

The official
publication
of Engineers
Geoscientists
Manitoba

THE KEYSTONE PROFESSIONAL

WINTER 2019



INSIDE
THIS ISSUE

- Engineers
- Geoscientists
- Manitoba's New President, Dr. Jitendra Paliwal
- Ingenium 2019 Conference Recap
- Meet Your Council

PM#40065075



Just the *facts*

about Engineers Canada-sponsored
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1 Canada Life and Health Insurance Association, "A guide to disability insurance," January 2016.
2 Parachute, "The Cost of Injury in Canada," 2015.
3 www.disabled-world.com, "Disability Insurance: Benefits, News and Claims," 2017.
4 Based on a percentage of your monthly earnings, while you are disabled and unable to perform your occupation.

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To give you an idea, have a look at the total annual cost to Canadians who suffer disabilities caused by different injuries, when you factor in health care costs plus the costs of reduced productivity and other issues:²

Description	Total cost (\$ Million)
Transport incidents	4,289
Falls	8,680
Fire/burns	366
Unintentional poisoning	1,264
Struck by/against sports equipment	187
Other unintentional injuries	7,127
Violence	1,142
Undetermined intent/other	598



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Engineers Canada-sponsored Disability Income Replacement Insurance was created exclusively for professional engineering, geoscience and technology association members and their families. This affordable plan can be a huge help while you recover, **covering 6 types of disabilities.** It features **low rates** not available to the general public and provides monthly benefit payments **up to \$15,000.**⁴ It includes automatic Cost of Living Adjustments, a compassionate care benefit and a waiver of premiums if you're totally disabled for more than 3 months.

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THE KEYSTONE PROFESSIONAL

The official publication of Engineers Geoscientists Manitoba



WINTER 2019

FEATURES

- ▶ **Ingenium 2019 Conference Recap** 13
- ▶ **The Big Chill** 29
- ▶ **Meet the New President of
Engineers Geoscientists Manitoba** 32
- ▶ **Meet Your 2019-2020 Council** 34

DEPARTMENTS

- ▶ President's Message 6
- ▶ CEO's Message 8
- ▶ Lasting Legacy 40
- ▶ Member Profile 42
- ▶ Member Update 44
- ▶ News and Notes 46
- ▶ Closing Notes 48

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The Keystone Professional Committee would like to hear from you. Please email your comments to: DWawryk@EngGeoMB.ca. Members are also encouraged to submit articles and photos on topics that would be of interest to the membership.

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Technology, Evolution and Diversity a Testament to the Winds of Change

As I sit down at my makeshift office at the Toronto Pearson Airport Starbucks to write my first President's Message for *The Keystone Professional*, I can't help but marvel how technology has transformed the way we live and work. In the last hour between my flights, I have already attended a video conference call, responded to several emails, scheduled my taxi pickup upon landing, and committed to attending my son's basketball game. It wasn't long ago when my only companions, while waiting in airports were my Walkman (with a few cassette tapes) and a book, which is all I could fit in my carry-on bag. The pace at which the world has changed around us is mind-boggling, to say the least. The credit of this change largely goes to the profession I'm a proud member of – engineering.

To me, engineering embodies the human desire to bring about a change – for the better. Even when there was no concept of engineers, human beings decided to engineer things. Be it through the invention of a wheel to move objects more efficiently, or the creation of machines to accomplish

tasks that couldn't be done manually. Most design or process improvements happened by learning lessons the hard way. With time, the enormity, as well as the complexity, of our products grew bigger and there was felt a need to regulate the profession. In most jurisdictions in Canada, regulatory oversight was brought in about a century ago. And what better way to regulate our profession than to self-regulate ourselves? It is an ultimate privilege that should not be taken lightly.

Another aspect of our profession I have always marvelled about is our ability to come up with solutions under constantly changing conditions. We assess, we adapt, we evolve, and finally, we solve. In the last century, the focus of engineering had mainly been on building – be it buildings, machinery, computers, etc. But the writing is on the wall that the next 100 years are going to bring a new set of challenges and opportunities. With technological advancements, the focus will be more on artificial intelligence, autonomous vehicles, drug delivery using nanoparticles, space mining, and bio-hacking. And this time around, we

have far evolved to learn from our mistakes. As professional regulators, we need to proactively position ourselves and start working on creating a framework to regulate these new frontiers. The stakes are way too high to not do so.

As we move forward, we also need to learn from our own shortcomings of the past. We do not want to be a self-serving profession that caters to, and is controlled by only a handful of people. We need to be more inclusive, diverse, and responsible – in our actions and our creations. Our profession has to be reflective of the demographics it exists to serve. I'm honoured to be joining this exciting endeavour at a time when our professions of engineering and geoscience are cautiously striving to bring these changes. Our Council is more diverse than it has ever been; a foreign-trained immigrant engineer writing this inaugural piece as your 100th President is a testament to the winds of change. I am humbled, honoured, and committed to serve you and this wonderful profession.

I would like to conclude with a quote from Theodore Roosevelt:

"Much has been given to us, and much will rightfully be expected from us. We have duties to others and duties to ourselves; and we can shirk neither."

If you have any questions or comments, please email me at President@EngGeoMB.ca. ☎



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My Reconciliation Story

I sat next to Karen in grade six. Our desks were in the last row at the back wall. Everyone liked Karen. She was really nice. She was a quiet, kind, happy person, and always quickly offered to help others. We didn't know what was going on. I could tell that she lived with a family across the schoolyard from my house. It seemed obvious to me that Karen was an Indigenous person, but she lived with a family of different ancestry. Kids in our class didn't talk about it. My parents didn't talk about it. No one questioned it.

Decades later, I now know what was happening. Today, it's called the Sixties Scoop. This is the term referring to the practice that occurred across Canada of taking, or 'scooping-up', Indigenous children from their families and communities for placement in foster homes.¹ In my view, it is a sad period of history. Can you imagine being taken away from your parents and siblings and sent to another family? I can't. It must have been terrible.

In the last few years, I have often thought of Karen and wondered where she is now. Is she alive? Is she in Winnipeg? I've tried a few times to search the Internet, but the surname given to her by the foster family was/is too common. Facebook, Twitter, WhatsApp, Instagram show hundreds of Karen B____s. I've searched some of the websites on reconciliation, Sixties Scoop reunions, and Indigenous support groups, but without success and losing hope.

If I could meet Karen again, I would give her a big, tearful hug and tell her sincerely how sorry I am for what took place all those years ago. We didn't know what was happening. I would tell her how much I've thought about her in recent years. I would offer help of various kinds and would give it gladly if she wanted it.

“
Let's get out into the community this winter and participate as neighbours and friends.
 ”

Season of Giving

As winter is just beginning and the festive season is upon us, I think of all the great community events that will occur over the next few months. Winnipeggers are known for spending the long winter days and nights creating, performing, playing, and engaging in community volunteerism like no other citizens anywhere.

Engineers Geoscientists Manitoba is also active throughout the winter months and upcoming year. During the winter, there are the Robot Games, WISE-Kidnetic Energy Adopt a Class, Spaghetti Bridge Competition, Manitoba Science Symposium, and others. I'm aware of many members who volunteer their time coaching, helping out with dance recitals, music festivals, raising money for charity causes, and assisting seniors and those that need help with mobility. One member (through his company) has personally raised more than \$450,000 for one of the health charities. WOW! Way to go. All of these activities are worthwhile and fun, making our community a great place to live. So start now! Look for a good place to volunteer this winter.

Get Out and Participate

I know that Engineers Geoscientists Manitoba practitioners do great engineering and geoscience. The public knows that we're on guard; protecting them and providing great technology. Let's get out into the community this

winter and participate as neighbours and friends at the various community centres, places of worship, classes, organizations, and charities. Here are a few suggestions: I Love to Read Month, Siloam Mission, Project Donate Blood Drive, Habitat for Humanity, Christmas Cheer Board, Winnipeg Harvest, Cancer Care Manitoba, and many, many others.

Centennial Year

As you are likely aware, 2020 is the Association's Centennial year. The anniversary date is March 27, 2020. Engineers Geoscientists Manitoba will be 100 years old! There are many volunteer opportunities to get involved in the numerous events that will take place. Don't let the year go by without participating. Sign up to volunteer at an event or on a committee. Get tickets for you and your family to attend our night at the hockey game, baseball game, football game, etc. Take a tour of a historically significant engineering site. Order your advanced copy of the history book being compiled and written by the Heritage Committee. There is something for everyone to enjoy.

Your feedback is invited and welcomed. If you have any thoughts on anything you read in the KP, please email me at GKoropatnick@EngGeoMB.ca.

Have a great day! ☺

¹ https://en.wikipedia.org/wiki/Sixties_Scoop



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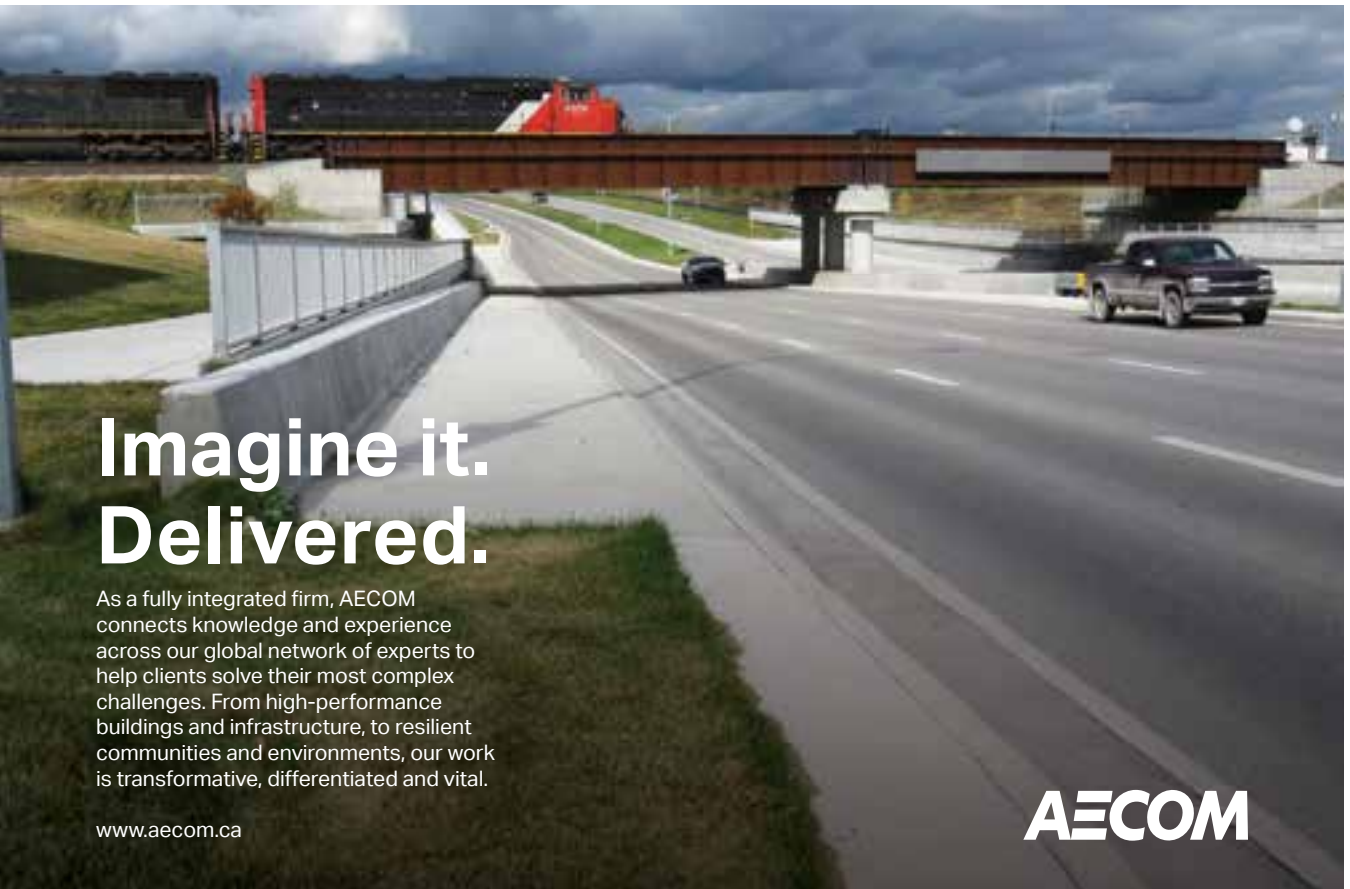
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Engineers Without Borders: A History of Learnings and Failures

Abbey Koch is a fourth-year student enrolled in the Department of Biosystems Engineering at the University of Manitoba. Over the 2018/2019 academic year, Abby served as Co-President of the Engineers Without Borders UManitoba chapter, and has been a member of the organization for four years. As a result of her community involvement efforts and enthusiasm for the engineering profession, Abby received the 2019 Marie Carter Undergraduate Ambassador Award from the Canadian Engineering Memorial Foundation.

Like many non-governmental organizations in the early 2000s, Engineers Without Borders Canada (EWB) was founded to contribute to the development of sub-Saharan Africa. Created in partnership by two engineers, George Roter and Parker Mitchell, EWB started its volunteer-based overseas work rooted in technical solutions to everyday challenges. In EWB's earliest days, Roter questioned: "Why wasn't there a role for us, as engineers, to play in making the world a better place?". This continual questioning gave rise to one of Canada's largest youth-driven non-profits.

Glowing with their first-ever mission statement: 'EWB works to improve the

quality of life of those in developing nations by helping find appropriate technical solutions...!' EWB was aptly equipped for hands-on work. To grow their network of volunteers, the non-profit spread-out across Canadian universities recruiting students and young professionals to commit to short-term overseas placements. Student and professional chapters now comprise of the bulk of EWB's membership across Canada.

In Laura McGrath's novel, *Good Luck and Don't Have Sex: The Humble Beginnings of Engineers Without Borders*, the story of Paul Slomp is recounted.¹ Upon completing his placement as a Junior Fellow in Guatemala, Slomp declared that overseas volunteers should be cut from the organization. Slomp's should-be simple engineering problem, pumping water into a village, had finished as a failure.

