

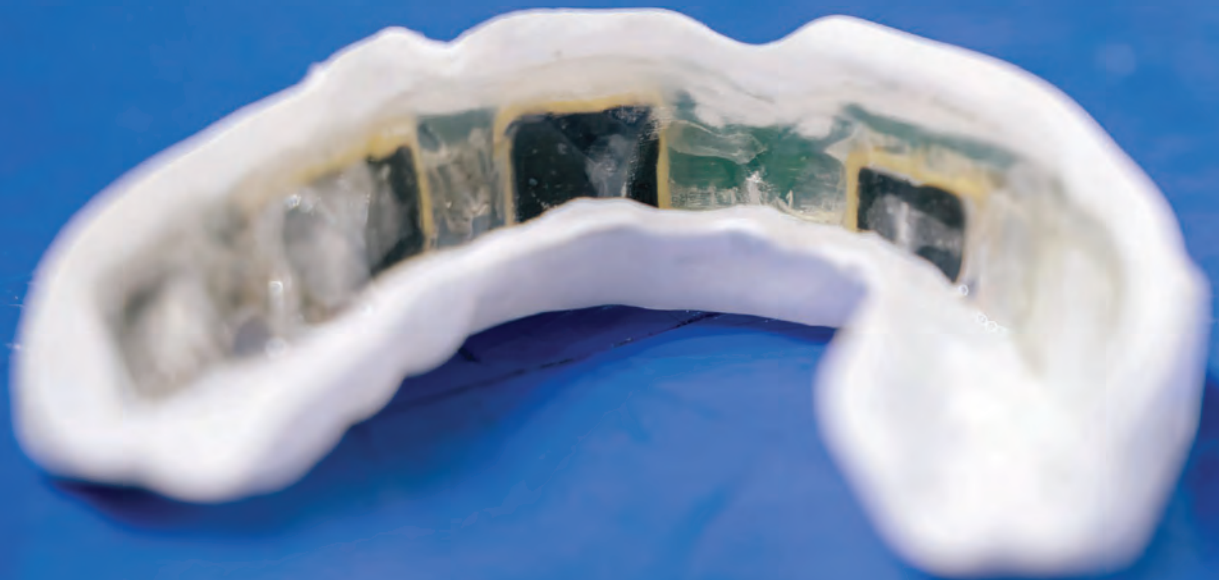
ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA

NOVEMBER/DECEMBER 2022

INNOVATION

MEASURING BRAIN TRAUMA WIRELESSLY

HOW A BC ENGINEER IS DEVELOPING
A WAY TO DETECT ATHLETE BRAIN
INJURIES IN REAL-TIME



NATURE'S INFLUENCE
ON DRONE DESIGN
HOW THE EFFECTIVENESS OF
BIRD WINGS COULD INFLUENCE
GEOSCIENCE RESEARCH TOOLS

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ON THE COVER

This mouthguard contains a triaxial accelerometer and gyroscope, designed to measure head trauma.

PHOTO: KAI JACOBSON/UBC

< COVER STORY

NOVEL MOUTHGUARDS MEASURE HOCKEY CONCUSSIONS

Concussions and other types of brain injuries are getting a lot of attention in the sports world these days. And one BC engineer has designed a high-tech wireless mouthguard that can measure hockey-related brain trauma in real time.



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QUALICUM BEACH RECAPTURES HISTORY

After years of waterfront development and erosion, the Town of Qualicum Beach approved a plan that would see the restoration of a shoreline estuary that would resurrect a fish habitat.



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NATURE'S INFLUENCE ON DRONE DESIGN

Scientists and designers have often wondered how the wings of various avian species, like gulls, lead to the kinds of maneuverability and stability that could make geoscience research and survey work easier. Now, BC researchers are finding out exactly how the design of remotely piloted aircraft can benefit from that which is already found in nature.



THIS DIGITAL EDITION OF *INNOVATION* INCLUDES VIDEO EXTRAS. LOOK FOR THIS PLAY ICON, AND CLICK ON IT TO VIEW VIDEO AND OTHER MULTIMEDIA CONTENT. AN INTERNET CONNECTION IS REQUIRED.



ENGINEERS & GEOSCIENTISTS
BRITISH COLUMBIA



STRENGTHENING CONNECTIONS WITH REGISTRANTS

It was with a great sense of humility and pride that I recently assumed the role of President of Engineers and Geoscientists BC. As a long-time volunteer, I'm honoured to have the chance to continue serving our professions and the BC public in this way.

I want to start by sincerely thanking Carol Park, P.Eng. for her work over the past year leading Council, and for her ongoing service to the organization in the role of Immediate Past President. I also want to congratulate Michelle Mahovlich, P.Eng., P.Geo., who Council elected as its Vice President for the coming year.

This past year, Council and staff developed the organization's new five-year Strategic Plan, and its vision of modern regulation for a resilient world. The Strategic Plan enshrines our efforts toward becoming greater collaborators, stewards of professional knowledge, and a future-ready and socially responsible regulator operating in the public interest. Among other things, it places greater emphasis on emerging disciplines, support for our volunteer network, and our working relationship with other regulators under the *Professional Governance Act* (PGA). It also acknowledges and promises action on diversity, climate change, and reconciliation with Indigenous peoples. The Strategic Plan and PGA harmonize well: the PGA provides the tools and methods that serve to protect the public and the Strategic Plan provides guidance on how we're going to get there.

As President, I plan to place a great deal of emphasis on connecting with you, our registrants, especially face-to-face—a valuable connection that we lost during the pandemic. As in-person activities begin to resume, I will be seeking your views about your challenges as professionals, and especially how Engineers and Geoscientists BC can best support you in your work as a practitioner and your ongoing adaptation to the PGA. I want your thoughts and stories to help guide us to be a responsive regulator delivering modern regulation, and ultimately help us all work toward our primary goal: to protect the public.

Mark Adams, P.Eng., President

president@egbc.ca

INNOVATION

NOVEMBER/DECEMBER 2022 | VOLUME 26 NUMBER 6

ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA

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Emily Lewis, CPA, CMA; Karen Ling, P.Eng.;

Mahsoo Naderi-Dasoo, P.Eng.; Mark Porter, P.Eng., Struct.Eng.;

Jessica Steeves, P.Eng.; Jens Weber, P.Eng.; David Wells, JD

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ANNUAL REGISTRATION RENEWAL

It's time to renew your registration for 2023. Here's what you need to know to complete your renewal.

