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Geoscientists
Manitoba

THE KEYSTONE PROFESSIONAL

SUMMER 2021



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Cover Photo: Some of the many submissions received from our Centennial Colouring Contest. See page 31 for the list of winners.





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Landmarks

Most of us can likely pick out key events in our lives where we experienced a turning point that changed the direction of our circumstances. One may have been a graduation; another perhaps becoming a licensed professional. Some other moments probably required heavy decisions. Safe to say all of us have something in common since the last year or so. We all had some part in the recent transformation of how and where we practise during a global pandemic. It will be interesting to measure how it all plays out in the end.

There are undoubtedly pandemic effects, personally and professionally, that have arisen; these are important and require care, but will not be detailed in this note. Professionally, I have sincerely missed interacting directly with my colleagues and project teammates. As your President, I have certainly enjoyed attending various virtual Association chapter events and Engineers Canada engagements, meeting new faces, and having new discussions. But unfortunately, at least so far, during my term I have not been able to do this in person. This I have missed as well.

All of us have worked remotely or digitally in some capacity this past year or more, and

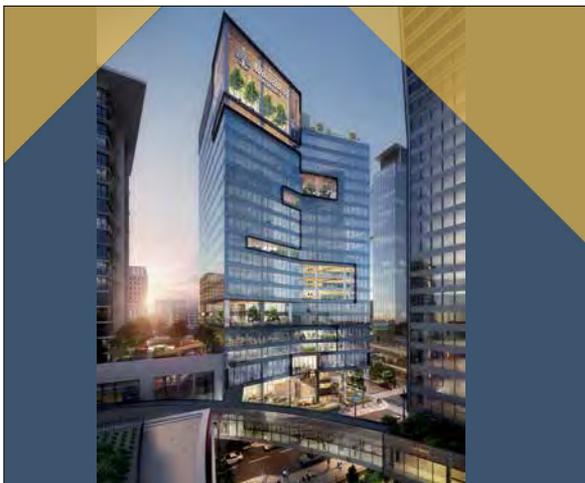
“When I work with historical engineering or geoscience studies, their outcomes often remind me that skilled and careful engineers and scientists got it right back then. They achieved the right outcomes without the advanced tools we have now.”

this has altered how we undertake our professions. These remote capabilities have kept us moving forward, kept us working together, but in a different way. Digital access in recent history (and especially most recently) has also given all of us an entry to new knowledge and resources.

The same access to technologies and digital solutions is also likely to create disruption. It is no longer “business as usual”, and we will need to be ready and able to adapt to the changes and the challenges. The industry might shift to embrace a technology-enabled on-demand workforce, and possibly also move further toward creating solutions derived by algorithms. As this develops, there is no doubt that creativity and innovation will guide us through.

When I work with historical engineering or geoscience studies, their outcomes often remind me that skilled and careful engineers and scientists got it right. They achieved the right outcomes without the advanced tools we have now. As the tools evolve, rapidly these days, our professions are not immune to disruption going forward. The future is key, and it is bright for the professions. As practitioners, we will need to continue to promote our relevance in creating, guiding, and using technology in the right ways. Because whichever way it goes in the end, I also believe that, as in the past, the best solutions arise from trained and experienced hands.

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



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It's a Marathon

This pandemic is proving to be a longer run than I expected. It's turning out to be a marathon! Is anyone getting tired of the restrictions? Tired of being forced to change personal habits and practices to stay safe? What about working from home – how's that going? Are the kids in the classroom or are they back doing online learning at the kitchen table? Hang in there – it's a marathon.

If you're like me, I'm sure you've grown tired of the daily news reports and the moment-by-moment coverage of the pandemic on the World Wide Web. It's hard to keep up with the number of vaccines, variants, data, and expert commentators. I viewed a television news story from a well-known news service that put the title "Scientist and Science Commentator" below the speaker's name. I get nervous when I see that. I've got a BSc and can make a few science-based comments, but that doesn't qualify me to comment on infectious viruses. I'd rather hear from Dr. Teresa Tam or Dr. Anthony Fauci, or some other MD, epidemiologist, or virus researcher. However, the news channels are grabbing at anyone who looks good, sounds good, and can say something tantalizing. Be careful – don't succumb to the plethora of bad information out there.

It's a natural human reaction to grow tired after enduring a long period of hardships like the ones caused by the pandemic. Some have it tougher than others, but we're all trying to find ways to keep going. We hope the finish line appears soon.

Another Marathon

I'm reminded of another marathon Engineers Geoscientists Manitoba started four years ago. In 2017, Council moved to embark on the long journey of balancing the gender disparity in the profession. At the time, one councillor said, "We'll never get there, if we don't get started." Everyone in the room that day shared this sentiment and so the long marathon began.

It has been an exciting four years with many accomplishments in a short time. Did you know that the Association has achieved the following?

- Created the Equity and Representation department.
- Designed and launched new webpages on the Association's website. Check them out: www.enggeomb.ca/DismantlingBias.html
- Developed and launched the Girl Power campaign. Check it out: www.girlpoweristheanswer.ca

- Gathered missing data along the "leaky pipeline".
- Launched the Manitoba 2030 Coalition and formed the Education Sub-Committee.
- Grew participation among key stakeholders in industry, government, and at secondary and post-secondary educational institutions, including students and parents.

A lot has been accomplished in a short time, but there is still a long road ahead. The most recent data indicates that in Manitoba the numbers are changing gradually. In 2017 we had 11.4% women, 2018 was 11.7%, 2019 was 12.4%, and in 2020 we reached 12.7% women. At this rate, it will take decades to achieve half or 50% women in EngGeoMB. But this effort is a marathon and we must continue on the path of fitting ourselves with the training, tools, fuel, and fundamentals to win the marathon. The prize is worth this sustained, long term effort.

Reflecting Society

It is an important quality for a group to reflect society. This demonstrates that a group functions with awareness of what is going on around them. It is the same for a profession. Doctors, lawyers, accountants, engineers, and others must reflect society in order to be effective servants of society. Without this commitment, a profession and professionals can lose step and be out of "sync" with the people it is called to serve. This is why EngGeoMB is attempting to balance the extreme gender disparity.

Your feedback is invited and welcomed. If you have any thoughts on anything you read in the KP, please e-mail me at GKoropatnick@EngGeoMB.ca. Have a great day! ☺

“It's a natural human reaction to grow tired after enduring a long period of hardships like the ones caused by the pandemic. Some have it tougher than others, but we're all trying to find ways to keep going. We hope the finish line appears soon.”



Manitoba Trailblazers

MELANIE MULDER



Melanie Mulder graduated with a Bachelor in Mechanical Engineering from the University of Manitoba in 1998 and immediately

began a successful career at StandardAero. For the first few years, Mel worked as a welding process engineer, learning to become a subject matter expert in various joining processes for a wide variety of metals and superalloys. To gain practical leadership skills, Mel accepted a role working as a production cell leader, where she managed a team of plating technicians and was responsible for all production work passing through the plating cell, an area that required additional safety and security measures due to the use of chemicals. She would become the director of engineering where she worked hard to develop and improve technical collaboration with Red River College and the University of Manitoba, in addition to her daily duties. She spent her entire career of 20 years committed to StandardAero and, in that time, made an extraordinary impact on many individuals, whether a fellow engineer, a technician, security staff, or executive. She provided thoughtful guidance and mentorship, and

celebrated and promoted women in leadership through it all.

While faced with a terminal illness, Mel met with various individuals from the engineering community and from the University of Manitoba to understand the requirements to initiate an engineering bursary. With help from a small advisory committee after her death in 2020, a perpetual fund was set up to provide for female engineering students in need of financial support. The successful launch of the Melanie Mulder Bursary for Women in Engineering was a final meaningful contribution to her profession and is indicative of her determination and commitment to trailblazing.

JOSHUA MYERS, GIT



Josh has always loved rocks and minerals. As a child, he read books, asked questions, and collected rocks. His boxes overflowed with

various rocks and minerals. This turned into a passion and career as an environmental scientist with Parsons Inc. Since graduating from the University of Manitoba with a Bachelor of Science in Geology, Josh has become involved with volunteering and teaching students about geoscience. Never having access to any geoscience-related classes throughout his schooling, he wholeheartedly believes

that, had he been exposed earlier, it would have sped up his current choice in geology. His goal is to teach kids more about geology and get them interested in science and learning in general. Josh visits classrooms from grades 3 to 7 with hopes to get kids interested in geology through presentations and hands-on activities. He also volunteers during Provincial Engineering and Geoscience Week where, each year, he develops new activities for kids to learn about his passion. The engagement and excitement he gets from students when they ask questions and want to know more is what really makes it worthwhile for him.

SUMAN SURI, P.ENG.



It was a dream for her parents to see her as an engineer, which complemented her interest in science and mathematics courses in high

school. Being naturally curious and deductive, she gravitated toward engineering in college.

After studying engineering, Suri opted to teach. Teaching was her passion and engineering was her interest; this combination inspired her to achieve success in professoriate positions.

After coming to Canada in 2016 as an internationally trained engineer, it was difficult for her to

find employment in her desired engineering field due to licensing requirements. In 2018, she fulfilled the requirement to become an engineer-in-training and eventually landed her dream job. She recently earned her professional engineer designation and works as an application engineer at New Flyer Industries. She also volunteers on the India Members Chapter Executive.

To her, engineering is the building block of change; she believes that engineers don't just identify problems but work towards solutions. She is proud to be an engineer and wears the iron ring on her finger to inspire others to become problem solvers.

CORY VITT, P.ENG.



Cory Vitt has spent the last 20 years building positive paths and being a role model. Cory is Métis, self-identifies as Two-Spirited,

non-binary, queer, and uses they/them pronouns. Recently, Cory advocated with the Manitoba Métis Federation for inclusive gender options and was one of the first Métis citizens to receive non-binary identification. Cory is the chair of the gender/sexual diversity (2SLGBTQ plus) network for one of the largest

employers in the province and is actively involved with other Winnipeg-based advocacy groups.

