CRO Retirement | STEM Contest Winners | Award Nominations

ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA JANUARY/FEBRUARY 2021

INNOVATION

THE REGULATION OF FIRMS

STEM AND DIVERSITY

EXAMINING MASK MATERIALS

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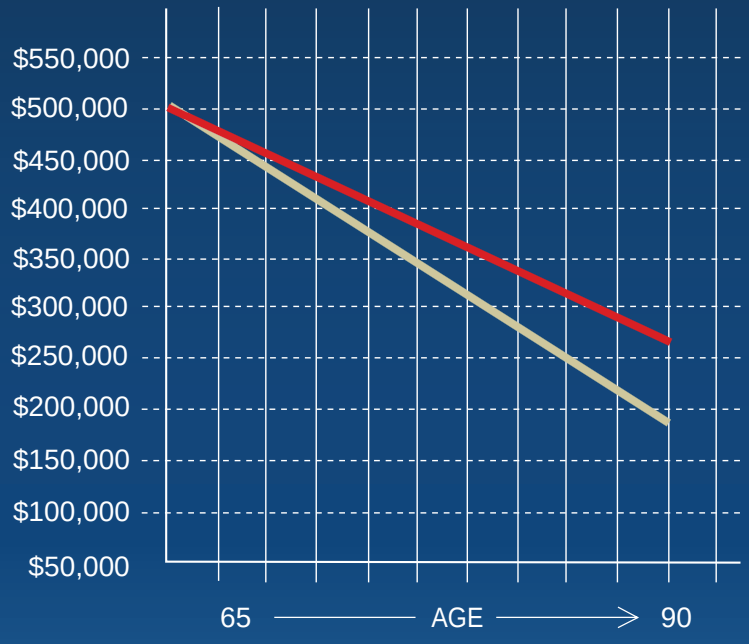

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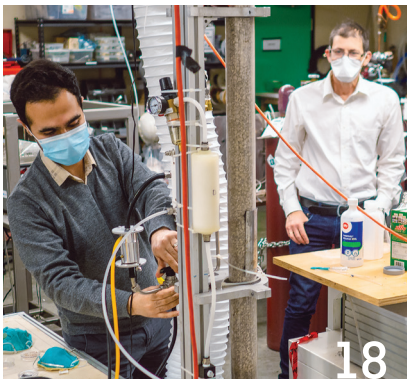


COVER STORY

EXAMINING MASK MATERIALS

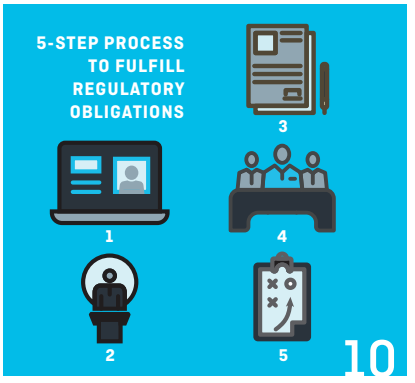
While COVID-19 vaccines are making headlines across Canada, experts are cautioning that masks will remain important for the foreseeable future. But not all mask materials are equally effective against the virus. A UBC engineer and his colleagues partnered with a BC anaesthesiologist to find out which mask materials are most effective.

STEM AND DIVERSITY

Introducing science, technology, engineering, and math fields to school-aged children is becoming increasingly commonplace. But educators and diversity advocates are also using it as a way to underscore diversity values.

REGULATION OF FIRMS

The *Professional Governance Act* introduces the regulation of engineering and geoscience firms in BC, beginning July 1, 2021. This article explains which firms the new regulation applies to and the steps to register for a Permit to Practice.



NEWS / DEPARTMENTS

COMMENT

OTHER

ON THE COVER

A UBC researcher and engineer and his colleagues evaluated a range of mask materials for their efficacy against COVID-19. PHOTO: CLARE KIERNAN

THE DIGITAL EDITION OF *INNOVATION* INCLUDES VIDEO EXTRAS. TO ACCESS, SCAN THIS QR CODE FROM ANY MOBILE DEVICE, OR GO TO *EGBC.CA/INNOVATION*. IN THE DIGITAL EDITION, CLICK ON THE PLAY BUTTON TO VIEW CONTENT.

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

FAIRNESS AND INCLUSION MATTER

Recent editions of *Innovation* have included considerable information about new requirements under the *Professional Governance Act* (PGA)—new provincial legislation which we expect to be enacted in February. One role of the Office of the Superintendent of Professional Governance (OSPG), which will oversee the regulators under the PGA, is to promote awareness among the regulatory bodies to support reconciliation with Indigenous peoples. In addition, continuing education for registrants includes education on legal rights and principles that support engagement and reconciliation with Indigenous nations in BC.

Engineers and Geoscientists BC was already progressing towards this, in response to a motion at the 2017 Annual General Meeting. We were the first engineering or geoscience regulator in Canada to investigate and develop a pilot program to address the Truth and Reconciliation Commission of Canada's Calls to Action. We established an Indigenous Engagement Working Group to oversee new initiatives. We have produced a significant number of webinars on Indigenous reconciliation, including a webinar in March that addresses land acknowledgements. In addition, there were excellent Indigenous keynote speakers at our last two annual conferences.

All this leads me to Principle 5 of the Engineers and Geoscientists BC Strategic Plan: to foster diversity and inclusivity. Equity, Diversity and Inclusion (EDI) is a topic that Council actively considers each time we meet. To me, the simple ethical statement that "everyone has the right to be treated fairly and equally" guides me and Council in all our work.

EDI principles have very broad implications. I attended Engineers and Geoscientists BC's Science Games 2020; watching the excitement and enthusiasm of elementary-aged students exploring scientific concepts was not only enjoyable, but highlighted that enthusiasm for science, technology, engineering, and math are high—regardless of culture, ethnicity, or gender.

For my entire time on Council, Engineers and Geoscientists BC has been blessed to be led by many dedicated women, including our last three presidents and our CEO. I hope that more young women are inspired to choose to enter the professions of engineering and geoscience. My own daughter has applied to three different engineering schools for next year, and I'm grateful that today's schools are so much more inclusive than they were when I attended in the early 1980s. We have collectively come a long way—and we collectively can continue to improve until everyone truly is treated fairly and equally.

To learn more about EDI at Engineers and Geoscientists BC, visit *egbc.ca/Diversity-and-Inclusion*.

LARRY SPENCE, P.ENG., President
president@egbc.ca

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CORRECTIONS

RETURNING COUNCILLORS

In the November/December 2020 print edition of *Innovation*, on Page 7, the list of returning Councillors was incorrect.

The correct list is provided here.

Mark Adams, P.Eng.
Alan Andison, BA, LLB*
Suky Cheema, CPA, CA
Leslie Hildebrandt, ICD.D, LLB
Christine Lambert, P.Geo.
Nathan Ozog, P.Eng., FEC
Tom Tiedje, P.Eng.
Jeremy Vincent, P.Geo.
David Wells, JD.

**until December 2020*

IN MEMORIAM

In the September/October edition of *Innovation*, we erroneously listed Francis Kenneth MacDonald, P.Geo., in the *In Memoriam* section of the magazine.

Engineers and Geoscientists BC and *Innovation* regrets these errors.

LETTERS

Letters to the editor containing your views on topics of interest are encouraged. Opinions expressed in letters are not necessarily endorsed by Engineers and Geoscientists BC. Letters should be 300 words or less and can be emailed to innovation@egbc.ca. Find information at egbc.ca/Submitting-to-Innovation.

FRIENDS AND COLLEAGUES PAY TRIBUTE TO GRAEME MACLEOD, P.ENG.

It is with great sadness that we report the passing of Graeme Macleod, P.Eng., on December 4, 2020.

Graeme had a calm, practical and unflappable approach to problem-solving that served him for a career of over 60 years. This passion for knowledge, problem solving, and mentoring earned respect from clients and colleagues, and developed long-term relationships.

Graeme was born in Anyox, BC, grew up in Nkana in Zambia, and graduated from the University of Cape Town in 1954. Graeme, with his wife Paddy, immigrated to Canada in 1954 and moved to Vancouver in 1956 to pursue his long and distinguished career in geotechnical engineering.

In Vancouver Graeme joined R.A. Spence Ltd. (1958), earned a Master of Science (Geotechnical) degree from UBC (1963), and together with four partners formed Piteau, Gadsby, Macleod Ltd. (1970). In 1976 he formed Macleod Geotechnical Ltd., which he operated for 25 years. He continued to provide mentoring and technical support to his firm and subsequent owner, exp Services Ltd., for the 24 remaining years of his career.

Graeme's specialty was foundation engineering, and he developed vast geotechnical knowledge throughout BC through participation on major projects including the Museum of Anthropology, Richmond LNG tank, the original Port Mann Bridge, the Golden Ears Bridge, YVR Expansion, EXPO '86, the Vancouver Court House, Science World, UBC Cliffs Stabilization, Simon Fraser University campus, Vancouver General Hospital Expansions, New Westminster Waterfront Development, and numerous high-rise and commercial buildings.

He was active in professional associations, a Vancouver Geotechnical Society Annual Award recipient, an avid gardener, tennis player, and traveler. He especially enjoyed his frequent trips to Italy and relationships with his family.

Throughout his career, he maintained a quality of character and passion in the pursuit of knowledge that has created a legacy. He was generous with his time, approachable and maintained an open-door policy. He especially enjoyed conversations with young engineers, providing guidance on approach and philosophy of problem-solving.

Friends, colleagues, clients, and family that have been part of his career and life will miss this remarkable gentleman.

—Jim O'Brien, P.Eng. (Colleague, Friend)
—Ernest Naesgaard, P.Eng. (Colleague, Friend)

REGISTRANT QUESTIONS NON-PRACTISING FEE STRUCTURE

Upon preparing to pay my association dues for next year, having recently retired, I discovered a regrettable change to Engineers and Geoscientists BC's fee structure. Our organization is now providing a 50 percent (only) off the full membership rate for non-practising status, which requires registrants to promise not to perform engineering work (even pro bono) or provide technical mentorship to younger engineers. This is now the only reduced-fee option available to retired registrants.

I understand this revised fee structure was enacted only in 2018. My strong recollection is that the fee structure before was much more favourable to retired members. Indeed, there are still many Life Members whose membership was grandfathered and who pay no fees. Interesting that our neighbouring provinces, to this day, offer a significant fee reduction to retirees, a structure to which I am requesting we return.

Given the present landscape, I am compelled to ask the rhetorical question: "Why would a retiree want to pay $225 per year plus taxes?" What is the value proposition—for me and for most other such members?

Perhaps now is the time to reassess this ill-considered fee structure. The present landscape hardly allows for healthy ambassadorship on the part of the retired cohort, nor does it encourage mentorship from those most able to deliver it!

—Derwyn Lea, P.Eng.

COUNCIL REPORT

SEPTEMBER 11, 2020

Engineers and Geoscientists BC's Council of elected members and government representatives meets throughout the year to conduct the business of association governance. The following are the highlights of its November 20, 2020 meeting.

CLIMATE CHANGE ACTION PLAN APPROVED

Council reviewed and approved the organization's first-ever Climate Change Action Plan. The Plan will provide strategic direction for how Engineers and Geoscientists BC can support its registrants in their professional practice and allow the organization to respond to climate change issues proactively rather than reactively. It was developed by Engineers and Geoscientists BC's Climate Change Advisory Group with input from registrants through a consultation process. The Plan is undergoing legal and editorial review and will be available on the website in the coming months.

