

THE PROFESSIONAL



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Agriculture and the Professions



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Table of Contents

ISSUE 164
SEPTEMBER/OCTOBER

05 President's Message

15 Member Profile

17 Fees Notice

18 Member Information Bulletin

20 Fall 2016 Professional
Development Days

24 Call for Council Nominations

25 30 By 30 Update

26 The Environment and
Sustainability Committee

28 College Corner

29 Safety Moment

30 News Beyond Our Borders

32 News From The Field

36 Calendar Of Events

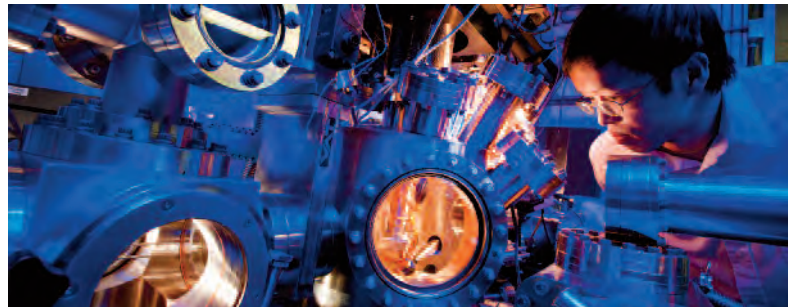
Agriculture and the Professions



7

Engineering a Farm: Experimentation makes Windy Poplars efficient, productive, profitable

BY MARTIN CHARLTON COMMUNICATIONS



10

Harvest of Light

BY MARTIN CHARLTON COMMUNICATIONS



13

M2M Technology

BY MARTIN CHARLTON COMMUNICATIONS

President's Message



President-Elect Ernie Barber, P.Eng., P.Ag. and President Tara Zrymiak, P.Eng., FEC.

Even a city girl like me recognizes the importance of agriculture to the economy.

Along with mining and oil and gas, agriculture is at the top of industries in this province.

The combination of these three sectors provides the diversity that keeps our provincial economy strong.

Agriculture has always been about engineering, even back in the days of the small family farm. Nowadays with the mega high-tech farms, the engineering is just different. Advanced research and education, such as the Prairie Agricultural Manufacturing Institute, enable the growth in productivity and profit capacity needed to address the demands of society. This is evident in high-tech agriculturally related work being done at the synchrotron in Saskatoon, research being done at the Saskatchewan Research Council and by engineers at the Brandt test farm and the use of SaskTel's machine-to-machine communication technology in agricultural applications, to name just a few examples.

Recently I attended the summer summit for PNWER. This Pacific NorthWest Economic Region foundation is a statutory public-private non-profit organization originally established in 1991 with a mission to increase the economic well-being and quality of life for all citizens of the region, while maintaining and enhancing our natural environment. Current membership includes representation from the states of Alaska, Washington, Oregon, Idaho and Montana and the provinces/territories of Yukon, Northwest Territories, BC, Alberta and Saskatchewan. At the summit, I participated in a working group session which involved discussions about agricultural topics and issues of interest for this region.

The first topic concerned agricultural advancements and consumer behaviour. There are a number of key areas affecting the relationship between consumers and the agricultural industry, including information technology, globalization, resource constraints and the increased availability of information. The consumer is now less concerned with price, taste and convenience and more concerned with transparency, health, safety, social impact and experience.

All opinions and views are available through social media and the traditionally respected roles of gatekeepers - scientists, authorities and experts - are no longer relevant. In fact, although surveys indicate that a majority of the public appear to find farmers relatively credible, the general population doesn't always care about facts. Unfortunately this has led to an undefined fear of chemicals, technology and the unnatural in food, even though these are accepted in other areas.

In an attempt to address this problem, SaskCanola created the documentary, *License to Farm – Building Trust One Acre at a Time*. The production was launched in January 2016 at the Broadway Theatre in Saskatoon and is available on YouTube, with very interesting discussions in the comments section. The takeaway for producers is that they need to distinguish themselves not by what they make, but by how they make it; they need to talk to people not about what they know, but why they do what they do.

There was then a session concerning climate change and food security. The growing population means that the need for more



Leah McDonald, Bob McDonald, P.Eng., MBA, LL.B., FEC, FGC (Hon.), FCSSE, Shawna Argue, P.Eng., FEC, FCSSE, FGC (Hon.) and Tara Zrymiak, P.Eng., FEC

food is greater than can be provided by the available land and other resources. We need to produce 70 per cent more food on the same land area - simple redistribution is insufficient. The solutions lie in prudent application of technological advances to produce “smart crops” and to increase yields.

The controversial areas of genetic plant engineering and synthetic fertilizer development are really just logical

extensions of agricultural advances that have been going on since the Second World War. All foods are made up of chemicals. Genetic modification simply involves using advanced knowledge of the molecular components of foods to improve their nutritive capacity.

In the area of yield enhancement, photosynthesis is key and more CO₂ in the air can improve the photosynthesis process and therefore increase yields. Fertilization will of course still be required, but increasing nitrogen-based fertilizer use also increases NO₂ emissions to the atmosphere, which has a far greater greenhouse gas effect than CO₂. In the end, we need to make sure that we regulate products to ensure that they are safe, while allowing experts to adjust the processes to meet the needs of society.

The last part of the session was dedicated to Canada – US regulatory issues related to agriculture. Work is ongoing on topics including wheat grading, differences in disease monitoring affecting ruminant trade, mandatory labelling of country of origin, microbial use legislation and harmonization of trucking standards. We’ve all heard about at least some of these issues, and the solutions are not simple given the inherent and systemic differences between Canada and the US.

I was encouraged however about the eventual outcome of these and other challenges by two things that I observed at the PNWER summer summit: First, the participants were primarily legislators from the various jurisdictions on both sides of the border, i.e. the people who can make these decisions. They communicated a desire to make things work. Secondly, during the opening keynote for the entire conference, both David MacNaughton (Canadian Ambassador to the USA) and Bruce Heyman (USA Ambassador to Canada) clearly expressed that, in general, we all want the same things and that we should focus on what is common between us rather than what is different. This is a great philosophy between countries and between people.

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Courtesy Windy Poplars Farms

Engineering a Farm: **Experimentation makes Windy Poplars efficient, productive, profitable**

BY MARTIN CHARLTON COMMUNICATIONS

When Dustin Burns and Doug Reeve left their respective family farms to study engineering, they didn't know if they would return.

Closer than brothers, Burns says both of them took agriculture and bioresource engineering with a focus on farm machine design.

Reeve says the path was a natural fit.

“Both of us as kids did things like building Legos and Meccano and we were very interested in mechanics.”

After graduating in the late '90s, Burns and Reeve started careers as mechanical engineers, but it wasn't long before the farm called them back.

Burns grew up on his parents' farm, Windy Poplars, and his return in 2002 boiled down to timing and opportunity, he says.

“My parents had to make a decision; they were going to shrink the operation to a sustainable level for them and it was time for somebody else to step in. My wife and I made the decision and we moved out.”

Reeve worked full-time as an engineer for Brandt until he joined the Windy Poplars operation in 2004. While he enjoyed his career, even then he says farm life beckoned.



Doug Reeve (L) Dustin Burns (R)

“I didn’t spend one weekend in Regina because we were driving back and forth to the farm,” he says. “The love of farming, the passion of farming, is something that you can’t get out of your system. Life isn’t all about having a career and making money. It’s about doing the thing that makes you happy. What drew me back to the farm, primarily, was my love of it.”

An experimental farm

John and Linda Burns established Windy Poplars Farm near Wynyard in 1975. Today the name encompasses four farms: the original Windy Poplars, Dustin and Kristi Burns’s Four Winds Farm, Tyler and Janelle Burns’s Wayward Wind Acres and Doug and Bonita Reeve’s Windy Ridge Acres.

“We all have our own companies, but we all work as a unit under the heading of Windy Poplars for simplicity,” says Burns. “It gives us better buying power for equipment and inputs, or even when negotiating and marketing our grain.”

Not only is the structure of the farm different than most other farms its size. So is the farm’s focus on sustainability and experimentation.

“The engineering in us keeps us interested in the technology of farming and not just the machinery technology but the data technology,” says Reeve.

They have a monitoring system that tracks the temperature and moisture in grain bins and automatically turns the fans on and off. Some of their field machines

have GPS auto steering technology.

“It makes our farm more efficient, more productive and more profitable,” says Reeve.

With their backgrounds in mechanical engineering, Burns says they’re not afraid to modify or tweak equipment, which is precisely the reason manufacturers like Brandt from Regina and MacDon out of Winnipeg provide them with prototypes to test within their operations.

“We provide them with a real-world testing site,” Burns says. “We bridge the gap between scholar and where the machinery actually has to function. We both operate it and know how to pick it apart.”

“These companies get a technical farm, an engineering farm,” Reeve adds. “We have the technical design background to not only test the equipment but to provide them with insight or opinions on what we think and how to make it better.”

Their interest in experimenting makes their farm more sustainable. Every year they try to grow heavier and better crops, but that also inevitably means they have a thicker mat of material to deal with at the end of the season. They’ve experimented with many different ways of dealing with this residue and have more recently settled on keeping it on top of the soil to encourage microorganism growth, allowing them to use fertilizers more efficiently and protecting the soil from drought.

“We had very dry conditions last July, but some of the best canola crops in our history because that trash material kept the surface of the soil from being exposed, so the moisture held,” Burns says. “Our canola was able to hang on until we got more moisture.”

They grow alfalfa in their rotation to break up disease and insect pest cycles, and grow legumes to fix nitrogen levels. They also do a lot of farm research and development, using test plots for fertilizer or to try different pieces of equipment.

Reeve says their scientific background gives them the confidence to try new ideas outside the norm.

“We think it’s going to work, so let’s try it and prove whether it does or doesn’t,” he says. “It also makes financial sense to have leading-edge technology in all aspects of our operation because we know it pays back.”

Bringing the office to the crops

It takes an extra level of management to try these new approaches. Windy Poplars is more heavily staffed than other operations of its size.

Luckily, their training as engineers not only gave them the technical skills needed to succeed on their farms, but the managerial skills too, Reeve says.



Windy Poplars Farm at sunset

“What I really got out of university was a number of different managerial type skills, like time management and people management,” he says. “There’s a million, billion things to do on the farm every calendar year and we need to manage our time to make sure we get the tasks done that really need to get done.”

Burns agrees, saying that working in a professional environment gave him a good basis as a business owner.

“We have to manage the staff. There’s time management, project management -- all of that outside of the obvious like having to manage the farm, grow crops and harvest crops.”

They’ve recently hired another engineer onto their staff, an Engineer-in-Training out of university. Reeve recently re-registered with APEGS so he could act as the Engineer-in-Training’s mentor.

Burns says they hired an engineer not solely because of his education, but because he had the skills to handle technical projects. “Doug and I have things we’d like to do, but we’re busy managing the farm . . . We needed someone who could take our ideas and follow through with the details.”