In 2005, Cory was the youngest Canadian Indigenous person to graduate with an undergraduate engineering degree and was awarded the National Métis Role Model from the national council. Cory is working on their fourth university program; they hold a Bachelor of Science in Civil Engineering from the University of Manitoba, a Master's of Structural Engineering, which was funded by NSERC, from the Asian Institute of Technology, and two certificate programs. Cory specializes in the field of drinking water, with over 12 years in government. ⊕

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ASSOCIATION SURVEY

Explores Impact of the Pandemic on its Practitioners

By R. Lewis and C. Cousin, P.Eng.

It is hard to believe that we are a year and a few months into what most had hoped would be – at best – two weeks of a novel coronavirus outbreak. Instead, “two weeks to slow the spread” has turned into what is now being referred to as the Third Wave in a year-long pandemic of business shutdowns, government-mandated mask orders, and the ever-looming possibility for new lockdowns. Despite the prolonged period of uncertainty, many are looking to the release of new vaccines in hope that life, as they once knew it, would return to some semblance of normalcy. For many, the current “new normal” has come with its ebbs and flows as things continue to change with each coming day and little to no guarantees of exactly what the future will look like in a few weeks, let alone another year.

Engineers Geoscientists Manitoba wanted to get a sense of how its practitioners, and their businesses, careers, and personal lives, have been impacted by the pandemic. The Association dispatched a survey to gain further insight, with some of the survey’s respondents expressing a willingness to discuss their responses in more detail. Of the responses received, almost 46% were from women, 48% were from men, while just over 2.5% of the respondents were non-binary, or chose not to self-identify, respectively. Some of the survey’s respondents were selected to be further interviewed. This article dissects some of those responses, specifically as they relate to business, careers, education, infrastructure and environmental impacts, and personal well-being.

Impact on Business

If there is one area of life that has not remained untouched by the pandemic, it would be that of livelihoods. While engineering and geoscience were recognized as essential services, there was a decrease in private sector work as long-term capital investments paused, and some sectors, including the aerospace industry, were deeply affected. Many businesses have managed to weather the storms of both the first and second waves; others, however, have not fared as well. Some small businesses that relied on remaining open to keep afloat were forced to permanently shutter. Other businesses have had to deal with disruptions in the supply chain, while others decided to shift focus.

One such business is the InnoXL Group of Companies whose Co-Owner, President, and CEO, John Pacak, P.Eng., formed the company in 2014. As its name suggests, InnoXL operates with the goal of innovation through business and product development, bringing new technologies to the market. At the height of the pandemic, the company was heavily focused on developing two technologies – one for laparoscopic surgical procedures and the other for high-resolution spectroscopy. While preparing for clinical studies in Boston, which also happened to be a coronavirus hotspot, those studies had to be put on hold.

“There was an overall drop in sales of surgical products of up to 80% for certain businesses, and our company had to slow down tremendously. We were still moving forward developing and

evolving our surgical technologies, but certain business aspects went into a state of pseudo-paralysis,” said Pacak.

In this new reality of uncharted territory, and with in-person demonstrations of their products no longer feasible, Pacak and his business partners still managed to find a novel way to conduct a demonstration for the team in Boston.

“We set up a local demonstration with multiple cameras that would live stream in parallel, both inside the surgical subject, and externally. This allowed the team in Boston to see our instruments working in real time as they directed our surgeons, who became the hands for them,” said Pacak. “They watched the instruments do everything in real time from all different perspectives. In a way, it was almost a better demonstration than it would have been in-person.”

Pacak and his company have also found other ways to leverage their products in the face of challenges. One such product was its proprietary spectrometer, which has a higher resolution and a higher sensitivity than other spectrometer technologies – the core selling features of the technology. While the platform technology is used in several applications, the goal behind this product was rapid bacteria detection, sifting the good from the bad.

“When we started that development, we realized there would be a high regulatory hurdle to overcome. We decided to approach non-medical and non-diagnostic applications first. We went into the agricultural space, using our spectrometer to identify spectral signatures in the sorting of grains, allowing us to analyze every kernel, one by one, characterizing

them, and then sorting them based on quality characteristics such as protein and carbohydrate content, and removing kernels infected by diseases such as fusarium. This will be, essentially, the world's fastest and most advanced sorting technology," said Pacak.

When the government reached out to companies seeking help from them to manufacture personal protective equipment and other technologies to help combat COVID-19, InnovoXL was able to offer its bacteria detection technology and adjusted it for high-speed detection of infectious diseases such as COVID-19. From this interaction, Adva Diagnostics and Lexim Biophotonics were born. Lexim has developed what is essentially the world's most efficient UV-sterilizing technology, which the company is incorporating into all types of air-purification systems. This technology has also enabled them to create the world's first fully reusable UV-sterilizing mask.

Impact on Careers and Professional Life

Whether one has had the good fortune of simply pivoting to work from home or being requested by one's employer to take a few days leave without pay – which has been the case for some government employees – to a more sobering reality of temporary or permanent layoffs, every employee and family has felt the effects ushered in by the pandemic. Among those surveyed, many found working from home to be an adjustment, while others welcomed the change of pace and environment. For parents, however, caring for children or homeschooling while trying to maintain work schedules had become a juggling act.

While several survey respondents remarked that the reduction in face-to-face interactions with colleagues was something they had missed, others had come to terms with their new reality, finding it, in many ways, more productive than being in the office setting. Others, still, found the experience of strictly communicating via e-mail and text message challenging. As one survey respondent commented: it is "hard to read the intent of e-mails and text messages".

Some managers have struggled to assess the effectiveness and accountability of staff working remotely, while junior staff and those who have

transitioned into new workplaces have struggled with guidance and developing a sense of belonging with coworkers they have yet to meet in person. It has been difficult for some to remain engaged, as this period of working from home has persisted much longer than most would have anticipated. This "has turned into a marathon that is slowly wearing me down", noted one respondent. Many felt the loss of water-cooler chats, informal connections, and meetings, which often sparked creativity and collaboration.

There was a marked increase in those relying on online tools such as Zoom and Microsoft Teams for meetings. Almost 70% of the respondents stated that they relied on such tools during their day, and almost 80% of respondents expect these tools to become the norm even after they have returned to the workplace. Many survey respondents noted increased cohesion among project teams as they meet virtually. Travel time and expenses for meetings have been eliminated – a huge benefit to bottom lines and schedules.

While over 90% of respondents were able to keep working, the challenge remains yet for those who have lost jobs in what one survey respondent described as a "soft market". Companies such as Pacak's InnovoXL, however, are forecasting growth rates of over 100% in the near future, which could potentially spell new opportunities for out-of-work engineers.

Impact on Education

It is hard to imagine the grounds of education facilities void of the hustle and bustle of students running from one class to another, professors with doors wide open awaiting student-hour visits, or any of the other activities associated with campus life. And yet, when the pandemic hit, what would have been hard to fathom became a glaring reality.

With classrooms closed, universities and other higher education institutions across the province resorted to online forums to fulfil course requirements. James Dietrich, P.Eng., engineer-in-residence at the University of Manitoba's Price Faculty of Engineering compared the shift from in-person to online classes to sometimes feeling like engaging with a blank screen.

"It is hard to get a good, strong feeling for levels of engagement at times", Dietrich said. "Nobody turns on their cameras and students tend to be non-vocal. A few students sometimes put comments into the chat box."

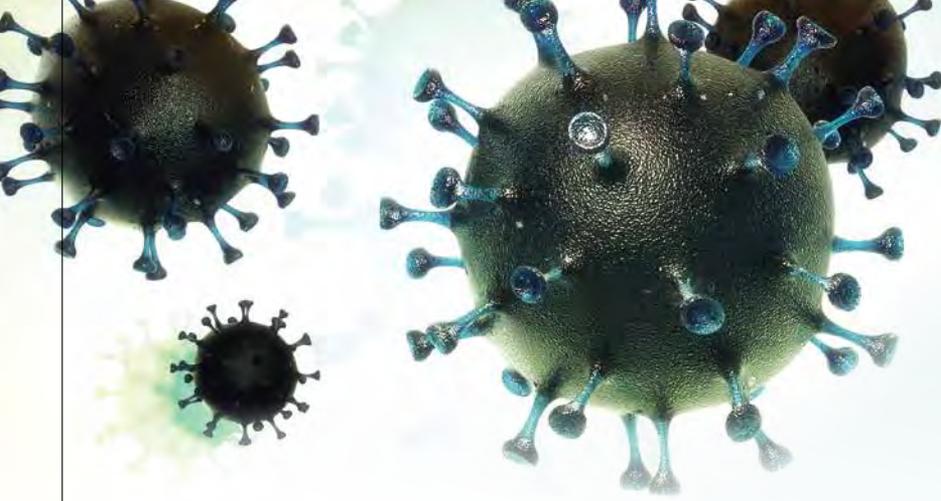
Programs like engineering, Dietrich believes, are extremely demanding and the tendency with online learning to be geared toward continued partial awareness does not lend itself to being fully engaged. Despite this, Dietrich sees these challenges as growing pains for remote learning and, while in-person instruction is still important, he isn't convinced that the classic methods of instruction are necessarily better. "I strongly feel that we need to redefine the rules of engagement in online learning", he said.

Dietrich appreciates the value of the remote learning paradigm. For one, students can access those resources whenever they need them, and they have the opportunity to pause or rewind to work out an equation or a concept that they may have otherwise missed in the classroom setting.

Of course, the other side of education comes after university. Engineers are required to fulfil a certain number of credit hours of professional development (PD). While a majority of the survey's respondents expressed difficulty in keeping up with the requirements of their work schedules, family responsibilities, and PD, respondents noted an increased availability of online resources to facilitate PD since the pandemic.