Citing the remoteness of the village, the language barrier and the political context as defining factors in his failures, Slomp realized his obligation to question this outcome. As other fellows returned from unsuccessful placements, it became apparent that EWB's short-term, one-off undertakings were not contributing to long-term positive impact. In fact, several other non-profits



in sub-Saharan Africa were working in a similar manner: design, build, and execute projects. Unfortunately, these technical and, at times Band-Aid solutions did not address the root causes communities faced.

Long-term, positive impact was the primary goal, but EWB had chosen the wrong problem to define. The question was not, 'What do we bring?' but, 'What do these communities need?'¹ With this realization came about a dramatic change in EWB's focus.

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In 2009, EWB's Co-CEOs publicly burnt their mission statement and shifted towards combining a social mission with leadership skills. To document the occasion, a Failure Report was created to acknowledge the failures and learnings of chapter members, fellows, and national office staff. This report has become an EWB tradition and is updated and shared annually with members at the EWB national conference.

Ten years later, EWB adopted a new mission statement: 'Bringing people and ideas together to tackle the most crucial causes of poverty and inequality.' Encompassing a holistic approach to development, this statement highlights the importance of considering a community's political, societal and environmental complexities.

This shift in thinking has trickled down to EWB's chapter system and is even felt here in Winnipeg. Today, the University of Manitoba EWB chapter focuses on big-picture thinking to create lasting change in the development of sub-Saharan African countries. Engaging Members of Parliament in conversations on better foreign aid policies and promoting fair trade products on campus are just two tangible ways that the Chapter continues to make an impact.

One can extract a variety of lessons from EWB's failures and learnings. For engineers, as well as various other professionals, the importance of being informed in the decision-making processes is one key lesson. The eighth and final canon of *The Code of Ethics for the Practice of Professional Engineering and Professional Geoscience* states, "Be aware of, and ensure that clients and employers are made aware of, societal and environmental consequences of actions or projects and endeavour to interpret engineering or geoscientific issues to the public in an objective and truthful manner."² In the case of EWB Canada, short-term, technically focused projects did not create the desired positive change. Root cause problem solving revealed important underlying social and environmental contexts which were necessary to consider. Similarly, in everyday engineering practice, it is necessary to make a habit of assessing

a problem from various contexts. And, if need be, channel a similar EW-Bravery and make the required changes to keep the public safe and informed.

- ¹ McGrath, L. 2010. Good Luck and Don't Have Sex: The Humble Beginnings of Engineers Without Borders. pp: 12-92 (2019/01/12).
- ² 2017. Legislation. Engineers Geoscientists Manitoba. www.enggeomb.ca/ActBylawsCode.html 

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NOTICE

Under the *Engineering and Geoscientific Professions Act* and the Association's Discipline By-law

The Investigation Committee of Engineers Geoscientists Manitoba has agreed to stay all charges of professional misconduct against Mr. David Grant. Mr. Grant has agreed to resign his membership in Engineers Geoscientists Manitoba.



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2019 Ingenium Conference Recap

The Association's annual Ingenium Conference took place from October 16-18, 2019. Thank you to all the staff, volunteers, and sponsors who made the 2019 Ingenium Conference such a huge success!



Recipients of FEC and FGC presented by President of Engineers Canada David Lynch, P.Eng., Association Past President Ruth Eden, P.Eng., FEC, Stirling Walkes, P.Eng., FEC, Robert Okabe, FEC (Hon.), Dr. Athula Rajapakse, P.Eng., FEC, Jennifer St. Laurent, P.Eng., FEC, Association CEO and Registrar Grant Koropatnick, P.Eng., FEC Missing from photo: Kyle Cumming, P.Eng., FEC and Danielle Huminicki, P.Geo., FGC

Wednesday, October 16

Recognition Wine and Cheese Reception

Held in the stunning Carlton Concourse of the RBC Convention Centre, this reception honoured Association Past Presidents, Life Members, Honorary Life Members, and those receiving their Fellowships of Engineers Canada (FEC) and Geoscientists Canada Fellowship (FGC).

Congratulations to those who received their FEC, FEC (Hon.), FGC designations in 2019.

Honorary Life Membership

One Honorary Life Membership was also bestowed during the reception, Ganpat Lodha, P.Geo., FGC. The granting

of Honorary Life Membership (By-law Clause 7.1.4) recognizes many years of meritorious service rendered to the Association or the profession.



Honorary Life Member Ganpat Lodha, P.Geo., FGC, HLM

Thursday, October 17

Professional Development Seminars

This year's Professional Development Seminars welcomed a record number of attendees. The day-long event offered attendees the choice of 20 breakout sessions and two keynote speakers.

Annual General Business Meeting

The Annual General Business Meeting is an opportunity for members to become directly involved in the business of the Association, vote on current matters, and acknowledge councillors completing or just beginning their terms. President Ruth Eden, P.Eng., FEC, ended her term and passed the gavel to incoming President Dr. Jitendra Paliwal, P.Eng., FEC.



Past President Ruth Eden, P.Eng., FEC and Incoming President Dr. Jitendra Paliwal, P.Eng., FEC

Congratulations to the councillors elected for 2019-2021 term: Cheryl Lashek, P.Eng., Katrine Levesque, EIT, Allan Silk, P.Eng., FEC, and Izabela Witkowska, P.Eng.

Friday, October 18 *Awards Gala Dinner*

Eight awards were presented at the Association's annual Awards Gala Dinner, which took place in the York Ballroom of the RBC Convention Centre. Engineers Geoscientists Manitoba was honoured to recognize the achievements of these exemplary individuals, teams, and companies who represent the best of engineering and geoscience in Manitoba.

After a delightful four-course meal, our 275 attendees were treated to inspiring performances that moved their focus around the room. The Armadillo String Quartet lead with a set of classic musical renditions that set the mood and atmosphere for the evening. Followed by an exhilarating aerial show by the Momentum Aerial and Acrobatic Troupe, a vibrant contemporary company that thrives at the intersection of dance, theatre, and the circus arts. The evening closed with an elegant performance by the Royal Winnipeg Ballet where versatility and technical excellence wowed the crowd.



CEO and Registrar, Grant Koropatnick, P.Eng., FEC welcoming guests at the Awards Gala



Momentum Aerial & Acrobatic Troupe



Ingenium RECAP

October 16-18
2019

www.EngGeoMB.ca/Ingenium



Armadillo String Quartet



Royal Winnipeg Ballet



Momentum Aerial & Acrobatic Troupe

What else would you like to learn about at Ingenium? The Task Group wants to hear from you! Let us know what professional development topics you'd like the Association to offer in 2020. Email your suggestions to Dwawryk@EngGeoMB.ca.



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2019 Team Achievement Award Winner

Taché Promenade Active Transportation Upgrades and the Belvédère Saint-Boniface; Trek Geotechnical Inc., Morrison Hershfield, and HTFC Planning and Design

The Team Achievement Award recognizes engineering or geoscience excellence in, and major contributions to, the concept, design and implementation of an engineering or geoscience project in Manitoba.

The Taché Promenade Active Transportation Upgrades and Belvédère Saint-Boniface is one of the first cornerstone projects of the City of Winnipeg's 20-year plan for riverfront economic development. The vision is to combine trails, parkways, drives, and open spaces to form a 'green ribbon' connecting both sides of the Red River at The Forks with other cultural and historic destinations. Trek Geotechnical Inc., Morrison Hershfield and HTFC Planning and Design collaboratively provided the geotechnical and structural engineering, architectural and landscape design, and public engagement.

The Taché Promenade project featured a widened promenade-style walkway and pedestrian belvedere, or lookout, elevated above the riverbank. The project incorporated riverbank stabilization to protect the promenade, roadway and important municipal infrastructure, and to increase the reliability of the city's primary dike. Community input was sought in a public engagement forum and online survey. The project included public art in the form of the 'Guiding Light' sculpture and viewing area.



Innovative engineering and architectural design were brought to the fore in numerous project details. The curved elevated walkway immerses pedestrians in a 'wandering' effect. Each curved structure component, in turn, required precise dimensions and angles, and specialized erection techniques. Three-dimensional geometry checks, along with girder fabrication using machine-guided bolt-hole laser cutting, ensured each piece fit within critical tolerances.

The curving structure, built upon a riverbank, presented a range of potential soil movement modes and behaviours. Time-dependent slope movement and the geometrically complicated structure were analysed using an iteration of sophisticated geotechnical and structural finite-element models. Output from the geotechnical model of lateral loads on piles produced a non-linear load-deformation response for each element of soil along each pile. This information was incorporated into another finite-element model of the complete bridge structure. This collaborative use of geotechnical and structural models identified the range of loading and boundary conditions that met desired performance outcomes. Loading on the riverbank, as well as on the sheet pile wall along Taché Promenade, was reduced using cellular concrete as lightweight backfill.

A wire mesh pedestrian railing gave a transparent appearance providing users a closer connection to nature. Design of the curved tensioned stainless-steel wire mesh railing, a Manitoba first, was complex, and required mesh elongation and tension forces to be analysed to ensure adequate fall protection.

The new structure was designed to blend with the natural landscape by purposeful selection of materials, colours, textures, and lighting. Weathered steel skirting, oak timbers, and glare-free illumination (LED puck lights were another Manitoba first) complemented the riverbank colours providing a rustic feel. Photovoltaic modeling was performed to specify safe light spacing and wattage. Material selection achieved desired aesthetics, durability, and ease of maintenance, while keeping within limits of superstructure weight restrictions.

The project team integrated six engineering disciplines as well as bridge and landscape architecture to create a complex and creative city landmark. The Taché Promenade Active Transportation Upgrades and Belvédère Saint-Boniface project, along a core city waterfront, improves connections to St. Boniface destinations and enhances pedestrian and cycling opportunities. This signature elevated walkway with a tree-top view of the Red River and the Forks National Historic site provides one of the city's most striking vistas.

In recognition of the engineering excellence demonstrated in their innovative design and implementation of the Taché Promenade Active Transportation Upgrades and the Belvédère Saint-Boniface Project, Engineers Geoscientists Manitoba is pleased to present the 2019 Team Achievement Award to Trek Geotechnical Inc., Morrison Hershfield, and HTFC Planning and Design.

2019 Intern Award Winner

Christopher Bzovey, EIT

The Intern Award bestows distinction on those training to be engineers or geoscientists, specifically those demonstrating exceptional work achievement in their early EIT/GIT years who enhance society's knowledge of our professions.



Christopher Bzovey, EIT, graduated from the University of Manitoba in 2014 with a B.Sc. in Mechanical Engineering, and from the University of British Columbia in 2016 with an M.Eng. in Biomedical Engineering. He has been an Intern with the Association since 2014.

Christopher joined Winnipeg Regional Health Authority (WRHA) as an intern right after graduating in 2014, and then returned after completing his master's

degree in 2016. He currently works for the WRHA Clinical Engineering program as a Regional Clinical Engineer, EIT. Chris has managed and successfully implemented a variety of medical equipment and system replacement projects while continuing to develop the surgical instruments repair portfolio. In this role, Christopher continues to work on various projects including equipment planning, procurement, the impact of technological solutions on clinical workflow, equipment donations, and regulatory compliance.

In addition to the Association, Christopher is a member of the Canadian Medical Biological Engineering Society (CMBES) through which he has published and made numerous conference presentations. He was also a part of the CMBEC40 organizing committee coordinating conference activities and the banquet.

Christopher is passionate about hockey and has coached at hockey schools for children of all ages. He assists students interested in engineering, giving tours and presentations of the WRHA Clinical Engineering Program in the University of Manitoba Biomedical Engineering Society (UMBES), while promoting and educating them on the profession of biomedical and clinical engineering. Christopher has won numerous scholarships, including the Springfield Xtreme Junior Hockey Club Scholarship, University of Manitoba Entrance Scholarship, and Ukrainian-English Bilingual Program Scholarship.

Christopher is passionate about his work in the biomedical field. He wishes to become a leader in Healthcare Technology Management and grow the presence of the clinical engineering profession within Canada. Christopher strives to improve and sustain the delivery of healthcare within Manitoba. After attaining his P.Eng. designation, Christopher wishes to pursue his exams to become a Canadian Certified Clinical Engineer.

In recognition of his exceptional work achievements and outstanding service to the community while training as an engineer, Engineers Geoscientists Manitoba is pleased to present the 2019 Intern Award to Christopher Bzovey.

2019 Early Achievement Award

Kathryn Dompierre, P.Eng.

The Early Achievement Award bestows distinction on outstanding engineers and geoscientists and recognizes exceptional achievements in the early years of their careers.



Kathryn Dompierre, P.Eng., completed her B.Sc. in Civil Engineering at the University of Manitoba in 2009, receiving gold medals for the highest standing in civil engineering and the Faculty of Engineering. She then completed a M.Sc. in Environmental Policy and Regulation at the London School of Economics. Her master's thesis on the socioeconomic impacts of oil sands development on surrounding Indigenous communities received a mark of distinction. After returning to Winnipeg, Kathryn worked for SNC-Lavalin as environmental manager on CenterPort Canada Way, in addition to other contaminated sites projects.

In 2012, Kathryn returned to school to pursue a Ph.D. in Civil Engineering

from the University of Saskatchewan. Her research focused on innovative methods for oil sands tailings disposal and assessing contaminant transport through these tailings using a variety of methods (field, laboratory, and numerical modeling). Kathryn published several peer-reviewed journal articles and conference papers. Upon completion of her Ph.D. in 2016, Kathryn began working for the geotechnical software company GEOSLOPE International Ltd., as a Research and Development Engineer. Her position involves providing technical support and training, attending conferences, and investigating new applications and theories for GeoStudio, GEOSLOPE's software suite.