HOW DO I RENEW?

Renew your registration by signing into your Engineers and Geoscientists BC account (at egbc.ca/Account) using your six-digit User ID number and password, and pay your fees electronically or by mailed cheque. Individual registrants can renew their registration now, and must renew by December 31, 2022.

FEES

For 2023, the individual registrant fee will be \$470; the fee for non-practising/retired registrants is 25 percent of a practising registrant,

or \$117.50. Both fees exclude applicable taxes.

Registrants who have not paid their annual fee by December 31, 2022 will be subject to late fees, and those who have not renewed by January 31, 2023 will have their registration cancelled.

IMPACT OF RENEWALS ON FIRMS

Sole practitioners who do not renew by December 31, 2022 will have a condition prohibiting practice placed on their firm's Permit to Practice. After a sole practitioner pays their fees, they must email firms@egbc.ca to remove the prohibition from their permit.

If you are the only Responsible Registrant of a firm with multiple individual registrants on the roster with a Permit to Practice and you do

not renew by December 31, 2022, a condition prohibiting practice will be placed on the firm's Permit to Practice. After the Responsible Registrant pays their fees, they must email firms@egbc.ca to remove prohibition from the firm's permit.

MORE INFORMATION

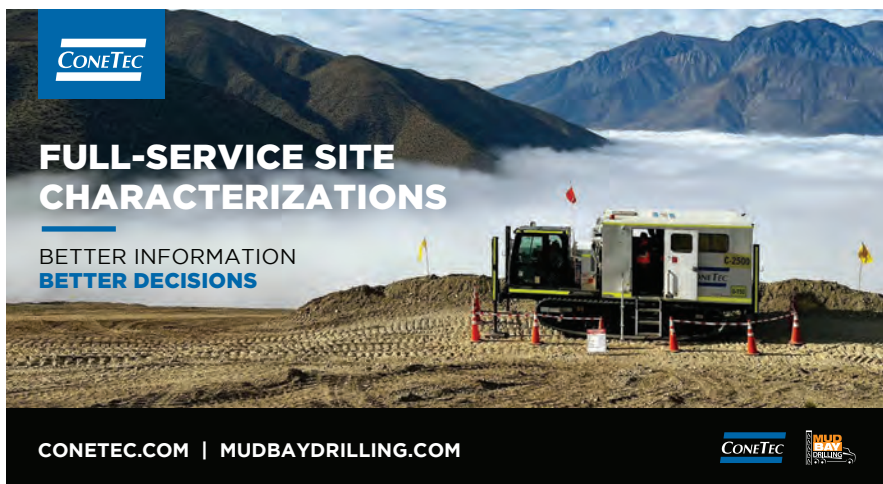
The 2022 renewal deadline also applies to registrants who submit their 2022 annual renewal invoice to their employers for payment. Please allow enough time for your employer to process your renewal. To learn more, visit the Fees page, at egbc.ca/Fees.

CORRECTIONS

In the September-October 2022 edition of *Innovation* Magazine, we misidentified the subject of a photograph on Page 19. The correct identity of the person in the photo is Alireza Hashemi.

On Page 20 of the same edition, we incorrectly reported the size of the shielding industry. It should have been indicated as a "multi-billion-dollar" industry.

Innovation regrets the errors.



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2022 COUNCIL ELECTION RESULTS

Engineers and Geoscientists BC's 2022 Council election opened on September 1, 2022 and closed at noon on September 30, 2022. This year, there were 5,550 ballots cast, comprising 14 percent of eligible voters (including professional licensees and trainees). The results of the election are as follows:

PRESIDENT (1-year term)

Mark Adams, P.Eng.

ELECTED COUNCILLORS (3-year terms)

Karen Ling, P.Eng.

Mark Porter, P.Eng., Struct.Eng.

ELECTED COUNCILLOR (2-year term to serve out Mark Adams' remaining term)

Mahsoo Naderi-Dasoar, P.Eng.

IMMEDIATE PAST-PRESIDENT (1-year term)

Carol Park, P.Eng.

RETURNING COUNCILLORS

Elected Councillors

Michelle Mahovich, P.Eng., P.Geo.

Jessica Steeves, P.Eng.

Jens Weber, P.Eng.

Government Appointees

Suky Cheema, CPA, CA

Leslie Hildebrandt, ICD.D, LLB

Emily Lewis, CPA, CMA

David Wells, JD

The Chief Executive Officer is the Chief Electoral Officer and is responsible for the conduct of the election. The online ballot was conducted using systems contracted from Simply Voting Inc., which operates under high-security, TLS 1.2, 256-bit encryption with anti-fraud controls and secure login for eligible voters. This third-party system protects the anonymity of a vote. Election results were not available to Engineers and Geoscientists BC until after the close of the election.

At its meeting in early November, Council will also appoint one of its elected members to serve as vice president.

For more information, visit egbc.ca/Council-Election.

**MICHELLE MAHOVLICH, P.ENG.,
P.GEO., F.CSSE, APPOINTED
VICE PRESIDENT**

At its inaugural meeting on November 3, Council appointed Michelle Mahovich, P.Eng. P.Geo., F.CSSE, as its Vice President for the 2022/2023 Council year.

Michelle is currently the Director of Engineering and Public Works for the City of Langford, where she has worked for the past 14 years. Previously, Michelle was the Project Manager that oversaw the remediation of the former cement plant at the 1,500-acre Bamberton site, and then the site's Development Manager. Her 17 years of private sector work experience included both geotechnical and contaminated sites engineering work.

Michelle holds a Bachelor of Science in geology and a minor in biology from McMaster University, along with a master's degree in geological engineering from the UBC. Michelle most recently served on Engineers and Geoscientists BC's Investigation Committee as Vice-Chair and as an executive member of the Municipal Engineers Division.

Michelle spends much of her volunteer time with the University of Victoria, Camosun College, and local school districts promoting women in STEM. She is a strong proponent of ongoing professional development for her work team. Michelle is an experienced volunteer with Engineers and Geoscientists BC and has served on Council for more than two years.



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SEPTEMBER 9 AND NOVEMBER 3, 2022

Engineers and Geoscientists BC's Council of elected registrants and government representatives meets throughout the year to conduct the business of organizational governance. The following are the highlights of its September 9 and November 3, 2022 meetings.