Impact on Infrastructure and the Environment

While so many aspects of business have been negatively affected by the pandemic, construction work on infrastructure continued. Infrastructure within the province has been largely supported by government funding to the tune of millions of dollars. In fact, one respondent, Angela Meier, P.Eng., Manitoba Central Services' Chief of Operations for the Water Services Branch in Brandon has seen infrastructure gain a new lease on life since the pandemic hit. She believes that this boost is a good investment in jumpstarting the economy again. Brandon is not the only area of



an increase in frustration and irritability with the ever-changing mandates, while others felt uneasy or uncertain.

For business owners like Pacak, work-life balance during the pandemic has become a little more out of reach as his business goes through the birth pains of new projects that require a great deal of time. “I have always worked hard, but this is taking it to a new level. Quite often, I am working till midnight or later. We take a few hours after school with our kids, but it is definitely far more work than is probably healthy. Regaining that work-life balance is something I am definitely looking forward to”, said Pacak.

Meier has chosen the approach of gratitude for the opportunity to have time with family, while still being employed. “I felt so fortunate to stay working and remain busy and to not have experienced the effects of being laid off. So, I don’t want to complain about it, but I know of others that were much more affected than I was”, she said.

As difficult as it was to transition work practices at the beginning of the pandemic, there will be further challenges in transitioning back to those traditional workplace practices.

“My sincere wish is that we extract the best insights from what we’re all experiencing through this disruption of our formerly normal lives and then integrate that in a new way of being that’s healthy and better for all”, said Dietrich.

Unequal Impacts

The economy has been discussed in the news lately as going through a potentially K-shaped recovery. Those who were doing well before the pandemic are doing even better now, while those who were struggling before have been the hardest hit. It is interesting to note that the divergence evident in the survey responses and comments indicates that a similar divergence is happening in responses to workplace changes due to COVID-19.

The pre-existing conditions that have impacted our responses appear to be primarily stage-of-life and personality traits. Those who have struggled most with the change to working from home

the province that has seen construction projects. Workers have been busy maintaining infrastructure in other areas too. Another survey respondent noted, however, that post-construction inspections had been suspended and another that new construction projects have been down over the past year resulting in a loss of business. Dietrich believes the future of infrastructure is closely tied to the environment and has the potential to support our desire to travel and explore.

At the beginning of the pandemic, there were several stories about a reduction in air pollution and cleaner waterways as people were commuting less, and travel for business and pleasure had ground to a halt. In fact, over 85% of survey respondents remarked that travel for business was affected by the pandemic. As life slowly shifted back to a more familiar routine with businesses reopening and many employees returning to the office, those environmental stories lessened. They are, however, regaining momentum.

“I think that we’re in a transition of climate change and disruption, and I believe that the contributing factors are in the ways that we engage with our environment and we need to revisit that”, said Dietrich.

As many employees have been working from home with limited access to office equipment such as photocopiers, scanners, etc., printing became a luxury that many learned to live without. While the concept of going paperless has been a topic for years among businesses, the changes in routine have essentially forced companies and their employees into a predominantly digitized space.

Impact on Well-Being

In a pre-pandemic world, the concept of work-life balance was frequently on the lips of almost every employee striving to meet the commitments of work and home. In the wake of the pandemic, while this concept hasn’t changed, it has become more of a nuanced conversation. For many, the opportunity to spend more time with family playing games, having meals, or simply watching a movie together has been one of the blessings of the pandemic. Those blessings, however, are not without their stumbling blocks. For those working from home, carving out uninterrupted time to focus on the day’s duties is sometimes challenging, particularly in situations where the workspace is shared. Other respondents found that they were able to allot more time to hobbies and ambitions such as adopting a regular workout routine, while others found themselves exercising less, and working more.

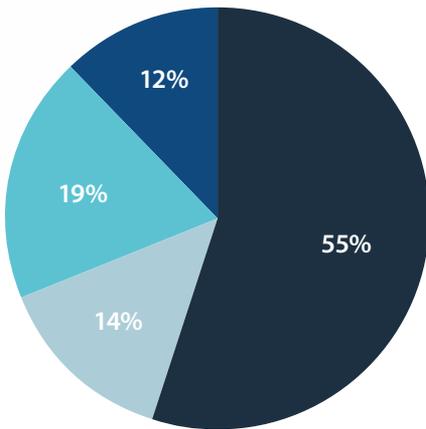
“We have blurred the lines between our work lives and our professional lives and I’m not sure if that’s healthy. I can certainly acknowledge the benefits of it as it allows some flexing, but when there’s always a big to-do list and no stepping back from it, that alone can be stressful”, said Dietrich.

For some, the decrease in social activities and interactions, not being able to get together with extended family and elderly parents proved challenging, in some cases leading to depression, in other cases, a marked increase in alcohol and/or tobacco consumption.

Some respondents noted improvements in sleep patterns and the ability to get more sleep with commute times now non-existent. Other respondents remarked that they had felt

Has business been lost and/or gained because of the pandemic?

- Not significantly affected
- Gained
- Both lost and gained
- Lost



include parents with young children, as the impacts of last spring on their lives cannot be understated. With schools

transitioning to remote learning, daycares closed, and grandparents not available to help with childcare, the situation was extremely difficult for parents to manage. With children at home and schooling falling to some parents, work often had to be completed once children were in bed, which isn't sustainable in a healthy way. Some individuals were much more affected by the loss of social interaction than others, and, anecdotally, it seems that younger individuals living alone, as well as social extroverts have struggled with loneliness and a sense of disconnection.

Role of the Association

In conducting this survey, Engineers Geoscientists Manitoba wanted to get to the heart of the issues and challenges facing its practitioners over the past year. And many of the survey's respondents expressed satisfaction with the Association's response to the rapidly changing situation. For some respondents, it was the ability to virtually attend the annual conference; something that many out-of-city dwellers have not

had the opportunity to do in the past. It's the one thing that Meier would like to see the Association continue to offer in the future.

Others surveyed responded that they enjoyed having access to the weekly newsletter and expressed interest in the expanded PD opportunities that promoted work-life balance and mental health. For a few respondents, case studies that explore a creative approach to getting work done, financial incentives for home-gym equipment, and support or sponsorship of group wellness activities are things they would like the Association to consider offering in the future.

The Keystone Professional Committee would like to thank those who took the time to respond to the survey regarding the impacts of COVID-19. While acknowledging that the results reflect only the experiences of those who chose to participate in the survey, a large number of the comments provided by respondents offered greater insight into what they have experienced this past year. ☺



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Interplanetary Geology

By R. Reichelt, P.Geo.(SM), FGC

Did you know that when the United States National Aeronautics and Space Agency (NASA) landed its Perseverance rover on Mars on February 18, 2021, the Mega Speed, a high-speed camera and accompanying software on the rover, were supplied by Canadian Photonic Labs of Minnedosa, Manitoba? This brought to mind the question of how do geoscientists investigate the geology of planets other than earth? There are three main ways to do this:

- Remote observation
- Robotic landers on the planet
- Manned missions to the planet

Remote Observation

Geoscientists can tell a lot about the geology of a place by examining photos obtained using remote sensing technologies. In the case of extraterrestrial bodies, this is often the first, and possibly only, means we have of obtaining information on their geology.

Observing other planets in our solar system using telescopes based on the earth has encountered many problems. In the case of Mars, the Italian astronomer, Giovanni Schiaparelli saw features in 1877 that he called *canali*, channels in Italian. Percival Lowell, an American astronomer, thought that he saw canals (i.e. artificially built features) on Mars through his telescope in 1894. Such was his prestige and some people's wish to see evidence of extraterrestrial life that Lowell's observations fed a host of science fiction, such as H.G. Wells *War of the Worlds*. However, other astronomers were unable to confirm Lowell's observations of canals on Mars, and further refinements in astronomy proved them to be artifacts of observational error.

Since the development of rocket technology in the late 20th century, we have been able to send satellites to

more closely observe conditions on the Moon and other planets. To date, more than 200 probes have been launched to observe the Moon and the other planets in the solar system. The planets have been examined with visible light, thermal imaging, and radar imaging.

The images sent back have been truly spectacular. Two of the methods used to determine the underlying geology from the images are:

Geomorphology of a planet's surface can point out mountains, plains, canyons, and other features. These features can often give a fairly specific indication of the underlying geology. For example, Mons Olympus on Mars is clearly a volcano, thus we can surmise that the geology is volcanic. In some cases we can see features that are clearly due to erosion and deposition, suggesting the presence of sedimentary rocks. Deep examination of the features can also give clues to the geologic history of a planet.

Spectral analysis of the light reflecting off the planet's surface or its atmosphere is another important technique to understanding the geology of other planets. Some are pretty obvious, for example, the red colour of the Martian soil is probably due to iron oxide and the yellow colour of Jupiter's moon, Io, is apparently due to sulphur. Other analyses have led to astonishing results; the atmosphere of Saturn's moon, Titan, is rich in methane and ethane that rain into seas of liquid hydrocarbons.

Using the techniques outlined above, geoscientists have prepared detailed geological maps for the Moon², Mercury³, Venus⁴, and Mars⁵.



Figure 1: Mars, photo taken by the OSIRIS instrument on the ESA *Rosetta* spacecraft during its February 2007 mission.
Photo credit: ESA/Rosetta/NavCam

Robotic Landers

More direct observations can be made by sending robotic landers to the Moon and the other planets in the solar system. So far, 14 landers have successfully landed on the Moon and 31 landers and probes have landed on other planets in the solar system, including five that have landed on asteroids and two that landed on comets. Many launches have failed between the launch pad and the target.

Sending robots to other planets can be risky. While the landers on the Moon and Mars have done fairly well in terms of lasting long enough to give plenty of information, the same cannot be said for missions to other planets. In the case of the probes sent to Venus, most have transmitted for only a short time before the harsh conditions on Venus destroyed the landers' electronics. A probe to Jupiter was destroyed as it fell through the Jovian atmosphere and the lander sent to Saturn's moon, Titan, transmitted data for 90 minutes before ceasing to operate.