REVISED POLICY ON TRANSPARENCY OF COUNCIL MEETINGS

Council approved updates to its Policy on the Transparency of Engineers and Geoscientists BC Council Meetings, which outlines when a closed meeting of Council can be held. In general, meetings of Council must be open to the public, except if they include discussion of confidential matters, such as litigation, personal information, or security issues. The updates formalize processes for publishing meeting minutes and provide clearer direction on topics that must be discussed in closed meetings.

PROFESSIONAL PRACTICE GUIDELINES AND ADVICE

Council approved the following guidelines at their November 2020 meeting:

- *Seismic Retrofit Guidelines 2020*, which account for changes in the National Building Code of Canada and the British Columbia Building Code, and incorporate feedback from technical experts and new developments in earthquake preparedness and planning;
- *Professional Practice Guidelines – Professional Engineering Services for Temporary Structures: Formwork, Falsework, and Reshore*, which provides guidance to engineering professionals that provide engineering work involving these temporary structures for construction projects. The guidelines were developed in consultation with Worksafe BC; and
- joint guidelines with the Architectural Institute of BC (AIBC): *Encapsulated Mass Timber Construction Up To 12 Storeys*, which were developed following government's announcement in 2019 that it is proceeding with a regulation to allow construction of mass timber buildings up to 12 storeys. The new provisions are expected to be introduced in the *National Building Code 2020*, but have been adopted in BC in advance of the national changes. These guidelines respond to the new 2018 BC Building Code classifications of building size and construction relative to occupancy.

These guidelines will now proceed to legal and editorial review prior to publication.

ASSOCIATION

CHIEF REGULATORY OFFICER TONY CHONG, P.ENG. ANNOUNCES RETIREMENT

Engineers and Geoscientists BC's Chief Regulatory Officer and Deputy Registrar, Tony Chong, P.Eng., FEC, FCSSE, has announced his decision to retire at the end of February. He has been with the organization for almost nine years, where he has overseen its regulatory accountabilities, strengthened partnerships with regulators both provincially and nationally, and built collaborative relationships with government and industry.

"Tony has been invaluable to our team," said CEO and Registrar Ann English, P.Eng., FEC, FCSSE. "He has championed big advances not only within the regulatory space, but also to our governance framework, organizational maturity and transparency, and employee engagement."

Tony is also known for his generosity with his time and has mentored many staff throughout the organization—something Ann says will return benefits during this transition. "Tony has built great depth and expertise within the organization that will serve us well into the future. With preparations for implementing the *Professional Governance Act* now substantially complete, Tony has ensured we are well-positioned to move forward with a strong regulatory foundation in place to protect the public."

Prior to joining Engineers and Geoscientists BC as its first Chief Regulatory Officer, Tony was the Chief Administrative Officer with the City of Port Coquitlam for 17 years. He also spent several years working in northern Canada, where he held senior roles with the Northwest Territorial Government and the Northwest Territories Housing Corporation. Tony is a mechanical engineer with a Bachelor of Engineering from the Royal Military College of Canada and a Master of Applied Science in Environmental Studies from the University of Toronto.

In his retirement, Tony is looking forward to spending time with family—and to pursuing activities that he has never had time to do!

Engineers and Geoscientists BC plans to appoint an interim Chief Regulatory Officer until a permanent successor is in place.

Tony's expertise, tireless dedication, and good humour will be sincerely missed by everyone at Engineers and Geoscientists BC. We wish him good health, longevity and happiness in his well-earned retirement.

PHOTO: EB ADVENTURE PHOTOGRAPHY/SHUTTERSTOCK.COM

WEBINAR SERIES HIGHLIGHT *PROFESSIONAL GOVERNANCE ACT* EDUCATION RESOURCES

Engineers and Geoscientists BC is preparing for the implementation of the *Professional Governance Act* (PGA)—new governing legislation for professional regulators in the natural and built environment, including Engineers and Geoscientists BC. The new legislation is anticipated to come into force in February 2021.

Engineers and Geoscientists BC will host a PGA webinar series in early 2021, on key obligations and requirements for registrants, including the updated Code of Ethics, Continuing Education requirements and the regulation of engineering and geoscience firms:

- *Understanding the New Code of Ethics* on January 27, 11:45 AM to 1:00 PM;
- *Continuing Education Requirements* on February 10, 11:45 AM to 1:00 PM; and
- *Understanding Regulation of Firms* on February 17, 11:45 AM to 1:00 PM.

To learn more or register for upcoming webinar, visit *egbc.ca/Events*. Recordings of all three webinars will be made available to registrants at no charge through Engineers and Geoscientists BC's Online Learning Centre soon after the webinars themselves are completed.

To ensure registrants are kept informed of the changes coming into effect, we developed a special PGA reference guide, included in the November/December edition of *Innovation* magazine (*egbc.ca/innovation*), and produced a short video about the PGA. To register for the upcoming webinars, watch previous PGA webinars, download the insert, or view the video, visit *egbc.ca/pga*.

If you have questions about the new legislation, email *professionalgovernance@egbc.ca*, or visit our website at *egbc.ca/pga*.

UPCOMING WEBINAR TO HELP DEVELOP LAND ACKNOWLEDGEMENTS

Engineers and Geoscientists BC and Engineers Canada will hosting a free one-hour webinar entitled *Land Acknowledgments for Engineers and Geoscientists*, scheduled for March 10, 2021. This session will explore the practice of acknowledging First Peoples and traditional land as a way to open meetings, and also as part of a larger process towards reconciliation between non-Indigenous and Indigenous Peoples in Canada.

Cassandra Polyzou of Engineers Canada will facilitate a panel discussion with Indigenous engineers, geoscientists, and Indigenous knowledge-keepers, on the importance of this traditional protocol and its application to the engineering and geoscience professions.

To learn more or to register, visit the event page at *egbc.ca/Events*, or email Allison Smith at *asmith@egbc.ca*. The Events Page includes upcoming webinars and on-demand offerings through the Online Learning Centre. To suggest future topics or speakers, email *pdevents@egbc.ca*.

RECOGNIZE OUTSTANDING ENGINEERING AND GEOSCIENCE TALENT

British Columbia's engineers and geoscientists are explorers and problem-solvers who lead the way in public safety, quality, and innovation. They are committed to improving and protecting the health and well-being of British Columbians every day. As accountable, ethical professionals, they find the balance between growth and safety, working towards prosperity and progress for everyone.

Engineers and Geoscientists BC is now accepting nominations for our 2021 awards. We are asking registrants to help us recognize the work and contributions of their peers by submitting a nomination in one of the following categories:

PRESIDENT'S AWARDS

The **R. A. McLachlan Memorial Award** recognizes a candidate that has made significant technical contributions, including leadership, to professional engineering and has demonstrated substantial professional service and community service.

The **C. J. Westerman Memorial Award** recognizes a candidate that has made significant technical contributions, including leadership, to professional geoscience and has demonstrated substantial professional service and community service.

The **D. C. Lambert Professional Service Award** recognizes a candidate that has made a substantial contribution of professional service, through leadership and dedication, to Engineers and Geoscientists BC or to a provincial, national, or international technical association or learned society.

The **Meritorious Achievement Award** recognizes a candidate that has achieved distinction and outstanding goals associated with their profession. The achievement may be the result of a single activity or the culmination of a number of activities.

The **Community Service Award** recognizes a candidate that has made a substantial contribution of community service, through leadership and dedication, to the well-being of their community.

The **Teaching Award of Excellence** recognizes a candidate that is an outstanding educator of engineering or earth science/geoscience students, and who, by their superior performance, enhances the quality of engineering or geoscience education.

The **Young Professional Award** recognizes a candidate that has demonstrated exemplary accomplishments in relation to their profession, professional service, including service with Engineers and Geoscientists BC, and community service.

Along with the President's Awards, Engineers and Geoscientists BC also recognizes exemplary registrants and projects with awards in the following categories:

2019 President's Awards Winners.
Photo: Mike Crane Photography

2021 AWARD DEADLINES

- **PRESIDENT'S AWARDS**: Nominations accepted until Friday, April 9, 2021
- **MENTOR OF THE YEAR AWARD**: Nominations accepted until Friday, April 9, 2021
- **SUSTAINABILITY AND ENVIRONMENTAL AWARDS**: Nominations accepted until Friday, March 19, 2021
- **FOREST ENGINEERING AWARD OF EXCELLENCE**: Nominations accepted February to October 2021

The **Mentor of the Year Award** recognizes excellence among mentors in the engineering and geoscience community in British Columbia. The Mentor of the Year Award will begin accepting nominations at the end of January. Mentees of the program are eligible to nominate their mentors. For more information on how to apply for the award, contact *mentoring@egbc.ca*.

The **Sustainability Award** recognizes the important contribution that engineering and geoscience make to the well-being of human life and the ecosystems on which we all depend.

The **Environmental Award** highlights the role of professional engineers and geoscientists in responsible environmental management.

The **Forest Engineering Award of Excellence**, sponsored jointly by Engineers and Geoscientists BC and the Association of BC Forest Professionals, recognizes excellence and promotes cooperation and leadership in forest engineering in the broadest sense. The 2021 Forest Award of Excellence will be presented by Engineers and Geoscientists BC.

Nominations for all awards are now open, and the awards will be presented in Fall 2021. For detailed information about nomination procedures, award terms of reference, and eligibility, visit *egbc.ca/Awards*. Questions about Engineers and Geoscientists BC's awards program can be emailed to *awards@egbc.ca*.

SERVICE ON COUNCIL
A CHANCE TO GIVE BACK

Are you an experienced practitioner with a strong desire to protect the public and enhance public safety? If so, consider applying to serve on Engineers and Geoscientists BC's Council.

Engineers and Geoscientists BC Council governs the organization and the professions of engineering and geoscience in British Columbia. Council members act collectively to set the policy and strategic direction for Engineers and Geoscientists BC, and are accountable to the public through the Ministry of the Attorney General, under the Office of the Superintendent of Professional Governance.

Service as a Council member is an exceptional leadership opportunity. This is a transformative time for the organization as Council guides the organization forward under new legislation and new initiatives, including regulation of firms, continuing education, and diversity and inclusion.

Past-president Lianna Mah, P.Eng., FEC, served as a volunteer for almost 30 years, and then as a councillor for 2 years before becoming president. "I loved working on projects that make a difference for our registrants," she said.

"When I think about it, the impact we're having on registrants and the public is very substantial," she said. "I gained a lot in terms of knowledge and experience, but what impacted me personally was building relationships and friendships with other councillors and staff. We did a lot of work, but we also had a lot of fun."

Engineers and Geoscientists BC is committed to advancing diversity and inclusion in the governance of the professions, and is seeking a slate of candidates with diverse backgrounds, experience, and expertise.

2019/2020 Council. Photo: Wendy D Photography

The call for nominations will open in February and the deadline to apply for this opportunity is 5:00 PM on April 5, 2021. If you are interested in being considered, but are unable to submit your application before the deadline, please contact nominations@egbc.ca. For complete information on the application process and positions available, visit *egbc.ca/Council-Nominations*.

INTRODUCING THE REGULATION OF FIRMS

The *Professional Governance Act* introduces the requirement to regulate engineering and geoscience firms in BC. Beginning July 2, 2021, all entities that engage in the practice of professional engineering or professional geoscience in BC, or employ those who practice professional engineering or geoscience, will be required to register for a Permit to Practice. To maintain their permit, firms will be required to create policies and procedures to meet minimum standards in ethics, quality management and continuing education.