Since returning to Winnipeg for a second time in 2015, Kathryn has contributed to multiple Engineers Geoscientists Manitoba initiatives. From 2015 to 2016, she was a member of the Engineering Education Task Group, helping to lead an investigation of accessibility to engineering education in Manitoba. This study pushed Kathryn to join the Committee for Increasing the Participation of Women in Engineering (CIPWIE) and act as a mentor for the CIPWIE Mentorship program. Since joining CIPWIE, Kathryn assisted in drafting the 30 by 30 proposal approved by Council and organised multiple networking events for female engineers, including the Association's first International Women in Engineering Day celebration in June 2019.

Kathryn's dedication to promoting engineering is evident by her involvement with Engineers Without Borders (EWB). In 2012, she was the EWB Saskatoon Outreach Coordinator, planning and conducting engineering-related presentations to schools across Saskatchewan. She also volunteers for the Lake Winnipeg Foundation (LWF) outreach team, presenting information on water issues to elementary school

students and writing promotional and informative articles for the annual Victoria Beach Walk for Water. In addition, Kathryn was on the planning committee for the 2019 Canadian Young Geotechnical Engineers and Geoscientists Conference, acting as the Logistics coordinator.

Her community involvement does not stop there. Kathryn has been an LWF board member since June 2017 and is a member of the LWF executive committee. She also sits on the board and executive of the Manitoba Eco-Network. From 2015 to 2017, Kathryn organised Blue Drinks, regular networking events for professionals in the water sector, as the regional representative of the Canadian Water Network's Student and Young Professional Committee. Kathryn has also volunteered abroad, working on four international Habitat for Humanity builds (Guatemala, Honduras, India, and Zambia), and is a canvasser for both the Canadian Cancer Society and the Heart and Stroke Foundation.

In recognition of her exceptional work achievements and dedication to promoting careers in engineering in the early stages of a promising career, Engineers Geoscientists Manitoba is pleased to present the 2019 Early Achievement Award to Kathryn Dompierre.

2019 Champion of Engineering Education

Herb Reynolds

The Champion of Engineering Education Awards recognizes an outstanding supporter and champion of the Faculty of Engineering at the University of Manitoba.

Herb Reynolds is a life-long, passionate educator, and champion for engineering education. In his many years as a science teacher at John Henderson Junior High,



Herb engaged with his students to help them discover a passion for science. His teaching career spanned 34 years. Even in retirement, as Chair of the Planning Committee for Manitoba Robot Games, Herb has helped more than 8,000 students build robots, peaking their interest in careers in STEM.

He is proud to share that over 24 years, the Robot Games have inspired over 10,000 students to consider a career in engineering. To participate, students purchase the basic robot kit and then modify it for strategic gain. Aspiring engineers participate in the 'battle games' where they can go for speed or torque, depending on what they think is the best strategy. Over the years, Herb has seen students show increasing degrees of creativity.

The Robot Games are an initiative of the Science Council of Manitoba, a volunteer organisation dedicated to promoting science and technology to Manitoba's youth. The competition is sponsored by a variety of businesses, professional organisations such as Engineers Geoscientists Manitoba, and government agencies.

In recognition of his dedication to promoting science and technology to Manitoba's youth, Engineers Geoscientists Manitoba, together with the Faculty of Engineering at the University of Manitoba, is pleased to present the 2019 Champion of Engineering Education to Herb Reynolds.



2019 Judith Weizmann Women in Engineering Champion Award

Roberta Radons, P.Eng.

The Judith Weizmann Women in Engineering Champion Award recognizes a woman who through engineering and career achievements has demonstrated the qualities that enabled Judith Weizmann to be an outstanding engineer, role model, and influencer of the profession for the advancement and support of women in engineering.



Roberta Radons, P.Eng., is the Section Head, Transmission Line Design at Manitoba Hydro. As leader of her team, Roberta oversees and motivates a highly skilled, multidisciplinary team of engineers, technologists, and technicians. Roberta has led her team through numerous high-profile projects, including, but not limited to, the Bipole III Transmission Line, Keeyask and Keewatinohk transmission lines, and the Manitoba-Minnesota transmission line. Roberta has also been instrumental in several vital transmission line relocations related to projects such as the City of Winnipeg's bus rapid transit, the construction of the east side road,

and the floodway expansion project. Roberta pushes her team to continue to expand and grow incorporating current technologies and fresh ideas as part of their design process, to create a fully

integrated design culture.

In her capacity as technical expert and team leader, Roberta has had the opportunity to be both mentor and friend to several young engineers. She works



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hard to make meaningful connections and supports her staff and co-workers. In addition to workplace mentorship, Roberta is also an active participant in the Committee for Increasing the Participation of Women in Engineering (CIPWIE) Mentorship Program. She regularly volunteers at outreach events, mentoring evenings, and student competitions, as a representative of Manitoba Hydro and independently. Roberta works to promote the diverse and rewarding benefits of a career in engineering through presentations, facilitating design competitions, and one-on-one conversations. Not only does Roberta volunteer her own time to serve the engineering community, she strongly encourages her team to volunteer as well.

Roberta is not only a leader within her workgroup, but is also an active leader within the engineering community within Manitoba Hydro and internationally. She is currently serving as the President of the Manitoba Hydro Professional Engineers Association (MHPEA), representing the needs and interests of over 500 engineers at Manitoba Hydro. She is active on a number of technical committees, including the Canadian Standards Association (CSA) Committee for CSA Standard C83 – Communication

& Power Line Hardware, CSA Committee for CSA Standard 22.3 no. 1 – Overhead Systems, and the Electrical Power Research Institute's (EPRI) Program 35 – Overhead Transmission.

In recognition of her outstanding advancement and support of women in engineering, Engineers Geoscientists Manitoba is pleased to present the 2019 Judith Weiszmann Women in Engineering Champion Award to Roberta Radons, P.Eng.

2019 Outstanding Service Award

Donald D. Himbeault, Ph.D., P.Eng., FEC.

The Outstanding Service Award recognizes outstanding service rendered to, or on behalf of, Engineers Geoscientists Manitoba, by a member of the Association.

Donald D. Himbeault, Ph.D., P.Eng., FEC, received his B.Sc. and M.Sc. in Mechanical Engineering from the University of Manitoba and went on to obtain a Ph.D. from the University of Waterloo in 1989, specialising in metal matrix composite materials. In 2009, he obtained a certificate in



Intellectual Property and Technology Commercialization Management offered by the University of Manitoba. He was granted a Fellowship of Engineers Canada (FEC) in 2010.

Following graduation, Don held positions as a research scientist, first at the Department of National Defence in Quebec, and then with Atomic Energy of Canada at the Whiteshell Laboratories. His research at these organisations led to several publications in the area of shaped charges and fracture mechanics, respectively. In 1998, he started work as a Research and Technology Advisor/Consultant, assisting companies in accessing research funding under the federal government's Scientific Research and Experimental Development

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(SR&ED) program, largely in the Manitoba region. In this capacity, Don has supported hundreds of engineers and geoscientists in reviewing and documenting their research and development activities.

Don has an impressive record of service to Engineers Geoscientists Manitoba, having served on Council and in other committees and volunteer activities such as Professional Development Committee, Ingenium Task Force, Nominations Committee, special awards judge at the Manitoba schools Science Symposium, and the Spaghetti Bridge Competition. Don was president of the Association from 2008 to 2009 and is still active on the Academic Review Committee as Chair. He also has an active interest in professional regulation outside of the Association, having served as a public representative on the board of the College of Registered Nurses of Manitoba, and is currently serving in the same role at the College of Pharmacists of Manitoba. He is also on the board of Nature Manitoba, and was President of that organisation for four years.

Don is also active in promoting science and technology in the community, first as an instructor of the inaugural mechanical engineering module for Mini-University in 1984, and later as a presenter for the Innovators in the Schools programs, which provided hands-on science activities to Grade 5 students. He is a member of the Manitoba Electric Vehicle Association, having completed the electric drive conversion of a classic vehicle, which he shows at various events to promote electric vehicle technology and adoption.

In recognition of his commitment to the Association, the profession, and the public, Engineers Geoscientists Manitoba is pleased to present the 2019 Outstanding Service Award to Donald D. Himbeault.

2019 Technical Excellence Award

Dr. Norman M. Halden, P.Geo.

The Technical Excellence Award recognizes outstanding achievement, including the direct advancement of the engineering or geoscience professions, by an individual member during his or her career.



Dr. Norman M. Halden, P.Geo., obtained his B.Sc. (Hons.) and Ph.D. degrees in the discipline of Geology from Glasgow University, Scotland in 1979 and 1983 respectively. He is a Professor of Geology and Dean of the Clayton H. Riddell Faculty of Environment, Earth, and Resources at the University of Manitoba. Norman taught petrology and geochemistry and most recently Instrumental Techniques in Geology. Norman is primarily a geochemist and has focused his research on trace elements as a predictor of geological and environmental processes. His numerous technical presentations and publications include disciplines of geochemistry, proton induced X-ray emission (PIXE), LA-ICP-MS, and otolith microchemistry.

The main thrust of Norman's research has been to characterize and quantify the distribution of trace elements in zoned minerals in a way that the patterns of their distribution can be

related to environments of mineral growth. He has worked on large-scale CAMIRO field projects in the Thompson Nickel Belt to microbeam analytical projects on zoned minerals. He was the one to quantify trace element oscillatory zoning in minerals using a combination of PIXE, image analysis and fractal geometry. For several years, he worked with PIXE and scanning proton microprobe (SPM) for mineralogical analysis. Norman showed that in using image and numerical analysis, it is possible to determine Lyapounov exponents and fractal dimensions for trace-elements oscillatory zoning in minerals. Calculated Lyapounov exponents of micron scale zoning allows comparisons of growth environments. More recently, his LA-ICP-MS work has allowed the understanding of a wider suite of elements to better characterize different environments and growth histories.

Norman has also used his research of trace element mapping in minerals to understand variety of otolith microchemistry problems. His Sr (Strontium) otolith microchemistry research has led to the first unambiguous discrimination of migratory Arctic char. This altered fisheries management in Arctic Parks, and established natal origins of char along Arctic north slope. Sr analysis by LA-ICP-MS now answers many fisheries management and environmental questions. His work on zoned Zn, Pb, Cd, and Se in otoliths is used in environmental effects monitoring to assess exposure to tailings.

Norman served the Mineralogical Association of Canada (MAC) for 18 years in various capacities including Finance Chair, Vice-President, President, and Past-President. He received the Berry Medal for his services to MAC. He has also served the Geological Association of Canada (GAC) as a Membership Chair and as a local

coordinator of GAC activities. His instrumental and analytical expertise led him to chair several NSERC committees and the Major Facilities Access Committee.

Norman has received the University of Manitoba Rh Award for Research in Natural Sciences, University Outreach Award and is three-time winner of UTS Teacher Recognition Award. He played a key role in the design and development of the Northern Manitoba Mining Academy. He has also served on the Premier's Economic Advisory Council and is currently the presiding member of the Manitoba Mines Board.

In recognition of his contributions to the field of geoscience, Engineers Geoscientists Manitoba is pleased to present the 2019 Technical Excellence Award to Dr. Norman M. Halden.

2019 Leadership Award

Shane Mailey, P.Eng., FEC

The Leadership Award recognizes an individual, not necessarily a member of the Association, with outstanding, long-range vision and/or achievement(s), usually in a senior leadership, management, or governance role. This award honours visionaries who have directly influenced major engineering or geoscientific works for the long term benefit of society or improved quality of life in Manitoba.

Shane Mailey, P.Eng., FEC, is the Vice-President of Transmission at Manitoba Hydro, a position he has held since 2013. He is also Manitoba Hydro's Corporate Chief Engineer. Shane graduated from the University of Manitoba with a B.Sc. in Civil Engineering in 1990 and joined Manitoba Hydro in 1991. Prior to his appointment as Vice-President, he was



the Division Manager of Transmission and Line Maintenance, which included design, construction management, contract administration, project management, and operations and maintenance.

In his current role as Vice-President, Shane is responsible for executive oversight of the bulk electric system for Manitoba Hydro to meet demand and regulatory requirements in the Province of Manitoba. As Division Manager for Construction, Shane was involved in the early planning stages of Bipole III, and helped lay the groundwork of those early stages. But it was later in his role as Vice-President of Transmission that his leadership characteristics came through. Bipole III is a complex system, utilizing several types of technology to transport high-voltage electricity from the northern regions of the province to the southern regions where most of the electrical demand is consumed.


Prior to the development of Bipole III, approximately 70% of Manitoba Hydro's transmission capacity relied on two transmission lines, which were near each other, creating significant risk due to major weather events that could result in loss of both lines. Bipole III, not only reduces this risk substantially, but also allows greater flexibility in maintaining and refurbishing portions of the pre-existing transmission system.

Shane's vision, dedication and leadership helped bring one of the largest

transmission construction projects ever performed in North America to fruition. He not only led Manitoba Hydro staff by empowering them with the necessary tools and resources, but worked with the main contractors to help them meet the challenging schedule for the project, while keeping safety at the forefront of all construction activities. He was also involved in strengthening Manitoba Hydro's relationships with several affected stakeholders, including several Manitoba Indigenous communities located along the route. Shane's personal involvement was incredibly impactful on Bipole III and contributed to ensuring a safe, reliable supply of electricity from northern Manitoba to southern Manitoba and beyond.

Shane has been an active member of Association committees, notably the Engineering Changes Lives Provincial Steering Committee, which advises on strategies to meet the Association's objective to have 30% of newly licensed engineers be women by 2030. As a result, he has formed a committee at Manitoba Hydro to understand the barriers to achieving gender parity in engineering, and is implementing plans to address those barriers. Shane has also undertaken the role of Co-Chair for the Manitoba 2030 Coalition, a group of industry leaders committed to the 30 by 30 goal, championing the endorsement of 30 by 30 by Friends of Engineering. Shane understands and continuously demonstrates his commitment to diversity and inclusion at Manitoba Hydro, and champions a positive work environment that helps the corporation attract and retain high-quality individuals in our engineering workforce.