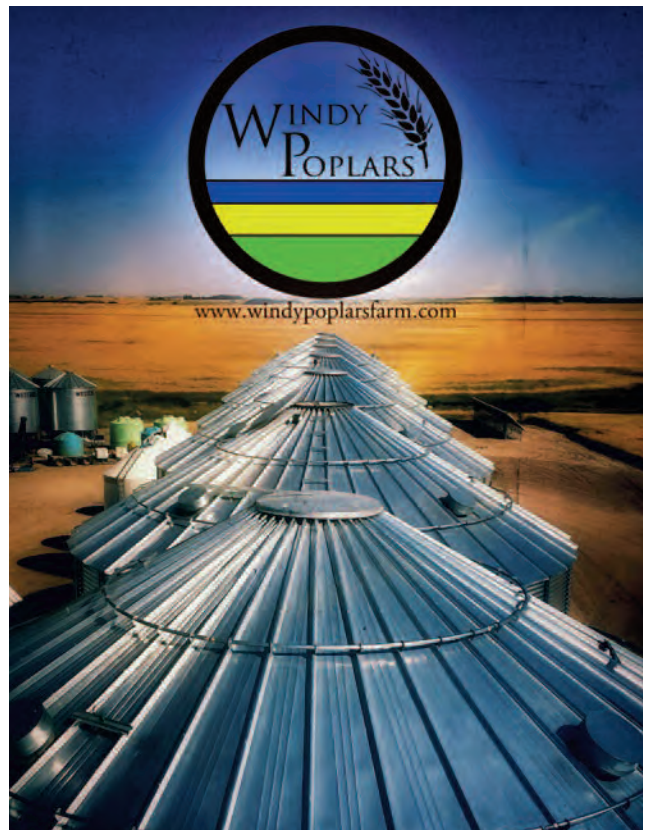
“The College of Engineering at the university teaches technical problem-solving skills,” Reeve adds. “Somebody with a technical background in engineering will have a practical, problem-solving mindset. You bear down to figure it out and solve it.”

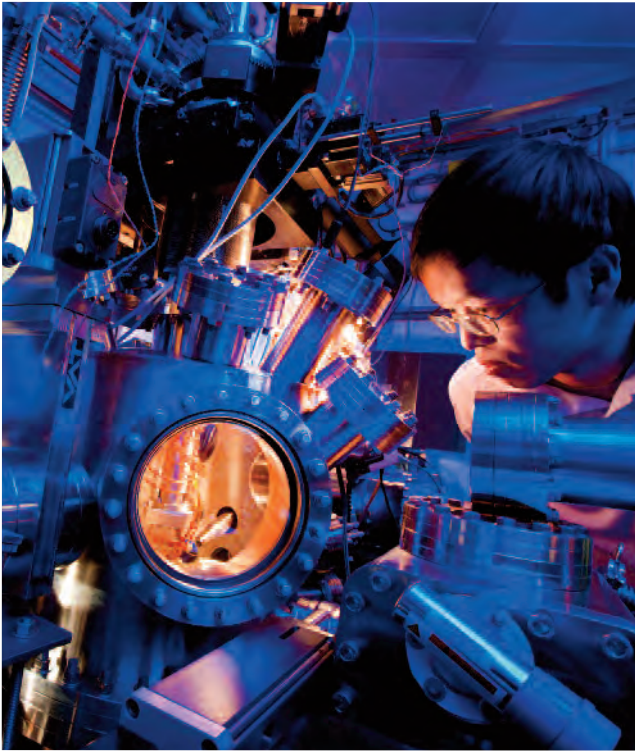
Equally important was that they found someone who is as passionate about farming as they are. After all, neither of them would be where they are today without that passion.

Burns’s parents encouraged him to get a post-secondary

education before settling on a farm and he says he still uses that education in his work every day.

“You have to have a passion for farming,” says Burns. “It shouldn’t be considered a fallback, but something you desire to do. Ultimately, the passion of the farm drew me back to it and we’ve been able to use both worlds together here.”





Harvest of Light

BY MARTIN CHARLTON COMMUNICATIONS

You might not think that Saskatchewan high-tech treasure, the Canadian Light Source (CLS) Synchrotron has a lot to do with farming. In fact, the research centre has had a close relationship with agriculture since its inception. It's right in its vision statement: "Delivering innovative solutions as a leading centre for research excellence in health, agriculture, environment, and advanced materials."

Over the years, CLS has contributed to hundreds of projects that have improved the efficiency of agriculture as well as the quality and health of food. Here's a snapshot of some highlights of CLS's agricultural achievements.

Cause of wheat disease discovered

A nasty disease that can wreak havoc on wheat crops has been identified by scientists, allowing plant breeders to develop better varieties with higher yields for farmers.

Known as Fusarium head blight, FHB is a fungus that attacks the head of the wheat plant, causing the kernels to shrivel up and produce toxins, leaving the plant discoloured and completely inedible for people and animals.

"Fusarium is a huge problem worldwide," said Dr. Rachid Lahlali, CLS plant innovation research associate. "It can affect up to 50 per cent of crop yields in certain areas around the world. Obviously, this is a huge problem."

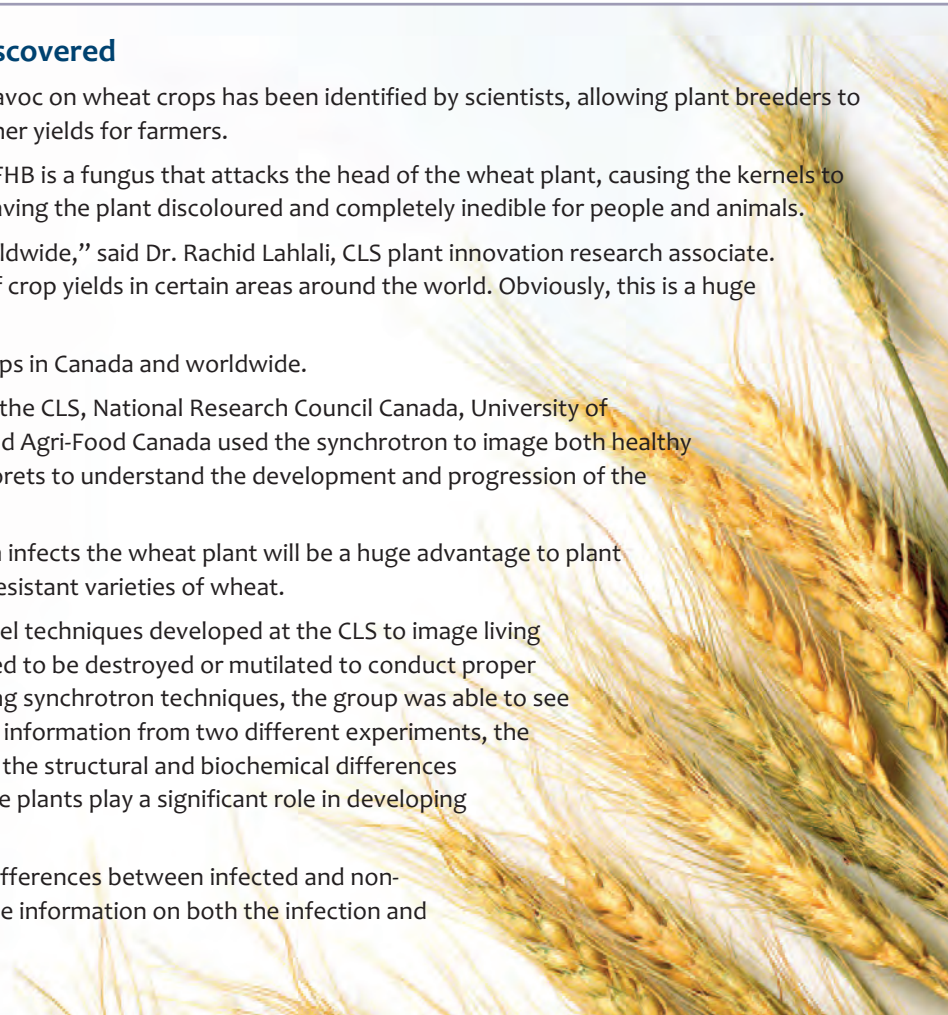
FHB affects wheat and barley crops in Canada and worldwide.

Lahlali and a research team from the CLS, National Research Council Canada, University of Saskatchewan and Agriculture and Agri-Food Canada used the synchrotron to image both healthy and infected wheat spikes and florets to understand the development and progression of the disease.

Understanding how the Fusarium infects the wheat plant will be a huge advantage to plant breeders trying to develop FHB-resistant varieties of wheat.

Lahlali and his team relied on novel techniques developed at the CLS to image living wheat plants. Typically plants need to be destroyed or mutilated to conduct proper experiments of this type, but using synchrotron techniques, the group was able to see changes over time. By combining information from two different experiments, the group tested the hypothesis that the structural and biochemical differences between resistant and susceptible plants play a significant role in developing resistance to FHB.

The results revealed significant differences between infected and non-infected plants, providing valuable information on both the infection and future plant imaging techniques.



Frozen bovine eggs

Preserving genetic material is an important way to ensure the long-term viability of Canada's agriculture sector because it ensures scientists will have diverse genetic material for future breeding. However, some common freezing techniques that work well for bovine sperm have failed to work well for bovine eggs. Using synchrotron technology, Agriculture and Agri-Food Canada (AAFC) research took a new look at what happens inside these egg cells and made a surprising discovery.

Dr. Muhammad Anzar, AAFC cryobiologist with the Canadian Animal Genetic Resources Program (CAGR) in Saskatoon, has researched how to improve the preservation of livestock breeds, specifically bovine eggs.

Dr. Anzar undertook a new research technique with the Canadian Light Source (CLS) using the synchrotron X-ray beamline to get a better look at what happens to the bovine egg when it undergoes vitrification, the special freezing process for genetic material. He is the only scientist attempting to confirm the ice or glass phase in cells or tissues of bovine eggs, making this research unique.

Through a partnership with Dr. Pawel Grochulski from the Canadian Macromolecular Crystallography Facility (CMCF) at CLS in Saskatoon, the researchers confirmed that inside the bovine egg, destructive ice crystals continue to form, in spite of techniques in the vitrification process aimed at preventing them. Something about the egg is resistant to preservation.

This study opened a gateway to study the behaviour of cells at low temperature, and that will be a new dimension for using CMCF to improve the frozen cells' health.



Scoping out soils

Healthy soils are vital to sustainable food systems. To keep soils healthy, farmers need to carefully monitor their use of fertilizer. Poor fertilizer use could be worse than none at all.

“The concept that not all fertilizer is used by each plant has been known for decades,” Barbara Cade-Menun, a researcher for Agriculture and Agri-Food Canada, explained.

While most farmers take into account previous rounds of fertilizer to plan their crop care, the estimates of key element levels, like phosphorus and nitrogen, are full of unknowns.

Cade-Menun focuses on the questions surrounding phosphorus left over from fertilizers. For example, one hot topic is how phosphorus moves through the soil and how much is washed away into lakes where the nutrient can trigger massive algae blooms.