BYLAW AMENDMENTS

Council approved a series of amendments to its Bylaws. The amendments address the composition of statutory committees, formalize the appointment process for the Executive Director, Registrar, and Deputy Registrar, and update the number of practising hours for designated structural engineers to better align with the organization's Continuing Education requirements. Several amendments to typographical errors were also made.

Bylaw amendments are reviewed and approved by the Office of the Superintendent of Professional Governance. Engineers and Geoscientists BC's current Bylaws are available at egbc.ca/Bylaws.

2021/2022 AUDITED FINANCIAL STATEMENTS APPROVED

Council received the report of the Audit Subcommittee and approved the organization's audited financial statements for the fiscal year ended June 30, 2022. No material weaknesses in internal controls were noted and no audit adjustments were proposed.

This year, Engineers and Geoscientists BC reported increased revenues, primarily due to the introduction of a regulatory program for firms, overall growth in the number of registrants, and higher participation in courses and exams. Surplus funds will be used to build up the organization's reserve funds for legal expenses, property and equipment, and to make additional progress toward achieving Council's target of six months' operating expenses in its general operating fund.

REPORT ON CONTINUING EDUCATION FEEDBACK AND COMPLIANCE


Staff provided Council with an update on compliance with the newly introduced Continuing Education and Annual Reporting requirements, and a summary of the feedback received from registrants. While most registrants met their first-year requirements by the deadline of June 30, some experienced challenges with the reporting system, confusion about the requirements, or were not aware that new requirements had been introduced. At times, the volume of inquiries also exceeded the resources available to respond to them, causing frustration for some registrants.

Staff are currently considering feedback registrants provided in a survey in early September and are reviewing updates to the functionality of the reporting system, as well as additional changes that will reduce confusion and make the process more streamlined for registrants. An update will be provided to registrants in early 2023.

NEW COUNCIL TAKES OFFICE; VICE PRESIDENT APPOINTED

On November 3, the 2022/2023 Council met for its inaugural meeting. Each councillor took an oath of office, an important commitment to uphold the duties, responsibilities, and accountabilities of their position, and to hold the public interest paramount in their decisions.

Council appointed Michelle Mahovich, P.Eng. P.Geo., as its Vice President for the 2022/2023 Council year. Michelle is an experienced volunteer with Engineers and Geoscientists BC and has served on Council for more than two years. More information about the appointment of Council's Vice President is provided on Page 7.



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Top: Aya Costa, EIT, working on a community water system planning and design project.
 PHOTO: ELECTRA COONJAH, EIT

Bottom: A project from Science Games 2022.



SCIENCE GAMES VOLUNTEERS INSPIRE YOUNG MINDS ACROSS BC

When Aya Costa, EIT—an environmental engineer-in-training at Urban Systems—first volunteered as a mentor for Science Games, she had no idea that she would have as much fun or learn as much about science as her students did.

“I definitely played with slime as a kid, but I never thought about how it worked at the time, or why it has the properties it does,” she said. “When you volunteer for Science Games, you get an opportunity to take a closer look and learn the science behind a lot of everyday phenomena like this.”

Returning virtually in February 2023, Science Games is a collaborative, hands-on event organized by Engineers and Geoscientists BC that motivates students ages 6 through 12 to develop their scientific talent, build their sense of curiosity, and dive into the world of science, technology, engineering, and math (STEM).

As a past Science Games mentor, Aya led small groups of students through weekly challenges and activities, showcased the most interesting parts of engineering and geoscience careers, and empowered students to find creative solutions to new problems.

Her favourite aspect of volunteering is the sea of smiles that greet you at the start and end of every Science Games session. “Their joy and enthusiasm make it very clear that the effort you put into volunteering for this event has a meaningful impact on these students,” she said.



A project from Science Games 2022.

Aya notes the “many other benefits” of volunteering for Science Games, which include contributing to a greater cause, creating a stronger balance of work and play in your life, stewarding greater diversity in STEM, and inspiring future generations of professionals.

“Exposure to different role models is especially impactful for kids who don’t have parents in STEM careers, or who don’t have the opportunities to engage in STEM activities from a young age,” she said. “It’s also important for kids to see that there is no single type of person—no single race, no single gender—that can succeed in these kinds of careers.”

Aya said that when she talks to young students now, they often express their dislike for science, math, and learning at school. Science Games helps rewrite that story by making science fun and engaging, while also illuminating a career path for young students to become engineers or geoscientists who safeguard the public and environment for future generations.

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Engineers and Geoscientists BC needs more than 50 volunteer registrants to make Science Games a success. To learn more and apply to volunteer as a mentor for this year's virtual Science Games, visit egbc.ca/2023-science-games-mentor or email sciencegames@egbc.ca. Volunteers must be registrants of Engineers and Geoscientists BC, or members of the student program.

REGISTRANTS ATTEND 2022 ANNUAL GENERAL MEETING

Engineers and Geoscientists BC hosted its virtual Annual General Meeting on October 15, 2022, providing an opportunity for registrants to hear from Council and senior staff on the organization's progress over the past year.

President Carol Park, P.Eng., and CEO Heidi Yang, P.Eng., FEC, FGC (Hon.) provided an update on the organization's activities, including the development of a new strategic plan that will guide the organization over the next five years, the introduction of new requirements for continuing education and the regulation of firms, the significant work undertaken to operationalize the *Professional Governance Act*, and the organization's commitment to equity, diversity, and inclusion.

They addressed questions from registrants on several topics, including the removal of advocacy from the organization's mandate, remuneration for volunteers, actions to address misuse of title, continuing education requirements, and issues pertaining to digital submission of documents to municipalities.

Registrants also heard from Paul Craven, Superintendent of the Office of the Superintendent of Professional Governance (OSPG), who presented a report on the OSPG's activities during its first year of operations. He reviewed the OSPG's engagement with regulatory bodies, lessons learned, and actions underway to clarify areas of reserved and regulated practice.

At the conclusion of the meeting, Mark Adams, P.Eng., was inducted



PHOTO: MIKE CRANE PHOTOGRAPHY

as Engineers and Geoscientists BC's President for 2022/2023. He welcomed newly elected and continuing Council members and reaffirmed the organization's commitment to transparent governance, risk management, and ensuring high professional and ethical standards are upheld in the delivery of its mandate.