In February 2021, the *Professional Governance Act* (PGA) is expected to come into force—legislation which will introduce firm regulation for the first time in BC. Through a multi-year consultation with government and registrants, Engineers and Geoscientists BC developed a regulatory program that ensures legislative requirements can be met without undue administrative burden on firms, while supporting our shared goal of strengthening public safety and protecting the environment.

WHO DOES FIRM REGULATION IMPACT?

The legislation defines "firms" as corporations, partnerships, government registrants (including ministries and agencies named in regulation under the PGA), sole practitioners, and other legal entities such as municipalities that engage in the practice of professional engineering and/or professional geoscience in BC. Companies that employ registrants who practice professional engineering or geoscience (like a manufacturer) will be required to register.

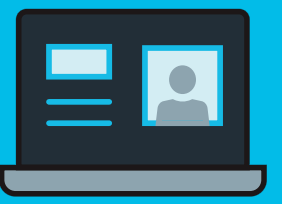
If the primary business activity of a firm does not require the practice of professional engineering or geoscience, then the firm may not need to be registered. There will be an exemption application process for firms that don't fall within the parameters of the regulatory program.

WHAT DO FIRMS NEED TO DO?

Although firm regulation is mandatory under the PGA, the regulatory model itself has been defined by Engineers and Geoscientists BC and will centre around three pillars: quality management, continuing education, and ethics. It seeks to improve regulatory oversight, protect the public interest, and provide opportunities for firms to improve processes and reduce risk—and in most cases, it's about formalizing responsible practices that are already in place.

Firms will need to follow a five-step process to fulfill their regulatory obligations.

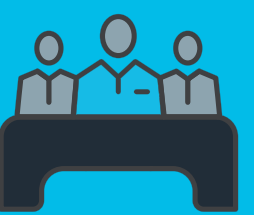
FIVE STEPS FOR FIRMS



Provide key information about your firm.

Nominate a Responsible Registrant and Responsible Officer.

Pay your firm's application fees and receive a Permit to Practice.



Attend a training session within 12 months of registering.

Create and implement a Professional Practice Management Plan within 12 months of registering.

1. **Register for the Permit to Practice:** The registration window to apply for a Permit to Practice will open July 2, 2021. Firms will be required to complete their registration before September 30, 2021.
2. **Nominate a Responsible Registrant and Responsible Officer.** A Responsible Registrant is a professional licensed by Engineers and Geoscientists BC who ensures that the firm's practice meets ethical, quality management, and continuing education requirements. A Responsible Officer is the executive lead for their firm—a person that has authority to make binding decisions on behalf of the firm.
3. **Pay fees:** A firm's annual registration fee is calculated using the following formula: √N x $500, where N is the number of Engineers and Geoscientists BC registrants on staff. Fees for sole practitioners will be $250 per year. A one-time application fee of $350 is also required. Once the registration process is complete, and the associated fees are paid, a Permit to Practice will be issued, granting legal authority to practice professional engineering or geoscience in BC.
4. **Attend training:** Within 12 months of registration, a representative of the firm must attend a training session online. The application fee includes one training seat.
5. **Develop a Professional Practice Management Plan:** Within 12 months of registration, firms will be required to have documented policies and procedures in place indicating how they will meet the requirements of the following three pillars outlined in the regulation:
    1. **Ethics:** firms must implement a Code of Conduct addressing how their professional employees will practice in accordance with the professions' Code of Ethics;
    2. **Quality management:** firms must describe how they will ensure their employees uphold the quality management requirements in the Bylaws; and
    3. **Continuing Education:** firms must develop procedures for assessing the competency and supporting the continuing education of their professional employees.

COMPLIANCE AUDIT

Twelve months after receiving a Permit to Practice, registrant firms will be eligible for a compliance audit. Engineers and Geoscientists BC expects to audit all registrant firms by July 2024. An audit will assess the firm's compliance with the Bylaws, guidelines, practice advisories, and policies of Engineers and Geoscientists BC, as well as compliance with quality management, continuing education, and ethics standards.

WHERE CAN I LEARN MORE ABOUT FIRM REGULATION?

More information about firm regulation, including specific obligations and applying for a Permit to Practice, is available at *egbc.ca/Firms*. A Regulation of Firms Overview webinar on February 17 will outline the requirements and timeline for firms, provide registrant tools and resources, and answer questions about the new program. To learn more or to register, visit *egbc.ca/Events*.

ENGINEERS AND GEOSCIENTISTS BC CELEBRATES FUTURE LEADERS

In 2020, we celebrated all things science, technology, engineering, and math (STEM) by hosting our STEM Leaders of the Future: Engineering and Geoscience contest. We encouraged students in Grades 1 through 12 to think about what they can do today to make the world a safer place for tomorrow. The contest asked students to design a project or use items found around the house to create something brand new that addresses one of today's big issues.

The STEM Leaders of the Future contest was part of our 100-year anniversary celebration in 2020. Throughout the year, we looked back on our proud history of safety, innovation, and building British Columbia, and looked forward to our vibrant future. With our STEM Leaders of the Future contest, we hoped to inspire future generations of engineers and geoscientists. We received creative and innovative submissions from students across the province and are pleased to announce the winner in the following categories.

GRADES 1-3: Grade 2 Vancouver student Juergen Gilhuly imagined a design for the Climate Change Sucker, which sucks up smoke from the environment and produces fresh air.

GRADES 4-6: Grade 5 Port Moody student Emma Robinson created the concept for the SolaRain 2050, which produces energy that doesn't harm the environment and helps save water.

GRADES 7-9: Grade 8 North Vancouver student Parsa Jafari envisioned CaptureDlaugh, an AI-enhanced emotion detection system that captures reactions to movies. Then, using AI image processing algorithms, it creates a movie rating system for you and recommends movies based on your past reactions.

GRADES 10-12: Grade 10 Burnaby student Angel Xu pitched the Automatic Electric Vehicle System, a convenient, safe, and clean city infrastructure system that uses self-driving solar and electric cars.

Congratulations to our winners and to all the students that submitted an idea. Our future is safe in the hands of these future leaders!

To view the videos of all the contest winners, visit *egbc.ca/STEM-Contest*. To learn more about student engagement opportunities, visit *egbc.ca/About/Career-Awareness*.

Grade 5 student Emma Robinson's SolaRain 2050 project. PHOTO: EMMA ROBINSON.

CONTINUING EDUCATION PROGRAM: REQUIREMENTS AND RESOURCES

In February 2021, the *Professional Governance Act* (PGA) is expected to come into force, replacing the *Engineers and Geoscientists Act*. The PGA requires Engineers and Geoscientists BC to develop and implement a mandatory Continuing Education (CE) Program for registrants.

Requirements for the new CE Program will come into effect as of July 1, 2021. The first reporting deadline for registrants will be June 30, 2022.

PROGRAM OVERVIEW

The new CE program was designed over several years by Engineers and Geoscientists BC's Continuing Education Advisory Committee and approved by Engineers and Geoscientists BC's Council in May 2020 following consultation with registrants. Registrants will be required to undertake a blend of technical, non-technical, regulatory and ethical training to meet program requirements, but the program is built to be flexible in allowing registrants to identify the areas of learning most relevant to maintaining their competency.

KEY REQUIREMENTS

The CE Program applies to all professional registrants. Practising registrants must:

- complete at least 60 CE Hours within a three-year rolling period (20 hours a year on average);
- complete at least one CE Hour of ethical and one CE Hour of regulatory learning each year; and
- create a CE Plan on an annual basis that notes their area of practice, risks of their practice, learning goals, and activities to help meet those goals.

Non-practising and retired registrants must complete at least one CE Hour of ethical and one CE Hour of regulatory learning every three years. EITs and GITs are exempt from the program but may choose to record their CE activities in Engineers and Geoscientists BC's online reporting system.

The reporting year for the CE Program will be from July 1 of one calendar year to June 30 of the following calendar year. If needed, registrants can apply for an exemption on a yearly basis for parental, medical, compassionate care leave, or for other extenuating circumstances.

TIMELINE

Requirements for the new CE Program will come into effect as of July 1, 2021. At that time, registrants will be able to record their CE activities and upload their CE Plan into a new online reporting system. To ease the transition to the new program, registrants will be able to claim any CE Hours accrued between January 1 and June 30, 2021 towards their first year of CE Hours.

COMPLIANCE AND PENALTIES

Beginning in 2022, if registrants don't meet some or all of the requirements (e.g., reporting sufficient hours, uploading a CE Plan) by the annual reporting deadline of June 30, they will be subject to additional fees and may face suspension or cancellation of their registration.

Registrants may submit within three months of the deadline (by September 30) but will be assessed a late reporting fee (if they had completed the items but failed to report them properly) or a late completion fee (if they completed the required activities during the late period).

Registrants that do not complete the requirements by September 30 will have their registration suspended. Once suspended, their status will change on the online register, and they will no longer have practice rights until the suspension is lifted.

If registrants are at risk of suspension after missing the June 30 deadline, they will be notified by email at least 60 days before the September 30 late reporting deadline.

To have a suspension lifted, the registrant must complete the requirements for the previous reporting year and submit them (either online or to staff directly) by December 31. If the requirements are not completed by this deadline, the registrant's registration will be cancelled, and they would have to apply for reinstatement.

RESOURCES AVAILABLE

The Guide to the Continuing Education Program provides key information for registrants to be aware of for the new CE Program including who the CE Program applies to, what types of activities count as CE Hours, and the documentation needed for compliance purposes. The Guide is now available on our website, at *egbc.ca/Continuing-Education.* A CE Program Overview webinar on February 10 will outline the CE Program requirements and timeline, provide registrant tools and resources, and answer questions about the new program. To learn more or to register, visit *egbc.ca/Events.*

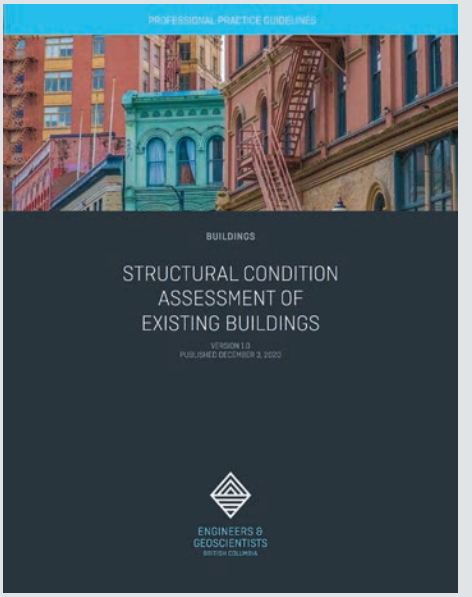
For questions about the CE Program, contact *cep@egbc.ca*, or visit *egbc.ca/Continuing-Education.*

NEW GUIDANCE ON STRUCTURAL CONDITION ASSESSMENT OF EXISTING BUILDINGS AND ELECTRICAL ENGINEERING FOR FLOOD-RESILIENT BUILDING DESIGN NOW AVAILABLE

Engineers and Geoscientists BC, with the support of the Structural Engineers Association of British Columbia (SEABC), has issued new guidelines titled *Professional Practice Guidelines: Structural Condition Assessment of Existing Buildings*.

These guidelines provide clarity on the expected level of effort, due diligence, and standard of practice expected of engineering professionals when conducting structural condition assessments of existing buildings. These guidelines apply only to condition assessments of existing buildings, not remediation measures or upgrades.

Notably, these guidelines are not intended to replace provisions of other applicable codes, such as the National Building Code of Canada Structural Commentaries (User's Guide – NBC 2015: Part 4 of Division B), but to provide guidance in applying them.