In recognition of his outstanding leadership, commitment to the profession, and service to the community at large, Engineers Geoscientists Manitoba is pleased to present the 2019 Leadership Award to Shane Mailey. ✚



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Building Our Knowledge Set on the Historical and Present Experiences of the Indigenous Peoples of Canada

By N. Everett

Attendees of Ingenium 2019, Engineers Geoscientists Manitoba's annual conference had the possibility of attending two social responsibility professional developmental presentations among the 20 sessions offered this past October. The two sessions: *Indigenous Perspectives: Historical and Present* and *Community Engagement: What is Involved and Why Does it Matter?* were presented by Linda Murphy, B.Sc., P.Geo. Attendees had the opportunity to build their knowledge set on the historical and present experiences of the Indigenous peoples in Canada, particularly in Manitoba, and to better understand how Indigenous community engagement makes good social and business sense.

Linda is a member of the Hollow Water First Nation (situated on the east side of Lake Winnipeg) and is currently the Senior Manager, Community Relations for the Yamana Gold Inc. Exploration Team. She is focused on the company's development of inclusive relationships and collaborative connections with both Indigenous and non-Indigenous communities and the provincial government.

Since earning her P.Geo. in 2015, Linda has been active on several of the Association's committees including the Indigenous Professionals Initiative Committee (IPIIC), the Engineering Changes Lives (ECL) Provincial Steering Committee, and is one of the founding executives for the Indigenous Members Chapter. Most recently, Linda was appointed to Engineers Geoscientists Manitoba's Council for a one-year term. Her diverse knowledge and personable demeanour provided a unique opportunity for the attendees at each session to meaningfully appreciate Indigenous worldviews and perspectives, and cultivate positive connections between Indigenous peoples and the corporate industry.

Feedback from attendees included: acknowledging the historical technology, specific steps toward meaningful engagement for a company and that connection to the Crown's Duty to Consult, and encouraging advice to the Association members going forward. Printed copies of Truth and Reconciliation Commission of Canada's Calls to Action and a separate

sheet on Recommendation #92 (relevant to the corporate sector) were provided as handouts at each session for attendees. Pertinent knowledge and specific discussions touched on the Constitutional Duty to Consult (1982), Manitoba's Path to Reconciliation Act (2016), and the National Inquiry into Missing and Murdered Indigenous Women and Girls Call to Justice (2019).

There is a misconception that Indigenous peoples are one homogenous group who share the same culture, traditions, worldviews, and language, which is simply not true. Recognition of the unique history, culture, and traditions of each community is a fundamental first step for Canadians and those working in our industries to take to respect Indigenous people and meaningfully support societal reconciliation and empathy. Understanding the unique background and protocols of each Indigenous community we work in will increase our personal capacity of knowing what is important to that community, what they are proud of, and what they value and protect.

The intertwining of diversity, representation, engagement practices, and learning the histories of Indigenous people is important for members for a number of reasons. Connections to the Indigenous and non-Indigenous communities not only serve to build and strengthen equitable partnerships, but acknowledging the value of Indigenous worldviews and consciously incorporating their perspectives into the work of our corporate sector will lead to better solutions that could not have been realized without them.





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Part of any company and/or personal successes will come from being willing to explore and value the talents, skills, and strengths of people from many different backgrounds, cultures, and abilities.

To be sustainable, our professional work in the community must reflect the richness and full diversity of our province's make-up and people. It means engaging the best minds of the profession, which includes women, Indigenous peoples, and internationally educated professionals. Employers, members, and leaders in engineering and the geosciences play an integral part, just as you are also an integral part. You have the power to ensure all employees are able to thrive within our fields and to create an inclusive industry that welcomes and supports employees of all cultures, genders, and backgrounds.

The Association's mandate to increase Indigenous professionals (End E-5.1) has recently gained momentum with the addition of Nicole Everett (a member of the Berens River First Nation with roots in Long Plain First Nation and Swan Lake First Nation) as the Indigenous Professionals Initiative Coordinator in our Equity and Representation Department (formerly the Diversity and Outreach Department) in September 2019. Among her duties, Nicole will be responsible for an environmental scan, strategic operational/action planning, development of parameters to guide the work of a potential provincial steering committee, and provide support to the Indigenous Members Chapter. Through her work, she hopes to increase the numbers of Indigenous peoples in engineering and the geosciences, improve the image of the engineering and geosciences profession within Indigenous communities, and support Indigenous youth participation in programs designed to encourage them to enter STEM fields.

Engineers Geoscientists Manitoba's mandate toward equity and

representation must be driven by partnerships within Indigenous and non-Indigenous organizations, groups, and communities. As such, by identifying and reducing barriers to success and building strong alliances to encourage young Indigenous people at every stage in their

engineering and geosciences career so they will flourish and; ensure that they remain within the profession to become experienced practitioners and leaders of our future.

We hope to continue the conversation next year. ☩

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Incorporating Climate Change Adaptation and Resiliency into Infrastructure Design

By M. Franz-Lien

During the Ingenium Professional Development Day, the Sustainable Development Task Group (SDTG) hosted a presentation and panel discussion related to the current hot topic of climate change, with an emphasis on the design implications for engineers, architects, planners, and other infrastructure professionals.

Curt Hull, P.Eng. is Project Director of Climate Change Connection, a consultant in sustainable development, and a member of the Association's SDTG. He began the presentation by indicating that climate change adaptation and resiliency considerations are increasingly making their way into infrastructure design, development, and construction. One cause of this was the release of the *Pan-Canadian Framework on Clean Growth and Climate Change* by the federal government. This initiative was supported by a requirement to include a "Climate Lens" for all bid submissions when applying to certain federal infrastructure funding streams.

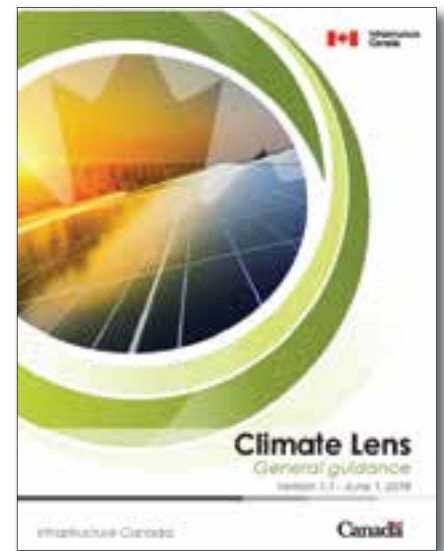
Curt heads up the Building Regional Adaptation Capacity and Expertise (BRACE) Task 2 working group for Engineers Geoscientists Manitoba. BRACE is a Natural Resources Canada program which provided funding to Manitoba Sustainable Development, which in turn, funded a number of projects. The Association's project and report is intended to assist professional engineers and others engaged in public and private infrastructure design and maintenance in Manitoba to assess the risks associated with a changing climate and to incorporate greenhouse gas mitigation and climate change adaptation into their decision making and planning. The project included making recommendations as to how

capacity might be increased through comprehensive curriculum and tool development. The Association worked with Engineers Canada throughout the project and referred to Engineers Canada's Principles of *Climate Change Adaptation for Engineers* for details regarding how to incorporate climate change into the scope of professional practice for engineers.

Three panelists presented how they have incorporated climate change adaptation and resiliency considerations into their professional practice.



Jeff O'Driscoll, P.Eng., is currently the Infrastructure Division Manager for Associated Engineering's Winnipeg office. Jeff is one of only six to have achieved Engineers Canada's Infrastructure Resiliency Professionals (IRP) designation. This designation recognizes competency in climate change resiliency assessment and design. However, this program is ending and will only apply until December 31, 2019. Infrastructure Canada has implemented a Climate Lens to use in assessing the greenhouse gas emissions and climate resilience of proposed infrastructure projects when applying for



Infrastructure Canada funding.

Resiliency examines if the infrastructure will be able to withstand current and future extreme weather events. Jeff noted that several processes are available for the assessment of infrastructure vulnerability and resiliency, including Engineers Canada's (Public Infrastructure Engineering Vulnerability Committee) protocol for risk assessment.

Through PIEVC, pilot assessments were done of municipal infrastructure, including roads, airports, bridges, buildings, and hydro networks. Jeff was involved in a PIEVC pilot project in Portage la Prairie in 2007, which assessed how specific pieces of infrastructure would be affected by various climate elements (temperature, wind, snow, floods, and droughts). PIEVC is used to assess current up to end-of-life deficiencies, using climate data and predictions for 2050 as a mid-period, and 2080 and beyond. At the time of the pilot in 2007, good climate

data for Manitoba was difficult to obtain, but it is now readily available through the Prairie Climate Centre's Climate Atlas that provides climate projections. Engineers need to use more specific, local climate data throughout the design steps, to ensure that predictive rather than historical climate elements are addressed.



Melanie Chatfield, P.Eng., is a mechanical engineer in the High-Performance Building section of STANTEC and serves on the Association's BRACE working group. Melanie described two STANTEC projects that incorporated climate change resiliency aspects in their design. The first project was the Eddy apartment complex on Boston's waterfront, with retail on the main floor and apartments above. Much of the land in Boston's waterfront has been created at sea level from the Atlantic Ocean, which is a concern with climate change and rising sea levels. The whole development was lifted up to make a new 500-year flood line to protect the apartments. The site was sloped so that any floodwater would be swept back into the harbour as soon as possible. The lower level was wet-floodproofed, using non-absorptive materials. All major electrical and mechanical equipment was elevated above the flood line or placed on the roof. With these design elements, \$150,000 in annual energy savings was identified through a cogeneration plant. One of the most interesting aspects of this project was that as a standard building

design it would have cost the owners \$10 million a year to insure it, but because of its resilient design, the insurance premium was only \$1 million a year.

The second project described was energy modelling of the freezing time for Yukon housing stock, subsequently verified

through actual Yukon Territory homes. In the study, the time for a house to freeze (interior temperature to fall to 0 degrees Celsius) after power outages was calculated through computer modelling and detailed whole-building energy simulation. Four housing types were studied: a typical 1980's house;



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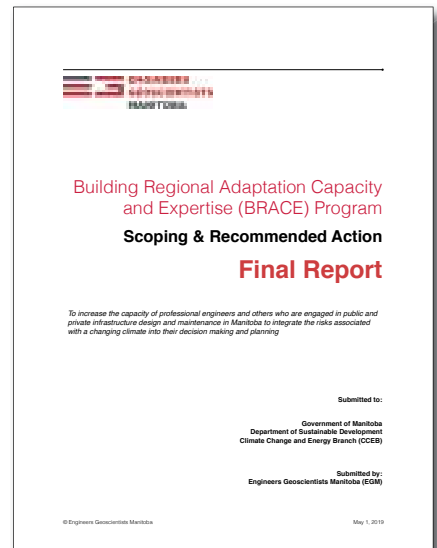
R-2000 housing; SuperGreen housing; and Passive housing. Three scenarios were used: (1) sustained, extremely low outdoor temperatures of -40 to -50 degrees Celsius; (2) power outage at a low temperature, with increasing outdoor air temperatures; and (3) power outage at a low temperature with decreasing outdoor temperatures. The end result was that: the 1980's house took less than two days to freeze; the R-2000 house took 2-4 days to freeze, and for the SuperGreen and Passive House houses, it took longer than a week to freeze.



Marten Duhoux is a partner at ft3 Architecture Landscape Interior Design where he leads the company's sustainability efforts. He described two current projects. The first was a design-build project of a school in Northwestern Ontario in a remote

Indigenous community with ice roads. In a design-build, three consultant-builder teams compete against each other for a project. Each competitor does a design of 30% completion, then submits it for evaluation. Typically, these projects are underfunded, and the competitors are told to cut the budget to a certain dollar figure and resubmit a design within the budget within a short period of time. Currently only oil heating is available in the community where the school is to be built, but it was anticipated that Hydro One would bring electricity to the community within two years. Ft3 proposed using generators to initially heat the school, then converting to electrical heating upon availability. The change would have lowered carbon emissions from 114 tons to 14 tons. Unfortunately, due to the funding program used in Ontario, the school would have lost a considerable amount of funding if oil heating wasn't used.

A more successful project was a personal care home addition in Steinbach, which was designed using a household model. Ft3 noted that Manitoba's Climate and Green Plan supports decarbonization through electrification. Unfortunately, the electrical grid could not accommodate an all-electric model for the boilers. Ft3 analyzed the annual energy use, energy costs, and projected carbon dioxide emissions in three models: an all-gas



system and two variations of hybrid gas-electrical heating systems. After reviewing the analysis, the Province of Manitoba is considering going one step further to increase the electrical grid so that all boilers in the addition can be fully electrified.

All panelists agreed that requests for proposal are generally very cost-focused on capital budgets and capital costs, rather than on value and on assessing performance. Some RFP's use vague language about "considering" climate change without specifying how that ought to be done. In public-private partnerships (P3) and design-build projects, requirements tend to be more detailed regarding climate change factors, and a common climate syllabus is helpful for all involved. Climate change awareness needs to be increased for infrastructure owners as well as for infrastructure professionals, including all engineers. While the discussion was on new building projects, the assessment of the climate-change vulnerability of existing infrastructure and the economics and carbon reductions of deep energy retrofits also needs to be addressed. ☕

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Geology and Society – the Big Chill

By R. Reichelt, P. Geo., FGC

INTRODUCTION

The Ice Ages were the real Big Chill; geologists call it the Quaternary Period. The geology and geo-morphology of Manitoba have been profoundly affected by the events of the Quaternary Period. The story of the Quaternary involves such things as dramatic climate change, the ebb and flow of continental glaciers, and the rise and fall of great lakes. In this article, I want expose you to the basic outline of the Quaternary: the story of the ice ages, the great Lake Agassiz that once covered much of Manitoba, and recent studies that suggest catastrophic events occurred some 12,800 years ago.

OUTLINE OF THE QUATERNARY PERIOD

The Quaternary Period includes the past 2.58 million years of time¹ and is marked by a series of continental glaciations followed by periods of relative warmth, called interglacials. Table 1 outlines the North American terminology for the glaciations and interglacials. The current epoch, the Holocene, is an interglacial following the most recent glaciation.