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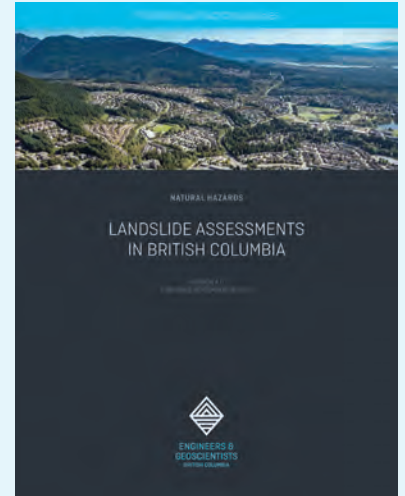
These guidelines, and other professional practice guidelines and practice-related resources, are provided at egbc.ca/Guidelines.

NEWLY PUBLISHED PROFESSIONAL PRACTICE GUIDELINES AND ADVISORIES egbc.ca/Guidelines

PROFESSIONAL PRACTICE GUIDELINES – LANDSLIDE ASSESSMENTS IN BRITISH COLUMBIA

These Professional Practice Guidelines outline the expectations and obligations related to landslide assessments. These Guidelines were first published in 2006 to provide a common understanding between Authorities Having Jurisdiction and qualified professionals about the nature and requirements of legislated landslide assessments. The updated 2022 Guidelines provide additional clarity on current methods and techniques used to perform landslide assessments, and expands the content to encompass the requirements of landslide assessments for non-legislated and existing developments, as well as those of legislated and proposed residential developments addressed in the previous version of these guidelines.

These updated Guidelines also respond to increasing development pressure, advances in science and methodology, the transition to adaptive management in a changing climate, and technological change in the digital era.



PRACTICE ADVISORY – OVERHEATING CONSIDERATIONS FOR EXISTING MULTI-UNIT RESIDENTIAL BUILDINGS

This practice advisory has been issued for registrants who provide services related to alterations and repairs to existing multi-unit residential buildings—specifically, engineering professionals who provide mechanical, electrical, building enclosure, and/or energy modelling services about their responsibility to consider relevant health and life-safety issues caused by overheating. This advisory provides guidance related to minimizing the risk and effects of overheating on building occupants, addressing indoor air quality, and reducing greenhouse gas emissions in existing multi-unit residential buildings. The activities of these engineering professionals may impact the management and effects of overheating, even where their engagement is not specifically intended to address overheating.

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FREQUENT PROFESSIONAL PRACTICE INQUIRIES

WHEN MUST INDEPENDENT REVIEWS OF STRUCTURAL DESIGNS BE SUBMITTED, AND WHO CAN REQUEST A RECORD?

In response to recent practice advice questions related to independent reviews of structural designs, Engineers and Geoscientists BC communicated with Authorities Having Jurisdiction (AHJs) and structural engineers to clarify the requirements for documented independent review of structural designs.

An independent review (formerly known as a “concept review”) is a documented evaluation of the structural design concept, details, and documentation performed by an appropriately qualified and experienced professional who was not involved in preparing the design. Independent reviews have been a requirement in BC since 1992 and are required for most structural designs in BC, with few exceptions (as outlined in the *Guide to the Standard for Documented Independent Review of Structural Designs*, at egbc.ca/Quality-Management-Guidelines). They are a key part of the design process and help to ensure that a professional has met their obligation to complete their work in a manner that minimizes risk to the public and the environment.

Engineers and Geoscientists BC has recently re-iterated the following requirements related to independent reviews of structural designs to AHJs and structural engineers.

1. **AHJ expectations:** Engineers and Geoscientists BC’s Bylaws (available at egbc.ca/Bylaws) require that the engineer of record or independent reviewer provide a copy of the documented record of the independent review to the AHJ when requested. Engineers and Geoscientists BC recommends that, where appropriate, AHJs require engineers to provide records of independent reviews to ensure they have been completed.
2. **Timing of submissions:** Independent reviews of structural designs are required to be completed prior to documents being issued for construction or implementation; Engineers and Geoscientists BC Bylaws do not require independent reviews to be complete before permitting, but do require building permit submissions to be substantially complete (as outlined in


Practice Advisory: Issued for Building Permit Documents, at egbc.ca/Guidelines). Documents issued for permitting must contain sufficient detail to enable the design to be checked for conformance to applicable codes. It is common for independent reviews to be completed between the permitting and construction stages; this meets the intent of the Bylaws but may not meet the requirements of the AHJ.

AHJs are encouraged to request records of independent reviews of structural designs at an appropriate stage in the permitting process. For some structural engineers, this may represent a shift in expectations and timing of submissions in the permitting process, which AHJs should keep in mind when implementing any new permitting requirements.

Structural engineers are encouraged to proactively adapt their workflow to anticipate an increase in requests from AHJs for records of independent reviews of structural designs at the permitting stage.

For questions related to professional practice obligations such as independent reviews, email practiceadvisor@egbc.ca.

Allison DenToom, P.Eng.
Practice Advisor



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HIGH-TECH MOUTHGUARDS FOR ATHLETES **REVEAL WHAT REALLY HAPPENS TO THE HEAD DURING IMPACT**

Concussion is a fact of life in many sports, football chief among them, but also hockey, soccer, rugby and lacrosse. But even mild traumatic brain injuries can have lasting consequences for athletes. That's why one BC engineer and researcher is attempting to learn more about what actually happens during a head impact using triaxial sensors implanted in custom-fit mouthguards.

ROBIN J. MILLER





Dr. Lyndia Wu, P.Eng. PHOTO: KAI JACOBSON/UBC



PHOTO: KAI JACOBSON/UBC

The US Centers for Disease Control and Prevention estimates that, in the United States, 10 percent of all sport athletes suffer from one concussion annually.

This equates to millions of concussions a year among amateur and professional athletes, and it's safe to assume that the numbers in Canada are similar. Fortunately, the majority of these brain traumas are so mild that the after-effects disappear within a few days; however, research had proven that severe or repeated mild concussions can cause long-term brain damage.

In response, sports bodies in the US and elsewhere now require teams to bench players after a head trauma—which is of course a great idea but very hard to enforce. Many players are reluctant to report anything that might take them out of competition, and team doctors and trainers have historically lacked the tools they need to recognize when a head trauma has occurred and how it has affected the athlete's brain.