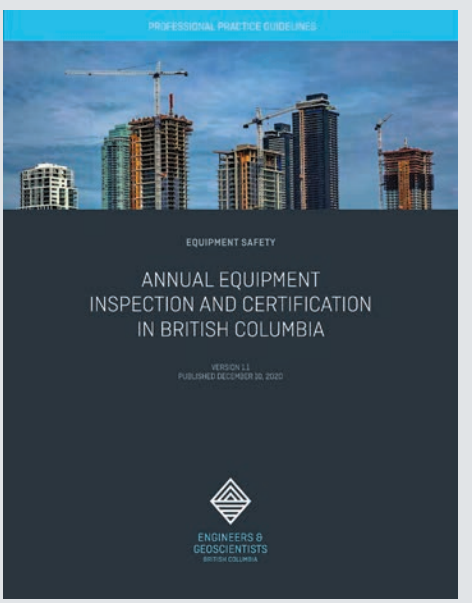


NEW ADVISORY ON ELECTRICAL ENGINEERING CONSIDERATIONS IN FLOOD-RESILIENT DESIGN OF BUILDINGS

Engineers and Geoscientists BC issued an interim practice advisory to inform registrants of their responsibilities when preparing engineering designs for electrical systems in building projects located in areas that may be subject to flooding over the design life of the building. In particular, the advisory outlines professionals' responsibility to consider relevant safety issues for these projects.

There are regulatory requirements related to designing buildings located in a floodplain and other areas (such as alluvial fans) that are potentially exposed to riverine and coastal flood hazards, or to pluvial flooding events at sites with unfavourable topography. The advisory provides interim guidance while a Canadian Standards Association committee revises the *Canadian Electrical Code*, expected in 2021.

Full details and practice considerations are described in the practice advisory.



UPDATE TO PROFESSIONAL PRACTICE GUIDELINES – ANNUAL EQUIPMENT INSPECTION AND CERTIFICATION IN BC

The *Professional Practice Guidelines - Annual Equipment Inspection and Certification in BC*, originally issued in January 2020, has undergone a minor revision (version 1.1) that updates the list of equipment required for inspection in accordance with revisions to the Occupational Health and Safety Regulation, along with clarification that inspection plans must be in written form.

These guidelines and other practice advisories and resources are available at *egbc.ca/Guidelines*. To contact an Engineers and Geoscientists BC practice advisor, email *practiceadvisor@egbc.ca* or call 1.888.430.8035 or 604.430.8035.

BC BUILDING CODE UPDATES AND HARD COPIES

Registrants who hold hard copy versions of the *BC Building Code* are reminded that errata and revisions to the *Code* are provided electronically, and may make hard copy versions out-of-date. To obtain updated versions electronically, visit *www.bccodes.ca*.

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PHOTO: © MMS_V - STOCK.ADOBE.COM

UPDATED GUIDELINES ON GEOTECHNICAL ENGINEERING SERVICES PROTECTS ARCHEOLOGICAL SITES

Archeological artifacts and sites in BC often helps us understand the history and legacy of First Nations and other local communities. For example, an ancient archeological find in 2017 on Triquet Island off BC's coast—nearly 14,000 years old—gave insight into and support for the oral history of the Heiltsuk Nation. Although sites of this significance are discovered infrequently, according to the Archaeology Branch of the BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development, archeological artifacts and sites in BC are regularly discovered by hikers, gardeners, home renovators, and property developers.

There are more than 50,000 archaeological sites currently recorded in BC, with many more being added to the provincial inventory every year. "This new archaeological information makes a valuable contribution to our understanding of the history of our province and prevents the destruction of cultural and non-renewable resources," the Ministry published on its website.

When Engineers and Geoscientists BC updated its *Professional Practice Guidelines – Geotechnical Engineering Services for Building Projects*—the first update to these guidelines since 1998—it included a provision guiding the project owner and the Geotechnical Engineer of Record to ensure respect for culturally significant sites.

The revised guideline, issued in Fall 2020, notes that building project owners need to verify that projects are "not within a defined archeological sensitive area or area of significance", and that registrants can provide services to assist with this owner responsibility. And, if "ground-altering activities" later reveal possible archeological artifacts, that must be reported to the Archaeology Branch of the BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development.

Archeological sites are protected under BC's *Heritage Conservation Act*, and archeological artifacts—known or not—

PHOTO: STANTEC

cannot be removed or altered without a permit. The Engineers and Geoscientists BC revised guideline clarifies that registrants have a responsibility to confirm with landowners to ensure that construction or exploration work does not take place in archeologically sensitive areas or areas of significance without appropriate permits, and that any discovery of potential archeological artifacts is properly reported.

To learn more about archeology in BC, visit *www2.gov.bc.ca/gov/content/industry/natural-resource-use/archaeology*. The *Professional Practice Guidelines – Geotechnical Engineering Services for Building Projects*, and other Professional Practice guidelines and advisories, can be found at *egbc.ca/Guidelines*.

WHEN IT COMES TO CLOTH FACE MASKS, IT'S ABOUT FABRIC + FIT

Robin J. Miller

Photo: Clare Kiernan.

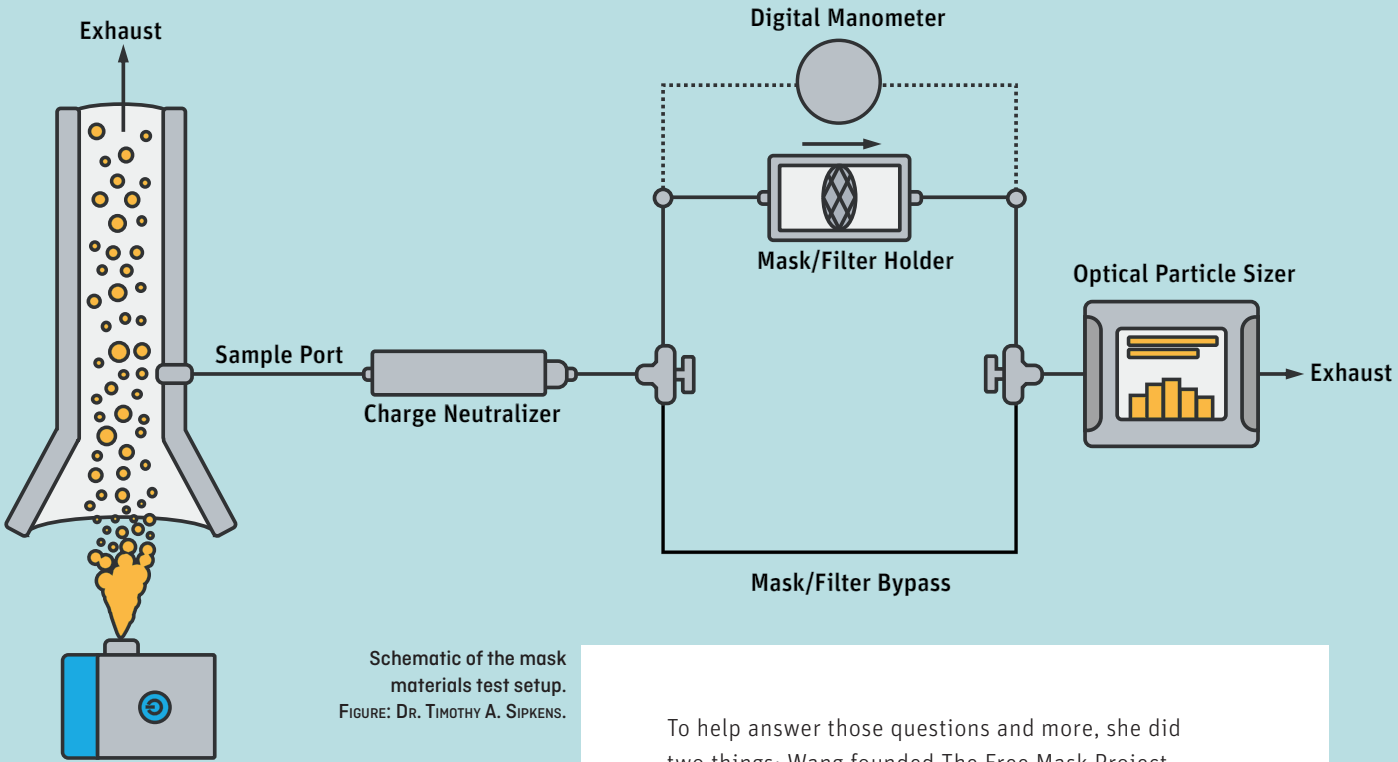
Dr. Steven Rogak, P.Eng., in the UBC aerosol laboratory. Photo: Clare Kiernan

With the advent of multiple COVID-19 vaccines, things are definitely looking up. But experts warn that the wearing of masks will not end any time soon. Many of us prefer wearing reusable cloth masks over disposable medical masks, but which fabrics are the most effective? A Surrey Memorial Hospital anaesthesiologist and a UBC engineer decided to find out.

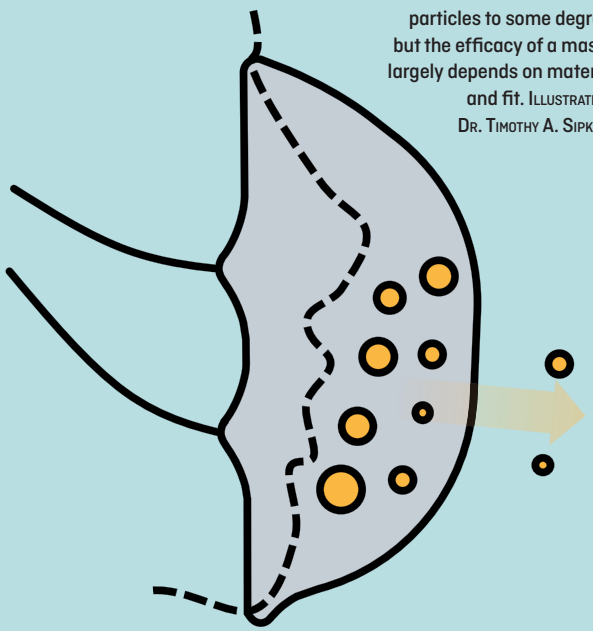
COVID-19 has changed our lives in so many ways it's hard to count them all: how we work and shop, how we celebrate and travel (or don't celebrate and travel)—even what we say. In late 2020, dictionaries around the world began announcing a series of new words and phrases that have quickly become part of our everyday lives, including lockdown, flattening the curve, self-isolating, contact tracing, and, of course, N95 mask.

An N95 mask, also known as a respirator, filters at least 95 percent of airborne particles with a diameter of 0.3 microns. The term leapt into our lexicon early in the pandemic when it became clear that a severe shortage of N95 masks—which fit more tightly around the nose and mouth than medical-grade masks, like those worn by surgeons or dentists—was endangering health care workers on the front lines. All new shipments, we were told, needed to be reserved for hospital workers. So what were the rest of us supposed to wear?

Dr. Jane Wang, an anaesthesiologist at Surrey Memorial Hospital, recognized early on that public health advice to wear a cloth mask when physical distance cannot be maintained might be sound, but imprecise. From March to May 2020, "hospitals were going into a little bit of a slowdown," said Wang, "and I started to have some time to think about the fact that there was not a lot of research into cloth masks." Would any cloth do, she wondered, or are some fabrics more protective than others? And what about laundering, layers, and fit? She also wondered how people at risk in the community, who perhaps could not access or afford an endless supply of single-use face masks, would manage.



Schematic of the mask materials test setup. Figure: Dr. Timothy A. Sipkens.