Answering these questions could help industry develop better fertilizers, honed so that specific crops could use up the nutrients entirely, thereby reducing the risk of phosphorus runoff damaging lakes.

Cade-Menun's team has a set of resources and skills that makes them uniquely capable of exploring these big agricultural questions. Cade-Menun uses wheat plots at the Semiarid Prairie Agricultural Research Centre in Swift Current, where she is based.





Oddly enough, 15 years after half the wheat plots stopped receiving phosphorus fertilizer, nothing has changed with respect to crop yield. Both the now-unfertilized and fertilized parts of the plots continue to produce equally, despite drastically different nutrient additions.

By combining CLS techniques with their other research, the team put together a picture of how the unfertilized soil changed over time as compared to its fertilized counterpart, to understand how wheat plants coped with the change.

Sure enough, the plants grown in plots free from phosphorus fertilizer had significantly drawn down the levels of easily-accessible phosphorus in the soil, “Which would tell us we should put fertilizer on there, except that the yields haven’t changed,” said Cade-Menun.

This unexpected result means that producers might be able to change the way they use fertilizers to better reflect the resilience of phosphorus sources in the soil. The work could also be used to improve prairie wheat fertilizers.

Meanwhile the team is continuing its study to see what happens to plants once they completely deplete their inorganic phosphorus sources.

Heat stress in peas

A recent collaboration between the Canadian Light Source and the University of Saskatchewan Plant Science Department is proving the potential for molecular imaging in plant research to produce greater yields, healthier varieties and more food for a hungry planet with a rising average temperature.

U of S plant scientist Dr. Rosalind Bueckert and CLS scientists Dr. Chithra Karunakaran and Dr. Rachid Lahlali used the CLS to examine the development of pollen grains during the growth of two pea varieties exposed to heat stress.

“Over the last century, the average temperature, and specifically the nighttime temperature, has increased in Western Canada,” says Bueckert. “This translates into increased frequencies of warm spells during summer. Between three and five days of heat above 28 degrees can cause up to 25 per cent yield decrease in pea crops.”

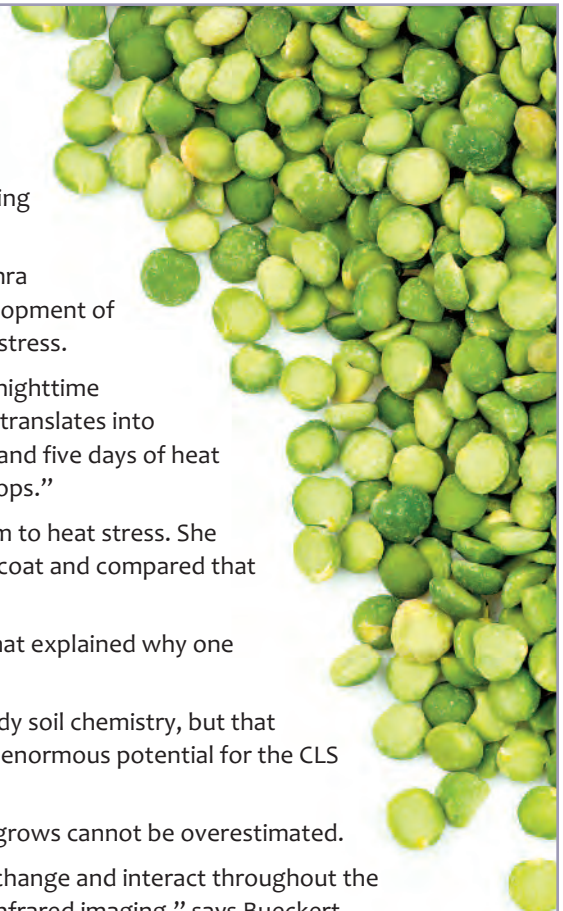
Bueckert and her group selected two pea varieties and subjected them to heat stress. She then used CLS imaging technology to track changes in the pea pollen coat and compared that to the reduction in germination in each variety.

The spectroscopy results revealed biochemical changes in the plant that explained why one variety is more heat resistant than the other.

Karunakaran says, “Before this project, the CLS was often used to study soil chemistry, but that was the extent of our agricultural reach. Now we have demonstrated enormous potential for the CLS to be used to study plants.”

The benefits of being able to observe a plant at the cellular level as it grows cannot be overestimated.

“Now researchers can watch how proteins, carbohydrates and lipids change and interact throughout the plant, and over time as the plant develops, using fast and affordable infrared imaging,” says Bueckert.



M2M Technology

BY MARTIN CHARLTON COMMUNICATIONS

You know you are living in the future when clichés come to life. In the modern world of the “Internet of Things”, the pot can actually call the kettle black. Machine-to-Machine (M2M) technology gives objects increasing abilities to monitor and report data on their status. These applications are unlocking a wealth of possibilities for the agriculture sector.



Bin there, done that

In many ways, the basic principle of M2M - communication between devices without the need for human interaction or control – has been an established part of conventional technology for years, if not decades. Most traffic lights are controlled by M2M software to detect flow and volume. Utility meters on homes are operated by M2M. And even that vending machine at work uses M2M to signal when a particular item is running low.

“I’ve been at SaskTel since 1998 and I’ve worked on M2M all through that time, in the sense of working on wireless data,” says Mark Miles, P.Eng., a SaskTel senior engineer.

What’s new about M2M is the sheer scale of recent applications and the scope of industries that are taking it up. Agriculture has long been targeted as a prime industry in which M2M technology could expand and provide farmers the ability to steadily improve their growth and operations with more efficiency.

Some agricultural applications existed in the past, Miles says.

“For example, we had some applications related to transportation monitoring such as GPS tracking on farm equipment, engine monitoring on grain trucks, that sort of thing.”

Kyle Folk, president of Intragrain

Last year, SaskTel launched its M2M Management Centre. Among its first clients was Intragrain Technologies Inc., a company focused on solving the age-old problem of bin spoilage.

“The problems have been around forever. As storage gets bigger and grain prices get higher, it becomes more of an issue. It’s estimated that producers in Canada lose more than \$750 million in grain per year and that’s a direct hit on their pocketbooks because there’s no insurance on stored grain,” says Kyle Folk, president of Intragrain.

The problem had a personal connection for Folk.

“My parents are grain farmers near Holdfast. I went back to visit one weekend many years ago and was helping my dad prepare for a semi to come and get some grain. When we put the auger in the bin, it hit a wall and wouldn’t go through. It was because the grain had spoiled. When I asked my father why he didn’t monitor it, he explained to me what products were available and I could see there was a massive void in the marketplace.”

SaskTel, along with other engineers and researchers, helped Folk realize his vision.

“Consulting with the farmers, getting to know their needs, that’s the role of the service provider and we don’t interfere with that. They bring their needs to us. Our job is

to work closely with the service provider to determine the right communications solution,” says Miles.

Intragrain’s product, Bin-Sense, monitors grain after it’s been stored in the bin. Measurements are transmitted wirelessly from bin to bin locally in the yard. One bin has a master unit on it that transmits the information to Intragrain’s server every hour. Farmers can access it by logging in over the Internet. If something changes from the parameters they set, they’ll be notified via text message.

The partnership between SaskTel and Intragrain has been a successful one.

“It’s working well and has been well received. We’re proud to have been able to contribute to it,” Miles says.

A growing network

Bin-Sense is becoming well-known in Saskatchewan but it is not the only M2M-related agricultural technology.

For example, it’s required by law in Canada for cattle to be tracked with radio frequency identification (RFID) tags, as part of food safety requirements. These RFID tags are now also being put to use in robotic milking machines to help monitor the milking production and frequency of each cow.

Semios

Semios is a popular pest management system that was launched in Canada almost six years ago. Its primary function is to monitor for insect pests, plant diseases and micro-climates by utilizing a combination of weather stations and camera-enabled traps that monitor daily pest activity.

Collected data is transferred wirelessly to the Semios dashboard and then transferred to a user’s smart phone to pinpoint the affected spot. It’s highly efficient and environmentally friendly as it cuts down on the spraying of potentially harmful pesticides over a large area.

Endless potential

The growth of M2M technology is helping make farming more efficient, economical and safer. There is still a long road ahead for its benefits to grow, says Miles.

“As the so-called ‘internet of things’ gets bigger, the possibilities just keep growing. From a Saskatchewan perspective, we’re just getting started.” Miles says.



Member Profile



This month *The Professional Edge* chats with **Trevor Allen, P.Geo.**, a resource evaluation geologist at Cameco.

Tell us about your personal and professional background.

I grew up on a family farm near The Pas, Manitoba before heading off to Brandon University.

Why did you choose to go into geology?

My mother was always asking my brother and me what we wanted to be when we grew up. I think it was a yearbook thing. Early on I started answering “scientist.” I eventually narrowed that down to physicist, which is how I started off in college. I ultimately concluded that professional physics wasn’t very practical so I switched to geology.

Why did you choose Brandon University?

I had offers from all over but I’m a small-town boy at heart so I picked the one that was the smallest and closest to home. I had an offer from the U of S but at that time Saskatoon was too much “the big city” to me.

What did you do after college?

I went travelling! I really have to give my parents credit for that because they urged me to do it and it was some of the best advice they ever gave me. Their view was that after college was the last good opportunity to see the world. After that, you would get tied down to your job, your mortgage, your family so the opportunity to travel, except for short holidays, would quickly vanish.

I had gotten married in my third year university. My wife and I took my parents’ advice and headed down to South America for three and a half months.

What sort of places did you visit?

All through the northern part of South America – starting off in Venezuela (where we met up with a friend who was already there), through Colombia and into Ecuador, Peru and Bolivia.

What was your favourite?

I would have to say Peru impressed us the most. It’s a fairly prosperous country so it has a lot of modern amenities. The people are amazing – very helpful and hospitable. It has a varied and beautiful geography. It has a great depth of history which you see reflected in the many ancient Incan sites and ruins.

What do you feel you learned from your trip?

My wife and I learned a great deal about how to relate to each other as a couple. In that environment, you have to be able to depend on each other and get along. For example, it wasn’t until the trip that I realized how much I needed to talk, which sometimes became an issue when my wife was the only one in the room who spoke English.

We also came to understand the lifestyle in South America where people are very hard working but also much more laid back. It’s hard to explain. For example, there would be a guy on the beach selling sunglasses. He might put in a long 10-hour day but then he would feel that he had earned a long, leisurely break. It’s a different sort of attitude, a different kind of freedom than how we live in North America.

What did you do when you got back from your trip?

I was hired by Hudbay Minerals as mine geologist at a copper zinc mine in Flin Flon. It was an amazing experience. I worked with a lot of smart people. It was a good learning environment - one of the best mines you could work on right out of university. My rock collection grew extensively - until my wife told me to cut it out.

What brought you to Cameco and the “big city”?

I had worked at Hudbay for seven years and it was starting to become clear that the mine was coming to the end of its run. Cameco had an opening for a resource geologist so my wife and I thought we should make the move while the kids were still young.