Dr. Lyndia Wu, P.Eng., is doing her best to change that.

Wu had never been a fan of contact sports, yet she got involved in American football in a big way while completing her doctorate at Stanford University. Now an assistant professor of mechanical engineering at UBC, she first became interested in the idea of developing electrical or mechanical designs for health-related devices while she was an undergraduate at the University of Toronto, studying biochemical engineering. "Then, when I was looking around at graduate schools, I saw this lab at Stanford that was developing smart helmets and

working directly with athletes on concussion mechanics, and I thought it was a really nice fit with my interests."

When Wu arrived at Stanford, she said, "there were a lot of discussions going on about concussions causing neurodegenerative disorders and we were looking for real-world mechanics data to see exactly what that connection was." Football, the sport responsible for the majority of US sports-related concussions, was a logical place to start, so Wu's Stanford lab began by considering fixing sensors that could track the head during an impact inside the helmets of the school's varsity football team. But helmets, it turns out, "are not designed to be rigidly attached to the head when players are hit," she said. "In fact, for safety, they are meant to mitigate impact energy through deformations and displacements during big impacts. So all the sensors would do is measure the motion of the helmet not the head, which was not at all what we wanted."

Looking around for a better spot, Wu explored the idea of placing sensors inside the players' mouthguards instead. As part of her PhD work, she developed a mouthguard that contains a triaxial accelerometer and a triaxial gyroscope to measure both linear and rotational motion of a player's head during an impact, caused by either a hit to the head or to the body, where there is a whiplash head motion. "The upper teeth are directly connected to the skull, so a mouthguard sitting on those upper teeth is directly connected to the skull," she said.

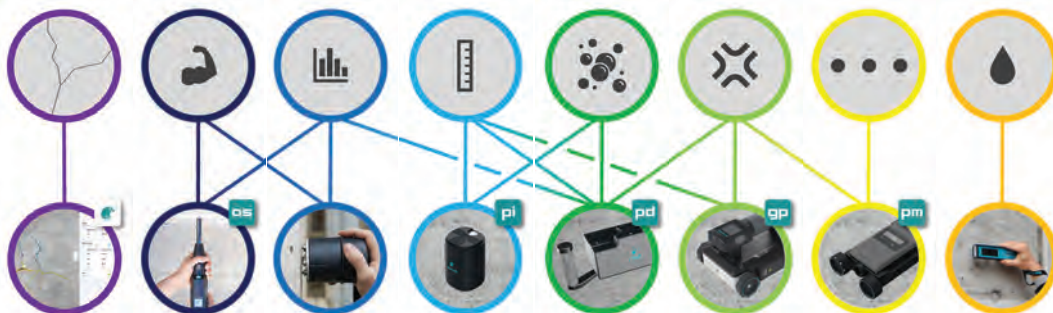


PHOTO: KAI JACOBSON/UBC



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Until a wearable MRI is developed, “it’s the closest we can get to the brain and to measuring the motion of the skull in real time.”

The sensors allowed Wu to collect a novel human data set—and to confirm the promise of mouthguard sensors in predicting injury—but only from one sport and one gender. When she came back home to Canada, Wu’s goal was to expand her work to address two groups currently under-represented in concussion research: female athletes, who are statistically more likely to sustain a concussion than men, and sports other than football. “In the US, there’s a lot of funding and a lot of research concentrated on football, with the majority of concussion data coming from that sport and focussed on male athletes. Here, hockey is also a sport with a high number of concussion incidents where we can gather data from both male and female athletes.”

In 2020, Wu and her UBC-based Sensing in Biomechanical Processes (SimPL) lab received a five-year Canadian Institutes of Health Research grant to study concussions in hockey. Delayed by the pandemic, Wu and her team—which includes, from UBC, research associate Adam Clansey, several graduate students, and multiple neuroimaging and neuro-assessment experts, plus a US-based brain modeller—finally managed to deploy her custom-fit instrumented mouthguards with both the UBC men’s and women’s hockey teams in the 2021/2022 season and are just now starting the second season of data collection. Like so many well-laid plans, however, the study has not quite worked as Wu hoped: only a few women signed up compared to a large number of men.

In women’s hockey, all players are required to have a full cage on their helmets, rather than the half-face visor most male players choose to wear. That meant the women would have to keep their mouthguards in at all times, even off the ice, making it impossible to talk, drink, eat, etc. “The men were more keen,” said Wu, “because for them the mouthguard doesn’t intrude at all. They can just pop it out when they want to.” Fortunately, though, the majority of the women players did agree to participate in the other parts of the study, including MRI scans and neurological assessments of brain structure and brain function, done pre-season, post-concussion and post-season, “when,” said Wu, “it may be possible to see accumulated effects of brain trauma.”

The sensors themselves, built by a commercial partner, are fully programmable. “Right now, we don’t really know what kind of accelerations are associated with concussions or what threshold we can definitively use for predicting injuries,” said Wu, so determining the speed at which injury can occur is a central part of her research. “If, for example, we tell the mouthguard that an event with 5-gs [g-force] of acceleration would be of interest, it will pick up and record for a short period any event where

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Study data captured through mouthguards. PHOTO: KAI JACOBSON/UBC

the acceleration of the head passes that threshold. Combined with the clinical outcomes information, eventually we hope to be able to define the threshold of injury from even very low acceleration levels—the little impacts where the brain trauma would not reach the level of clinical concussion—because even mild brain trauma means the athlete should take some time for recovery. These kinds of impacts occur frequently and they are usually not monitored by the teams. Only the clinical concussions are looked at and treated in sports.”

In addition to the continuing ice hockey research, Wu and her team are currently collaborating with the UBC women’s soccer team to gather data on impacts associated with “heading” and are starting a new collaboration with the UBC women’s varsity rugby team. “We want to gather more female athlete data to fill that gap of knowledge,” said Wu, “and try to understand whether there may be biological or anatomical reasons, potentially weaker necks, for example, coming into play and causing higher incidence of concussion and more severe impacts in women athletes.”