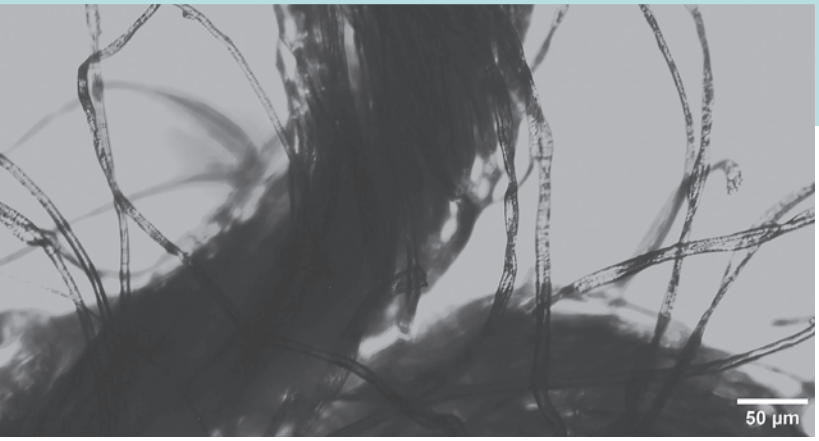


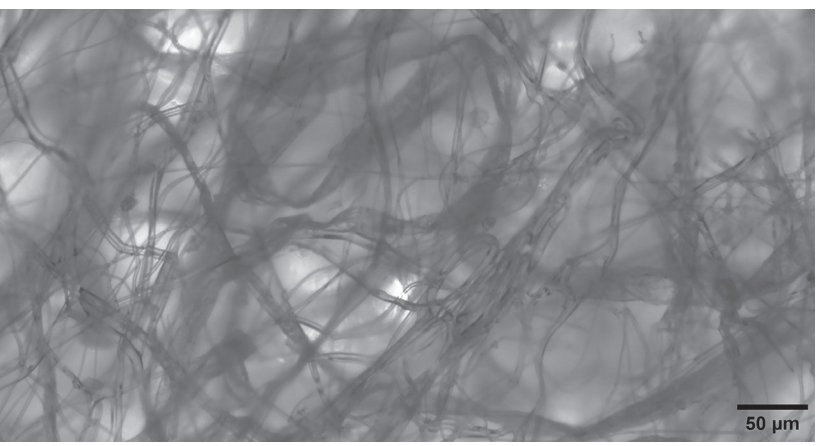
All masks filter out particles to some degree, but the efficacy of a masks largely depends on material and fit. Illustration: Dr. Timothy A. Sipkens

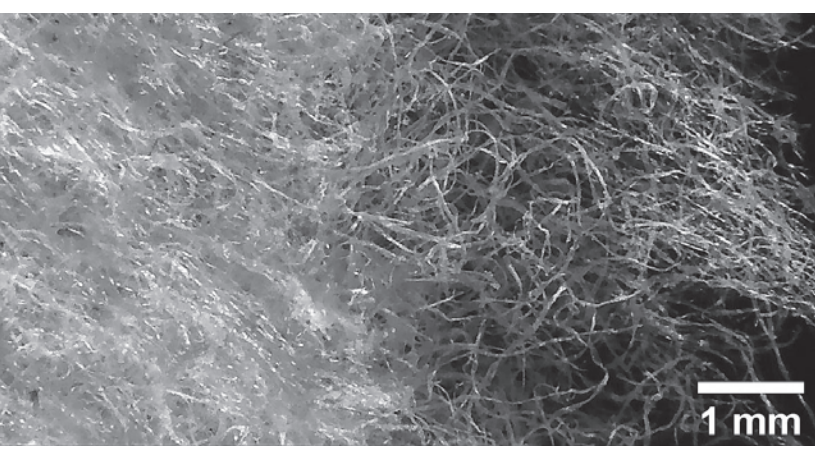
To help answer those questions and more, she did two things: Wang founded The Free Mask Project of Vancouver, and she contacted Dr. Steve Rogak, P.Eng., who teaches in UBC's mechanical engineering department and heads the UBC Aerosols Lab.

Rogak, as it turned out, had already done a fair amount of mask testing. "In the early days of the pandemic," said Rogak, "various agencies were concerned about the quality of the N95 masks they were importing and at that time there were only a few places in Canada that could do that kind of testing. So we were helping out health authorities by doing tests in our lab to see if the N95s coming in could meet the standards or not. And then by chance Jane Wang got hold of me because she was leading a project dedicated to providing free face coverings around Vancouver, using sensible but homemade approaches. She wanted some samples tested and that's how we got started."

Said Wang, "We wanted to design and make reusable homemade masks that are as effective as medical masks, so they had to be evidence-based." Along with Rogak and several of his students, Wang began sorting materials and preparing samples in the early summer, based on guidelines published by the World Health Organization in June 2020. The WHO recommended three layers for cloth masks: a hydrophobic or water-resistant outer layer; a hydrophilic or water-loving inner layer of fabric by the face; and a filter layer in-between the two.







The efficacy of masks depend partly on the materials. The top two photos are the fibres of a cotton knit jersey. The bottom two photos are the fibres of dried baby wipes.
Photos: Dr. Steven Rogak, P.Eng.

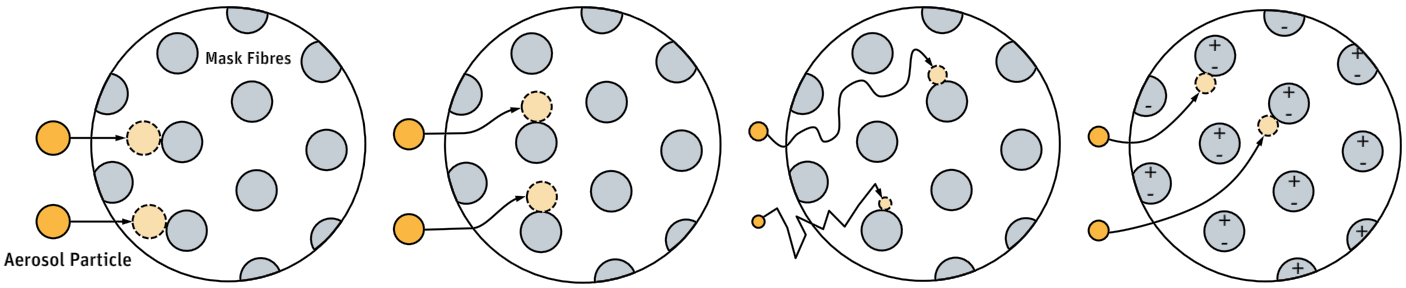
What Rogak and Wang discovered might surprise you.

For example, it turns out that a number of the fabrics that are best at stopping droplets and aerosols from getting out or in—including ones recommended by the WHO—are not necessarily the best for us to wear, for a number of reasons.

"We tested 41 fabrics that you could potentially use for a face mask," said Rogak, including natural and synthetic fabrics of varying types, such as cut pile (velvet or fleece, for example), knit, woven, and non-woven (including paper and polypropylene),"by placing a circular piece of fabric inside a sealed container and then sending a stream of air containing aerosol particles through the fabric filter. We knew that almost any cloth mask would capture large droplets when someone exhales or speaks, so we were focussing on smaller particles, aerosols, in the 1 to 5-micron range.

Advice to the public on masks has changed radically in the last year based on emerging research, and researchers still do not fully understand what size of respiratory particles we need to be most concerned about, but it now appears unlikely that particles below three microns have a major role in transmission." This may change, however, Wang warned, "with the new mutation strains that are more contagious."

The testing process included using an ultrasonic mesh nebulizer to transform a saline solution into an aerosol, then passing the aerosol through an x-ray neutralizer to reduce the electrical charges on the aerosol particles, because they can make filtration artificially easy. A digital manometer then measured the pressure drop as the aerosol flowed through the fabric filter at a rate mimicking normal or moderate breathing: the more pressure lost going through the filter, the more difficult it would be to breathe. Finally, an optical particle sizer determined the



The mechanisms of mask filtration include impaction, interception, diffusion, and electrostatic attraction. Figure: Dr. Timothy A. Sipkens.

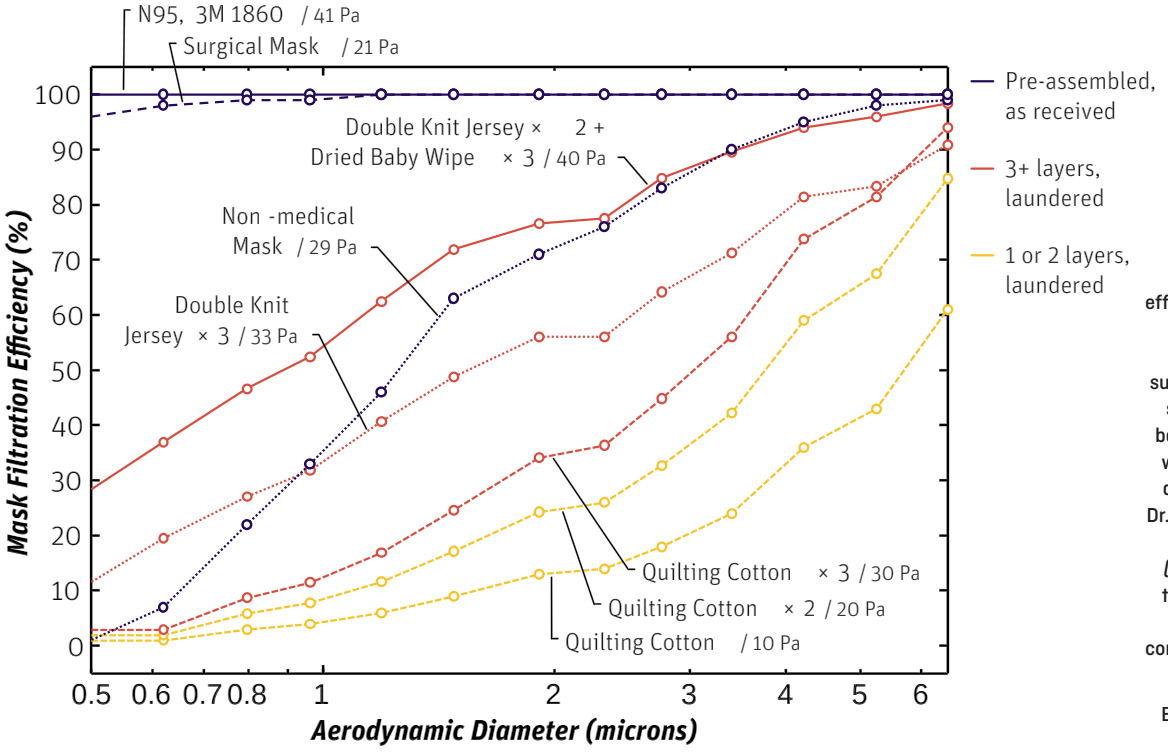
aerosol size distribution before and after the filter, "and by the difference," said Rogak, " we knew what particles had been removed by the fabric."

Unexpectedly, it turned out that densely woven fabrics, such as high-thread count cotton, silk, and polyester satins do not perform as well as looser weaves of cotton. "These fabrics may filter well but they are not very breathable," said Wang. "They are poorly tolerated when worn tightly around the face and so you know people would be pulling them down, exposing their noses.

The good news, though, is that there are a lot of simple fabrics that filter well, do a good job of wicking away moisture, and are also very breathable," including inexpensive 40- to 50-thread count quilter's cotton, preferably double-knit, for both the inner and outer layer. (The team ruled out the WHO's recommendation for a waterproof outer layer. "A good idea," said Rogak, "but most people outside a hospital will never be exposed to the kinds of large droplets that would necessitate that kind of fabric.")