Some researchers have combined the Kansan and Nebraskan glaciations into a time interval called Pre-Illinoian, since there may have been as many as 11 glacial advances and retreats during that time.

The ultimate cause of the ebb and flow of the glacial and interglacial periods appears to be the cyclical changes in the amount of solar radiation reaching the earth, the so-called Milankovitch cycles.³

Our current location in the cycle appears to point towards a cooling phase. Any effect from anthropogenic sources may delay the cooling, but for only a short while in geological time.

One other thing to explain is why the Quaternary is divided into two epochs: the Holocene and the Pleistocene. Geologists typically define geological units by their fossil assemblage. That is, by the creatures that lived at that time. The end of the Pleistocene is marked by the disappearance of a large number of so-called megafaunas – mammoths, mastodons, woolly rhinoceros, giant sloths, and many other species. Geologists continue to debate the exact cause, but the extinction of the megafauna marks the end of the Pleistocene and the beginning of the Holocene.

LAKE AGASSIZ

When the Wisconsinan Glacier began to retreat about 15,000 before present (B.P.) meltwater began to accumulate on the south side of the remaining glacier. In 1823, William H. Keating was the first to recognise that sediments in Minnesota and Manitoba were possibly deposited in a glacial meltwater lake. Warren Upham named the lake after the Swiss geologist, Louis Agassiz, in 1880.

Figure 1, below, shows the maximum extent of Lake Agassiz.

One of the interesting things about Lake Agassiz is when it drained away. J. T. Teller and D. W. Leverington suggested in their 2004 paper, Glacial Lake Agassiz:



Figure 1: Maximum Extent of Lake Agassiz (Teller & Leverington⁴)

A 5000-year history of change and its relationship to the $\delta 18O$ record of Greenland⁴, that when Lake Agassiz drained away, the cold water draining into the Atlantic Ocean essentially shut down the thermohaline circulation in the Atlantic. This, in turn, led to a dramatic cooling of the climate. This cooling has been called the Younger Dryas Event, named after a pretty flower that grows on the tundra, *Dryas octopetala*. The pollen of this flower shows up in sediments that date from the Younger Dryas Event in places far to the south of modern tundra, suggesting a tundra-like climate during that time.⁵

THE YOUNGER DRYAS EVENT




Figure 2: *Dryas octopetala*⁶

The Younger Dryas Event began around 12,800 years B.P. and lasted until around 11,700 B.P. The Younger Dryas Event

EPOCH	GLACIATION	INTERGLACIAL
Holocene		Holocene
Pleistocene	Wisconsinan	
		Sangamonian
	Illinoian	
		Yamouthian
	Kansan	
		Attonian
	Nebraskan	

Table 1: Major Divisions of the Quaternary in North America²



is an interesting period of time since it strongly correlates with some other things that seem to have happened at that time. These other events include possible multiple meteorite strikes,⁷ a hypothesis called the Younger Dryas Impact Hypothesis.

■ The Younger Dryas Impact Hypothesis is a controversial hypothesis. At least one team of researchers have serious reservations about the idea.

The Younger Dryas Impact Hypothesis postulates that the meteorite strikes triggered massive meltwater floods that led to the global cooling of the Younger Dryas Event. The general mayhem from floods and fires associated with the meteorite strikes may also have led to the mass extinctions of megafauna.

The Younger Dryas Impact Hypothesis is a controversial hypothesis. At least

one team of researchers⁸ have serious reservations about the idea. However, the hypothesis has the advantage of explaining many phenomena, including a meteorite crater under the Hiawatha Glacier in Greenland⁷ and anomalous findings at a crater in South Africa.⁹

As the research continues, the evidence will eventually confirm, or deny, the Younger Dryas Impact Hypothesis. Healthy skepticism is called for while the evidence both for and against the hypothesis accumulates.

After the end of the Younger Dryas Event, the world began to warm up and the continental glaciers receded. The melting of the ice led to sea level rise, flooding the continental shelves.

If you are curious, check out the references below and educate yourself about the Big Chill of the Quaternary, Lake Agassiz and the Younger Dryas.

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Introducing the Manitoba Liaison Committee on Mining and Exploration

By L. Stewart, P.Geo.

The mining and mineral exploration industry of Manitoba is primed for prosperity, with a wealth of potential hiding in the ground. Although the industry in general has been slowly recovering from various global economic challenges, the recent accelerated rise in gold value has spurred renewed interest in resource investment. Historically, the Fraser Institute has consistently ranked Manitoba highly in overall Mining Investment Attractiveness Index, which combines ratings on geologic attractiveness and the effects of government policy on attitudes toward exploration investment. However, in recent years, Manitoba's Policy Perception Index had dropped in ranking (6th in 2016; 27th in 2017; and 33rd in 2018).

In an attempt to address these perceptions, the Manitoba Government recently established an advisory group dedicated to examining the issues concerning mining and mineral

exploration in the province. The Manitoba Liaison Committee on Mining and Exploration (MLCME) includes a diverse set of stakeholders. More information can be found <https://news.gov.mb.ca/news/index.html?item=45385>.

"The goal of this working group is to position the province to attract the investment it needs to discover and develop new mineral deposits in order to create economic opportunities for all Manitobans." – Shastri Ramnath.'

The MLCME works together with the Government of Manitoba to coordinate their efforts for the benefit of the mineral exploration industry. The committee works with the newly formed Economic Development Office, which was established as part of the Economic Growth Action Plan, in order to prioritize initiatives that will create growth in the sector. The committee will collaborate with the Communities Economic Development Fund to expand the Look North Initiative



addressing the challenges of northern economic development and the Manitoba First Nations Development Protocol, which serves as a model for Crown-Indigenous consultation through the mineral development cycle.

Economic growth in the mineral exploration industry will benefit all Manitobans, particularly those in the areas proximal to the exploration activities. This new committee is dedicated to helping make Manitoba a more attractive place to explore and mine and to support responsible mineral exploration and mining that contributes to sustainable development and reconciliation. ✦

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Meet Your New President Dr. Jitendra Paliwal, Ph.D., P.Eng., FEC

By R. Lewis



Dr. Jitendra Paliwal at work at the University of Manitoba.

Engineers Geoscientists Manitoba has a new President, Dr. Jitendra Paliwal. His journey to the presidency can hardly be described as anything but one which inspires admiration. Like much of Manitoba's demographic, Dr. Paliwal isn't originally from Manitoba. He grew up in India and developed his fascination with the field of engineering where he pursued his undergraduate studies. In many aspects of Dr. Paliwal's life, it is fair to say that his efforts, both in the study of engineering and in his giving back to the profession through volunteer work have come full circle. It's for these reasons Dr. Paliwal not only feels humbled by his

appointment to the presidency, but also has a strong desire to pay it forward.

Dr. Paliwal was hardly thinking about going beyond his undergraduate studies in engineering, but an encounter with a professor from the University of Manitoba, who would eventually be his lifelong role model, changed the direction of his life.

"When I was a student, at that time, Dr. Digvir Jayas (Past President of Engineers Geoscientists Manitoba) from the University of Manitoba visited my university in India. He was an alumnus of that university. He was accepting students at the time and he had three admission forms. Back in the day, everything was on paper, so he handed out

those three forms to the top three students in the graduating class. I happened to get my hands on one of those forms and then I applied. It didn't happen right away, there was a lag of about a year. I guess I thought I would never be going for higher studies, but then, a year later, I got the call saying that I had been accepted to the University of Manitoba. It was an opportunity too exciting to miss."

It has been 24 years since that life-changing encounter; something that not even Dr. Paliwal could have possibly predicted. Once a student of the institution wandering its halls, running from class to class, working his way through tedious

projects and presenting his work for review like any other student, he has now become one of its respected professors.

"It is very interesting because a lot of professors who taught me, all of a sudden, they became my colleagues. It took a little getting used to; sitting beside them, eating lunch, sharing jokes," he said.

To think that there was even a remote chance that the profession could have lost out on Dr. Paliwal's contributions is hard to believe, but it almost happened. He shared a story of exploring the field of business, after having been accepted into India's most reputable business school. Thankfully, it wasn't his cup of tea and his first love: engineering, won the bid for his affections.

"Engineering is something that has always fascinated me. I can recall that even when I was very little, my mind was constantly trying to figure out how to build stuff. So I returned to engineering where I belonged. I'm a very hands-on kind of person and in business school, I was there doing mostly theoretical stuff. There wasn't an opportunity to build something and see that Wow! It works!" he said.

Now, Dr. Paliwal is taking on an even bigger challenge: that of the presidency of Engineers Geoscientists Manitoba. Having worked his way up through the Association, rubbing shoulders with fellow students, committee members, and past presidents, Dr. Paliwal comes to the presidency with a unique perspective and a keen insight of its inner workings. This, he feels, positions him perfectly to fill the role.

"I think I have a very fair and balanced approach to things. I have been a part of the profession for 24 years. I work with engineers, I teach engineers, and I have been involved with the Association long enough to understand how the entire



Incoming President Dr. Jitendra Paliwal, P.Eng., FEC signing the Association scroll.

system functions. So that's something I would say is an asset. I have worked my way from the ground up. I was a foot soldier volunteering my time as a student during Engineers Week, where we would stand in the mall and tell people about what engineers do. That's where I started back in 1997. So I have volunteered at every level and then slowly getting involved with the committees and Council, and now to the executive and president, so I would say that I have a very thorough understanding of how the Association functions," he said.

It's that 22-year involvement with the Association that allows Dr. Paliwal to be able to reach individuals from all walks of life within the profession and those looking to enter it. While he feels confident in the work that the Association has been doing and in its efforts over the years to bring attention to the profession, he has not become complacent about the fact that there is still much work to be done and for a post that lasts for only one year, Dr. Paliwal knows that not only does he have his work cut out for him, he is ready to take on the challenges.

A few of the things on his agenda include encouraging women, minorities, and Indigenous groups that they too can be assets to the profession, particularly in his field of biosystems engineering, which he feels could potentially be the next frontier in engineering application. He is also determined to keep the lines of communication open with members, particularly where it relates to the correlation between due hikes and operational goals.

"We have operationalised some new initiatives, such as Engineering Changes Lives. So I would like to engage with our members to show them that there is value in the dues hike, especially if we want to bring about changes in our profession," he said.

Another valuable message that Dr. Paliwal is also passionate about is the one that reaches the public. That two-fold message is one of reassurance and enlightenment: "The Association is doing a pretty good job at regulation, which is our primary responsibility. We're there, not simply for our members, we're there for the public of Manitoba. That's something that gets lost on people," he said.

The other message Dr. Paliwal feels gets lost in the shuffle is the work that engineers do: "Engineers change lives. As much as lots of other professions do, but I would say that engineers do even more because there is really nothing in our lives that hasn't been touched by engineering. So I think the narrative has to change a little bit when you're trying to encourage young people to enter the field of engineering. 'Engineering changes lives', I think, is the right slogan."

With next year being the Association's 100th anniversary of engineering regulation in Manitoba, you can be sure that Dr. Paliwal wants to make the celebration a memorable one. And in the same way he has dedicated himself to the work of the Association, volunteering at every level, as a student, to working on the Experience Review Committee, to now being at the helm of the organisation's operations, his hope is that young engineers and students would get involved too.

"The Association does so much work and is always looking for volunteers... I want to do some consensus building and promoting the profession a little more. A lot of engineers don't participate more in the activities of the profession, so I would like to encourage people to be more participative," he said.

Like any growing organisation, Dr. Paliwal doesn't shy away from the fact that the Association faces challenges, but his approach as its current head is one of openness and objectivity: I'm a listener... I believe that any opinion, even if it does not fall in line with something I might perceive, has to be valued and judged on its own merit. I like listening to all arguments before passing my judgement," he said.

All in all, the opportunities Dr. Paliwal has had are not lost upon him. There's a quiet confidence and humility in his approach to every new opportunity that has come his way and he is ever mindful of the students and young engineers with whom he has crossed paths and had the opportunity to serve: "To me, the most rewarding thing is when I get to hear from my students, or young engineers. I feel very satisfied when they tell me that what they got from the university or the Association benefited them as a professional or individual," he said. ☺

Meet Your 2019-2020 Council

The Council acts in the name of, and on behalf of, Engineers Geoscientists Manitoba to exercise all of the powers, authority, and privileges conferred to the association through *The Engineering and Geoscientific Professions Act*. Get to know your new council!



Vaibhav Banthia, P.Eng.

Degree(s) and Discipline

M.Sc. Civil Engineering, B.Eng. Civil Engineering

Years of Experience

22 years

Area of Practice/Sector of Work

Structural Engineering and Project Management/Bridge Planning and Operations

Employer

City of Winnipeg

Why I Chose to Serve on Council

Serving on Council was a way of giving back to the profession. After serving as a member of Association's Academic Review Committee, then as a founding member, and eventually Chair of the India Chapter, I felt I could offer more. I believe that any governing body should be a reflection of the entire community, and therefore, wanted to be one of the 14 decision makers who develop the future of our profession and ensure that we stay true to our vision and mission, as harbingers of societal changes in our profession.

My Biggest Asset

Working in the public sector has provided me with the skillset and insight to place serving and protecting public interest as my highest priority. This requires patience, active listening, debating constructively, and always respecting the opinions of others.

One Thing Most People Don't Know About Me

The one day I disliked being a civil engineer was during the construction of Esplanade Riel. I was relatively new to Manitoba and had to supervise a long concrete pour when the temperature was below -35°C. I want to believe that after persisting 19 winters I am much wiser now.



Ruth Eden, P.Eng., FEC

Degree(s) and Discipline

B.Sc. Civil Engineering, M.Sc. Structural Engineering

Years of Experience

32 years

Employer

Manitoba Infrastructure

Why I Chose to Serve on Council

I have a breadth of knowledge and a passion for the professions and want to ensure that there is a sound and strategic vision in place to begin the next 100 years of Engineers Geoscientists Manitoba.