Cameco has been great to work for. There is a great variety of projects. I have had the privilege to work at McArthur River, the best uranium mine in the world – not something everyone can say. I’ve also been down to their operations in Wyoming.

What has been your greatest achievement as a geologist so far?

I’m still looking for the big one every geologist hopes for - finding a major deposit. But so far the best is my work on the Reed Deposit in Flin Flon. It was great to see the development process all the way through, from initial drilling to putting the mine into production.

Besides your South American trip, where do you like to vacation?

Flin Flon! It’s sort of ironic that when we lived in Flin Flon we would sometimes take trips to Saskatoon but now that we live here we go back. We are an outdoorsy family and we like the wilderness up there.

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

In my career, my current boss, Alain Mainville, is a well-rounded guy who’s taught me a great deal and is continually challenging me to learn more. Also, previous

colleagues Rob Carter and Tim Schwartz were great guys to work with and have excellent technical skills.

As for my life in general, I would say my father. He was always pushing us to do better. He was a proud farmer but he didn’t want my brother and me to end up on the farm.



ARE YOU AN ENGINEER RETURNING TO UNIVERSITY?

Let the Engineers Canada Scholarship Program Help You!

Manulife Financial Scholarships (3)

\$12,500

Engineering: To enhance expertise in engineering. Applicants must be accepted or registered full-time in a faculty of engineering, beginning no later than September 2017.

TD Insurance Meloche Monnex Scholarships (3)

\$7,500

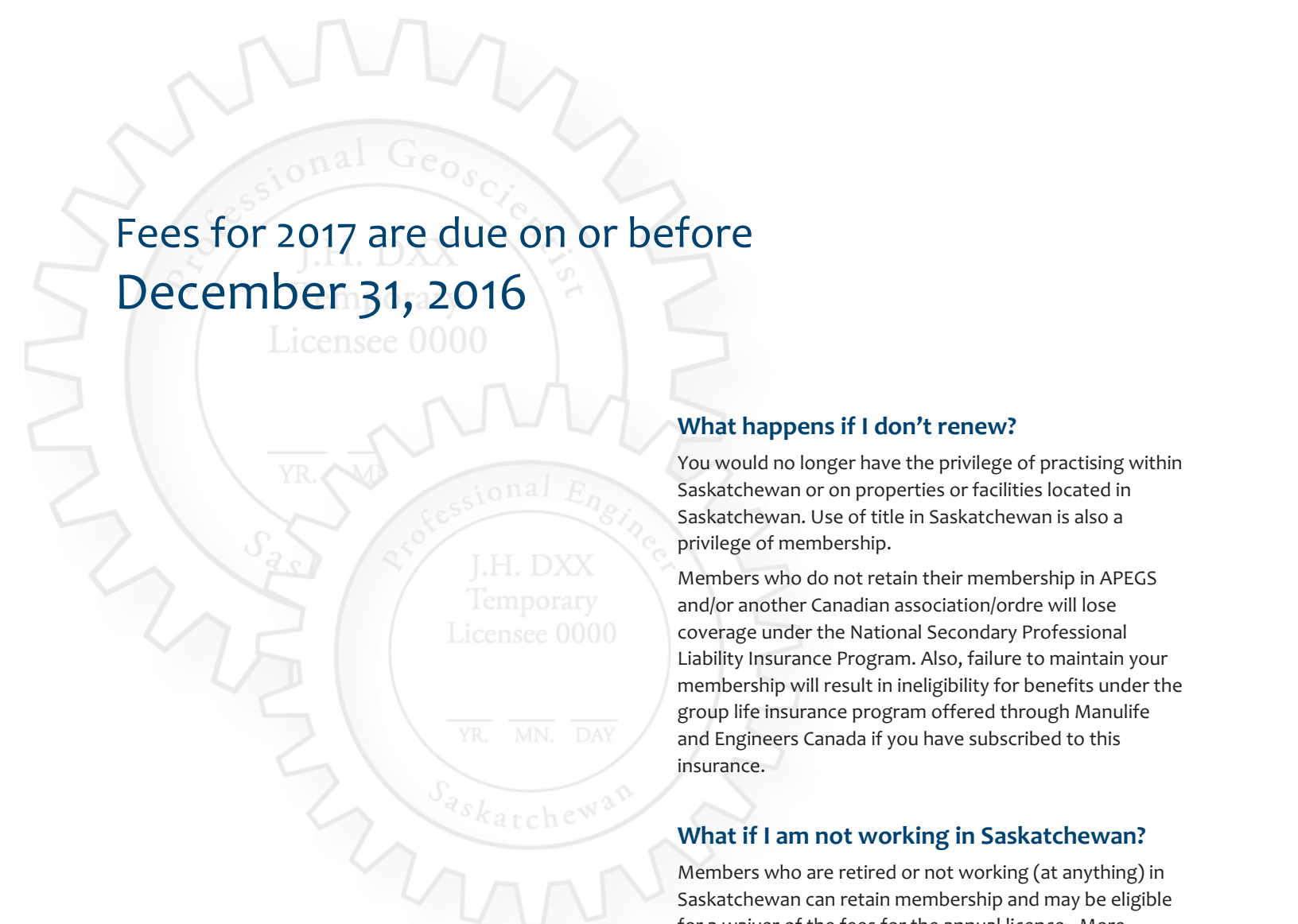
Non-engineering: To enhance performance in the engineering profession. Applicants must be accepted or registered full-time in a faculty other than engineering, beginning no later than September 2017.

DEADLINE: March 1, 2017

Application form and complete list of criteria at:
www.engineerscanada.ca/awards-and-honours/scholarship-program

Building on **ENGINEERING*** knowledge

*The term ENGINEERING is an official mark owned by Engineers Canada.



Fees for 2017 are due on or before December 31, 2016

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, 2016, contact APEGS. Fees are due on or before December 31, 2016 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, 2016 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.

MEMBER INFORMATION BULLETIN

Features of the APEGS Website www.apegs.ca

Did you know...???

The APEGS website has many useful features:



- **News Items**
- **Spotlight**
- **Events Calendar**
- **The Professional Edge**
 - eEdge (electronic version) and pdf downloads
 - Annual Reports
 - Job Postings
 - Informative Items
 - *The Engineering and Geosciences Professions Act* and Bylaws
 - Boards, Committees and Volunteers
 - Application Processes and fees
 - Law & Ethics Seminar
 - Professional Practice Exam
 - Member Benefits
 - Scholarships and Bursaries
 - Salary Surveys

- **Login to your On-Line Profile**
 - Update contact information and employer information
 - Reset your password
 - Report Continuing Professional Development (CPD) activities
 - Renew your Permission to Consult (if applicable to you)
 - Volunteer for committees, one-time events and other activities
 - Select the types of information / communications you wish to receive from APEGS
 - Monitor the status of your membership application
 - Online payments
 - Register for APEGS events and meetings.



APEGS encourages all members to regularly visit the APEGS website, www.apegs.ca

For more information:

For more information regarding the APEGS website please contact the APEGS office.

apegs@apegs.ca | 306-525-9547 | 1-800-500-9547



Women of APEGS Lunch

APEGS President Tara Zrymiak, P.Eng., FEC invites members in the Saskatoon area to attend an information / networking lunch to recognize and celebrate the contributions of women to our professions.

Tara will provide updates to the attendees on initiatives that APEGS is currently undertaking to promote women in the professions in line with the 30 by 30 Engineers Canada initiative. This is a great opportunity for members in the Saskatoon area to connect and network as well.

When: Thursday, December 1, 2016, noon

Where: Saskatoon Club (417 21st St E, Saskatoon)

This event is open to all APEGS members at no cost. Lunch will be provided. Register online through your online profile on the APEGS website (www.apegs.ca).

Deadline for registration is November 20.

TD Insurance
Meloche Monnex

Scholarships to support you on your path to greater knowledge



TD Insurance Meloche Monnex, provider of the home and automobile insurance program endorsed by Engineers Canada, is proud to be associated with the Engineers Canada Scholarship Program by offering three scholarships for 2017.

Three TD Insurance Meloche Monnex Scholarships of \$7,500

Each scholarship will assist the candidate to pursue studies or research in a field other than engineering. The discipline should favour the acquisition of knowledge which enhances performance in the engineering profession. Candidates must be accepted or registered no later than September 2017, in a faculty other than engineering.

APPLICATION DEADLINE: March 1, 2017

Application forms are available at engineerscanada.ca or by contacting the Engineers Canada Scholarship Program at awards@engineerscanada.ca

Building on ENGINEERING* knowledge



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Fall 2016 Professional Development Days

November 3 & 4, 2016

Thursday, November 3, 2016

Queensbury Convention Centre, Evraz Place, Regina

8:00 – 8:30 Registration

8:30-10:00 TRACK 1

Bold Strengths of Safety Leadership

POZNIAK SAFETY ASSOCIATES

Let your Bold Strengths take you where you have not been before within your safety program. People who choose to be bold are inspiring not just because they get big things accomplished, but because they also instigate growth, progress and movement for themselves and others around them. This presentation will explore and identify some of those key strengths that are the foundation pieces to your role in safety in any workplace. Some of the bold strengths reviewed will be: knowing your legislation with an overview of the new prime contractor responsibility, leadership approaches, understanding hazards, risks and controls. Eldeen will share key strength information and approaches through stories and humour.

Eldeen Pozniak, BA., BSc., CEES, CHSC, CHSMSA, CRSP, FIIRSM, CMIOSH is an advisor and consultant to various industry sectors, government organizations, and businesses, and a lecturer at educational institutions. She is the past president of the Canadian Society of Safety Engineering (CSSE) and the president of the International Network of Safety and Health Professional Organizations (INSHPO). She has received the Saskatchewan Safety Professional of the Year award and the CSSE Bell Canada Safety Professional of the Year award. She has recently been inducted into the Saskatchewan Safety Hall of Fame.

TRACK 2

Time Management

ACHIEVE TRAINING CENTRE

Our workplaces demand productive employees, and it often feels like there is not enough time to do everything we need to. Our ability to manage time affects productivity and the quality of work we are able to produce. Developing effective skills in time management empowers us to deal with the conflicting priorities we face every day. This workshop will set you up for managing your time with proficiency. You will learn how to set priorities, get yourself organized, manage your time and achieve your goals. As you learn to optimize your time, you will enhance your ability to deliver results.

Janice Nistor has a master's of human resource management and is an accredited Professional Certified Coach. Janice has many years experience in non-profit, government and private business. Her areas of expertise include training and development, leadership development, performance management and engagement. Janice has led teams of various sizes throughout her career, most recently in the banking sector. As a seasoned facilitator, Janice brings humour and stories to her sessions, ensuring participants are engaged and learning.