Over the next few years, Wu would like to see the data she has collected, on both male and female athletes, translated not only into a commercially available mouthguard for sports teams to use “for more reliable and timely diagnosis of mild traumatic brain injury,” but also, eventually, into “a wearable sensor that anyone interested in tracking their own impact exposure can purchase, so that our research will start to benefit people in a real way.” ♦

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A portrait of Mark Adams, P.Eng., a man with short brown hair and a friendly smile, wearing a dark blue suit, white shirt, and blue tie. He is standing in a modern, brightly lit interior space with large windows and warm lighting in the background.

MEET THE PRESIDENT

MARK ADAMS, P.ENG.:
**A PASSION FOR VOLUNTEERING
AND REGISTRANT ENGAGEMENT**

Although still relatively early in his career, Mark Adams, P.Eng., Engineers and Geoscientists BC's newly elected President, has a long history of volunteer work. In 2016, he was awarded the Sovereign's Medal for Volunteers—a national medal that recognizes volunteer achievements of Canadians. Inside Engineers and Geoscientists BC, he has amassed many years as a volunteer on multiple committees, including more than seven years as a member of the Continuing Education Advisory Group, eight years as a Mentor Program volunteer, and three years on Council.

Mark's obvious leadership skills were built through his engineering career and through his deep commitment to service in the professions and in the community.

"I've structured my volunteering the same way as I've structured my career. I always want to contribute at a higher and higher level, and to add more value," he said. "Serving on [Engineers and Geoscientists BC's Continuing Professional Development Committee], including as Chair, provided exposure to many different facets of the organization. Now, after almost a decade of volunteering with the organization, I'm happy that I'm in a position where I can hit the ground running as President."

Mark currently serves as Vice President of Studies and Technology and Global Mining Sector Lead at SNC-Lavalin, and he has worked in the mining industry for nearly 20 years in engineering, operations, technology, and project

development roles. He holds a Bachelor of Applied Science in Mining Engineering and an MBA from UBC, and has volunteered on boards and committees for many non-profit organizations advocating for youth, veterans, education, healthcare, and STEM. He also spent over a dozen years as a reserve officer in the Canadian Armed Forces.

When did you first decide to become an engineer, and what keeps you excited about working in the profession?

I decided to be an engineer in grade seven. We were doing a project where the teacher showed two land masses and said "draw what you think would be a bridge between them." Everyone came up with something different. After that exercise I remember asking lots of questions, and then my teacher asked me if I'd ever considered a career in engineering. That was a defining moment and I made the decision then. I studied mining engineering at UBC, and what gets me excited now is mining's role in the net zero transition. We need so many metals and materials to produce the electrical infrastructure that is needed. Being an enabler for the net zero future and to combat climate change is a big motivator for many of us in the industry.

What are you most excited to see happen during your term as president?

Council and staff are both very invested in the new strategic plan, with its emphasis on climate change, reconciliation with Indigenous peoples, and equity, diversity, and inclusion. All of these things are fundamentally

important to the professions, and the public expects us to address them.

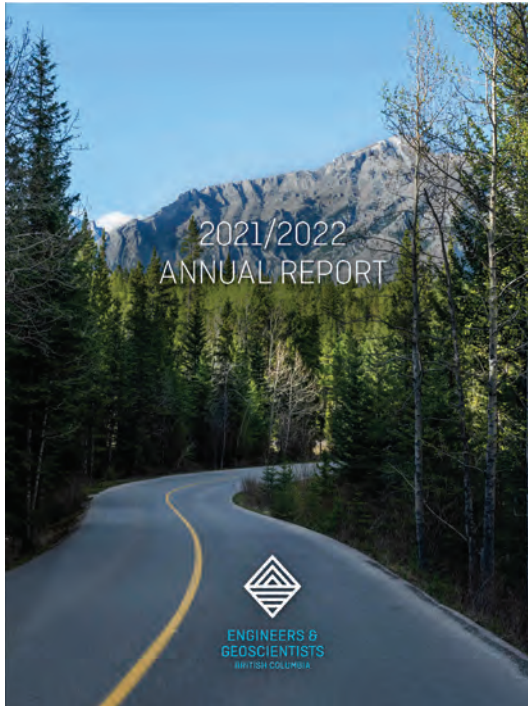
Registrant engagement is another important area for me. I want to hear from registrants about their challenges and how we can support them. I'm looking forward to getting back to in-person activities like events and branch visits where we can have conversations, get to know each other, and talk about issues.

I'm also proud that we're seen as a national leader in innovation and regulation, and we need to continue to nurture that leadership position. Being an innovator is part of this organization's culture.

You're also a leader in community-based service. Can you tell us more about your approach to volunteering?

Service is an important value in my life that was instilled in me by my parents. In the last 10 years I've volunteered for about a dozen organizations. This has really informed my view that those of us who are doing well and have people that care about us, we need to be there for people who don't have that and need that.

With volunteering, I always feel that I get out more out of it than I give. There is so much learning that you wouldn't otherwise get until much later in your career. I've had a chance to learn so much about governance, risk management, financial oversight, and strategy. I also get to meet successful, talented, caring people who are not from the mining or engineering community, and who think about things in a different way because they come from different industries and backgrounds.



2021/2022 ANNUAL REPORT NOW AVAILABLE

Engineers and Geoscientists BC's 2021/2022 Annual Report summarizes the work of our volunteers, Council, and staff to conclude the 2017-2022 Strategic Plan. The report outlines the organization's transition to new legislation, the introduction of new regulatory obligations, and the introduction of the organization's new Strategic Plan. The report also includes the organization's audited financial statements for 2021/2022.

For more information, or to download the 2021/2022 Annual Report, visit egbc.ca/Annual-Report.



INNOVATION MAGAZINE'S PROJECT HIGHLIGHTS EDITION 2023 COMING SOON

Each year, *Innovation* Magazine invites BC's professional engineers and geoscientists to submit photographs and project descriptions of recent work, for consideration for the magazine's popular Project Highlights Edition, planned for the May/June 2023 edition.

Registrants or companies may submit photographs of projects undertaken in 2022, inside or outside BC, involving at least one Engineers and Geoscientists BC registrant. Readers are encouraged to watch for an email announcement early in 2023 that will provide submission criteria, deadline dates, and other important information.

The submission form is expected to be available in early January 2023, and close in late February. For more information, visit egbc.ca/Innovation.