My Biggest Asset

I love working with the people side, seeing what we do as engineers both internally and externally and how it benefits society.

One Thing Most People Don't Know About Me

Diet Coke gets me through the day.



Carolyn Geddert, P.Eng.

Degree(s) and Discipline

B.Sc. Mechanical Engineering

Years of Experience

32 years

Area of Practice/Sector of Work

Manufacturing and Education

Employer

University of Manitoba

Why I Chose to Serve on Council

Engineering is a service-oriented profession. I was asked to let my name stand on a ballot in 2018, and I was both humbled and motivated to serve.

My Biggest Asset

I work hard. I am proud and protective of the engineering profession.

One Thing Most People Don't Know About Me

I can knit socks.



Neil Klassen, CET

Degree(s) and Discipline

Diploma in Structural Engineering Technology

Years of Experience

36 years (34 years in Canada, 2 years in Australia)

Area of Practice/Sector of Work

Program and Project Management and Structural Design

Employer

AECOM Canada Ltd.

Why I Chose to Serve on Council

Having worked as a technology professional in the consulting engineering community for my entire career, I have come to know the privilege and importance of self-regulation in engineering. I understand that self-regulation does not function without significant input from the many volunteers, such as those on Council and committee members. I believe my contribution of serving on Council allows me "give back" in a small way; to serve and protect the public

interest, maintain high standards for the profession, and increase of member knowledge and skills.

My Biggest Asset

My prior experience in consulting engineering and on the CTTAM board as director and as president provided me with a unique, complementary perspective to Council interactions and to the task groups of Council I participate in.

One Thing Most People Don't Know About Me

There are two things:

- 1 I'm a hobby beekeeper, @stickypawshoney on Instagram.
- 2 I once played volleyball for Canada's National team.



Cheryl Lashek, P.Eng.

Degree(s) and Discipline

B.Sc. Mechanical Engineering

Years of Experience

18 years

Area of Practice/Sector of Work

Technical Safety Regulator, mechanical equipment, and trades licensing

Employer

Office of the Fire Commissioner, Province of Manitoba

Why I Chose to Serve on Council

As a government regulator, I have extensive experience working with trades and engineers, and have seen a disparity in how both groups view technical codes, standards and compliance to legislation. I feel my experience can help increase

awareness among professionals to code changes and the existing roles on code development committees. Encouraging participation on code committees will help to create clearly defined requirements ensuring that the intent of all legislation is maintained, while making safety of the public the top priority, and bringing industry trades and engineers to common understanding.

My Biggest Asset

I am extremely enthusiastic to serve as a councillor and I have the willingness to serve the Council. I am motivated to encourage the upcoming generation to pursue engineering as a rewarding career.

One Thing Most People Don't Know About Me

In addition to being significantly left-brained with my technical career as an engineer, I find extreme joy (and balance) in using my right brain to run a successful local small jewelry business in my spare time. (I like to think it keeps me well-rounded, and not so geeky!)



Katrine Levesque, EIT

Degree(s) and Discipline

B.Sc. Civil Engineering, BA Recreation Management and Community Development

Years of Experience

3 years

Area of Practice/Sector of Work

Structural Engineering

Employer

Dillon Consulting Limited

Why I Chose to Serve on Council

I chose to serve on Council because I strongly believe in the direction the Association is headed. I am excited to be a part of the change to come, as well as continuing to be an advocate for the profession.

My Biggest Asset

My passion for engineering and how it shapes the world. I care about our profession deeply and I enjoy speaking to young people about the potential a career in engineering can offer them.

One Thing Most People Don't Know About Me

French is my first language, I am a proud Engineering Access Program alumni, and during my recreation degree, I played for the Bisons women's hockey team. I suppose that's three things.



Jason Mann, P.Geo.

Degree(s) and Discipline

B.Sc. Environmental Science, M.Sc. Geology

Years of Experience

22 years

Area of Practice/Sector of Work

Environmental, Hydrogeology, Geotechnical/Consulting Engineering

Employer

KGS Group

Why I Chose to Serve on Council

I felt that it was important to volunteer some time back to the Association. It has been very rewarding because I have had a hand in making some key forward-looking decisions, which will be reflected within Engineers Geoscientists Manitoba programming for the foreseeable future.

My Biggest Asset

I am comfortable in making decisions. I am careful to weigh all input and information as part of the process. Open communication is important; and I am not shy to share my opinion when necessary.

One Thing Most People Don't Know About Me

I am interested in boats, particularly sailboats. I like being on the water more than any other place, other than perhaps the rink, watching my kids play hockey.



Dr. Christina McDonald

Degree(s) and Discipline

Ph.D. Sustainable Development

Years of Experience

20 years

Area of Practice/Sector of Work

Indigenous Consultation and Public Relations related to Environmental Approvals

Employer

Province of Manitoba

Why I Chose to Serve on Council

I thought that I could contribute in a positive way to the governance of the engineering and geoscience professions given my knowledge of sustainable development, which is at the heart of these professions. I work closely with engineers and geoscientists and thought serving on Council would provide further insight into their fields of practice. As a career civil servant, this provides another opportunity to serve the public of Manitoba in a different way. Above all, I chose to serve to develop new relationships with experiences, intelligent and wise people.

My Biggest Asset

My biggest asset is that I work well with others.

One Thing Most People Don't Know About Me

I was born on a Hutterite colony in Manitoba.



Linda Murphy, P.Geo.

Degree(s) and Discipline

B.Sc. (Hon.) Geological Sciences

Years of Experience

14 years as a geologist, four years geoscientist

Area of Practice/Sector of Work

Professional geoscientist in field mapping and community liaison geology

Employer

Yamana Gold Inc.

Why I Chose to Serve on Council

My life goal is to ensure Indigenous peoples currently living in Manitoba and in Canada are fairly represented in professional Associations, and that their input and concerns are heard, with the intent to resolve. I chose to join Council in order to learn how Engineers Geoscientists Manitoba is governed, in appreciation of its success, and also to provide awareness of Indigenous perspectives related to our professions.

My Biggest Asset

I entered the profession as a mature adult. So, I gained a diverse life experience before I became a geoscientist. This helps me communicate and connect with people from all parts of society.

One Thing Most People Don't Know About Me

Most people know I am an Indigenous woman from Hollow Water First Nation; however they may not know that I grew up on a farm in Manitoba's Interlake.



Jitendra Paliwal, P.Eng., FEC

Degree(s) and Discipline

B.Sc. Agricultural Engineering; M.Sc. and Ph.D. Biosystems Engineering

Years of Experience

24 years

Area of Practice/Sector of Work

Agricultural and biological engineering

Employer

University of Manitoba

Why I Chose to Serve on Council

I'm proud to be an engineer and value the work our profession does for the society. Serving on Council gives me an opportunity to participate in policy formulation, mentorship, and community service.

My Biggest Asset

My ability to remain calm and composed even in the most stressful situations.

One Thing Most People Don't Know About Me

I almost quit science right after high school to become an economist and got accepted in India's most reputed business school. All this while pursuing a side career in radio jockeying.



Allan Silk, P.Eng., FEC

Degree(s) and Discipline

B.Sc. in Engineering – Computer

Years of Experience

34 years

Area of Practice/Sector of Work

High Voltage AC Transmission Systems – Utility Sector

Employer

Manitoba Hydro

Why I Chose to Serve on Council

I started volunteering with the Association in January, 1994. Between then and now, I have always been either a member of a committee, or a member of Council. I found my previous term on Council to be extremely rewarding. Now that I am entering a period of my life when I have more volunteer time, I wanted to increase my involvement with the Association. I look forward to working with all the councillors to achieve the Association's goals.

My Biggest Asset

My biggest asset is that I have five years of experience working on Council using the Carver governance model. During those five years we had as many challenges as any council could hope to have.

One Thing Most People Don't Know About Me

I don't think a lot of people know that I am a former Scottish Country Dancer. I danced for about 10 years. It was through country dancing that I met Colleen. For many years, Colleen and I were part of a group called the Scottish Entertainers which performed at retirement residences.



Ian Smallwood, P.Eng.

Degree(s) and Discipline

B.Sc. Mechanical Engineering

Years of Experience

17 years

Area of Practice/Sector of Work

Commercial Building Mechanical Systems Design (HVAC, smoke control, plumbing, etc.) and Special/Unique or Alternative Engineering Solutions

Employer

Nova 3 Engineering Ltd.

Why I Chose to Serve on Council

I felt I could contribute to ensuring that engineering and its oversight in Manitoba is conducted honourably on behalf of every member of society.

My Biggest Asset

My friends tell me I'm a good listener.

One Thing Most People Don't Know About Me

I obtained my private pilot's licence when I was younger, but don't regularly fly anymore.



Efrem Teklemariam,
P.Eng., FEC

Degree(s) and Discipline

B.Sc. Hydraulic Engineering, M. Eng. Hydraulic Engineering, M.Sc. Water Resources Engineering, Masters Certificate in Project Management

Years of Experience

Over 30 years

Area of Practice/Sector of Work

Consulting and utilities engineering

Employer

Manitoba Hydro

Why I Chose to Serve on Council

Self-regulation is paramount to the profession as it ensures that the ethical, competent, skilled, and diverse members can be relied upon to appropriately support the public interests and safety in all engineering works. If self-regulation was lost, government intervention in regulation could result in external influences inadvertently devaluing, reducing respect, and undermining the profession.

My Biggest Asset

I draw and reflect the experience and expertise gained working in the consulting and utilities engineering field in Canada, Europe, Latin America, Middle East, and Africa. In addition, I have volunteered my time and experience to several professional and non-profit organizations.

One Thing Most People Don't Know About Me

Lived and work as an engineer on five continents (Africa, Asia, Europe, North America, and South America)



Izabela Witkowska, P.Eng.

Degree(s) and Discipline

Masters Degree, Mechanical Engineering, Discipline – Materials Science

Years of Experience

33 years

Area of Practice/Sector of Work

Technical airworthiness, leading failure analysis, and investigations

Employer

StandardAero Ltd.

Why I Chose to Serve on Council

To represent the private sector and pay it forward by sharing the technical and professional expertise to advance members of the Association. To support women in engineering, employment equity and diversity, and build stronger professional relationships between Council and members for sustainable engineering in Manitoba. To promote a focus on the 'big picture', demonstrate critical thinking, and system approach. To emphasize understanding of the potential impact of councillors' decisions and the broad implication they have on people, environment, business, industry, and public interests.

My Biggest Asset

Education and knowledge supported by practical exposure to various industries. Dedicated engineering professional, subject matter expert with international experience, diverse professional and technical training. Passionate interest in mentoring and volunteering.

One Thing Most People Don't Know About Me

I was privileged to visit almost 100 countries and all seven continents. I recharge when I come upon something spectacular and unexpected; something rare. Travelling allowed me to encounter staggering wildlife, superb views, and appreciate the life I am building in Canada. ✈



2019-2020 Engineers Geoscientists Manitoba Council

ASSOCIATION ARCHIVE



Good day readers. Welcome to P. Eng's Science Corner where we poke into the curious crannies and novel nooks of the whole wide world around us (sorry about that, I mean around us).

Today's extremely technical treatise is on that modern day, high-tech component, the wheel.

Now this is an observation which has been passed on to the old Professor by an older and wiser person, so I cannot take full credit for the following mega question mark.

The simple picture is a rubber-tired Volkswagen rolling along at 60 miles per hour. All four tires are running on dry pavement and the highway is straight. Looking closely at a single tire, we will note that the centre of the wheel is moving forward at the same speed as the "People's Car". The bottom of the tire is somewhat compressed and is in contact with the pavement. While this is happening, the top of the tire is moving forward at twice the speed of the vehicle. Now I wish I could understand how something that seems as simple as the wheel can possibly even work. How does the tire stay together when the bottom is stationary and the top is moving at 120 miles per hour? The old Professor certainly doesn't have the answer, just thoughts on the matter.

Maybe the tire stretches when it changes speed from 0 to 176 feet per second? Perhaps that's why tires are made out of rubber. But then again, ox carts had solid wheels, but very few ox carts travelled at 60 miles per hour. I think there was some federal restriction on the operation of ox carts back in the olden days, but that's another story.

If there are any bright ideas or even questions for Professor Eng, please forward your cards and letters to P. Eng. c/o the Bulletin.

WATCH FOR OUR SPECIAL CENTENNIAL ISSUE IN MARCH 2020!

The Keystone Professional Committee has been combing through past issues to share Association Archives with you and now it's your turn to share.

Send your memories, stories, and/or tidbits about the Association over the last 100 years for our Centennial issue to Dwawryk@EngGeoMB.ca.

We'd love to hear from you!



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Charles Ralph Bouskill, P.Eng., FEC

By R. Lewis

Charles Bouskill has been in the field of engineering for almost 59 years. After graduating from the University of Manitoba with a BScME degree in 1952, he went on to pursue his MBA at the University of Western Ontario. While his 40-year career at companies such as Eaton's and Inter City Gas Corporation (ICG) are among his most memorable achievements, it is really his work at the Association prior to and following his retirement that he holds in high esteem.

Following retirement, what should have been a nine-to-12-month stint at what was then known as the Association of Professional Engineers and Geoscientists of Manitoba, turned into a 17-and-a-half-year part-time career. From 1992 to 2010, Mr. Bouskill was an integral part of the Association's Investigations Committee, and was its first chairman when it was first formed as the Practice Committee.

If there is any legacy Mr. Bouskill is proud of leaving behind, it would be the time he invested in the Association. As one-time president of the Association, with membership on 17 standing, ad-hoc and council committees totalling some 130-plus years collectively, it's no wonder Mr. Bouskill's contributions to the profession of engineering were recognised. In 1971, he became the first recipient of the Association's Outstanding Service Award, and in 1997, he became an Honorary Life Member. In 2009, he was named a Fellow of Engineers Canada for his contributions to the engineering profession.

One thing Mr. Bouskill hopes for the profession is that young engineers would become more active in the Association: "There are many engineers out there who have seldom walked through the doors (of the Association). They probably have lots to offer, but they are unknown to the Association," he said.