10:00-10:15 Coffee Break

10:15–12:00 **Bold Strengths of Safety Leadership** (continued)

Time Management (continued)

12:00-1:00

Luncheon

Luncheon Speaker: How do you attract the clients you want, the staff you want and the revenue you want? Strategy first + design excellence. BRADBURY BRANDING & DESIGN

Award-winning designer and 27-year branding veteran Catharine Bradbury, of Bradbury Branding & Design, walks us through her firm's trademarked Brand Imprint process. She provides an insider's perspective on what a brand is and isn't, why every organization needs a strategic and visible brand, and how a great brand pays dividends in everything from client loyalty and public awareness to lower marketing costs and stronger employee recruitment and retention.

Catharine Bradbury, CGD, is president and creative director of Bradbury Branding & Design. She has studied graphic design and fine art in Alberta, Saskatchewan, and British Columbia at the prestigious Emily Carr Institute of Art and Design. She has designed over 40 stamps for Canada Post, including the Saskatchewan Centennial Stamp, a commemorative stamp for the Law Society of Saskatchewan and the Legendary Canadians and Canadian Tourist Attractions commemorative stamp series, all of which are housed in the National Archives of Canada. The winner of well over 300 international, national and regional awards, her work has appeared in numerous international design publications and has been profiled in prestigious magazines and books.

1:15-2:15

TRACK 1

Invasive Aquatic Species

MINISTRY OF ENVIRONMENT

Certain aquatic invasive species (AIS) can be very damaging to aquatic ecosystems by creating impacts to the ecosystem, aquatic recreational values and the infrastructure attached to these aquatic systems. To combat AIS there have been international, federal and provincial agreements and legislation created for containment and/or prevention. Public education and awareness campaigns have been launched. This presentation will look at Saskatchewan and the regulations in place here, as well as the measures being taken for prevention and monitoring, and the public awareness and education activities ongoing. The presentation will also provide a look at system impacts and the ways to deal with both the ecological and infrastructure impacts.

Ron Hlasny is an aquatic ecologist and aquatic species at risk ecologist. He is currently the aquatic invasive species coordinator at the Fish, Wildlife and Lands Branch of the Saskatchewan Ministry of Environment.

TRACK 2

Conflict Resolution

ACHIEVE TRAINING CENTRE

Conflict holds great potential for harm and for good. The results of unhealthy conflict impact us individually and contribute to negative group performance. Those people who master essential conflict resolution skills reduce the occurrence of negative conflict in their lives, leading to healthier, happier relationships and work environments. Conflict has many sources, including miscommunication, disagreements, stress and personality differences. Many conflicts would not spiral out of control if people used conflict resolution techniques that are easy to learn and utilize. This workshop will teach participants to understand the dynamics of conflict and equip them with the skills needed to respond confidently and effectively.

Janice Nistor – See bio under Time Management track above.

2:15 – 2:45

Climate Change Legal Considerations for Engineers and Geoscientists

APEGS

The rapidly evolving legal treatment of climate-change-induced events is going to be front and centre for engineers and geoscientists on a global basis. Whether private businesses, crown corporations, municipalities, or federal / provincial governments, engineers and geoscientists will have to incorporate climate change planning into projects going forward, or perhaps have to deal with unknown consequences. Additionally, federal and provincial discussions for greenhouse gas (GHG) emissions mitigation and reporting are also evolving. How may this affect Saskatchewan? What can we, as professional engineers and geoscientists, do to prepare and increase knowledge in this area? Are we prepared for climate change adaptation and GHG emissions mitigation considerations in current and future projects?

Ian Loughran, P.Eng., is a member of the APEGS Environment and Sustainability Committee. He led the energy and sustainability engineering group at the City of Saskatoon from 2011-2014. From 2009-2010, he led the renewable energy programs at SaskPower. Ian is a partner with Vereco Smart Green Homes. He founded Energy Six Consultants, which specializes in assisting clients with developing energy-efficient buildings and renewable and clean energy projects. He is also VP of project development with the First Nations Power Authority.

2:45 – 3:00

Coffee Break

3:00 – 3:30 **Climate Change Legal Considerations for Engineers and Geoscientists** APEGS (*continued*)
Conflict Resolution ACHIEVE TRAINING CENTRE (*continued*)

3:30 – 4:00 **Life Cycle Assessment of GHG from Mining and Milling Uranium in Saskatchewan**

GOLDER ASSOCIATES

To reduce greenhouse gas (GHG) emissions from the production of electricity, the world economy needs to shift from primarily consuming GHG-intensive energy sources to consuming primarily low-GHG energy sources. To accomplish this transition it is necessary to understand the GHG emission intensity from energy sources and their fuel cycles. This discussion will present the results of the first comprehensive “cradle-to-grave” assessment of GHG emissions from uranium mining/milling in Canada.

Cameron S. McNaughton holds a B.A.Sc. in environmental engineering from the University of Waterloo in Ontario, Canada and an M.S. and Ph.D. in Oceanography from the University of Hawai'i at Mānoa in Honolulu, Hawai'i. He is a registered Professional Engineer in the provinces of Saskatchewan and Alberta and is currently employed at Golder Associates Ltd.

Friday, November 4, 2016

Queensbury Convention Centre, Evraz Place, Regina

8:00-8:30 Registration

8:30-10:00 **P5™ Impact Analysis – Holistic Decision Making for Options Analysis**

ENVIRO INTEGRATION STRATEGIES

P5 stands for people, planet, profit, process and product. This workshop will introduce P5 impact analysis and present a tool to utilize in comparing various project component options, to facilitate making decisions and recommendations for the best possible outcomes of a project, aligned with the 5Ps.

This workshop is designed for:

- Project managers and engineers who desire a transparent, communicable method of assessing and comparing design options.
- Project stakeholders who would like to know when and how they might influence project designs and considerations.

Karen Chovan, P.Eng., is the principal of Enviro Integration Strategies and has worked in the mining and construction industries. She has acted as an internal sustainability consultant, managing organization-wide changes. (www.envirointegration.com)

10:00-10:15 Coffee Break

10:15–12:00 **P5™ Impact Analysis** *continued*

12:00-1:00 **Luncheon Speaker: APEGS Continuing Professional Development Program**

APEGS

All members of APEGS are required to maintain their professional competency by undertaking professional development activities. APEGS has made revisions to the requirements for Continuing Professional Development (CPD). This presentation will outline these changes and demonstrate how to report professional development activities.

Sebastian Walrond, P.Eng., PMP is Chair of the APEGS Professional Development Committee. He is a registered Professional Engineer with over 25 years of industrial experience spanning five countries. He graduated with a bachelor's degree in mechanical engineering and a master's degree in power systems from The University of the West Indies, Trinidad. He is the president and a founding member of the Internationally Educated Engineers Qualification (IEEQ) Program alumni group in Manitoba since 2011.

1:00-2:45

Project Risk Reduction Strategies

ENVIRO INTEGRATION STRATEGIES

Projects of all types are facing increasingly high rates of failure. Several causes have been cited; however, the most prevalent are those that are non-technical in nature, related to communications and collaboration, stakeholder engagement, planning and change management.

This workshop will introduce a few key strategies to facilitate planning and collaboration by breaking down silos, improving communications and helping project teams see the connections between their work and the work of others, as well as the links of their work to the overall project, corporate strategies and external pressures.

This workshop is designed for:

- Project managers and engineers who need a foundational starting point of understanding the complexities of large-scale projects, and how they might set themselves up for success.
- Engineers and environment professionals who often experience project rework and/or change requests stemming from missed, or misunderstood stakeholders
- Other project team members who want a better understanding of how their work is intertwined within the whole project
- Project stakeholders who would like to know when and how they might influence project designs and considerations.

Karen Chovan, P.Eng., is the principal of Enviro Integration Strategies and has worked in the mining and construction industries. She has acted as an internal sustainability consultant, managing organization-wide changes. (www.envirointegration.com)

2:45-3:00

Coffee Break

3:00-4:30

Project Risk Reduction Strategies ENVIRO INTEGRATION STRATEGIES *continued*

Registration

Registration Information:

APEGS is pleased to be able to offer this affordable professional development opportunity as a benefit of APEGS membership. Attendance can be counted towards CPD credits under “informal activity.” Participants will receive certificates of completion for each workshop attended.

Early Bird Registration (before Oct. 1/16) = \$250.00 per day

After Oct. 1/16 = \$300.00 per day

Student Registration = \$150.00 per day (must provide proof of being registered as a full time student)

Non-APEGS members = \$500.00 per day

Registration fees include continental breakfast, coffee breaks, lunch and all workshop materials. To register for these events, please log on to your On-line Profile on the APEGS website (www.apegs.ca) and register under “Meetings.”

Looking for Accommodations?

APEGS has negotiated a rate of \$129.00/night, plus taxes, at the Residence Inn (corner of Dewdney Avenue and Lewvan Drive) for Nov. 2 & 3, 2016. http://www.marriott.com/meeting-event-hotels/group-corporate-travel/groupCorp.mi?resLinkData=APEGS%5E6UR%60yqrr%60&app=resvlink&stop_mobi=yes

For More Information:

For more information, contact Shawna Argue, P.Eng., MBA, FEC, FCSSE, FGC(Hon), director of education and compliance, at the APEGS office: 306-525-9547, toll free 1-800-500-9547, email sargue@apegs.ca.



Call for Council Nominations

Nominating Committee

The Nominating Committee, chaired by Past President Margaret Anne Hodges, P.Eng., FEC, is soliciting names for the positions described below. You may contact staff support to the Nominating Committee, Shawna Argue, at sargue@apegs.ca to propose names of potential candidates. Shawna may also be reached through the APEGGS 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). Ernie Barber, P.Eng., P.Ag. is the current president-elect and Stormy Holmes, P.Eng., FEC 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 APEGGS office no later than 5 p.m., Wednesday, March 15, 2017, as the election will take place when ballots are counted on Monday, May 1, 2017, the “polling day.”

2017 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

2017 Vacancies & Terms of Office

- Only members in good standing are eligible for nomination. A person elected to Council may hold office only 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 APEGGS 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>

30 BY 30 UPDATE

SUBMITTED BY THE 30 BY 30 TASK GROUP



At the May 2015 APEGS annual meeting, the membership passed a motion for APEGS to endorse Engineers Canada’s “30 by 30” initiative. APEGS joined the other provincial engineering regulators in signing on to this initiative. The 30 by 30 goal is Engineers Canada’s commitment to raising the percentage of newly licensed engineers that are women to 30 per cent by the year 2030.

It has been a busy summer for the 30 by 30 Task Group as we ramp up the planning process, complete our terms of reference and identify some early initiatives.

The 30 by 30 theme was a major part of the annual APEGS council orientation and strategic planning meeting in June with representation from APEGS boards and committees. A brainstorming session was held to generate ideas as to how different APEGS committees and Council can support and move forward on the initiatives. Some of the ideas on which we have started to take action include creating an APEGS-specific 30 by 30 logo, designing a set of banner bugs for 30 by 30, developing partnerships, enhancing information on the APEGS website and undertaking outreach activities. We are already booked to attend the Saskatchewan Career and Work Education Association’s 2016 Better Workplace Conference in North Battleford in October.