The landers and probes have all sent back detailed data on

conditions on the extraterrestrial bodies. For example, the landers that went to Venus confirmed the harsh conditions with atmospheric pressure equivalent to 92 times that of the Earth and surface temperatures of approximately 462°C. Harsh conditions also exist on the Moon, mostly from extremes of heat and cold, together with no atmosphere. Mars has a thin atmosphere but tends to be fairly cold where -30°C is considered a hot day.

The best way to do geoscience is to have actual samples to examine. Some of the landers have sent back samples from the Moon, Mars, the asteroids 25143 Itokawa, 162173 Ryugu, and 101955 Benu, and the comets 81P/Wild and 67P/Churyumov–Gerasimenko.

Manned Exploration

So far, the only extraterrestrial body actually visited by human beings is our Moon. From 1968 to 1972, six missions of the American *Apollo* program landed 12 men on the Moon. Lots of geoscience was accomplished on these missions, from sample collection, outcrop mapping, and geophysical measurements. Thousands of geologists and geology students had the opportunity to examine and analyze the samples returned by the *Apollo* missions. One of the highlights of my geology studies was looking at thin sections of moon rocks graciously lent to the University of Saskatchewan by NASA in 1978.

The next step in manned exploration will be a return to the Moon and an expedition to Mars. Space exploration missions, especially those with human crews, are horrendously expensive. Entrepreneur Elon Musk, plans to spend his own money to send a mission to colonize Mars, although he admits that the mission will be dangerous and people will die.⁶ However, there have been plenty of volunteers.

Final Word

I write these articles to spark people's curiosity in geology. Don't entirely believe me until you've done your own research and checked the evidence. If this article has sparked your curiosity,

follow up with some of the links provided. Follow the evidence and make up your own mind.

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Meet the People That Make Life Work Better

Leo Macaraeg, P.Eng.

Member Profile

By R. Lewis



Since his move as a teenager, along with his family, from the Philippines to Manitoba in 2009, Leo Macaraeg has spent most of his time in the town of Neepawa. While the bright lights of city life and the possibility of more job opportunities often draw many to make Winnipeg their home, Leo, upon completion of his engineering degree at the University of Manitoba did just the opposite. He returned to Neepawa and put his brand-new degree to work at HyLife, where he has settled into his career as one of the company's project managers. While the impression of life in a small town is usually one of limits and monotony, Leo hardly feels restricted in his surroundings. His exposure to other professionals in his field and similar fields makes the experience not only a rewarding one with opportunities to learn and grow, but also creates unique situations that he may not have had otherwise.

What was the catalyst for you entering the engineering profession?

I have always been fascinated by engineering and how things work. I can vividly remember as a kid watching TV shows and documentaries on the Discovery Channel. One of these shows was the *How It's Made* series that goes into detail on how common household items are made and/or fabricated. They broke down the processes and provided reasoning for the steps that result in the final products. Another show I used to watch a lot was *MythBusters*. I believe these shows were the catalyst for me entering the engineering field as I became curious about how these common things are made.

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

There are always lessons to be learned. You get exposed to all sorts of challenges that require critical thinking in engineering and you get the opportunity to solve them. Sometimes the answer could be an outside-of-the-box solution; sometimes a newer technology is the answer.

For an audience of non-engineers, what sums up what your work is all about?

I am a project manager with the maintenance department at HyLife Foods – Neepawa pork plant. I manage repair and maintenance projects for various equipment, machinery, and facilities. These include full equipment rebuilds and preventive maintenance, especially for critical machines in the plant, to prevent production downtime. I also collaborate and assist with other departments (operations, quality assurance, and continuous improvement) within the plant on the implementation of process-improvement projects.

What resources have you found useful in excelling at your career?

My work revolves around conveyors and rotating equipment, such as compressors, pumps, and gearboxes. I have found that standards, codes, and regulations on this equipment are especially helpful to determine proper machine guarding and electrical safety. I also utilize various project management tools at work. One of the

most recent tools I have been using is an app called FieldWire. It is especially useful for job-site coordination between contractors and customers. It also has the capability to track performance and identify deficiencies on the job site, so that the contractors can address issues immediately.

Of all the tasks that come with your job, what's your favourite and what's your least favourite?

Almost all of my projects and tasks involve working closely with various skilled trades – welders, machinists, HVAC technicians, millwrights, plumbers, electricians, power engineers, and even roofers. Working directly with these trades provide a greater understanding of how things are supposed to run, as well as some good industry practices in different trade specialties. Part of the work I do is procuring parts and materials required to execute a project. We don't always have them readily available, hence there is sometimes a lull in the project from waiting for parts to arrive. This waiting game is my least favourite, as I always want to be doing something. Therefore, I fill the time in by working on other projects instead.

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

Recently, I got into the topic of social responsibility and sustainability through my workplace. I have been learning about diversity and inclusion in various companies. I do hope in 20 years that there will be more cultural diversity and gender equality in the engineering and geoscience professions, as well as in certain industries, such as agricultural and pork processing. Also, in the world we live in, and the continuous issues revolving around climate change, I hope there would be more focus

on this topic in the next few years. We need to take care of our environment. Our environment is not just important, it is life-sustaining. I believe we are moving in the right direction, however, with various initiatives focused on reducing our carbon footprint and greenhouse gas emissions.

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

Not at the moment, but I have completed a survey for the BRACE Project team that sought feedback on climate change adaptation knowledge. I would totally support climate change initiatives and would like to learn more about these if given the chance.

How do you keep organized?

What role does compartmentalization play in staying on top of things when it comes to work-life balance? What other tricks of the trade have you picked up?

I manage projects by breaking them down into smaller, more manageable tasks. I categorize and prioritize them to ensure the most important tasks are completed first and with the highest regard. There is a well-defined line between work and life that I try to separate as much as possible. I do this by completing all my tasks at work through proper time management and delegation before the end of the day so that I would not need to bring my work home.

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

I can usually be found at the local gym when I am not working. I like working out, lifting weights, and doing some CrossFit in my downtime. Otherwise, I'm usually at home during these unprecedented times.

What are you doing to make life better?

I strive for continuous improvement and making things and processes more efficient. I apply lean principles not just at work, but also at home, and everywhere else. In addition to reducing waste, I also look at innovation in all the things I do. For example, if I have a project at work that involves the installation of new equipment, I ensure that we consider efficient, effective, and sustainable equipment to get the job done. ☺

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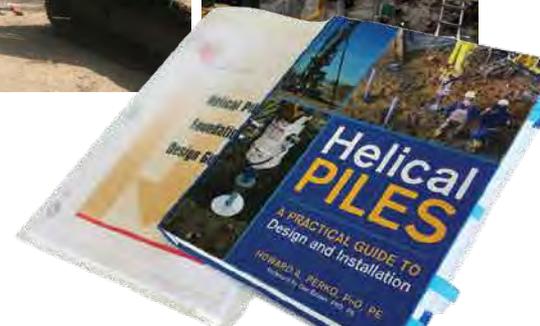
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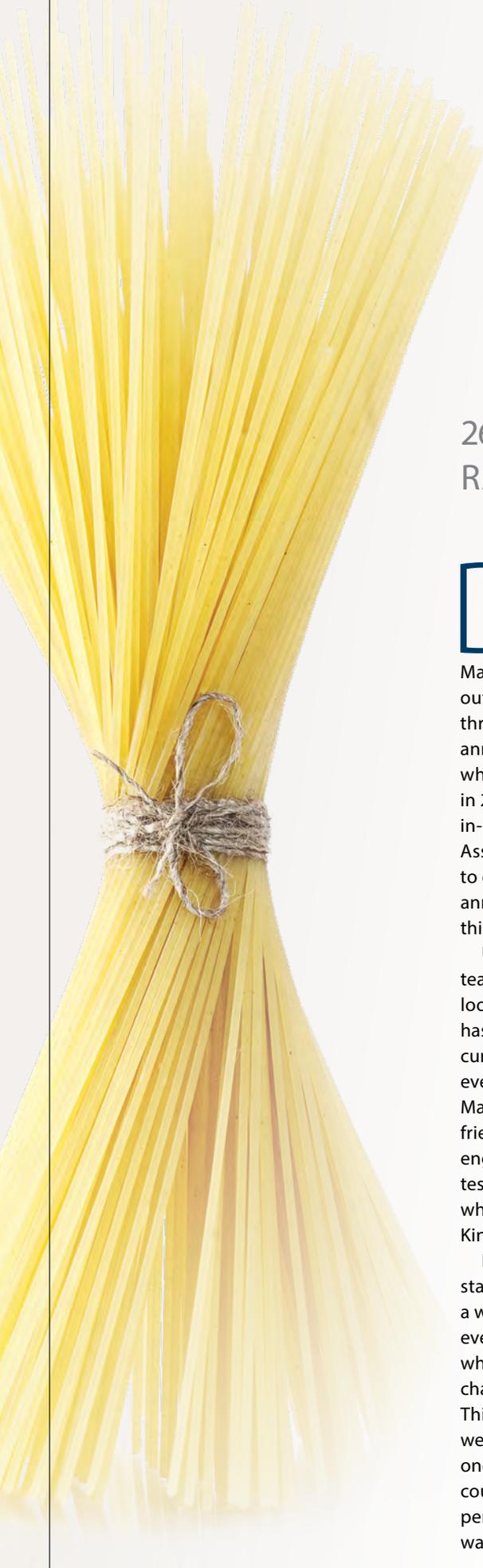
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Fighting Hunger by Putting Engineering Skills to the Test

26TH ANNUAL SPAGHETTI BRIDGE EVENT
RAISES \$10,000 FOR HARVEST MANITOBA

During Provincial Engineering and Geoscience Week (PEGW) in March each year, volunteers from Engineers Geoscientists Manitoba can usually be found doing outreach work with local students, both through children's activities and the annual Spaghetti Bridge Competition, which attracted over 1,000 participants in 2020. With the pandemic restricting in-person events this year, the Association made the difficult decision to cancel what would have been its 26th annual Spaghetti Bridge Competition this March.