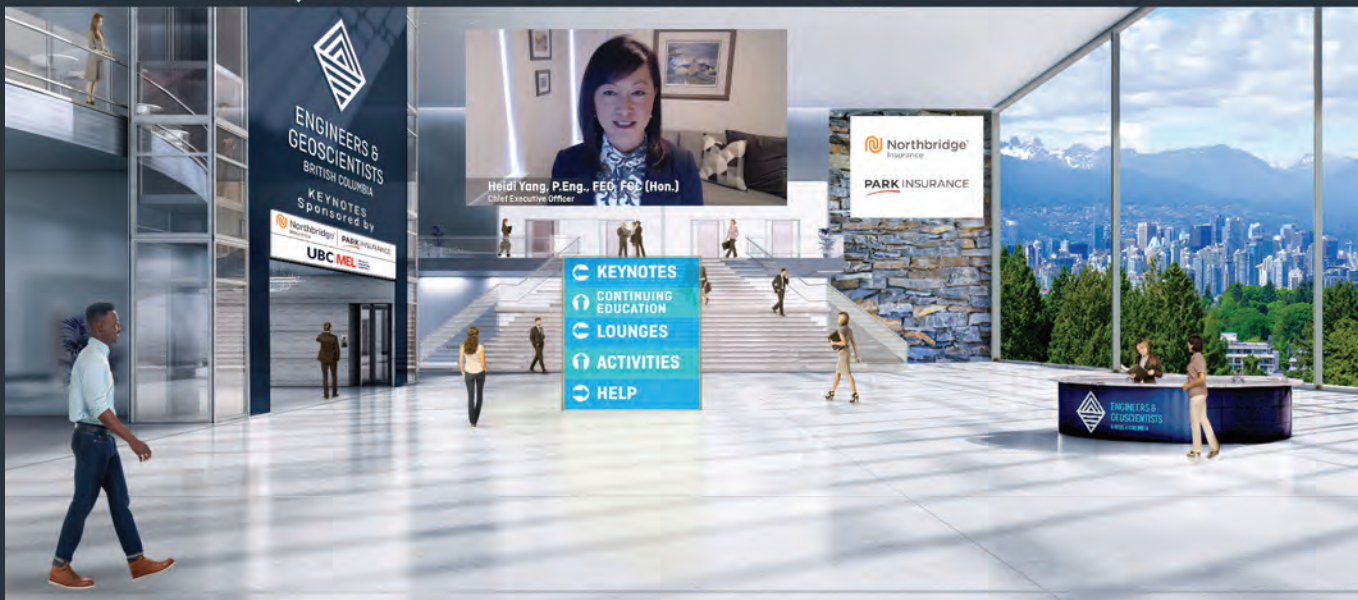
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2022 ENGINEERS AND GEOSCIENTISTS BC ANNUAL CONFERENCE CONCLUDES

For the third year in a row, Engineers and Geoscientists BC held its Annual Conference virtually, giving registrants the flexibility to attend from anywhere in the world. Over 1,000 individuals attended the Annual Conference, from across Canada and around the world held on October 12-13, 2022.

Registration for the Annual Conference included access to 30 hours of Continuing Education (CE) sessions, CE streams, networking opportunities,

gamification, a virtual tradeshow, and keynote addresses from Anna Maria Tremonti and Waneek Horn-Miller.

Registrants that missed the Annual Conference can purchase on-demand conference packages until December 16, 2022. Your purchase includes access to high-quality session recordings and handouts—up to 30 CE hours—and unlimited on-demand access for all breakout sessions. Access to the breakout sessions is available until January 31, 2023. For more information on the 2022 Annual Conference and to purchase an on-demand package, visit egbc.eventsair.com/ac22/post-conference-registration.

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predominantly about education – or elected officials, long-term staff (who may not recognize the value of dynamic designs), stakeholders and the public 10/12/2022 2:48PM

David Lee: How do we bridge the gap between evolving climate science and applied science that engineers are more used to? Will there be new design/analysis methodology that helps engineers move forward? Or are we expected to complete a quantitative risk analysis to establish basis of design? 10/12/2022 2:44PM

Morgan Tidd: That would depend on the application and your clients risk tolerance - we have incorporated quantitative risk analysis into many project lifecycles where risk tolerance is low. 10/12/2022 2:50PM

SLIDES

FEATURE

GEOSCIENCE ON THE FLY

NICOLE D. BARLOW, P.GEO.





PHOTO: DR. VIKRAM BALIGA/UBC

Researchers at the BC Geological Survey are venturing into new technological territory by applying tried-and-true airborne geophysical methods—in miniature—to determine subglacial till composition for drift prospecting. At the same time, researchers at UBC and the University of Michigan are being inspired by nature to innovate in this same field of technology.

Travis Ferbey, P.Geo., of the BC Geological Survey has been using remotely piloted aircraft systems (RPAS) technology for drift prospecting since 2019, with the RPAS enabling an intermediate scale of data collection between ground surveys and traditional airborne surveys. Ferbey said, “We started off by flying an RPAS that’s designed to collect high-quality air photos to create photogrammetric digital elevation models (DEMs). These are useful in Quaternary geology because we map the breaks in slope of surficial sediments to delineate landforms and interpret what sediments will be in those landforms.”

For the past two summers, the team used RPAS geophysics—specifically magnetometry and gamma-ray magnetometry—to detect dispersal of mineralized lithologies in subglacial tills, formed from sediment deposited by moving glaciers. “Those measurements will characterize the rock that the till is derived from,” Ferbey said.

Both the gamma-ray spectrometer and magnetometer are miniaturized versions of equipment used on fixed-wing aircraft or helicopters. The spectrometer measures gamma rays from the top 30 centimetres of the ground, and “if we ensure that we’re flying over a subglacial till, we’re measuring concentrations of potassium, equivalent uranium and equivalent thorium in that subglacial till,” said Ferbey. Potassium values could indicate potassic alteration from a porphyry deposit, which is an important target for BC mineral exploration. Spikes in uranium and thorium could indicate a carbonatite deposit, a potential source for some of the critical minerals needed to fuel a green economy. Ratios of potassium, uranium and thorium can characterize bedrock lithologies if you’re flying over bedrock instead of till.