Some of our most exciting news pertains to developing a relationship with Saskatchewan’s Status of Women Office. The Status of Women Office (part of the Ministry of Social Services) is providing \$7,500 to the task group to initiate our plans to engage girls and women in the pursuit of engineering and geoscience as a career for:

1. Girls in early-to mid-elementary school years – the future engineers of the year 2030.
2. Girls in high school years – making class choices and career/university path decisions.
3. Young women enrolled in engineering – keeping them engaged, providing mentorship and encouragement.
4. Women already in the profession – retaining them.

Some of our existing activities (such as “What is, Engineering” hosted at the two universities) will be enhanced. Another of our proposed initiatives is to host a “Women in Engineering, Science, Trades and Technology Conference” in Saskatchewan.

There are many opportunities and ideas for APEGS 30 by 30 to pursue. We encourage all members to be role models to your sisters, nieces, cousins and daughters, and provide support for female colleagues. The task group challenges you to share your ideas and experiences in engaging young people, particularly girls, to think about engineering and geoscience. If you have talked to students, taken part in a mentorship program, found the perfect science-related gift or book, please let us know. We’ll share the ideas with the rest of the APEGS community.



Standing (l to r): Barbara McKinnon (Ministry of Education), Ben Freitag (EYES), Dr. Aaron Phoenix, P.Eng., FEC (U of S), Catherine Griffith, P.Eng. (Connection & Involvement), Greg Godwin, P.Eng. (Student Development), Dr. Dena McMartin, P.Eng., FEC (APEGS representative on the Engineers Canada Sustainable Professions Committee).

Seated (l to r): Dr. Denise Stilling, P.Eng. (U of R), Margaret Anne Hodges, P.Eng., FEC (Chair), Dawn Friessen, P.Eng. (Equity and Diversity, Women of APEGS Sub-committee Chair), and Shawna Argue, P.Eng., MBA, FEC, FCSSE, FGC (Hon) (staff support).

Absent: Adeline Chiu, P.Eng. (K-12), Pat Faulconbridge (Status of Women Office) and Rob Stables, P.Eng., FEC (Council Liaison).

The Evolution of Solid Waste Management in Saskatchewan

BY IAN JUDD-HENREY, P.GEO., DALE RANKEL AND MICHAEL RATHWELL, A.SC.T.

Opinions expressed do not necessarily reflect the views or policies of APEGS.

In the early 1900s, the average household generated little waste. At that time, most waste consisted of ceramics, glass and old cans, with minimal plastics waste.

Over time, the amount and type of waste that our society generates has changed and continues to change. While there have been some positive changes lately, through most of the past century the volume of waste constantly increased.

The way people dispose of waste has also changed over the past 100 years. Once, domestic waste was disposed of in small, shallow pits and burned. Filled pits were covered and new ones were dug.

Then people got together to designate larger, centralized dumping areas. The qualities of a suitable dump site typically included convenient access and poor land quality. At the time, few considered potential environmental impacts. The waste in these uncontrolled dumps was not segregated. Up until 2002, it was common practice to burn solid waste. There were also few, if any, standards about the soil cover placed over the waste.

Saskatchewan has the dubious distinction of having one of the highest numbers of dumps per capita in Canada. As of 2013, there were about 500 active municipal landfills in the province. Ontario has 81 and Alberta has 126. Obviously, we have more dumps than we need.

Change is happening. Many Saskatchewan communities are moving to regional landfill models used in other jurisdictions, in which urban and rural municipalities manage an updated landfill while smaller local landfills are closed down.

Modern facilities are designed to reduce the amount of waste which has to be buried or “landfilled,” and promote waste minimization using the four Rs (reduce, re-use, recycle and recover). Modern landfills are a vast improvement over the former dumps, with extensive and innovative environmental protection measures.

Prince Albert’s landfill demonstrates this evolution. It was originally established as an uncontrolled dump. As this dump approached capacity, an environmental impact assessment was conducted to determine the next steps. It was decided that a modern landfill should be constructed at the site and that the dump should be closed. In 2003, the first double-lined landfill cell was constructed

and a groundbreaking door-to-door recycling program was initiated. This new landfill was established as one of the first regional landfills in the province serving the newly formed north central waste management area. Since that time, a second municipal landfill cell was constructed and a groundwater cut-off wall was completed around the former dump. More recently, the city constructed a special double-lined industrial landfill cell to abide by provincial policy regarding petroleum-contaminated soils. This new landfill cell was designed to separate the oily soils, treat these soils through farming and control any runoff. This treatment process also produces soil of suitable quality for daily cover needs at the landfill. To deal with water quality concerns, the city is also creating a connection from the landfill to the city’s water treatment plant.

Like most environmental regulations, the regulations concerning waste management, landfills and transfer stations continue to evolve. The current solid waste management approach of the Ministry of Environment involves:

- Encouraging the regionalization of waste management and integrated solid waste management systems;
- Making waste reduction and diversion a priority;
- Educating municipalities and the public about current regulatory requirements and best management practices.
- Ensuring best management practices and industry accepted standards for design, operation and closure of waste disposal grounds are followed, and
- Updating compliance assurance measures in accordance with results-based regulation.

Landfill owners, operators and professional geoscientists and engineers need to be aware of both the current legislation and guidelines and potential changes that may affect their collection systems and facilities in the future. One way to do this is through organizations like APEGS, Solid Waste Association of North America (SWANA) – Northern Lights Chapter (<https://swananorthernlights.org/>) and the Association of Regional Waste Management Authorities of Saskatchewan (www.arwmas.ca). Groups are encouraged to work with the Ministry of Environment at an early stage to determine the best course of action.

NOTICE TO MEMBERS

Bylaw Change

At its June 16, 2016 meeting, Council passed a motion to amend The Engineering and Geoscience Professions Regulatory Bylaws, section 9, to include the requirement for engineering and geoscience licensee applicants to successfully complete the Principles of Professional Practice Exam prior to obtaining their licence. The amendments are as follows:

Engineering and Geoscience Licensees

9 To qualify for registration as an engineering or geoscience licensee, a person must, in addition to the requirements set out in subsection 20(2) of the Act:

- a) in the opinion of the Council, be qualified to practise in a particular field or type of engineering or geoscience, under any terms and conditions that the Council may determine; **and**
- a) **complete an examination, called “Principles of Professional Practice,” which conforms to the required admission standards, secure a grade acceptable to Council, and pay the required examination fee, or submit evidence satisfactory to the Council that he or she has already passed a similar examination recognized by the Council or was admitted to membership in a Canadian professional association recognized by Council prior to January 1, 1987.**

These amendments to the Regulatory Bylaws have been approved by the Minister of Highways and Infrastructure and will be in effect until approved, amended or rescinded by the membership at the 2017 annual meeting.

Complete versions of *The Engineering and Geoscience Professions Act, 1997* and accompanying Regulatory and Administrative Bylaws can be found on the APEGS website: (<http://www.apegs.ca/Portal/Pages/Act-Bylaws>).



Advertising in The Professional Edge

The Professional Edge is a great way to get the word out about your business, service or event. Each issue of the Edge reaches over 12,000 readers.

The Edge is made available to every engineer, geoscientist, member-in-training and licensee with APEGS, including our many out-of-province members.

The magazine is displayed and read in the offices of engineering and geoscience firms across the province. As well, complimentary copies are sent to many of Saskatchewan's decision makers and opinion leaders.

For more information on rates and advertising opportunities, contact Chris Wimmer at 306-585-9547 or cwimmer@apegs.ca

Faculty of Engineering and Applied Science, University of Regina



Courtesy of Dave Charlton

The asBot winning team: (left to right) Dean Kertai, Caleb Friedrich, Sam Dietrich and Joshua Friedrich

Over the past few months, engineering students at the University of Regina have won a number of prestigious awards.

- Competing with the likes of Purdue, Virginia Tech, Michigan State and Ohio State universities, the U of R engineering team (Sam Dietrich, Caleb Friedrich, Dean Kertai and Joshua Friedrich; faculty advisor Dr. Mehran Mehrandezh, P.Eng.) placed first at the 2016 agBot challenge. As well, the team tied for the third place (Muchowski Farms) was led by Nathan Muchowski, a graduate of electronic systems engineering at U of R.
- Brad Lulik, Eva Rennie and Brent Yeske, U of R Engineering recent graduates, won the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Applied Engineering Design Challenge. They competed against schools throughout the world, including UBC, University of Toronto, Western University, MIT, Texas A&M, City College of New York and Temple University, as well as institutions in China, Indonesia and the Middle East.

- At the national level, the Minerva Canada 2016 National Safety Award was given to Tanner Thomseb, Marlee Wasnik and Ryan Schmidt. This team was supervised by Dr. Denise Stilling, P.Eng.
- Locally, Gang Luo, Kulbir Jaglan and Simon Hanna were the winners of the annual Regina Engineering Society Project Day Award. This team was supervised by Dr. Mohamed El-Darieby, P.Eng. and taught by Dr. Craig Gelowitz, P.Eng.
- Dr. Xiaoli Li, a graduating petroleum systems engineering student under Dr. Tony Yang, P.Eng. was the recipient of the 2016 Governor General's Academic Gold Medal at the U of R's spring convocation.

A number of our faculty members have received national recognition:

- Dr. Gordon Huang, P.Eng. received an honorary degree from McMaster University.
- Dr. Yasser Morgan, P.Eng. received the Wilfrid Laurier University Award for Public Sector Leadership in Advanced Technology.
- Dr. Paitoon Tontiwachwuthikul, P.Eng. was inducted a new Fellow of the Canadian Academy of Engineering.

We are pleased to welcome our newest petroleum system engineering faculty members, Dr. Saman Azadbakht and Dr. Na Jia.

The EYES (Educating Youth in Engineering and Science) Program had another successful series of summer camps for children entering grades 2 to 9. EYES had approximately 1,350 campers this summer, 20 instructors, two office staff and 30 volunteers.

This September our fourth-year students will be starting their capstone design projects. We welcome ideas for industrial projects. If you would like our students to address a design problem that you may have, please send a short one-page proposal to the dean <esam.hussein@uregina.ca>.

The faculty will be presenting a series of engineering seminars to be held on the last Monday of each month from 11:30 am to 12:30 pm. The seminars will address topics of interest to the engineering community, provide a forum for continuing education and feature research performed at the faculty. If you are interested in attending any of these seminars, please email our associate dean (research), Amr.Henni@uregina.ca.

The National Council of Deans of Engineering and Applied Science will be holding its next meeting in Regina, November 24-26, 2016, on the invitation of the faculty.

SAFETY MOMENT

The Professional Edge is pleased to present this new regular column on workplace safety issues, courtesy of the Saskatchewan Workers' Compensation Board.

Have You Heard?



Over 500 people report work-related hearing loss injuries to the Saskatchewan Workers' Compensation Board (WCB) each year.

If you are in an industry that is a high-risk for hearing loss, you must provide hearing tests to your workers upon hiring them, at regular intervals during employment and encourage your workers to obtain a test within five years of retirement.