Upon receiving the news, several teachers reached out to the Association looking for an alternative to what has become an exciting part of their curriculum. No stranger to virtual events, Engineers Geoscientists Manitoba pivoted to an online school-friendly format and four professional engineers volunteered their time to test trusses made from spaghetti and white glue by students ranging from Kindergarten to Grade 8.

In previous years, EngGeoMB staff and volunteers would spend a week hosting bridge-breaking events at schools and Kildonan Place where hundreds of trusses would be challenged to hold the strongest load. This year, 192 trusses from 11 schools were delivered to the Association office one week before the event so they could undergo their own quarantine period, and participants were invited to watch the live event online on March 26.

To add competition to this year's event, teams from each of the 18 participating classes were vying to win the prize for being the best in their class. For the second year in a row, the overall top spot was awarded to a team from Dr. F.W.L. Hamilton School. Special congratulations go out to the Grade 4 team whose truss bore 140.7 kg of weight before breaking!

Students are not the only ones who benefit from the competition. The Association has donated thousands of dollars to Harvest Manitoba, previously Winnipeg Harvest, to offset the loss of edible spaghetti – a total of \$207,353 between 2010 and 2020. Because of Harvest Manitoba's buying power with other suppliers, this financial donation translates to tens of thousands of pounds of food feeding hundreds of families in Manitoba over the last decade.

"We are so pleased to be the charity of choice for the annual Spaghetti Bridge Competition", said Keren Taylor-Hughes, CEO of Harvest Manitoba. "This year's fundraising event raised the equivalent of 1,731 kg of food, which the Harvest Community Food Network will provide to thousands of students just like these to build a bridge to a healthier future."

"We were glad to be able to offer this opportunity to students and teachers again this year despite current restrictions", said Grant Koropatnick, P.Eng., FEC, Engineers Geoscientists Manitoba's CEO & Registrar. "Students



Ronnie Sugden, P.Eng., gives feedback to students on their design via Zoom.



Nhi Le, P.Eng., and Ronnie Sugden, P.Eng., testing the load of trusses made of spaghetti and white glue.



Don Spangelo, P.Eng., FEC, has volunteered with the Spaghetti Bridge event since its inception in 1995.



Trusses under quarantine at the Engineers Geoscientists Manitoba office a week before the testing.

used simple building materials, their imagination, and applied their classroom learning to build trusses that held a total load of 4,476.6 kg. This translates into a donation to Harvest Manitoba of \$10,000 from EngGeoMB which will provide 2,985 spaghetti meals. We've had such a great response from our first virtual event that we're looking at adding a virtual element in 2022, while hopefully returning to in-person events at schools."

The Spaghetti Bridge Competition was part of a series of events to celebrate Provincial Engineering and Geoscience Week (PEGW). The celebration is part of National Engineering Month, which takes place across Canada throughout March each year. PEGW also promotes careers in engineering and geoscience to young people of all ages. 🍝

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INTERNATIONAL ENGINEERS Find New Path to Licensure in MB



By R. Lewis and C. Shymko, FEC (Hon.)

Becoming an engineer is no easy feat. After several years of study – and several more years of work, depending on one’s area of specialization – there is still that hurdle of becoming registered and fully licensed by the regulatory body of one’s home province. The process is a rigorous one and understandably so. After all, these are the folks who will take the reins of innovation when it comes to building our bridges, securing our structures, manipulating the molecules and chromosomes intrinsic to our very existence, and ensuring products and processes work well and work safely. We would all sleep a little better at night knowing that these folks, upon whom we depend on to make our lives more functional, can perform the tasks at hand impeccably and ethically.

For newcomers to Canada, however, the trek to becoming licensed in their adopted country is an even more demanding and daunting one. So much so that many abandon their first love and resort to jobs that will pay the bills and keep a roof over their heads, as they try to navigate a new way of living and doing things. While some return to engineering once they have settled in, others fall into the routine of life and are never able to re-establish themselves in their careers as engineers. For those who do, there are no regrets, but they will be the first to tell you that the process is not an easy one.

Then...

Edwin Sapnu, P.Eng., is one such engineer. He became a registered electrical engineer in the Philippines after five years of study and eventually

moved to Papua New Guinea where he upgraded his skills to become recognized as a professional engineer there. Even though Edwin had worked as an engineer in Papua New Guinea for almost 13 years, when he made the move to Canada in 2000, and had completed the assessment outlined by Engineers Geoscientists Manitoba – he was hit with the sobering reality that he would essentially have to start all over. He would be required to sit three technical examinations. Edwin instead decided to defer his plans and prioritize the needs of his family. However, he sought out opportunities that would allow him to work as closely to the field of engineering as possible to ensure his skills remained sharp. By the time Edwin decided to revisit licensure as an engineer in Manitoba, the three technical examinations that the Association had initially recommended had turned into eight (three qualifying exams followed by five exams, and a thesis). This would be the equivalent of 16 university courses. His options? Go back to university full time and complete a bachelor of science degree, or challenge the process by studying on his own, paying the examination fees, and sitting for eight two-hour exams.

Edwin opted for the latter, a gruelling process, but one that still allowed him to work full-time to take care of his family. Eventually, Edwin completed three exams, but he still had five more left. And it was right around this time, in 2009, that the Association began making changes to the process. Edwin would now have the opportunity

to make a presentation of his work experience, to potentially waive the five remaining exams. He would be required to illustrate an in-depth knowledge of those five exams in a 30-minute presentation before a panel, and once the presentation was completed, he would then have to field technical questions from that panel.

Edwin challenged the exams via the interview and, at the end of the two-hour process, in which he was successful, he became academically qualified. This was the first step. Next, he was required to prove his experience by starting the pre-registration process (otherwise known as experience review). He started this process, and approximately two years later, after submitting reports, passing the National Professional Practice Exam, and providing references, he met all the criteria. Edwin’s application to become a professional engineer in Manitoba was then approved.

While these changes were a welcome one for Edwin and others in his position, it was still a time-consuming endeavour. The Association has recognized just how daunting a process it can be for newcomers and recently implemented further steps to make the process a more welcoming experience for immigrants wanting to get certified as engineers in Manitoba.

Now, engineers and geoscientists with 10 or more years of high-level engineering or geoscience experience who have received their training internationally may challenge both the examination and experience process at the same time. Whereas the interview

that Edwin had undergone in his attempt to become certified could take up to three hours and result in academic qualification, the new method has now been revamped to a one-hour virtual exam, which includes the written submission of an interview proposal as well as a recorded presentation, which is reviewed by the assessors in advance of the interview. The assessors also complete a report-card-style evaluation of each competency along with their recommendations. This revamped process allows internationally educated candidates to challenge the confirmatory exams and experience requirements at the same time, which makes the process transparent, consistent, time-efficient, and clear.

While the revamped interview is more efficient, it still requires the rigorous process of confirming knowledge and experience. The goal of these changes is to reduce the barriers that immigrants often face when trying to settle into a new life, while ensuring that the process is transparent and consistent. Kamala Kodihally Nanjundeshaiyah, EIT, is one of the most recent inductees to the Association's newly implemented process.

Now...

When Kamala and her family decided to make the move to Canada, she researched what it would take for her to become a licensed professional engineer in Manitoba. With over 20 years of engineering experience in her home country of India, and high-level experience on several projects in the United States, Kamala made the move to Manitoba, contacted the Association, and there, the journey towards becoming licensed to practise in Manitoba began.

Kamala first had to have her degree and transcripts assessed by World Education Services. From there, she paid the fees and submitted her application along with her resume to the Association. Kamala's assessment determined that she would be required to complete four confirmatory examinations. Therefore, she chose to take advantage of the new interview process. While this may seem a lot more convenient for an internationally educated engineer now than, for example, Edwin's path, the process is

Explore Your Options

While the interview process is only available to assessment candidates with a minimum of 10 years of current and high-level engineering or geoscience work experience, there are also other options available to internationally educated candidates. Engineers Geoscientists Manitoba may not be able to offer the interviews to every applicant who feels that they qualify. For example, applicants in disciplines for which there may be no qualified interviewers or applicants who have experience that is not current, or not at a high-enough level should explore other options. To learn more about these options, visit <http://www.enggeomb.ca/AcademicAssessment.html>.

still a detailed and rigorous one, which also requires providing supporting documentation from past employers confirming one's work experience, and a 30-to-40-minute video presentation of work experience as it relates to the exams for which one is seeking exemption. This step can take upwards of a month. EngGeoMB staff then contact technical reviewers to interview the applicant to determine whether the requirements of the registration process are fulfilled. Kamala completed the steps and then, upon successful completion of the interview process, she enrolled as an intern. She will officially become a licensed professional engineer in Manitoba after completion of the last requirements, which include writing the National Professional Practice Exam and providing references.

A Clearer Path

A process that could take anywhere from five to eight years is now reduced significantly. The Association has come a long way in not only modernizing the process of getting internationally educated candidates licensed to practise in Manitoba, but also in making the path a little clearer for newcomers. While many internationally educated candidates did not have this opportunity before and were forced to prioritize the immediate needs of their families over their personal ambitions, with these changes, the hope is that qualified future engineers and geoscientists relocating to Manitoba will be able to take advantage of this opportunity. The steps are not easy, and the interview is purposely challenging, but for those who qualify, the path to licensure can be faster. ⊕

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♡ Dialogue

The benefits of telemedicine

The fast pace of modern life, coupled with ongoing public health restrictions, means that telemedicine is rapidly increasing in popularity. This isn't surprising, given that virtual clinics offer a number of advantages, including shorter waiting times. Here's an overview of the telemedicine services offered by Dialogue, with Alexis Smirnov, the company's co-founder and Chief Technology Officer.