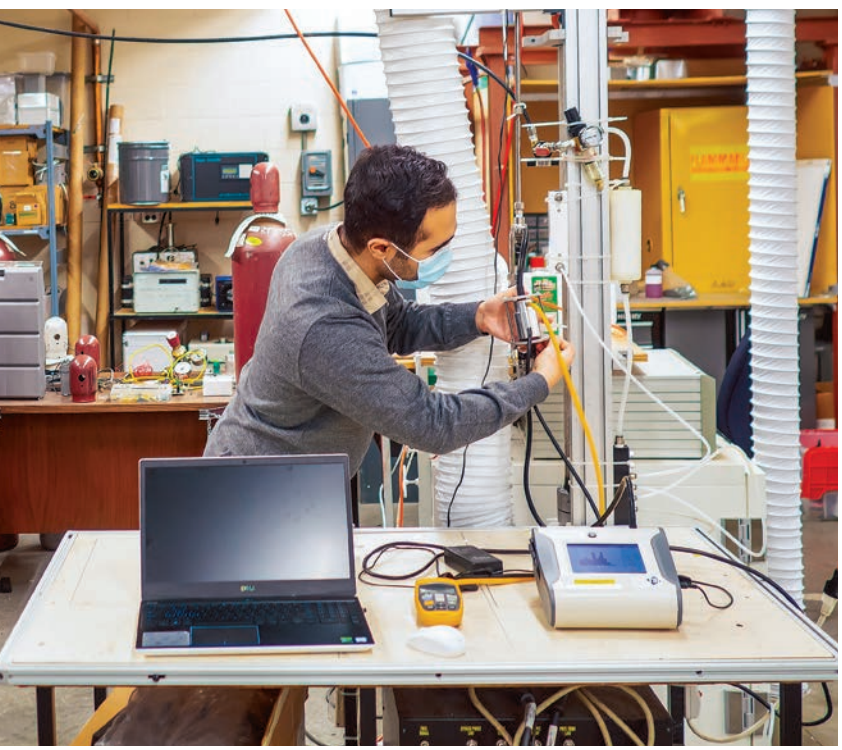
Thicker fabrics, like wools, also block significant aerosol transmission, but are uncomfortably warm to breathe through and too difficult to keep clean. Thicker fabrics can also make a proper fit around the

N95 masks and other material samples. Photo: Clare Kiernan.



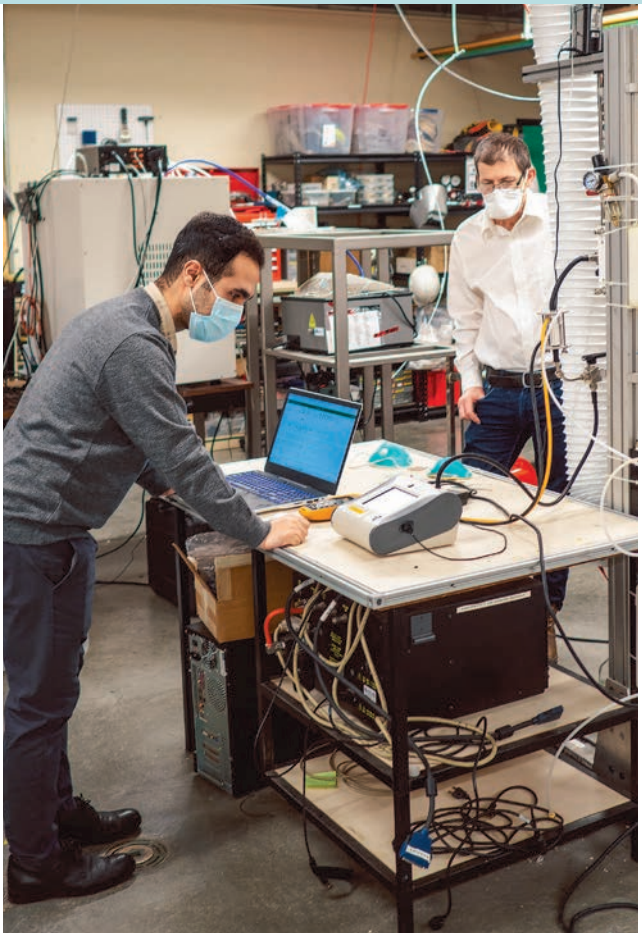
This graph indicates how efficiently various materials filter various particle sizes. N95 masks and surgical masks are the gold standard. Curiously, dried baby wipes also performed well. If you're interested in designing your own mask, Dr. Timothy Sipkens created an interactive table tool *(tsipkens.github.io/fmviz)* that allows users to select various materials and compare their performance. TABLE: DR. TIMOTHY A. SIPKENS

BOTTOM: Hamed Nikookar. PHOTO: CLARE KIERNAN.



nose and chin difficult. "There is a lot to the problem beyond filtration efficiency," Rogak said. "A mask won't do you any good if it doesn't fit." The best fitting masks tend to be similar to N95s, with a cup or duck bill shape that stands away from the face—Wang recommends "about one finger's width" from the nose and mouth—but seals well to the face, with, said Rogak, "a flexible nose band with mouldable foam underneath." Ties behind the head work better than ear loops, which can hurt if they are too tight, to ensure a close fit.

As for the filter layer, the project confirmed that three dried baby wipes, inserted between the two layers of quilter's cotton, work very well to allow breathability while trapping aerosols. "A three-layer cotton mask with the filter layer composed of 3 plies of baby wipes is about 80 to 90 percent effective in stopping 3-micron particles" said Wang, "similar to disposable non-medical masks and some medical-grade masks." Added Rogak, "It's difficult to provide defensible advice to the public when the foundational science is evolving. This has been a key challenge in all COVID-



Hamed Nikookar with Dr. Steven Rogak. Photo: Clare Kiernan

related research. We still don't know, for example, how to optimize indoor spaces to reduce COVID transmission and a lot of people may be trying all kinds of crazy things to increase ventilation rates in buildings. These may be misguided. For example, improving ventilation would be a good thing if you are trying to protect against 1-micron particles; however, it would be tough to reduce concentrations by a factor of 2, and almost any mask will do this.

On the other hand, you would need 50 to 100 air changes per hour—almost like being outdoors—to significantly reduce concentrations of 20-microns droplets, but such large ventilation rates could cause drafts that would carry droplets from person to person. For these larger particles, masks will be *very* effective, but ventilation strategies will be ineffective or even harmful. We can therefore be confident that wearing a mask is the most important thing we can do, and it now appears that a well-fitted cloth mask can provide protection approaching that of medical masks." ♦

MENTORING PROGRAM PROVIDES SUPPORT AND GUIDANCE TO YOUNG PROFESSIONALS

Nicole Brisson, P.Eng.

The simple act of a senior professional sharing advice with a less experienced professional can make a profound difference in the crucial stages of a career. Engineers and Geoscientists BC's mentoring program provides great rewards to registrants looking to receive or offer advice.

Nicole Brisson, P.Eng., a water and tailings engineer with Agnico Eagle Mines' Nunavut Division, said that the two-year experience in the mentoring program has provided her invaluable guidance in career decision-making.

"My mentor helps me set out career goals and suggests ways to achieve them," she says, adding that her mentor also helps her navigate challenging decisions and piece together how decisions fit into the bigger picture. Nicole describes her mentor, a chemical engineer, as a someone with a very active portfolio of projects and broad experience in multiple industries. She said that her mentor also supports and champions Nicole's work and accomplishments. "I also really appreciate how [my mentor] promotes and shows confidence in my work to her colleagues and network."

The mentoring program connects members-in-training and new professional registrants with experienced professionals willing to share and transfer their skills and knowledge. The mentoring program is an essential resource for topics including advice on career planning and goals, succession planning, retirement strategies, and entrepreneurship.

Current mentees like Nicole say that the mentoring program provides them with more opportunities and support in their overall professional development.

For mentors, beyond the personal rewards of goodwill and "paying it forward", mentoring can help sharpen leadership and coaching skills often needed in later years of a career.

Registrants can help expand the mentoring movement by joining the Engineers and Geoscientists BC mentoring program. The commitment is flexible, but participants should commit to meeting regularly through a one-year term, and invest at least one hour per month into mentoring activities such as meetings or email correspondence. Participants can browse through current listing of over 1,000 mentors and mentees to find the one right fit. There is no cost to becoming a mentor or mentee.

To learn more or to apply to become a mentor/mentee, visit *egbc.ca/Mentoring*. For questions or more information, contact John Suyte, Mentoring Program Coordinator, at *mentoring@egbc.ca* or 604.412.4885.

VIRTUAL SCIENCE GAMES NEEDS VOLUNTEER MENTORS

Every March, Engineers and Geoscientists BC hosts the Science Games—an event that allows students in Grades 1 through 6 to participate in exciting challenges that bring engineering and geoscience to life. While the event will be a little different this year (a virtual event throughout March instead of a one-day event), focus will remain on collaboration, connection, discovery, and fun—and Engineers and Geoscientists BC needs volunteer mentors to help support this event.

Throughout March 2021, students from across the province of BC will participate in weekly challenges, "Meet the Expert" sessions, and mentorship opportunities with industry experts. Students will be organized into cohorts, with two mentors per cohort, who will coach them through each of the weekly challenges over the four-week event.

Engineers and Geoscientists BC needs more than 90 volunteer Science Games mentors for student teams across the province. Mentors can impact students by showcasing the fun and interesting aspects of engineering and geoscience, provide support to student teams, and encourage teams to help build their confidence and interest in science. There will be four weekly activities for each of the two student divisions, all of which are led by mentors in an online setting. Volunteer mentors can expect a time commitment of about 11 to 20 hours across the four-week virtual event.

Engineers and geoscientists (and EITs and GITs) who are interested in becoming Science Games mentors are encouraged to apply. To learn more, or to apply to become a Science Games mentor, visit *egbc.ca/Science-Games* and scroll down and click on "Become a Science Games Mentor".

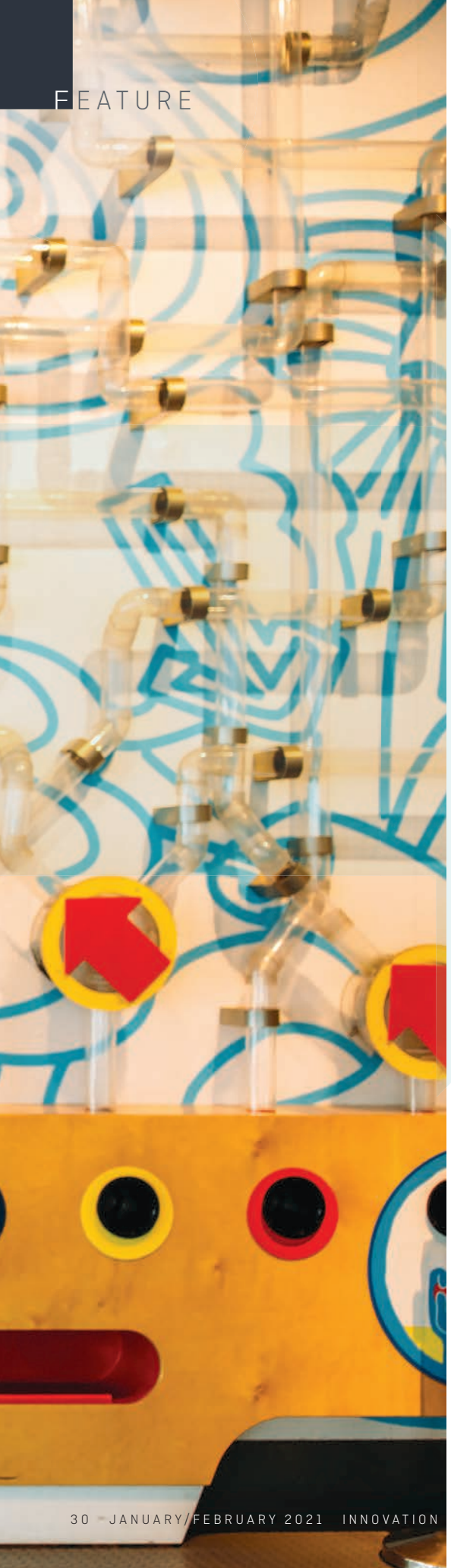
STEM AND DIVERSITY

A STRENGTHENING PARTNERSHIP

Monique Keiran

Opportunities for children to connect with STEM fields are popping up all over the province. But educators are increasingly using STEM as a catalyst for also teaching the value of diversity.