It is important that you keep all hearing test information on file even after workers retire. This information is useful if a worker reports hearing loss any time in the future.

The WCB uses past hearing tests to help determine if the predominant cause of the hearing loss is work related.

The Saskatchewan Employment Act requires employers to arrange for audiometric testing and counselling at least every 24 months for workers who:

- Have regular work exposure to a daily noise level equal to or greater than 85 decibel A-weighting (dBA) or
- Regularly work in areas where noise levels are equal to or greater than 90 dBA.

In work areas with lower sound volumes but regular exposure to noise, it is good practice to have employees' hearing tested regularly.

If you obtain testing for your workers, obtain a summary report of the audiometric test results from the supervising health professional.

This report will contain:

1. The names of the workers who underwent audiometric testing.
2. The number, but not the names, of workers who had one or more of the following:
 - a) abnormal baseline audiograms
 - b) early warning audiograms
 - c) abnormal audiograms
3. Any recommendations made by the supervising health professional.

The summary report will help you determine whether your hearing conservation measures are successfully protecting your workers' hearing. Keep copies of all summary reports for as long as you operate in Saskatchewan.

If an Occupational Health and Safety Division officer requests to see the summary reports, you must provide them.

If your workers give permission, you may also obtain their personal results. Have your workers keep a copy of their own hearing records (audiograms) or send a copy to their family doctor, who should keep these on file. Making audiograms part of their regular health checkups helps provide early detection of hearing loss for people who work in high-risk industries.

The only cure for hearing loss is prevention:

- Measure noise levels in your workplace to ensure your workers aren't overexposed to noise.
- Choose equipment that emits lower volumes of sound.
- Baffle noise where you can.
- Train your workers in the proper use of hearing protection.



For more information, visit www.worksafesask.ca or call the Saskatchewan Workers' Compensation Board at 1.800.667.7590.

News Beyond Our Borders



news.uaif.edu

Arctic research vessel Sikuliaq

Association of Professional Engineers and Geoscientists of British Columbia - BC firm AKAC Inc. has helped design research vessel Sikuliaq, an icebreaker designed for oceanographic research in Alaskan waters, with the possibility of seasonal operations in the Canadian Beaufort Sea. It is owned by the US National Science Foundation and operated by the University of Alaska Fairbanks.

During the design, AKAC Inc. was the naval architect responsible for ensuring the vessel was capable of operating and conducting science missions in the Arctic ice. To meet its unique mission requirements, several unique design features were incorporated, including azimuth propulsion.

AKAC Inc. prepared an ice operations manual for the vessel and conducted hands-on field training to help ensure the vessel is used to its maximum potential. Evan Martin, P.Eng., was in charge of ice trials conducted to provide training to the crew, and to develop and verify operational procedures for conducting science operations in sea ice.

Regulatory body for Quebec engineers placed under trusteeship

Ordre des Ingénieurs du Québec - Quebec's professional regulatory body for engineers, the Ordre des Ingénieurs du Québec (OIQ), has had its powers of self-regulation revoked and has been placed under trusteeship of the provincial government.

Announced July 6, the move by Quebec's provincial government follows a recommendation from the Office des Professions, the authority that oversees the province's professional regulatory bodies. A press release issued by the Office states: "The Office believes that the effective delivery of activities of regulation of the profession and the financial stability of the OIQ are seriously affected, to the point of putting into question the capacity of the OIQ of carrying out its primary mission of public protection."

The OIQ has faced a number of internal challenges and financial difficulties in recent years. In 2014, two experts, Pierre Pilote and Dr. Yves Lamontagne, were appointed by the Office des Professions to help the order address these issues. They presented their recommendations in January 2015. In a report submitted in June 2016, the OIQ outlined how it intended to implement the recommendations. These were dismissed by Quebec's Justice Minister, Stéphanie Vallée, as "insufficient." She said that infighting and financial difficulties had made the OIQ unable to fulfill its primary responsibility of protecting the public.

Three administrators have been named by the government to work with the OIQ board to achieve a solution for governance of the order: professional engineer Michel Pigeon, lawyer Johanne Brodeur and certified professional accountant François Renaud. The OIQ board of directors took office only recently.

New research into wood buildings

Association of Professional Engineers and Geoscientists of British Columbia - The National Building Code of Canada places strict height limits on combustible wood-frame buildings in Canada. Over time, the code has changed to accommodate new research, materials and technologies that improve the structural and life-safety performance of wood-frame buildings and building systems.

A number of new alternative solutions that permit increases from mid- to high-rise heights have been developed. For example, use of modern mass timber products such as glued laminated timber, cross-laminated timber and structural composite lumber has been identified as a viable approach to safely increase the height of wood buildings. Timber-based hybrid buildings have also been identified as viable structural forms. Hybrid buildings combine steel, reinforced concrete, and wood into structural components and systems.



gowood.blogspot.com

The University of British Columbia has been a leader in promoting wood-only and timber-hybrid buildings. A number of recently constructed buildings at the Vancouver and Okanagan campuses, including the 18-storey student residence being built this year, are examples. The university also leads in research into effective use of wood in mid- and high-rise buildings.

Trial for former engineer who inspected Elliot Lake mall

CBC News - The trial of Robert Wood is taking place in Ontario Superior Court in Sault Ste. Marie. He is accused of two counts of criminal negligence causing death and one count of criminal negligence causing bodily harm in connection with the Elliot Lake mall collapse in 2012. He has pleaded not guilty to all charges.

Wood was the last person to examine Elliot Lake's Algo Centre Mall before a portion of its rooftop parking deck caved in on June 23, 2012. He also evaluated the structure in 2009.

Crown attorneys Marc Huneault and David Kirk will argue that the inspector's work contributed to the mall's collapse, which killed two women — Lucie Aylwin, 37, and Doloris Perizzolo, 74 — and severely injured another person.

The Crown attorneys will bring forward a long list of witnesses including a prospective buyer of the Algo Centre Mall, who alleges Wood warned it would cost \$1.5 million to fix the structure's roof or it would cave in. Wood told a public inquiry that was launched into the disaster that he could barely recall any such conversation.

If convicted, Wood could face a life sentence.

Historic space mission to asteroid Benu

Royal Ontario Museum - A team led by the Canadian Space Agency has a ticket to an asteroid. On September 8th, 2016, NASA launched the OSIRIS-REx probe from Cape Canaveral with the aim of a rendezvous with Benu, a Near Earth Object (NEO) asteroid two years later. The mission will help scientists investigate how planets formed, tell us about the origins of some of the building blocks of life, as well as improve our understanding of asteroids that could impact Earth.

Once in orbit with the asteroid, OSIRIS-REx will analyze the asteroid's surface features over an extended period. Then, in a daring flight maneuver, the probe will touch down and scoop up a sample of Benu's terrain before flying away again. OSIRIS-REx will complete its mission by returning the sample to Earth for analysis. This will be the largest extraterrestrial sample return mission since the lunar Apollo missions.

This is the first time Canada will participate in an asteroid return space mission. The Canadian Space Agency is contributing the OSIRIS-REx laser altimeter (OLA) - a key payload for the entire mission. Previous experience on Canada's Mars Phoenix Rover team has provided the foundation for OLA. The Royal Ontario Museum and the Universities of British Columbia, Calgary, Toronto and Winnipeg are collaborating on the project as well.

For its participation, Canada will receive 4 per cent of the retrieved sample from Benu. This material will support homegrown planetary science research.



www.rom.on.ca

News From The Field

UNIVERSITIES AND RESEARCH



www.uregina.ca

Regina engineering students win international award, help charity

Regina Leader-Post - Brad Lulik may have been a “broke university student,” but he still found a way to give back in a big way.

Lulik and two other recent graduates of the University of Regina’s Faculty of Engineering and Applied Science, Eva Rennie and Brent Yeske, recently won an international award from the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

Maybe more importantly, the winning project found a cost-efficient way for Souls Harbour Rescue Mission, a local charity, to improve its daycare space.

“It doesn’t sound sexy per se, but it’s certainly something that’s critical, especially for a daycare setting,” said Lulik. “We worked to design them before regulatory heating, ventilation and air conditioning system.”

In winning, the students beat out some famous schools, including MIT Engineering, the University of Toronto and the University of Western Ontario.

“It’s quite a humbling experience,” said Lulik. “We certainly saw this as an opportunity to give back with our expertise.”

Doing a capstone project was a requirement of their studies, and according to Lulik, when the students heard about the competition, they decided to kill two birds with one stone.

The students met with a number of different charities in Regina before choosing Souls Harbour.

“It was very clear that Souls Harbour has such a substantial impact on the local community, and so much of their operating budget goes to simply the services,” said Lulik. “They don’t have the funding to upgrade their building so readily.”

“Their services that they gave us help us continue to improve our building. For them to come along, choose us an organization, donate their services to us for a year and compile a very comprehensive engineering report and energy assessment on our building helps us make well-informed decisions on the maintenance needs of the building,” said Michael Towers, the director of operations for Souls Harbour.

The students were awarded a cash prize and can attend an awards ceremony in Las Vegas next year.

Drone and robotic technology will be used to help maximize crop yields



CBC News - The University of Saskatchewan has officially launched a new high-tech research centre to study food security and

how Saskatchewan can grow even more for the world. The program was launched ahead of an international symposium being hosted at the university and included demonstrations of new drone technology to monitor crops and the land beneath them.

“It’s probably the place in Canada to do all of this work,” said Maurice Moloney, CEO of the university’s Global Institute for Food Security. “What we have here is very strong computer science, excellent image acquisition and analysis.”

“We have also . . . very good agriculture engineering, robotics and so on,” he said.

The research, part of the new Plant Phenotyping and Imaging Research Centre, at the university will help enhance crop breeding to find solutions for national and international food security. One of the approaches being studied includes high-tech digital imaging using drone technology.

The drone uses a multi spectral camera to analyze crops and fields.

The launch also showcased a robotic vehicle that can be used to monitor crop development from the ground.

MINING

Yancoal's Southey potash mine closer to construction

Saskatoon StarPhoenix - The provincial government has approved an environmental impact assessment for the Yancoal Canada Resources Co. potash project near Southey.

“We’re very confident that the due diligence has been done and this project can go ahead to the next phases of permitting and approvals,” former Saskatchewan Environment Minister Herb Cox told reporters this summer.

Yancoal was established in 2011 as a wholly owned potash mining and exploration subsidiary of the Chinese coal mining firm Yanzhou Coal Mining Co., which is itself owned by the Chinese government.

The company wants to build a \$3.6 billion, 2.8 million tonne-per-year solution mine near Southey, about 60 kilometres from Regina. The controversial project has attracted the ire of several activist groups, including local landowners and environmentalists.

At a news conference in Saskatoon, Cox told reporters the company took pains to consult with residents, local First Nations and Metis groups, and that he’s satisfied with its commitment to protecting the environment.

As Yancoal begins the next phase of mine development, which includes obtaining other licences and permits, it must meet certain conditions, including entering a development agreement with the Rural Municipality of Longlaketon.