Fast access to care

Dialogue is one of Canada's leading integrated virtual health platforms. "We cover everything related to primary care and mental health. Our services include prescriptions, prescription renewal, referrals to specialists, outpatient clinics and laboratories," says Alexis Smirnov.

With round-the-clock services, a mobile app, live chat and tele-consultations, Dialogue saves patients an average of 4.1 hours, according to internal data compiled by the company.

"We start with a quick triage using artificial intelligence. Then, a care coordinator refers the patient to the right healthcare professional for their problem. If the patient is given a prescription, it can be sent to a pharmacy near their home or workplace. It can even be delivered to the patient's home or office. And we always follow up with the patient a few days later. Continuity of care is important to us at Dialogue," says Smirnov.

Convenient and secure

Dialogue doesn't claim to replace the current healthcare system. "Our services are complementary. At Dialogue, we can resolve more than 70% of patients' problems directly. The remaining 30% of cases require exams, treatments or tests done in person. But that doesn't mean we abandon those patients. We'll make an appointment for them in a public or private clinic close to their home or workplace. We make it easier for patients to navigate the process," adds Smirnov.

Access to Dialogue's virtual healthcare services is usually reserved for employers and organizations. **But it is also included, at no additional cost, in National Bank's banking offer for engineers.**

Access to the service is unlimited. There are no monthly or annual caps to worry about. And there will never be additional charges for patients.

In addition to all these benefits, Dialogue is highly secure. "Our cybersecurity is robust, and all our data is stored in Canada," says Smirnov.

Our offer for engineers just got even better.

Learn about the new advantages on nbc.ca/engineer.ca.



Discipline Committee

By D. Wawryk

In this second of a two-part series, we will continue to review the discipline process once a complaint has been submitted against one of the Association's practitioners or holders of a Certificate of Authorization. The complaints and discipline process reviews past practice to prevent future actions that fall below the standard expected of professional engineers and geoscientists. Please note that this will be a general overview, and reference to the Act and By-laws should be made for a comprehensive description of the processes involved.

In the Spring issue, we spotlighted the Investigation Committee, and the process committee members undergo when a complaint has been made against a practitioner by either the public or members of the Association. In this issue, we'll resume from the point where the Investigation Committee has determined that there is sufficient evidence of professional misconduct or unskilled practice but fault is not accepted by the practitioner and the matter was not resolved by way of a penalty proposal. In this case, a charge is forwarded to the Discipline Committee which triggers a hearing to determine innocence or guilt.

As a self-regulatory body, all processes, regulations, guidelines, etc., are created and governed by peers, for peers. The Discipline Committee is composed of at least 10 people appointed by Council, one-third of whom are lay members, and the rest of the Committee is composed of professional engineers and geoscientists representing various disciplines. The current committee has 11 members who cumulatively have served on the committee for over 104 years and have over 230 years of engineering and geoscience experience, which provides them with ample resources to regulate their peers.

"I have been involved with numerous Association committees and Council over a number of years. I feel my commitment

to protecting the public while involved with these various posts has accumulated to being involved with the Discipline Committee which addresses the inappropriate actions of members at the highest level", said Don Spangelo, P.Eng., FEC, who has served as Committee Chair for almost 19 years (1993-2008 and since 2018). "It is important to become familiar with the Association's Code of Ethics and follow them every day, for every project, and every interaction with a client, contractor, owner, project team member, and, especially, the public."

The Discipline Committee is different from other committees as members do not gather on a regular basis for meetings. "The Committee typically addresses hearings as a panel of three, with one panelist being a lay member of the public. The proceedings do follow typical legal procedures, as outlined in the Act and within provincial laws. Thus support from the assigned legal counsel is required", says Spangelo.

For example, during a hearing the following people would be present:

- Panel (three Discipline Committee members: two peers and one lay person)
- Legal counsel for the Discipline Committee
- Legal counsel for Investigation Committee
- Investigated person (and their legal counsel, if applicable)
- Court reporter

The Discipline Committee must establish policies and procedures, not inconsistent with the Act or the By-laws, for committee governance. During a hearing, the Investigation Committee representative will present evidence in support of the charge to the Discipline Committee panel. Once they have heard the charges and deliberated, the disciplinary process may result in any of the following outcomes.

- Reprimand
- Suspension for a stated period

- Limitations on practice
- Conditions on practice
 - Practice under supervision
 - Periodic inspections, audits, reporting
 - Requirement to pass a course of study
- Counselling
- Cancellation of registration
- Payment of costs and fines
- Publication of the findings of disciplinary decisions in *The Keystone Professional*, newspapers of public record, weekly E-News, and a notice to other associations.

If the Discipline Committee determines that the investigated person is guilty of professional misconduct or unskilled practice, the practitioner may choose to appeal this decision. The appeal would be heard by a three-person panel of Councillors, one of which would be a lay member. This panel is appointed by the President of Engineers Geoscientists Manitoba. If Council upholds the decision of the Discipline Committee, the practitioner can appeal to the courts, which will review decisions to a standard of reasonableness and may take years to reach a final decision.

As mentioned in the previous article, a hearing may be an expensive, lengthy process, and should be avoided whenever possible. *Engineers Geoscientists Manitoba's Code of Ethics* ensures that practitioners always apply their specialized knowledge and skill in the public interest with honesty, integrity, and honour, and conduct themselves in a spirit of fairness and tolerance when dealing with fellow professionals, to avoid the disciplinary process.

For additional information on the disciplinary process, please refer to the article "Discipline by the Numbers" published in the Spring issue of *The Keystone Professional*. ☺

What We Heard – Manitoba Climate Resilience Training, BRACE



Engineers Geoscientists Manitoba, in partnership with Natural Resources Canada and the Manitoba Government, is working to achieve the objectives of the BRACE Program. The project team will help design a comprehensive training course to enable engineers and other infrastructure decision-makers to integrate climate resiliency into their designs and practice.

The Building Regional Adaptation Capacity and Expertise (BRACE) project team has been working diligently to engage stakeholders and professionals across Manitoba to assess their current level of knowledge on how to design, build, and manage climate change adaptable, resilient infrastructure as well as their training needs. The BRACE project team is grateful to everyone who participated in the survey and/or engagement sessions. Your voice will enable them to create the most effective and tailored training possible. This article presents highlights of the findings from the engagement sessions held, what was heard from the Engineers Geoscientists Manitoba membership and stakeholders, and the next steps to be undertaken by the team.

Two key engagement sessions were held in February; one for stakeholders from industry, professional associations, advocacy groups, educational institutions, and government, and a second one for EngGeoMB practitioners. In both sessions, Probe Research Inc. was engaged to advise on session design and conduct facilitation and analysis. The purpose of these

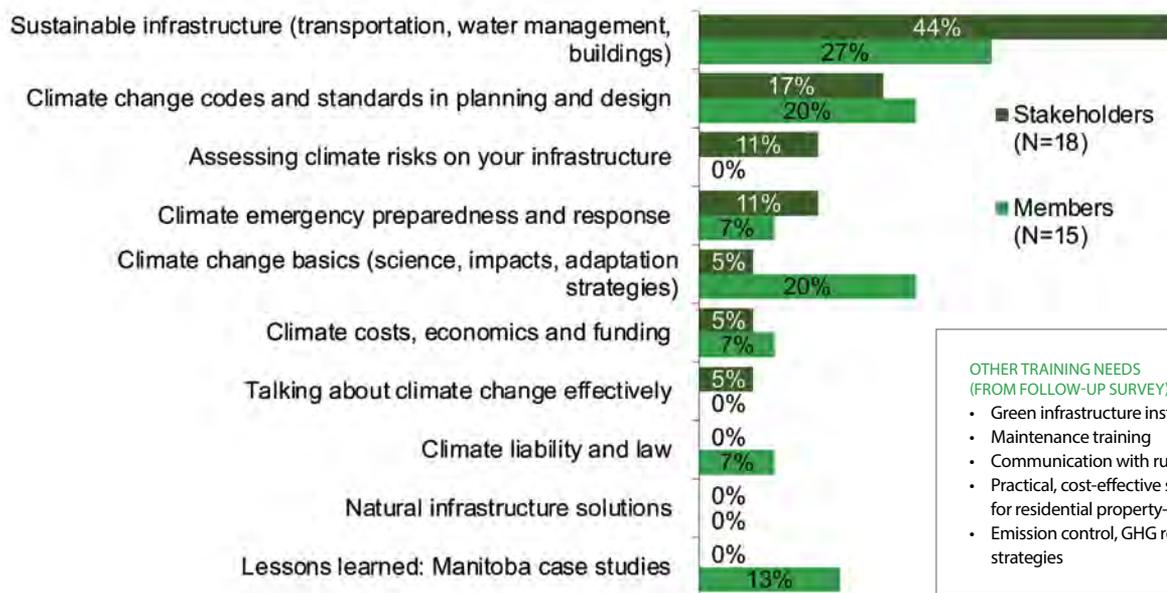
sessions was to spread awareness of the ongoing efforts to design BRACE programs, as well as to gauge the current level of awareness among the attendees.

To kick off these sessions, participants were asked to assess how much climate change resiliency has affected their work – specifically in the areas of planning and designing of infrastructure projects. Most of the attendees (78%) indicated that, although climate change did not currently significantly affect their plans and designs, there was recognition of the need to alter their plans and designs in the future.

Attendees identified a need to be ready for the next generation of climate training, particularly on codes and other kinds of sustainability approaches.

Concerns were expressed about the current level of climate change preparedness in frontline work. It was also raised at both sessions that mitigation training, such as in building retrofitting, was essential. Several attendees also mentioned the need to have practitioners trained in net-zero-energy design before new

“Thinking about your work (and the work of your colleagues/members), what kind of training would be most useful?”