PHOTO: SCIENCE WORLD



Chunpreet Sahota, P.Eng., tells of strolling down a quiet, dark street in Calgary's downtown area with a colleague one evening.

"I told him, 'I don't normally come this way, and when I do, I walk as fast as I can—no headphones, cellphone out, alert and ready just in case,'" she says. "And he was like, 'Really? When I walk along here by myself, I take it slow, I enjoy the quiet.' Our perspectives were completely different."

Those differences illustrate why engineering needs diversity and inclusion.

"Somebody put a lot of thought into what that street would be like—how much lighting there'd be, what storefronts would be open—and they thought that design was a good idea," she says. "But, in fact, 50 percent of the population probably don't feel safe there. How sad is that?"

BENEFITS OF DIVERSITY IN STEM

When people with diverse backgrounds, cultures, beliefs, affiliations and orientations work together in science, technology, engineering and math (STEM) fields, decisions improve, says Sahota, who works as a structural engineer in Vancouver and volunteers with Women in Consulting Engineering, a BC-based organization that supports women in engineering and seeks to increase gender diversity and inclusion in the industry.

"By including diverse voices at the table, we're more likely to include those perspectives when we design communities," she says. "We put more thought into whether our designs actually serve all the people they're meant to serve.'

Diversity and inclusion benefit organizations, too. McKinsey and Company's 2018 global study of more than 1,000 organizations shows that organizations with gender-diverse leaders are more profitable than their competitors. Other research shows that employees of diverse and equitable organizations are more loyal, resilient, productive and creative.

University of British Columbia Professor of Civil Engineering Dr. Sheryl Staub-French, P.Eng., was appointed the Faculty of Applied Science's Associate Dean of Equity, Diversity and Inclusion (EDI) in 2018. She says BC society would benefit from increased diversity in STEM.

"We would get better outcomes—better designs that better meet the needs of society, improved innovation, more creative problem solving, better lives," she says. "We have a significant labour shortage in engineering in BC, and the job forecasts indicate that 70 percent of future jobs will require STEM skills. If more women, more Indigenous people, more people from other underrepresented groups pursue careers in STEM, our talent pool will not only grow, it'll be richer."

MOMENTUM FOR CHANGE

Although STEM initiatives—like Science Games, the STEM Leaders of the Future Contest, Gearing Up Clubs, Kamloops' BIG Little Science Centre—are designed to introduce kids to STEM careers

and topics, STEM dovetails perfect with diversity initiatives, too. Since 2014, Engineers and Geoscientists BC has been working to meet 30 by 30—a national, Engineers Canada-led initiative aims to increase the number of women entering the engineering profession to 30 percent by 2030.

Last year, about 22 percent of new Engineers and Geoscientists BC registrants were women.

"I see momentum building," says EDI consultant Marcie Cochrane, P.Eng., who developed Engineers and Geoscientists BC's 30 by 30 Action Plan and helps to implement it. She also works with ACEC-BC to deliver its EDI strategy and framework. "There's growing desire among firms to improve diversity and inclusion in the workplace, and there's increasing openness to having difficult discussions about EDI."

Awards programs recognizing women or organizations that inspire others in STEM fields or that demonstrate leadership in EDI also increase awareness. Women in Mining BC, for example, has three such awards, and ACEC-BC recently launched its own Equity, Diversity and Inclusion Award.

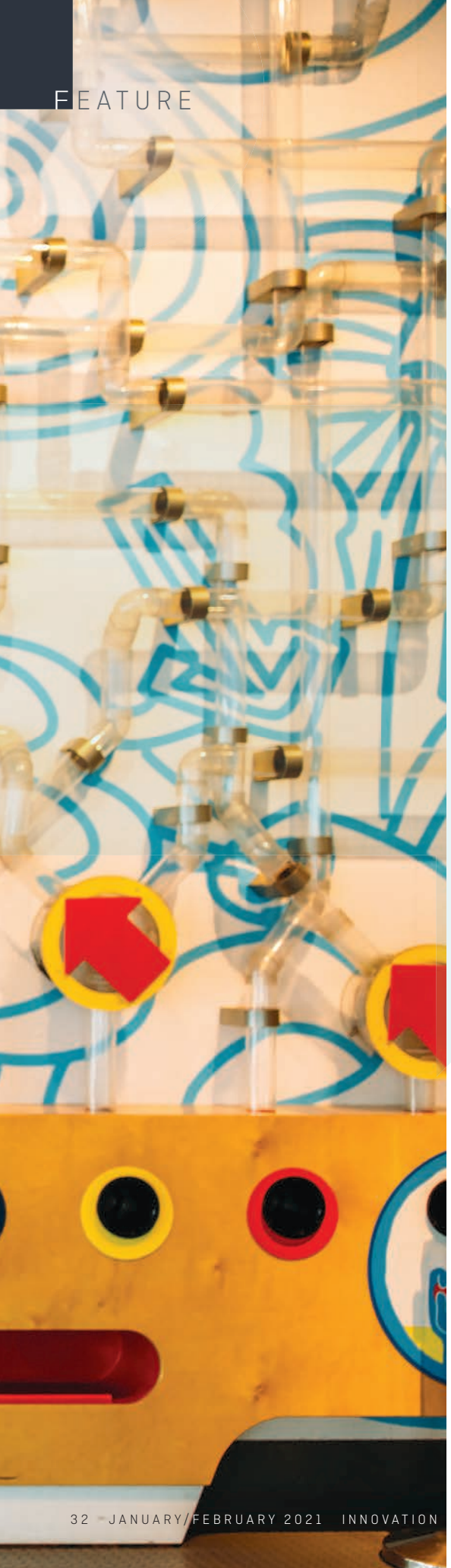
"The ACEC-BC EDI committee proposed that award," Cochrane says. "It was their idea, they developed the scope, and they brought it forward. The consulting engineering sector is placing enough value on diversity and inclusion that their representatives on the committee want an award to recognize the sector's EDI leaders."

STEM INTAKE

Many organizations target points along the STEM recruitment pipeline to encourage young women and other underrepresented groups to choose STEM careers.

Top: Chunpreet Sahota, P.Eng., Project Engineer with WSP. Photo: Courtesy of Chunpreet Sahota.

Bottom: Photo courtesy of Science World.



For example, in 2020, Engineers and Geoscientists BC invited BC youth to take part in a series of online challenges as part of its STEM Leaders of the Future program. The Greater Vancouver Mining Women's Association subsidizes school bus trips to the Britannia Mine Museum near Horseshoe Bay and helps schools purchase mineral kits. The UBC program Geering Up! provides outreach to kids in grade school, including all-girls science camps, free programming in inner-city and underserved communities, as well as programs specifically for Indigenous kids and youth across BC.

Many professional engineers and geoscientists volunteer with science camps at Vancouver's Science World, Kamloops's BIG Little Science Centre and Prince George's Exploration Place; some take part in National Science and Technology Week and National Engineering Month outreach. Many also mentor students.

Although barriers continue to divert underrepresented people away from STEM, the targeted initiatives seem to be helping attract young women, the only group for which good data exist. The 2018 Women in Tech World: Discovery Foundation gender equality roadmap report shows that women now represent 54 percent of BC's post-secondary graduates in STEM fields.

LEAKY PIPELINE

After graduation, however, everything changes. According to the same report, few STEM graduates in BC work in their fields, and women account for only 15 to 20 percent of BC's STEM workforce—well below the 25 percent Canadian average.

When Cochrane was studying for her Master's degree in 2018, her research showed that, in the first five years of becoming licensed, practising engineers, women in BC leave the profession at a rate 1.5 to 2 times that of men.

Staub-French says she, too, almost left the profession just a couple of years into working in engineering.

"I was confounded by how I was treated differently," she says. "I just could not understand why it was so different for me and my female colleagues."

In the end, she become a professor.

"When I was getting my PhD, I had two great male professors—they were all male professors in those days—who were really supportive and who mentored me," she says. "And I thought, 'I want to do that for others.'"

SHIFTING CULTURE

For organizations like Engineers and Geoscientists BC and ACEC-BC, "it's really about influencing the culture of engineering and geoscience by getting that messaging out as much as possible," Cochrane says. "That means embedding EDI into policies, professional development and culture, even in seemingly little things like the language used in practice guidelines."

As Associate Dean of EDI for UBC's Faculty of Applied Sciences, Staub-French says, "One of the greatest joys I have is getting to remove the barriers that I and other people have encountered in STEM."

She works with colleagues to cultivate an environment where everyone in the faculty feels respected, valued and included, and where EDI is embedded into

the faculty's systems, structures, conversations and culture. Faculty, staff, graduate students and department heads receive training to help them develop as teachers and leaders who further diversity and inclusion in their work. Curriculum is being revisited to ensure the engineers of the future are inclusive leaders and graduate with EDI, anti-racism and Indigenous-relevant competencies. Students in the co-op program receive training so they can be EDI ambassadors in their work placements.

"We're creating change agents who will go out into the workforce and build that culture change," Straub-French says.

To similar end, the UVic Faculty of Engineering and Computer Science recently published its EDI vision. Branzan Albu, Jackson and others are also working with the university's Equity and Human Rights office to create faculty training programs.

"A key audience for the training is our teaching assistant group," Jackson says, "The people who work most closely with our students can use inclusive language, be sensitive to race and culture, be inclusive, and model these values."

Changing the culture of the professions and its institutions and corporations takes persistence. Every initiative to promote, increase and embed EDI in STEM advances the professions a bit further.

"We're moving in the right direction, but we can't let up," Cochrane says "We need to continue our efforts."

As the professions evolve to be more diverse and inclusive, the resulting

Top: Photo: JGalione/istockphoto.com.

Middle: Photo: ©2014 Pamela Albin Moore/fstop123/istockphoto.com.

Bottom: Photo Courtesy of Science World.

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DISCIPLINARY NOTICE: JOHANN G. DUERICHEN, P.ENG., SMITHERS, BC

On December 16, 2020, the Discipline Committee of Engineers and Geoscientists BC issued an interim order imposing practice restrictions on Johann G. Duerichen, P.Eng., pending a disciplinary hearing scheduled for May 11-14, 2021. The interim order and the hearing relate to engineering services Mr. Duerichen provided for two separate projects: the construction of a residence in Revelstoke (for which Mr. Duerichen took responsibility for the structural, architectural, and geotechnical elements); and the construction of a retail store in the Town of Smithers (for which Mr. Duerichen took responsibility for the structural, geotechnical, and electrical elements). The allegations in the Notice of Inquiry include unprofessional conduct, incompetence, and violations of the Engineers and Geoscientists BC's Bylaws, and call into question Mr. Duerichen's qualifications with respect to structural, geotechnical, and electrical engineering.