What was the catalyst for you entering the engineering profession?

Well, in my teens, I worked as a millwright's helper in a flourmill, which



no longer exists. It was on Archibald Street in St. Boniface. I enjoyed the work I was doing with mechanical equipment. Perhaps others influences were my father, who was a superintendent of a chain of the flour and feed mills, and his father who had been a millwright at a number of flourmills before that. Hence, I chose mechanical engineering.

What other choices, if any, had you considered professionally?

Medicine. I think that was partly because my mother had graduated with a BA from an Arts and Medicine program at the University of Toronto, without proceeding to complete the medicine part of the program. She had a younger brother and she wanted him to be able to complete an architectural program.

Do you wish you had chosen differently? Any regrets?

No. I didn't take too well to Latin, which was a requirement for medicine in those days.

Have you encouraged friends or family members to follow in your footsteps?

Yes. We encouraged our four sons to consider engineering as well as other occupations to better themselves. While none of them became engineers, each of



them has had responsible management positions in their chosen fields.

What are some of the challenges you encountered early in your career?

The design of an adjustable bearing housing to meet certain conditions for a roller in a paper mill. It was the first project I had to work on after I graduated. I worked away at it for a while before telling my mentor, the design engineer, that it could not be done, and he said: 'Yes. It can. Go back and do it.' So, I kept at it until I finally figured it out.

One of the projects I worked on was for Eaton's catalogue to develop a reference manual for sales staff to enable them to effectively operate new point-of-sale registers to be introduced in some new catalogue stores.

The first one was in North Battleford, Saskatchewan during a pre-opening visit to the store. A trainer from the register supplier, whose job it was to travel through North America to assist with training employees in the use of these point-of-sale devices, asked me who had prepared the manual she was using. When I told her I had prepared it, she told me that during all her years of travelling and training, she had never seen a set of instructions like this reference manual,

and that the trainees were moving through the training faster than any group using the manual as a training tool.

A number of years later in Saskatoon, when introducing new point-of-sale registers, another trainer said that she was expected to have the salespeople trained in three days, but was finding that even at the end of five days, some trainees still weren't sure about what they were doing. So I suggested she teach them using the reference manual. She later came back to me and said that using the manual had made a world of difference and even the commission salespeople were through the training in three days.

What projects are you most proud of having worked on?

I developed and arranged the installation of a pneumatic system to distribute filling tickets to the stock-filling departments in Eaton's catalogue operation. The system in use was based on having batches of filling tickets dispatched by a staff of couriers every 20 minutes to whatever part of the building those tickets were to be distributed. I developed a system where, instead of having people running around the building with these filling tickets, they would be placed in a pneumatic tube carrier, a destination address would be selected, and the carrier would be inserted into the pneumatic system and delivered to the appropriate location. The challenge for this project was to determine how many filling tickets were to be dispatched to each filling area at the peak season and then determine how many carrier trips would be required to move that many filling tickets.

After the system was installed, and the Christmas peak season had passed, the equipment supplier's representative told me that the trafficker system had been estimated to an unusually accurate degree.

What were some of the most significant changes in how things were done over the course of your career?

Technological and computer development. For six months, starting in mid-July 1956, I was a team member

involved in documenting and analysing the information and paperwork processing systems in Eaton's mail order operation with the objective of computerizing the information system, including inventory control. After determining the number of stock-keeping units (SKUs) that were available in the various catalogues, the computer consultant/team leader for this project announced that there was no computer anywhere in world with sufficient capacity to handle the number of SKUs currently available in the mail order distribution network; the project objective could not be met at that time. Amazing how relatively little data old, big computers could process compared to the large amount of data being processed by today's much smaller devices.

Another change was not so much in the environment, but in attitudes, where women, Indigenous peoples, and minorities are being drawn to the engineering fraternity.

How would you describe your management/leadership style over the years and how did you modify your style throughout your career?

I always tried to be respectful of others; to encourage others to participate and to not become discouraged.

What aspect of retirement has surprised you the most?

The revelation of the truth in the description of retirement is that you get up in the morning with nothing to do, and by nightfall it is only half done.

How have you filled your days since retirement?

Retirement has allowed me to travel when I wanted to travel. We've travelled throughout the UK on a number of occasions, in search of family information. We cruised the Baltic Sea with family and the Rhine and Danube rivers with friends, and we have visited parts of Mexico and the USA. Retirement has allowed me to enjoy the leisure of gardening, reading, and being active in the organizations to which I belong.

Do you believe you retired too early or too late? What's your reasoning behind this?

No. ICG was beginning to be sold off in segments, divesting portions of the company. I thought it was a good time.

What advice would you give to a fellow engineer who is thinking about preparing for retirement?

Keep busy. Participate. If you don't have outside interests, it's time you did. Pursue things you've wanted to do but didn't find time to do before. ☕



Meet the People That Make Life Work Better

Emile Shehata, Ph.D., P.Eng.

Member Profile

By R. Lewis

It's a long journey from the land of pyramids to the vast expanses of this prairie province, but it's a journey Emile Shehata made some 25 years ago with nary a regret. Now Senior Vice President at Tetra Tech, his venture into the field of engineering began in 1984 with a Bachelor's in Civil Engineering, followed by his Masters in 1994. He then left Egypt that year for the halls of the University of Manitoba, where he pursued his Ph.D. In 1999, Emile entered the workforce at Wardrop Engineering, which was acquired by Tetra Tech in 2009.

In his years at Tetra Tech, Emile has climbed the engineering ladder successfully, with project after project. From the Disraeli Bridges, to the Southwest Rapid Transit Stage II project, he has achieved much in his 20-plus-year career. Among these projects are accolades, such as the 2019 Association of Consulting Engineering Companies (ACEC) Manitoba Award of Excellence for his team's work on the Brandon First Street Bridge.

Despite his achievements, Emile is cognizant of the team of people who make it all possible and the hard work that makes it all worth it.

What was the catalyst for you to enter the engineering profession?

Growing up, it was all about problem solving and facing challenges. I had the opportunity to participate in math challenge exams and riddle-solving events. In my spare time, I would try to solve mind games – that was in the 1980s

– and would spend hours with the Rubik's cube and other inspiring puzzles. Then it became clear to me, during my high school years, that I would be successful if I pursued a career in engineering.

What does a typical workday look like for you?

Typically, a workweek starts with a not-so-busy calendar; then by Tuesday, I would find my calendar is completely full. My focus is generally on managing the Tetra Tech operating unit, which is based in Winnipeg, providing services in the infrastructure and environment sectors. There are always challenges, and problems, which need immediate solution. Typically, a workday may extend late into the night, and, very rarely, end at lunchtime, and it can mean that I am offsite or at the office. It all depends on what the great team I surround myself with brings to the table.

What advice do you have for people considering entering the geoscience and engineering professions?

Once you decide to be an engineer, your first goal is to keep learning and expect to learn something new every day until you retire. Get your heart set in the discipline you like and feel you can contribute to the most. While in university, always strive for excellence, focusing on your studies, and achieving the highest marks.

What's the most rewarding part of your career?

Personal achievements are good. However, it is very rare that one engineer can design or build by himself or herself. The most rewarding part stems from working with the team we have. It is when I see the design of my team turn into a reality that I feel the most rewarded.



Tetra Tech Senior Vice President, Emile Shehata

What are the three most memorable projects you've worked on?

I can name a few projects here, like the Disraeli Bridges, Brandon First Street Bridge, and most recently the Southwest Rapid Transit Stage II project. However, all of these projects would not have happened without having a dedicated engineering team working together towards the finish line. Every project is a new challenge, as there is no copy and paste in engineering.

Do you have a dream project? If so, what is it?

I have had the opportunity to work on large projects for the City of Winnipeg and the Province of Manitoba. My dream is to continue to participate in major transportation projects in Winnipeg and Manitoba. Every new project is a new challenge and the feeling of success at the end is priceless!

What do you get out of engineering that you couldn't get out of any other line of work?

Always having the pencil, calculator, and calculations pad ready. Engineering keeps

the mind fresh by facing new problems every day; either simple math problems or complicated business matters. To be a good engineer, you need to be versatile and knowledgeable of other engineering disciplines outside your practice. This way, you can lead and bring a larger team all together.

Are there Engineers Geoscientists Manitoba initiatives that you are involved in or support?

At Tetra Tech, we have employees who are active members of various Engineers Geoscientists Manitoba committees, which have our full support. We also encourage our Tetra Tech associates to participate in events organized by the Association For me personally, I sit on the Board of Directors of the Association of Consulting Engineers Canada – Manitoba chapter; and we do have interactions with Engineers Geoscientists Manitoba.

What makes your current job such a great place to work?

The continuous challenges, the new opportunities, and most importantly, the chance to see young engineers are learning new things. This makes me feel very proud of their achievements.

What do you hope the engineering professions will look like 20 years from now here in Manitoba?

The evolution of science has placed significant challenges on our profession. It is becoming essential that engineers keep learning to stay up to speed with new technologies. However, it is equally important that engineers do not forget the basics that we learn in school. I hope to see more events and courses to tie in the new technology to the engineering basics to prepare the next generation of engineers with a solid background.

When you're not working, you can be found...?

I am a big soccer supporter and fan! You can find me watching an English Premiere League game on TV, watching my son's games – he plays in the Manitoba Major Soccer League premiere division – or, rarely, playing soccer and table tennis for fun with friends.

How much of a balancing act is family life and work life and what's your secret to keeping on top of both?

Family life is always first, but work is the fuel for the family life to run. The secret to keep up with both is to be always "visible and available".

Never ignore a phone call from your family or from your work colleagues. It is not easy but can be done.

What tips can you offer to young engineers just starting out in the field or persons who are considering engineering as a career?

Two pieces of advice: Firstly, "Seize the minute". Do not let any minute pass without achieving and/or learning something new. Simply: *Get it done!* Secondly, "Work as hard as you play, and play as hard as you work". Always find the time to balance your work with your personal life and never compromise either of them. ☺

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Welcome New Members

M. Ahmeduzzaman	H.D. Deng	M.A. Haw	C.R. McEvoy	J.N. Schmidt
T. Al-Zabet	J.J. Depieri	K. Heshami	C.E. McLaughlin	G.L. Schoening
M.E. Amador	J.E. Dickie	F.R. Hillmann	W.M. McNeil	R.F. Sewell
S.X. Arkia	C.J. Driedger	D.W. Holbrow	D.C. Mersereau	F. Sheikh Hosseini Lori
J.A. Arsenio	C.L. Dube	J. Horton	W.A. Motriuk	K. Sookbirsingh
K.J.S. Bedi	E. Dumont	J.P. Howe	S.R. Nage	D.J. Sorenson
J.R.J. Bingham	P. Emond	M.N. Islam	K.J. Nemez	A.O. Sowunmi
T.A. Bischoff	D.J.C. Esposito	J.L. Jachniak	B.H.M. Ngo	L.C. Swanson
B.B. Bittner	J.D. Ethier	S. Kacar	S.O. Oduor	E.T. Sy
W.A. Blunt	L.L. Gallagher	A.J. Kaminski	E. Ortiz de Zarate	D.W. Tabernor
A.N. Brenner	V. Garshasbi	E.A. Karr	J. Panda	G.W. Vetro
R.L.D. Brosas	T.L. Gilman	T.D. Klassen	S.V. Pandkar	M.R. Violot
D.L. Burgess	R.A. Gravelle	C.D. Klemmer	N.V. Paulic	C.B.M. von Teichman
B.R. Burnham	A.U. Gulgeze	J.H.F. Lam	M.J. Paznar	S.I. Whettell
H.N. Collins-Kramble	P.D. Guzzi	M. Lashkarizadeh	A. Pradhan	K.A. Whyte
T.H. Cooke	N. Haider	M. Lavictoire	G.N. Reale	K.R. Williams
E. Cubi Montanya	J.M. Hall	D.C. Lindberg	L.D. Reichart	O.T. Winkelmeyer
Z.C. Czarnecki	R.A. Hanke	D.S. Luzi	L.A. Richl	M. Woloch
C. Dedeurwaerder	R.L. Haralampiev	P.L. Malaghan	D.E.V. Rondeau	B.L. Yee Ching
K.A. Deku	D.J.M. Harvey	G.K. Malhi	K. Salame	H. Zhang
	A.L. Hausauer	M. Mardan	N.S. Saran	

Certificates of Authorization

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Albarrie Geocomposites Limited	MBA Engineering Ltd.	RockEng Inc.
Bauer Chadwick Fratin Lavers Sivret Engineering Inc. o/a Sivret Engineering	McNeil Consulting Inc.	Siemens Canada Limited
BCL Engineering Ltd.	MCW Consultants Ltd.	StructureCraft Builders Inc.
Canam Buildings and Structures Inc.	MGP Architects . Engineer Inc.	Terrane Geoscience Inc.
Corvus Engineering Inc.	Ontenco Inc.	Tower Engineering Canada, ULC
Eddcorp Inc.	Orion Engineering Inc.	Urbinsky Corp.
Great Northern Engineering Consultants Inc.	PHILLEX Ltd.	Vortex Fire Consulting Inc.
JIT Professional Services Inc.	PRI Engineering Inc.	WaterChemEng Engineering Ltd.
	Produits Metalliques Pouliot Machinerie Inc.	Yoon and Associates Engineering Ltd.