**OTHER TRAINING NEEDS
(FROM FOLLOW-UP SURVEY):**

- Green infrastructure installation
- Maintenance training
- Communication with rural ratepayers
- Practical, cost-effective steps/training for residential property-owners
- Emission control, GHG reduction strategies

codes are in force for buildings. Others brought up the need to understand the impacts climate change will have on the designs and dissemination of best practices to prepare for those impacts. Attendees were also asked about what specific training would be most useful to them and where the knowledge gaps existed within their organizations. To learn more about the key themes that emerged from the discussions, see <http://www.enggeomb.ca/pdf/BRACE/Engagement2021.pdf>.

Following the engagement sessions, a survey was sent to attendees to further identify training needs. Among the questions, practitioners were asked to choose which kind of training would be the most useful. Training on designing sustainable infrastructure was found to be the number one priority. The results from this question are shown on the infographic, from both the stakeholders' and Association practitioners' points of view.

In addition to the engagement sessions, a climate change survey was sent to Association practitioners practising in Manitoba; 1,001 responded. The survey had two main

purposes: to continue identifying the needs and gaps of practitioners awareness of how to design in consideration of climate change, and to compare the changes of awareness in the membership from 2012 to 2021. Once analyzed, the survey responses from the Association's membership will further refine the training and tool development priorities and ensure the development of training courses and tools to address them.

The BRACE project team is grateful for all the positive engagement received through this project so far and encourages you to share your feedback as the project progresses. Should you have questions or recommendations, please send your enquiries to GR@EngGeoMB.ca for forwarding to any of the project team members: Curt Hull, P.Eng., Project Manager; Jeff O'Driscoll, P.Eng., Technical Advisor; Trina Semenchuk, Research Assistant; or Scott Sarna, Director of Government Relations.

To learn more about the BRACE program, see the Government Relations article in the Winter 2020 of *The Keystone Professional*. [+](#)

“Following the engagement sessions, a survey was sent to attendees to further identify training needs. Among the questions, practitioners were asked to choose which kind of training would be the most useful. Training on designing sustainable infrastructure was found to be the number one priority.”

Notice to Members:**Annual
General
Meeting**

The 2021 Annual General Meeting of Engineers Geoscientists Manitoba is scheduled to be held at 1:30 p.m., on Thursday, October 14, 2021. The Association Council is currently planning to hold the meeting in a virtual format. A notice will be sent when registration opens.

**Dr. Karen Dow, P.Eng.,
Appointed Associate Dean**

Congratulations to Dr. Karen Dow, P.Eng., who has been appointed as Associate Dean Undergraduate Programs of the Price Faculty of Engineering at the University of Manitoba. Throughout her teaching career, she has witnessed and empathized with the difficulties all students, but particularly the under-represented, face in the field of engineering. Karen has been an active Association volunteer contributing to the Committee for Increasing Participation of Women in Engineering Mentorship Program and the Education Sub-Committee. We wish her success in her new role.

**NOTICE**

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

This is notice that on March 13, 2021, Mr. William Hanuschak, P.Eng., consented to the registration of a conviction and issuance on a charge of professional misconduct or unskilled practice in accordance with section 35(1)(f) of *The Engineering and Geoscientific Professions Act*.

William Hanuschak, P.Eng., while registered as a professional engineer in the Province of Manitoba, failed to cooperate with an investigation being carried out by the Investigation Committee of the Association in that he:

- a) failed to provide relevant information about his involvement in a building construction project at 1143 St. Anne's Road (the "project") pursuant to a request that he do so by letter from the Association dated June 14, 2017;
- b) failed to provide specific documentation from his project file as requested by letter from the Association dated August 29, 2018;
- c) failed to provide specific information about the project as requested by letter from the Association dated August 29, 2018;
- d) failed to provide specific documentation from his project file as requested by letter from the Association dated September 24, 2020;
- e) failed to provide specific documentation from his project file as requested by letter from the Association dated September 28, 2020;
- f) failed to provide specific information about the project as requested by letter from the Association dated September 28, 2020;

which failures are contrary to his professional obligations pursuant to subsection 33(1) of *The Engineering and Geoscientific Professions Act* (the "Act") and which failures constitute professional misconduct.

Having received Mr. Hanuschak's consent, Engineers Geoscientists Manitoba's Investigation Committee has registered a conviction and imposed the following penalties:

- a reprimand;
- payment to the Association of the sum of \$6,700 as a contribution to the costs of the investigation and prosecution; and
- the full text or a summary of this conviction and order will be published by the Association in print and electronic publications including on the Association's website.

Grant Koropatnick, P.Eng., FEC
CEO & Registrar

NOTICE

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

This is notice that on February 17, 2021, Mr. Stephen M. Petrovich, P.Eng., consented to the registration of a conviction and issuance on a charge of professional misconduct or unskilled practice in accordance with section 35(1)(f) of *The Engineering and Geoscientific Professions Act*.

The conviction arises out of Mr. Petrovich's involvement in the process of issuing the design and geotechnical report for a retaining wall system at a private residence in Winnipeg.

Specifically, by issuing design documents sealed between July 8, 2016, and June 22, 2018, for a retaining wall system on helical piles, Mr. Petrovich:

- a) issued a design for an active slope based on a report from over three years prior, without performing a site review to assess, identify and update the changes to site conditions;
- b) issued and sealed a design and corresponding report titled "Geotechnical Assessment & Recommendations" for a retaining wall system and upper bank regrading without having conducted or engaged a third party to conduct a geotechnical assessment of the proposed design on the active slope;
- c) submitted drawings to the City of Winnipeg showing insufficient and incorrect detail to support the proposed work; and
- d) proposed a design which fell below the minimum recommended factor of safety for a design which could impact the stability of the slope and the residence situated above.

Having received Mr. Petrovich's consent, Engineers Geoscientists Manitoba's Investigation Committee has registered a conviction and imposed the following penalties:

- a reprimand;
- his licence be limited such that he is restricted from practising geotechnical engineering until he satisfies the Investigation Committee as to his competence in geotechnical engineering by undergoing supervised practice by someone approved by the Investigation Committee. A review of the work will be conducted by Engineers Geoscientists Manitoba after 12 months of geotechnical work has been submitted.
- the matter be published by the Association.

Grant Koropatnick, P.Eng., FEC
CEO & Registrar

NOTICE

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

This is notice that on March 22, 2021, Ms Sijie Liu consented to the registration of a conviction and issuance on a charge of professional misconduct or unskilled practice in accordance with s.35(1)(f) of *The Engineering and Geoscientific Professions Act*.

Ms. Liu, while registered as a professional engineer in the Province of Manitoba, knowingly attempted to obtain an illegal chemical weapon; a crime which she pled guilty to in U.S District Court. These actions by Ms. Liu are detrimental to the public interest and are conduct unbecoming a professional engineer, in violation of s.46(1)(a) and 46(1)(b) of *The Engineering and Geoscientific Professions Act*.

Having received Ms Liu's consent, Engineers Geoscientists Manitoba's Investigation Committee has registered a conviction and imposed the following penalties:

- a reprimand;
- Ms. Liu's Certificate of Registration be cancelled;
- no application for reinstatement be considered for five years; and
- the decision be published, with names.

Grant Koropatnick, P.Eng., FEC
CEO & Registrar

Welcome New Members

C.T. Aire	A.K.L. Chan	M.S. Grewal	V. Martins Segunda	P. Shannon
S. Al-Bar	S.B.A. Charles	J.L.D. Guindon	N.F.S. Mendonca	A.S. Shirazi
T.H.E. Al-Kazimi	G. Chen	B.B. Gustave	N.A. Mills	D.B. Shymko
C.N. Aldaba	P. Coles	A.L. Harms	P.L. Mireault	P. Somboonyanon
S.L.A.F. Alexander	S.M. Crouch	M.J. Hayes	A. Mohiuddin	I.H. Southern
M.A.R.M. Ali	B.B. Dae	J.G. Henning	J.J. Nelson	G.P. Spronken
A. Alimujiang	J.B. Dafoe	J.A. Hicks	M. Nemati	G.P. Srirangam
W.A. Ambach	E. De Rubeis	A.R. Hingston	J.D. Nguyen	V. Tharmakulasingam
I. Ariani	M.A. DeBlois	D.B. Hunt	E. Nuta	A.C. Tilak
Z.H. Aungkyaw	J.E. Deichert	S. Huot	B.T. Oca	S.A.J. Tokaryk
S. Bagheri	S. Dela Cruz	O.I. Ibianga	D.C. Ogundu	K.M. Turner
J.L. Bartel	H. Deng	P.A. Jecker	J.D. Orr	D.A. Underwood
A. Basma	N.R.S. Ducharme	P.D. Kelley	M.G. Peddle	W.L. Vollick
C.M. Batara	C.J. Dueck	R.D. Kelln	J.M. Penner	S.M.T. Wang
B.W. Bergen	D.W.C. Eng	R.W.J. Kennedy	E.C. Qiao	V.M. Watson
B.M. Bhavsar	G.K. Feldcamp	K. Khan	F. Quamrul	K.L. Watt
P. Bhusal	M.M. Ferenc	N.F. Kicz	R.M.K. Rathnayake	D.A. Weiss
A.R. Billinkoff	S.D. Findlay	R.J. Kieper	J.F. Ribeiro	O.A. Westervelt
Y.M.J. Blais	C.M. Flavel	C. Kwong	M.D. Riecken	B.C.Y. Wu
Z. Bogeviski	B.J. Francis	R.A.J. Lafreniere	K.K. Rivett	M.M. Zaky
D.R. Brandt	V.E. Gambino	K.J. Lamothe	J.T. Santos	W. Zhang
L. Bratu	A.W. Gerry	J.C. Langlais	J.M. Schram	S.R. Zhao
J. Braun-Janzen	C.H.J. Giffen	S. Latulippe	C.J. Sebelius	G. Zhu
A.J. Burton	T.K.P. Glassey	A. Letsos	S.B.B. Sector	J.X. Zhu
J.R. Cappello	J.E. Gowrie	H. Liu	T.M. Semenoff	C. Zubin
P. Cengiz	E.A. Grenier	G.K.A. Macnab	R.C. Shaha	