The application for the interim order included an expert report on Mr. Duerichen's work on the Smithers project, and excerpts of the transcripts from interviews between Mr. Duerichen and the Investigation Committee. Joint submissions from Engineers and Geoscientists BC and Mr. Duerichen proposed restricting Mr. Duerichen's structural engineering practice, and prohibiting his geotechnical engineering and electrical engineering practice.

The Discipline Committee has the authority to issue interim orders if, after an initial assessment of the facts, it determines that there is a risk to the public interest that requires an interim order be imposed. Mr. Duerichen reserves the right to argue at the disciplinary inquiry that the evidence does not establish the allegations against him as set out in the Notice of Inquiry.

In this case, the Discipline Committee agreed that the proposed restrictions on Mr. Duerichen's practice are necessary and appropriate, that the allegations are serious, and that the prospect of work being carried out in a way that is not in accordance with applicable engineering standards presents a clear risk to the public.

The interim order restricts Mr. Duerichen from structural engineering work, except buildings whose design and construction is governed by Part 9 of Division B of the British Columbia Building Code. He may also practice structural engineering in relation to components of Part 9 Buildings that must be designed in accordance with Part 4 of Division B of the British Columbia Building Code, provided that his work is directly supervised in accordance with the Engineers and Geoscientists BC's Quality Management Guideline on Direct Supervision, and that the supervising professional assumes full responsibility for his work.

The interim order also restricts Mr. Duerichen from signing or sealing any drawings, reports or other documents, and restricts him from practising geotechnical engineering and electrical engineering.

The restrictions on Mr. Duerichen's practice are effective from December 17, 2020 until the inquiry is completed and a decision is rendered, or until a Consent Order is agreed to.

The full text of the determination can be found in the Disciplinary Notices section of our website, at *egbc.ca/Discipline-Notices*.

The Engineers and Geoscientists BC website contains information on the complaint, investigation, and discipline processes. You can contact us at 604.558.6647 or toll-free at 1.888.430.8035 ext. 6647, or by email at complaints@egbc.ca.

ORGANIZATIONAL QUALITY MANAGEMENT PROGRAM

The following organizations have recently received OQM certification.

To find out more, visit *egbc.ca/oqm*.

A Plus Structural Engineering Inc.
BASIS Engineering Ltd.
City of Langford
Holistic Engineering Ltd.
iaconicDesign Inc.
Infinity Solutions (1191027 BC Ltd)
Innovo Power Engineering Inc.
Interior Testing Services Ltd.
Jing Kong & Associates Consulting Structural Engineers Inc.
Liang Engineering Ltd.
Linkfield Engineering Consultants Ltd.
MidSea Engineering Ltd.
O&S Engineering International Inc.
Perihelion Ventures Ltd.
RMTEC Consultant
Simpson Geotechnical Ltd.
Skyline Engineering Ltd.
SMcN Consulting Inc.
UNISOL Engineering Ltd.
Vancouver Fraser Port Authority –Infrastructure Delivery Department
Waters Edge Engineering Ltd.
XT Engineering Ltd.

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varied perspectives at the table will help to shape streets, buildings—and workplace policies—that serve and support all the people they're meant to serve. ♦

Left Photos: Wendy D Photography.
Below: Photo courtesy of Science World.

MEMBERSHIP

IN MEMORIAM

Engineers and Geoscientists BC announces with regret the passing of the following members:

John Michael Anderson, P.Eng. (Retired)
Peter Barnes, P.Eng. (Non-Practising)
Raymond Philip Benson, P.Eng. (Non-Practising)
Theodore McDonald Berger, P.Eng. (Non-Practising)
Hugh Wall Buckley, P.Eng.
Peter William Corless, P.Eng.
Boris Dziubenko, P.Eng. (Non-Practising)
John Gerard Edwards, P.Eng. (Non-Practising)
Uwe Finger, P.Eng. (Retired)
Robert Henry Forsberg, P.Eng. (Non-Practising)
Robert Peter Jordan, P.Eng.
John Bruce Knight, P.Geo.
Robert Francis Little, P.Eng. (Non-Practising)
Edward Marion Lyons, P.Geo.
Donald (Graeme) Macleod, P.Eng.
Frederick Norman Manson, P.Eng. (Non-Practising)
Kenneth Ian McDonald, P.Eng.
Daniel James McGuire, P.Eng. (Non-Practising)
Donald James McLennan, P.Eng.
Anatoli Toly Messinger, P.Eng.
Delbert Howard Olson, P.Eng.
Gary Kenneth Pattullo, P.Eng. (Retired)
Ross Clayton Radatzke, P.Eng. (Retired)
Jacek Krzysztof Radlowski, P.Eng. (Retired)
William N. Rea, P.Eng. (Non-Practising)
Merlyn Joseph Royea, P.Eng. (Retired)
Milan Sikoparija, P.Eng.
Winston Dunderdale Stothert, P.Eng.
Sidney Clark Todd, P.Eng.
Neal Arthur Wood, P.Eng. (Retired) ♦

AD INDEX JANUARY/FEBRUARY 2021 INNOVATION

CONTINUING PROFESSIONAL DEVELOPMENT

PERSONAL INVESTMENT. PROFESSIONAL COMMITMENT.

We encourage you to take advantage of the Online Learning Centre, at egbc.ca/online-learning, *which provides remote educational opportunities. The Centre now hosts more than 50 online learning opportunities on a variety of topics.*

UPCOMING WEBINARS

CHARACTERIZATION AND MANAGEMENT OF METAL LEACHING AND ACID ROCK DRAINAGE

February 10, 2021

This webinar will provide an introduction to the subject topic for scientists, engineers, and geoscientists who are involved in any projects that require management of waste rock to address water quality effects from runoff. Basic principles will be discussed with a focus on site-specific approaches rather than recipes.

CONTINUING EDUCATION REQUIREMENTS

February 10, 2021

The regulatory landscape in BC is changing and the upcoming implementation of the *Professional Governance Act* will introduce a mandatory Continuing Education Program for professional engineers and geoscientists. In this webinar, we will be discussing the Continuing Education Program requirements and timeline, information on tools and resources, and allowing time for your comments and questions about the new program.

BUILDING CONDITION ASSESSMENT FUNDAMENTALS: LEVEL 3

February 11, 2021

Engineers are often engaged by owners to conduct assessments of buildings and structures. This Level 3 seminar will provide engineers with a good fundamental understanding of the steps required to conduct a building condition assessment, including methods of evaluating mould, moisture, and fire safety problems and reporting one's findings.

DEVELOPING A WATERSHED RISK MANAGEMENT FRAMEWORK

February 16, 2021

This is the second in a series of webinars to assist Association of BC Forest Professionals members and Engineers and Geoscientists BC registrants with implementing the new joint practice guidelines for assessing and managing watershed hydrologic and geomorphic risks in the forest sector.

UNDERSTANDING THE REGULATION OF FIRMS

February 17, 2021

Mandatory firm regulation will begin in July 2021. The regulatory model is based on three pillars: quality management, continuing education, and ethics. This webinar will cover the requirements in the *Professional Governance Act*, Regulations, and bylaws, and how Engineers and Geoscientists BC will support registrant firms in meeting the Permit to Practice requirements.

ADAPTIVE LEADERSHIP AND EFFECTIVE COLLABORATION

February 22, 2021

In this one-day online workshop, participants will be introduced to an innovative framework that challenges the understanding of leadership. Central to this framework is the premise that leadership is not a position, rather a practice that may be conducted by anyone within an organization

NI 43-101 - WHAT QUALIFIED PERSONS SHOULD KNOW

February 23-25, 2021

National Instrument 43-101 is an internationally recognized standard of disclosure for mineral projects and it has become a brand in the mining industry. This webinar presentation will review the roles and responsibilities of a Qualified Person when preparing scientific and technical information for public disclosure including content of technical reports.

STRESS MANAGEMENT

February 25, 2021

Personal management of stress is critical and not always easy. This workshop takes stress management to a deeper level of awareness so that participants understand their root cause of stress, the impact, and what actions they can take to minimize and release it. The model and techniques used are simple and pragmatic in handling day-to-day and ongoing stress issues that may arise.

HYDROLOGIC AND HYDRAULIC DESIGN OF CULVERTS

March 2-5, 2021

Today's design engineers who work with transportation agencies are asked to develop more complex and complete designs for culverts than ever before. Evolving requirements now often include aquatic organism passage and aspects of long-term channel stability. This course will provide participants the knowledge necessary to design a culvert considering issues of peak flow, aquatic organism passage, and local policies of importance.

CONTRACT ADMINISTRATION AND CONTRACTUAL ISSUES FOR ENGINEERING AND CONSTRUCTION PROJECTS

March 9, 2021

This session will cover legal and contractual issues related to the effective management and administration of construction projects. It focuses on the roles and responsibilities of the owners, contractors, and engineers.

LAND ACKNOWLEDGEMENTS FOR ENGINEERS AND GEOSCIENTISTS

March 10, 2021

This session will explore the practice of acknowledging First Peoples and traditional land as a way to open meetings but also as part of a larger process towards reconciliation between non-Indigenous and Indigenous Peoples in Canada. This facilitated panel discussion with Indigenous engineers, geoscientists, and Indigenous knowledge keepers will discuss the importance of this traditional protocol and its application to the engineering and geoscience professions.

DESIGN AND CONSTRUCTION OF PILE FOUNDATIONS

March 11 & 12, 2021

This is a comprehensive two-day deep foundations online course dealing with bored, driven, and helical screw piles foundations. Major emphasis will be on the analytical methods and the problem solving aspects of the design and construction of pile foundations. This course provides the participants with an opportunity to apply the design procedures to "real life" challenging foundation design projects.

PROJECT CONSTRUCTION MANAGEMENT

March 11, 2021

The purpose of this course is to build on the Fundamentals of Project Management and Contract Administration and Contractual Issues for Engineering and Construction Projects sessions also offered by Engineers and Geoscientists BC by focussing on the construction phase and its challenges with reference to major projects, cost overruns, safety, quality and labour productivity.

BUSINESS DEVELOPMENT AND SALES SKILLS FOR ENGINEERS AND GEOSCIENTISTS

April 1 – June 30, 2021

This program provides registrants with the skills and confidence to effectively address issues relating to sales and business development. Course topics include: presenting your firm's value proposition, discovering your client's requirements, conducting professional sales presentations, and securing commitment while selling. Participants receive 3 months of access to the myKISON eLearning program along with monthly 90-minute webinars facilitated by program creator Ralph Kison. The webinars include case studies, role plays, and peer discussions so participants can apply the content to their own situations.

For a complete listing of online learning opportunities, or for more information, visit *egbc.ca/online-offerings*, or contact us at 604.430.8035 or 1.888.430.8035.

CALL FOR PRESENTERS

Are you an expert in your field who would like to contribute to engineering and geoscience practice? Engineers and Geoscientists BC is actively seeking members to present on a variety of topics. For more information, please visit *egbc.ca/Practice-Resources/Professional-development*.

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

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[1] See full First-Time Applicant Offer eligibility and offer details at www.manulife.ca/newmember.
[2] Statistics Canada, "Household spending, Canada, regions and provinces," November 25, 2019.
[3] CMHC, "Mortgage and Consumer Credit Trends National Report – Q4 2019," December 2019.

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