The mining company must also submit a community involvement plan and an environmental protection plan that includes an outline of how nearby bodies of water will be monitored.

More interest in Sask. diamonds

Saskatoon StarPhoenix - As De Beers Canada Inc. prepares to start drilling for diamonds north of the decommissioned Cluff Lake uranium mine, another group of industry veterans is planning to explore targets about 20 kilometres away.

Vancouver exploration firm Canterra Minerals Corp. has begun drilling in the area. Company president and CEO Randy Turner has been looking for — and finding —

diamonds since the early 1990s. Canterra was formed after De Beers bought his previous company, Winspear Diamonds Inc., in 2000.

On August 17, Canterra signed an agreement with CanAlaska Uranium Ltd. — the same company that optioned 43,000 acres to De Beers for up to \$20.4 million this spring — to explore the West Carswell property about 750 kilometres northwest of Saskatoon. Surveys have shown magnetic anomalies consistent with kimberlite, the mineral associated with the presence of diamonds.

Finding diamond mines is not easy. Only a small percentage of magnetic anomalies turn out to be kimberlite pipes, and only a handful of those bear diamonds.

“In the end we like to say it’s high-risk, but very high reward. So as explorationists, we keep our eyes open, our ears open, our minds open — but we like what we see,” said Turner.

ENERGY



U of S prof studies power grid

Global News – A U of S engineering professor has been awarded a \$2.2-million research chair to create solutions to the pressing challenge of power grid modernization.

Tony Chung will lead a research team that will work alongside SaskPower engineers to modernize its power grid and incorporate renewable energy sources.

“Adding more renewable electricity options, such as wind and solar, is part of our plan to significantly reduce emissions,” said Guy Bruce, SaskPower’s vice-president of planning, environment and sustainable development.

“This research will help us better understand the best way to integrate these options into our power grid as we plan the system of the future.”

Chung is an internationally recognized expert in smart grid technology. Smart grids include a broad array of emerging technologies that improve power grid reliability, enable greater use of renewable energy and prevent blackouts.

The project’s goals will be to evaluate these technologies and develop new ones to determine options for incorporating them into Saskatchewan’s power grid.

Nineteen U of S students and research personnel will make up Chung’s team.

Wind project near Chaplin denied

CBC News - A wind project proposed near a shorebird habitat in southwestern Saskatchewan will not go ahead, says the provincial government. The province announced it had denied a 79-turbine wind project near Chaplin.

The environment ministry said it received 137 responses during a public review period of Algonquin Power & Utilities' proposed wind farm in 2015. It said all but one of those responses supported wind energy, but expressed concern about this particular location.

Environmentalists were worried about the hundreds of thousands of birds which fly through the area during migration. They were also worried about the destruction of natural habitat to build the proposed 79 wind turbines.

The province has developed new guidelines for wind producers – so they know which areas of the province are too delicate for projects to be considered in the future. It says there is a five kilometre buffer zone around environmentally-sensitive areas including national and provincial parks, ecological reserves, important bird areas and certain rivers.

A spokesman for Algonquin Power said the guidelines released today provide more clarity for potential wind farms. Algonquin Power's vice-president of business development, Jeff Norman, said the company hopes to find a new location over the next few months. He said Algonquin is eager to find a new location for its proposed 177 megawatt wind farm, and plans to amend its contract with SaskPower accordingly. Norman said a new site would be chosen for the wind farm over the next two months.

ENVIRONMENT

SK uranium mining emits few greenhouse gases

University of Saskatchewan - A U of S research group has found that the mining and milling of Canadian uranium contributes very little greenhouse gas for the amount of energy produced.

"People frequently think that nuclear power still emits a lot of greenhouse gases because of uranium mining, but what this study shows is that mining is a relatively small contributor to nuclear's overall emissions," said Cameron McNaughton, P.Eng., an environmental engineer with Golder Associates and adjunct professor in the U of S College of Engineering.

The study, supported by the Sylvia Fedoruk Canadian Centre for Nuclear Innovation at the U of S, was published online earlier this year in the peer-reviewed journal *Environmental Science and Technology*.



l.huffpost.com

"We found that the mining and milling of uranium contributes about a gram of greenhouse gases (as CO₂ equivalents) per kilowatt hour of power that comes from that uranium," said David Parker, Engineer-in-Training, who conducted the study for his master's degree, co-supervised by McNaughton and U of S Professor Emeritus Gordon Sparks, P.Eng.

By comparison, coal produces over 800 grams of CO₂ equivalent per kilowatt hour and natural gas about 500 grams, according to the 2014 UN Intergovernmental Panel on Climate Change. The report cites a mid-range value of 12 grams of CO₂ equivalent gases per kilowatt hour for nuclear power, similar to wind power.

"Saskatchewan has the highest grade uranium in the world, and the emissions from uranium mining in Canada are very, very low when compared to extracting fossil fuels," said Parker. "This is the first rigorous look at greenhouse gas emissions from uranium mining and milling in Saskatchewan, and is more detailed than the few studies that have been done before."

The study involved adding up the greenhouse gases emitted by everything used in the mining and milling of uranium at three Saskatchewan operations – from the fuel used in heavy machinery and to power the mine and mill operations, to the concrete and steel used in construction, to the emissions from flying workers in and out of the mine sites. Even the emissions from the mining companies' head offices were tallied. The technique, called a life cycle assessment, followed a methodology laid out by the International Organization for Standardization.

U of S receives \$77M for water research in Canada

CBC News - The federal government is giving the University of Saskatchewan more than \$77 million to study water issues across the country.

The money will be going towards Global Water Futures, a research hub that will study everything from floods, droughts and degraded water quality in northern climates.

"The University of Saskatchewan and its many national and international partners will transform the way communities, governments and industries in Canada and other cold



regions of the world prepare for and manage water-related threats, such as devastating floods and droughts, in this era of unprecedented global change," said President Peter Stoicheff.

According to the university, this is believed to be the largest water research grant ever funded worldwide.

Part of the research will include helping industries and governments to manage water threats and to reduce water consumption.

The research will also focus on water quality issues in First Nations and Métis communities. According to the university, 1,000 boil water advisories were in effect as of this year.

'Indigeneers' marry engineering, environmentalism

Saskatoon StarPhoenix - Tasked with writing a report to justify the economic case for burning the gas byproduct from oil wells instead of capturing it and building infrastructure to get it to market, "indigeneer" Deanna Burgart, P.Eng. went a step further and showed the company how it could save even more money by using the gas to generate energy to power the pump jacks right at the wells.

She used her technical knowledge to solve an engineering problem in a way that satisfied her need to minimize waste when taking from the earth.

Burgart – who grew up in Calgary and is a member of Fond du Lac Denesuline First Nation in Saskatchewan – and Pamela Beaudin, a Metis with roots in Ile à la Cross, are engineers who are launching a Calgary-based company to occupy the space between aboriginal engagement and engineering.

"We felt we belonged to both," Burgart said Wednesday at the World Indigenous Business Forum in Saskatoon, after announcing the launch of Indigenous Engineering Inclusion Inc., a company she and Beaudin founded. "We wanted to create a space where we could be our whole selves all the time," she said.

The new company will offer consulting to firms that

understand the need to build relationships with indigenous communities in the lands where they want to do business. They'll promote diverse workforces to widen the perspectives of problem solvers, something Burgart began doing years ago when she first started mentoring girls interested in science and technology.

Companies that want to work on indigenous lands need to build relationships long before they fulfil their duty to consult on planned projects, Burgart said. She recalled an elder telling her the land is like family to the indigenous people who have always lived there.

"If you wanted to marry my daughter, would you come and talk to me the day of the wedding?" he asked.

OIL AND GAS

New test centre for Sask heavy oil production

Saskatoon StarPhoenix - A new Saskatchewan Research Council (SRC) initiative aimed at developing and commercializing new extraction technologies could provide oil producers with access to the billions of barrels of crude buried deep beneath west-central Saskatchewan that can't be extracted using traditional methods.

The main method of extracting heavy oil, known as cold heavy oil production with sand (CHOPS), has an average recovery rate of about 7 per cent, according to Mike Crabtree, head of SRC's energy division.

That leaves roughly 23 billion barrels of oil, or about 90 per cent of the 26 billion barrels estimated to reside beneath west-central Saskatchewan, inaccessible to producers.

While new tools are available, risk-averse companies often don't have the time to experiment with new methods and prefer to optimize existing methods, Crabtree said.

SRC's new post-CHOPS Well Test Centre aims to develop technologies to address some of the oil left in the ground and incentivize producers to adopt them, Crabtree said.

Producers will get a royalty incentive to give the Well Test Centre access to their wells.

It typically takes years for producers to adopt new techniques, but the Well Test Centre's incentives could cut that down to months, Crabtree said.

Even if the tools it helps introduce allow producers to access an additional 3 billion barrels of heavy crude, it would be a "big deal" for the province and extend its resource base significantly, Crabtree added.

"There are literally thousands and thousands of these wells in Saskatchewan . . . so it's going to be about mobility, sustainability and economic viability of these technologies, and that's what we'll be testing."

Calendar Of Events



Canadian Design-Build Institute Conference 2016

October 13-14, 2016, Winnipeg, MB
www.cdbi.org/conference/2016-conference/

Professional Practice Exam

October 22, 2016, Regina & Saskatoon
www.apegs.ca

Ingenium 2016 – FEC and FGC Reception

October 26, 2016, Winnipeg, MB
www.apegm.mb.ca

Ingenium 2016 - Professional Development Seminars

October 27, 2016, Winnipeg, MB
www.apegm.mb.ca

Ingenium 2016 Engineers Canada Awards Gala and Dance

October 28, 2016, Winnipeg, MB
www.apegm.mb.ca

Project Management - The Basics

October 28, 2016, Kelowna, BC
www.apeg.bc.ca/Events/Events/2016/16OCTPMB

APEGS Professional Development Days

November 3-4, 2016, Regina, SK
www.apegs.ca

Canadian Aboriginal Mineral Association Conference

November 6, 2016, Ottawa, ON
www.aboriginalminerals.com

Effective Communication Skills

November 9, 2016, Webinar
www.apega.ca/members/events/detail/229

Navigating Complexity: Implementing Change in Unpredictable Times

November 22, 2016, Vancouver, BC
<https://www.apeg.bc.ca/Events/Events/2016/16NOVNCZ>

2016 Saskatchewan Geological Open House

November 28-30, 2016, Saskatoon, SK
www.openhouse.sgshome.ca

Women of APEGS Luncheon

December 1, 2016, Saskatoon, SK
www.apegs.ca/Portal/Pages/fall-pdd

Women in Leadership

January 31, 2017, Webinar
<https://www.apeg.bc.ca/Events/Events/2017/17JANWIL>

International Conference on Water Management Modeling (ICWMM)

March 1-2, 2017, Brampton, Ontario
www.icwmm.org

Registration Deadline for Spring Professional Practice Exam and Law & Ethics Seminar

March 17, 2017, Online
www.apegs.ca