Interns

B.J. Abrahams	R.A. Da Silva	C.L. Hsu	A.D. Ragetli	O. Taleiko
L.L.T. Ager	J. Da Silva Leite	E. Ishaya	S.Y.S. Rajapakse	S.D. Thain
S.F. Allahgholipour	M. Dawoud	D.B. Janzen	L.S. Ramana	N.A.B. Toga
K.O. Amore	F.H.M. Delattre	H. Jia	P. Rodrigues Sintra	H.T. Tran
D.T.A. Anderson	N.L.J.G. Denutte	A.R. Kathler	A.G.R. Rugay	L.O. Travers
L.J. Andreychuk	E.P. Doctolero	M.W. Khalil	A.M.M. Sadik	L.V. Trinh
D.E. Asu	C.E. Dubon	K. Kodihally	E.L. Sass	T. Truong
J.S.S. Athanasios	S. Elassiouty	Nanjundeshaiah	L.D. Schell	B.S. Uthiria Raj
D.S. Atwal	M.H.M. Elserafy	D. Li	L.M. Schulz	H. Wang
M. Azhar	S. Faraz	E.S. Lutz	B.E. Scoville	S.M. Warnakulasooriya
N.S. Bala	T.L.D. Fontaine	J.M. Magtoto	R.P. Shiroya	J.F. Watts
L.A. Bandel-	Z. Fu	J.E. Mallari	C.A. Shumski	B.N. Wood
Komorofsky	A. Gholizadeh	E.M. Morris	G.R. Sinclair	C. Xue
M. Berezin	L.M. Gonda	A.G. Murray	G. Singh	M. Zamani
A.R. Brown	A.A. Grimolfson	R. Naseri Oskouie	V. Singh	J. Zhang
J. Catalon	W. Guo	A. Patel	G.A. Sobowale	F. Zheng
C.W. Chandler	A. Habib	K.A. Patel	D.S. Sohi	Q. Zheng
G.T. Collier	W. He	K.R. Pieper	Q. Sun	
G. Costa Nascimento	B.T. Hoban	A.D. Poersch	B.G. Taddesse	

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 Al-Terra Engineering
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 Algonquin Bridge Limited
 AWL Engineering Ltd.
 Burhani Engineering
 and Construction Limited
 Canadian Consulting Group Ltd.
 Canam Group Inc.
 DNV Energy Systems Canada Inc.
 Dymaco Inc.
 Gagne Geoservices Inc.
 Gannett Fleming Canada, ULC
 Handassah Inc.
 Heartland Engineering
 (Alberta) Ltd.
 Horn River Engineering Ltd.
 Imperial Oil Limited
 J.S. Held ULC
 JCK Engineering Inc.
 KFI Engineers, PC
 Mainville Solutions Inc.
 o/a Vintec Acoustics
 McElhanney
 Engineering Services Ltd.
 Mobia Technology Innovations Inc.
 NAC Constructors Ltd. o/a
 Concepts, Alternatives &
 Necessities Engineering
 Nucleom Inc.
 Prairie Post Frame
 Construction Ltd.
 PS Engineering Inc.
 Qualtech Inc.
 Red Pelican Building Science
 Roth IAMS Ltd.
 Scaletta Engineering Ltd.
 Senaltek Ltd.
 Seneca Experts-Conseils Inc.
 Senez Consulting Ltd.
 Sense Engineering (Alberta) Ltd.
 Talon Projects Inc.
 Techtree Engineering Ltd.
 TJCM Group of
 Companies Canada Inc.
 WF Engineering & Design Ltd.

In Memoriam

Gerald Joseph Tencha
 Paul Janzen



Licensees

D.K. Croft
 D.R. Davis
 N.S. Doyle
 D.A. Olheiser

Specified Scope of Practice Licence

B.S. Dulay



Congratulations to our Centennial Colouring Contest Winners!

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Taking Your Career in a New Direction

For many years now, we have repeatedly heard that people change jobs more often than ever before. Statistics quoted in various articles and studies suggest that, on average, people change jobs every three years. Many of these changes are minor and may involve simply moving to another organization to fulfill the same role.

However, a 2019 survey by Indeed.com¹ suggests that about one-half of today's workers have made a "dramatic career shift" at some point. Two-thirds of respondents who indicated that they haven't already made a dramatic career shift confirmed that they were contemplating such a change. The average age for people making the change was 39, suggesting that many were in one career for a significant timeframe before making the switch.

This frequency of major career changes may not hold true for professionals. The significant amount of education and experience that we are required to undertake creates a substantial 'sunk cost' when examining our future career path. However, Engineers Geoscientists Manitoba knows with certainty that professional engineers and professional geoscientists do, in fact, undertake dramatic career shifts. We know this because sometimes it goes very wrong.

In the past decade or so, there has been no shortage of members ending up in front of the Investigation Committee because they have tried to move into a new area of practice. If this transition has not been executed properly, it leads to sub-standard practice. That sub-standard practice gets noticed, particularly in fields where there is an authority reviewing work issued by the member.

Although the risk associated with a change of scope is not unique to the professional engineers in our

There have been many examples of members who have successfully transitioned into other, equally challenging roles: the mechanical engineer who became proficient in electrical design, the biosystems engineer who became an expert in HVAC design, the civil engineer who became a lawyer. These successful transitions, however, required careful planning and execution.

membership, to date there have not been any professional geoscientists in the Engineers Geoscientists Manitoba disciplinary process for this reason. Perhaps the undergrad degree has something to do with this. There is no doubt that successful completion of an engineering program instills a significant amount of confidence in its grads; a belief that we can do anything.

It's possible that engineering grads may, in fact, be able to do anything that they set their minds to. The last part of that phrase, however, is key. There have been many examples of members who have successfully transitioned into other, equally challenging roles: the mechanical engineer who became proficient in electrical design, the biosystems engineer who became an expert in HVAC design, the civil engineer who became a lawyer. These successful transitions, however, required careful planning and execution.

To guide such a major transition, we only have to look back at that 'significant amount of education and experience' that we were required to undertake before achieving our professional status. We needed formal education and professionally-guided experience to become proficient in the first place, and we need a similar

combination to become proficient in a new area.

Returning to that Indeed.com survey, it was determined that individuals spent an average of 11 months planning their major career move before executing it. At first glance, this sounds like a lengthy period of time. On further review, it is actually a reasonable period given the combination of coursework and time spent applying a new body of knowledge under the supervision of a qualified mentor.

The qualified mentor is, without a doubt, the key component to making a successful transition. With a mentor's guidance, the professional making a major career change can determine which courses are required. The mentor's guidance will also help to determine the right amount of supervised practice required before independent practice can be ethically undertaken in the new scope of practice.

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.

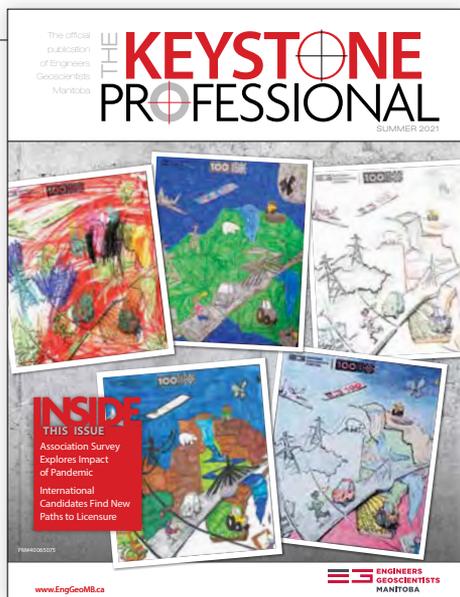
Reference

¹ <https://www.indeed.com/lead/career-change> 



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**Your practice is
at risk every day.
Your reputation is
always on the line.**

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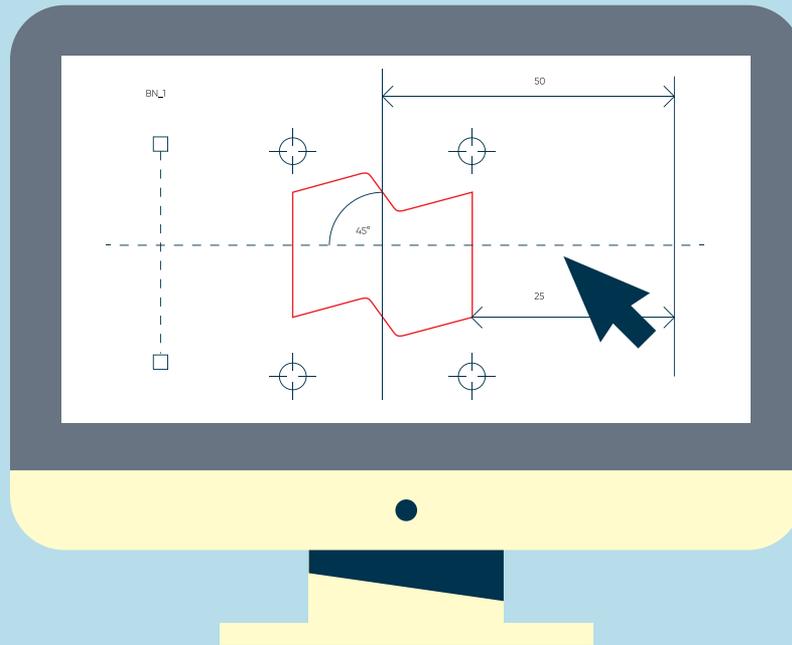
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