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In Memoriam

Graham Murray Campbell
Robert Alastair Glennie
Calvin Grant Coey

Interns

- | | |
|-----------------------|-------------------|
| T.B. Adeniji | D. Kim |
| N.A. Aguiar | S.P. Klassen |
| O. Aina | M. Krouguer |
| O. Akinola | A.J. Lagasse |
| A.R.I. Al-janabi | N.J.L. Lambert |
| M. Ali | A.O. Lawal |
| K.G. Allard | A.S. Lee |
| A.C.I. Araya | N.A. Legaspi |
| W. Asihene | C.B. Livingston |
| J.T. Audette | H. Mazhar |
| R.P. Baliwas | M.D. Menei |
| B. Banitalebi | E.T. Morrish |
| C.A. Barragan Infante | N.A. Moschler |
| S.A.P. Bellin | M. Nadimi |
| J.S. Bhullar | H. Nasir |
| C.A. Boden | J. Nobrega |
| M.W. Broesky | dos Santos |
| B.E. Butler | J. Norman |
| D.L. Carnegie | T.D. Nychyk |
| D.M. Carver | N. Panchendrabose |
| D.M. Castuera | C.C. Pastula |
| J.C. Catigay | Y.A. Perez Rojas |
| A.J. Cochrane | C.G. Pettitt |
| P.L.E. Cortez | T. Rahman |
| J.D. de Guzman | T.M. Raposo |
| J.M.N.L. Dequier | H. Rauf |
| C.M. Di Pietro | M. Rochette |
| L.M. Diaz-Contreras | J.P. Rodriguez |
| R.S. Dingwall | Chacon |
| D. Dixon | M. Saaly |
| J.T. Drachuk | A. Salaris |
| J.L. Duke | G. Sathiyamoorthy |
| H.S. Dullat | G.N. Sawatzky |
| J.D. Dyck | V.L. Schindle |
| C.A. Espino | D.W. Schmidt |
| Z. Fan | V.S. Shah |
| S.N. Fay | T. Sherepanov |
| V. Floris | B.M. Sirant |
| C.D. Fritz | S. Stiller |
| J.M. Gerbrandt | H. Tan |
| M. Gervai | L.X. Tan |
| A.H. Gray | A.M. Taplin |
| R. Gutierrez Cabello | J.M. Thomas |
| I.A. Hernandez | J.S. Tkachuk |
| X. Huang | A.H. Trieu |
| S.A. Hunt | S.L. Turner |
| D.J. Hurd | S.P. Vercaigne |
| A. Huynh | V. Verma |
| M.A. Jalil | R.W. Watson |
| X. Jin | R.T. Weiss |
| T.M. Kelkay | S. Xu |
| M.I. Khan | X. Yang |
| E.J. Kiely-Smith | J.H. Yu |

New Member Luncheon and Certificate Presentation



New members in attendance at the New Members Luncheon on October 8, where they received their official licence certificate. This luncheon, held three times a year to recognize new members and formally present them with their official license certificate, was held at the Norwood Hotel.

University of Manitoba Engineering Student Wins Marie Carter Award

Abby Koch, a fourth-year student in biosystems engineering at the University of Manitoba, is the recipient of the \$5,000 Marie Carter Memorial Award through the Canadian Engineering Memorial Foundation (CEMF). The award honours the memory of the 14 women who lost their lives in the École Polytechnique massacre on December 6, 1989.

After she graduated from high school, Koch pursued post-secondary education in environmental studies. Three years later, she accepted an internship opportunity with Engineers Without Borders Canada in Toronto.

"I was really interested in international development. I wasn't interested in engineering at all. But when I did the internship, I was around so many incredible people who happened to be engineers. I thought to myself, 'Maybe I could be



Abby with Julie Lassonde, CEMF President

an engineer too," as shared with the Winnipeg Free Press.

Now in her fourth year of her engineering program, Koch persevered and learned the importance of resilience. This past year, Koch served as the president of the Engineers Without Borders Canada chapter at the University of Manitoba campus. She also works to co-ordinate the final year Capstone Design project for biosystems and mechanical engineering students.

2020 Annual Dues

Due December 31, 2019

By now you should have received your renewal notice. Notices were sent to your preferred e-mail on file with the Association, unless you have indicated a preference for paper mail in your online profile. It is the responsibility of members to make sure that contact information is up to date.

If you haven't received your renewal notice, please contact the Association. Annual dues deadline is December 31, 2019 regardless of problems with delivery. If you miss the renewal deadline, a late fee will be applied.

Check your contact information in your on-line profile

To check your contact information, log into your online profile by clicking "LOGIN" in the top right corner of the Association home page.

What happens if I don't renew?

You would no longer have the privilege of practising in Manitoba. Use of title in Manitoba is also a privilege of membership.

Members who do not retain their membership with Engineers Geoscientists Manitoba 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, if you have subscribed to this insurance.

What if I am not working in Manitoba?

Contact the Association to discuss options based on your specific situation.

What if my membership ceases and I need to reinstate?

Memberships that have ceased are subject to reinstatement fees including a deregistration penalty. More information on reinstatement can be obtained on our Reinstatement and Resumption of Practice webpage.

Changing your membership category

Requests to change to a non-practising category or to resign need to go through the office. If you decide to not renew your membership in Manitoba, you must provide notice of resignation to remain in good standing. Resignation without notice results in de-registration, which has consequences if you later decide to reapply.

News from the Equity and Representation Department

As we approach the end of our two-year Engineering Changes Lives special project, we are pleased to share that the Department of Equity and Representation will be officially operational in January 2020. We will continue the efforts to increase the percentage of newly licensed engineers who are women to 30% by 2030. Currently, the annual percentage of newly licensed engineers who are women fluctuates around 20%.

The first two years of this special project have been spent conducting research to identify systemic gender bias all along the career course of a potential or actual practitioner, from early childhood, through grade school, post-secondary education, and into workplaces. We've learned from the many, many volunteer champions – women in engineering and geoscience and their allies – who have been working to address

these biases for years and decades. Over the last two years, we have brought together stakeholders to identify what roles Engineers Geoscientists Manitoba may be able to fulfill with dedicated resources and strategic planning to achieve our strategic end that our membership represents the public for whom engineers and geoscientists work to protect, serve, design, and problem solve.

Our strategic plan includes establishing a metric baseline and protocol for annual tracking; conducting initial and ongoing research on biases from early childhood; through grade school; post-secondary education and workplace recruitment, retention, and promotion; developing resources for equity and representation best practices; working with consultants to develop and deliver marketing campaigns to both encourage girls to consider engineering and geoscience and engage stakeholders; engaging, learning from

and/or supporting diverse and intersectoral stakeholders on expanding equity initiatives.

Additional funding through increased member dues will yield approximately \$350K to fund these efforts. Roughly 40% of these additional funds will pay for staff salaries, benefits, and contributions. Approximately 55% will pay for strategic planning and marketing consulting, marketing campaign development, media purchase, and soliciting sponsors to implement effective marketing campaigns. The remaining 5% will go towards logistical costs of meetings and outreach events.

We'd like to thank all of the champions who continue to dedicate time, resources, and energy to reach gender equity in the professions. We look forward to walking alongside you to advance this movement you have set in motion.

THE **KEYSTONE** PROFESSIONAL



We're excited to tell you about the upcoming Spring 2020 issue of *The Keystone Professional* magazine which will showcase an editorial feature on the 100th anniversary celebration of the Engineers Geoscientists Manitoba!

We invite you to share in this centennial milestone and show your support for the Association by including your company's congratulatory ad in this special issue!

Contact **Jeff Kutny** today for more information on how you can be a part of this special 100th anniversary issue!



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The ballots on the voting for the By-law change were counted in accordance with the Association's By-law 17.6.10 on Friday, October 11, 2019.

2019 By-law Re-write Proposal **PASS** For 657 Against 89

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2020 Curling Funspiel



Registration for the Association's 2020 Curling Funspiel is now open! Join Association staff, members, and corporate partners, for an afternoon of fun on the ice at the St. Vital Curling Club on Wednesday, January 22, 2020.

All teams must be registered by Wednesday, January 8, 2020. For further information about the event and how to register, see the Events Calendar at www.EngGeoMB.ca

Interested in becoming a sponsor? Email Dwawryk@EngGeoMB.ca for more information. ☎

Professionalism eLearning Modules

This year, Engineers Geoscientists Manitoba began a project to develop online modules that practitioners could use for professional development. At Ingenium in October, attendees were provided an opportunity to get a glimpse at the first module, which had reached a stage where the initial draft could be demonstrated. The module unveiled at that time is just the first in a series of eLearning offerings that the Association will make available to practitioners.

There were several factors that led to the initiation of this eLearning module development project. The first factor is the need for regulators like Engineers Geoscientists Manitoba to provide more proactive methods of protecting the public. The second factor was due to a desire by the Association and, in particular, the Continuing Competency Committee to offer professional development opportunities related to the professions of engineering and geoscience. Thirdly, shifts in professional regulation have resulted in an emphasis

on non-technical issues, which requires more guidance for practitioners.

The desire to provide ethics training for practitioners has been felt at the national level for some time. Since national coordination was not made possible, each jurisdiction has begun its own path to development. Prior to initiating the project in Manitoba, each of these on-going efforts was reviewed, and it was determined to use online eLearning modules as the delivery method.

This method, most importantly, is interactive. Studies show that interactive training increases comprehension of complex projects. It has also been shown to double engagement of participants.

eLearning provides many other benefits as well, including:

- **Accessibility:** practitioners can access this training from any geographic region, at any time, using any type of device (desktop, tablet, and mobile phone)
- **Lower Cost:** setting up this training does not require rental of hotel space,

travel costs for the presenter or attendees, or labour of the presenter and organizers

- **Learning Styles:** multiple tools are employed with these eLearning modules to ensure that multiple learning styles are addressed
- **Consistency:** every practitioner who accesses the module receives the same training
- **Tracking:** using an online allows for direct recognition of participation and provides feedback for ongoing improvement of the modules (e.g. if all participants struggle with the same question)

Finally, development of these eLearning modules benefits from the fact that experts in each component are gathered to create the end product. Subject matter experts join with content creators, graphics specialists, and web developers to each provide input into the training that the user eventually experiences. Professional voice actors are even hired to produce the audio voice-over dialogue.

As mentioned above, this eLearning module project is being developed to provide an on-going series of resources for practitioners. To that end, the official rollout will consist of three modules; Professionalism Overview, Code of Ethics, and Good Character. The latter was the one demoed at Ingenium in October. Future modules will cover more topics and allow for deeper exploration of professionalism issues.

Are there any eLearning modules that you'd like to see developed? What other resources should Engineers Geoscientists Manitoba provide in tandem with these eLearning modules?

As always, I appreciate comments and discussion about standards issues. If you'd like to talk about the above topic or any other area of concern, please do not hesitate to contact me at: MGregoire@EngGeoMB.ca.

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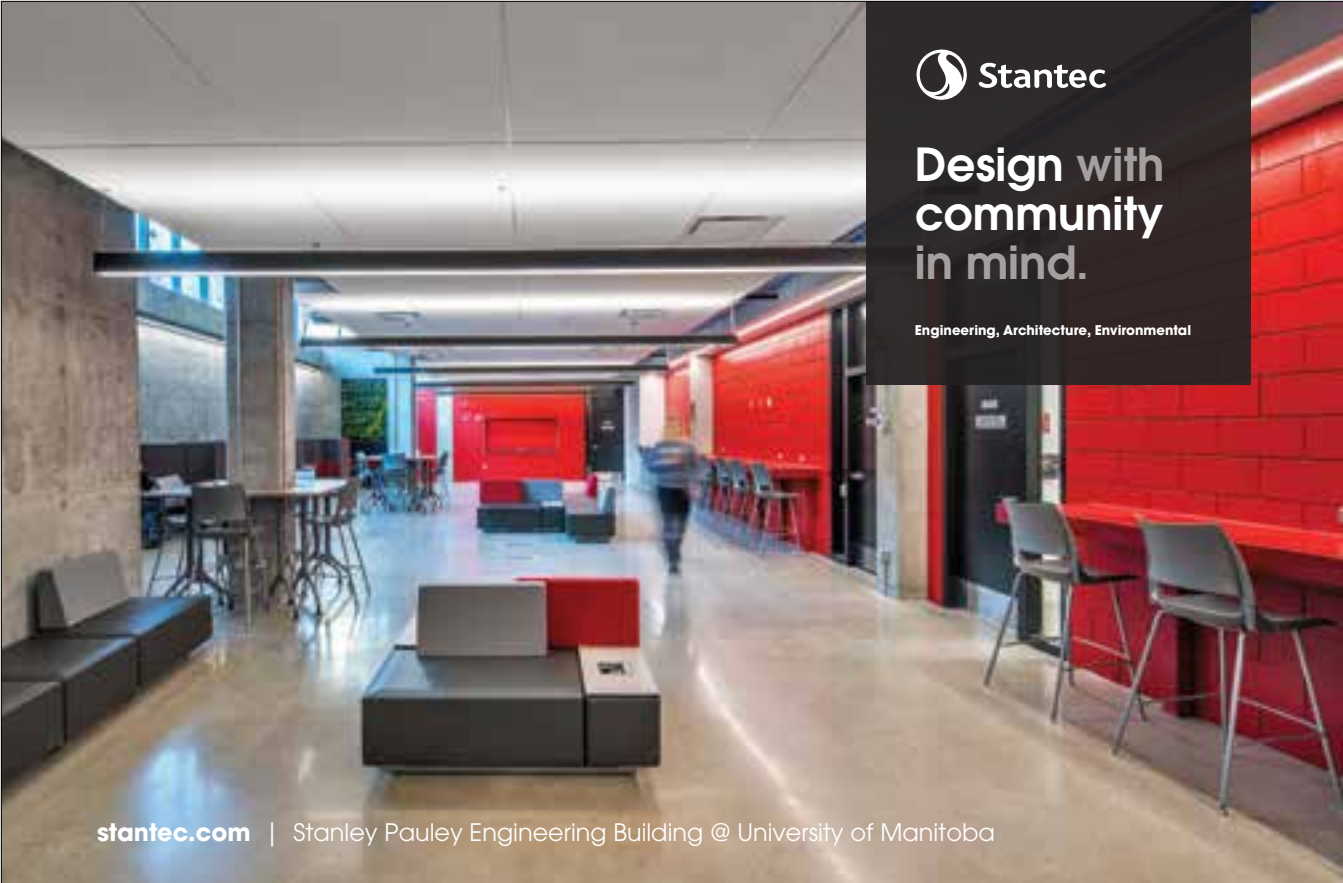
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