration opens September 2019)  
[www.apegs.ca](http://www.apegs.ca)

## ACEC-SK Awards of Distinction

November 26, 2019, Saskatoon, SK  
[www.acec-sk.ca/](http://www.acec-sk.ca/)

## Saskatchewan Geological Open House

December 2 – 4, 2019, Saskatoon, SK  
[openhouse.sgshome.ca/index](http://openhouse.sgshome.ca/index)

## 2020

### Inclusivity in STEM Conference

January 22, 2020, Saskatoon SK  
[www.acec-sk.ca](http://www.acec-sk.ca)

### SUMA Convention & Tradeshow

February 2 – 5, 2020, Regina, SK  
[suma.org/conventions](http://suma.org/conventions)

### SustainTech 2020

March 19, 2020, Saskatoon, SK  
[www.seima.sk.ca/](http://www.seima.sk.ca/)

### Law & Ethics Seminar

April 17 – 18, 2020, Saskatoon, SK  
[www.apegs.ca/Portal/Pages/Professional-Practice-Exam](http://www.apegs.ca/Portal/Pages/Professional-Practice-Exam)

### GeoConvention 2020

May 11 – 13, 2020, Calgary, AB  
[www.geoconvention.com/](http://www.geoconvention.com/)

### 2020 CCWESTT Biennial Conference

May 21 – 23, 2020, Winnipeg, MN  
[www.ccwestt.org/conference](http://www.ccwestt.org/conference)

## Did You Know?



Reading *The Professional Edge* counts as credits for reporting continuing professional development under the Informal Activity category.

Attending conferences also counts as credits under the Informal Activity category.

For more information visit: [apegs.ca](http://apegs.ca)