The magnetometer can be used to measure magnetite content. Ferbey said, “Felsic to

intermediate intrusions will often have magnetite as an accessory mineral. When a glacier moves over top of that, erodes that, and produces a subglacial till, that subglacial till will also have magnetite in it.” Unfortunately, the magnetometer provides a bulk measurement, combining the bedrock and surficial values. Geophysicists on the project who specializes in magnetometry are working on separating the two signals to help with the analysis.

Traditionally, Quaternary geologists would physically collect samples for elemental concentrations and mineral assemblage determinations to identify prospective covered lithologies, which can be time-consuming and requires disturbing the landscape to dig holes to collect samples—safety is also an issue in dangerous topography. Researchers often need to wait two to three months to get results back from the lab. With the RPAS, said Ferbey, “We can collect data during the day, head back to camp, process

all the data on a laptop, and those data can guide the program the next day.”

Ferbey and his team worked in the Interior Plateau of BC: near the Mt. Polley mine, around the Woodjam developed prospect, and north of Merritt in the Guichon Creek batholith. They used the DJI Matrice 600 Pro exchangeable payload RPAS (a configurable platform) for the gamma-ray spectrometry, magnetometry and lidar, and the DJI Phantom 4 RTK to collect high-quality air photos. They also added flight planning software so surveys can be programmed and flown as autopilot missions, in conjunction with a radar altimeter to ensure a constant, preset altitude above ground.

The team flew the RPAS-borne gamma-ray spectrometer and magnetometer 5-10 metres above ground level (since gamma rays attenuate too quickly to use the miniaturized spectrometer any higher), which limited their work to cut blocks, where forest cover wasn’t an issue. Still, hazards abound: the occasional tree,

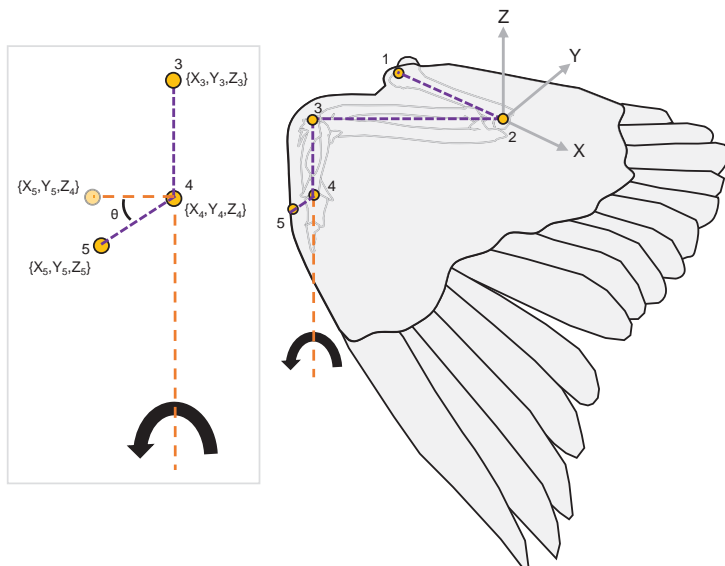
debris, stumps, and snags. They used laser range finders to measure hazards and tops of trees to plan flight lines, and—thanks to precise measurements—flew 300 line-kilometres incident free, despite the M600 RPAS not having collision avoidance hardware or software. Ferbey could see applications for RPAS use in exploration elsewhere in Canada: “Above the treeline, either in the alpine or in the Arctic, that presents a completely different scenario, where these methods could really shine.”

Ferbey is excited about the rapidly changing RPAS technology in a field still in its infancy. Commercially available RPAS with improved battery power would help: with a payload of 3 kilograms, they are limited to 25 minutes of flight time. “Beyond that,” Ferbey said, “other instruments commonly used in geophysics that aren’t yet available for RPAS.”

For Ferbey’s application, he needs maneuverability and stability to fly

Marker placement indicating range of motion and tracking joint angles in the avian wing.

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Easton Elia, GIT.

PHOTO: TRAVIS FERBEY, P.GEO./BC GEOLOGICAL SURVEY



accurate flight lines 10 metres apart and a consistent distance from ground. He wondered, “Would something that flies like a bird be able to spin around over a relatively short horizontal distance to continue with the next flight line?”

Dr. Daniel Inman from the University of Michigan assembled a team, including biologists from UBC, to investigate this question: how could maneuverability in RPAS be informed by bird flight?

Dr. Vikram Baliga, a Research Associate at UBC’s Department of Zoology, focused on the range of motion of a bird’s wing. “When you see birds in flight, they don’t have static wings. They have elbows, they have wrists...as they’re flying, we can see that they’re using these joints to change the shape of their wings,” which their research calls ‘wing morphing.’ Unlike humans, birds have constraints on their joints that change their wing shape based on the overall orientation of the wing. Baliga said, “Evolutionarily speaking, why would it be favourable to have those

very position-specific constraints? The implication is that the constraint resists some sort of force, like turbulence.”

Baliga spent the last few years measuring joint constraints across more than 61 species to determine the key differences. He said, “I wasn’t sure if those constraints on a particular species would be universal to all birds...as I measured two or three species, I immediately saw a difference.” He then provides those parameters to the engineers on the project. Engineers take the biological parameters and model airflow using methods like an engineered aircraft wing or computational fluid dynamics to test if they can aerodynamically understand the potential need for these constraints.

In one recent project, Baliga and the University of Michigan team researched wing morphing of gulls in relation to RPAS. Gulls are a similar size to an RPAS and although RPAS currently tend to have either a rotary-wing or fixed-wing design, the research team postulates that with

“morphable” wings like gulls, they can increase aircraft maneuverability. Baliga thinks this is possible with their research, but might affect stability, which would be needed for Ferbey’s application. He said, “Maneuverability and stability often trade-off with each other...an aircraft that is designed to be more maneuverable is generally more unstable and vice versa. If you engineer a drone that can dynamically change its wing shape depending on the circumstances that it’s flying through, you can design it such that it can be maneuverable sometimes or it can be stable sometimes and highly adaptive to whatever circumstance is coming at it.”

Baliga envisions an RPAS that could “adapt on the fly to something that you did not expect.” Their new research, not officially tied to the aerospace engineering group, is looking at optic flow, which is “how visual imagery flows over the retina and how that is interpreted by the brain and later becomes a part of the animal’s behaviour

CONTINUES ON PAGE 37...





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FEATURE

QUALICUM BEACH R WITH AWARD-WINNIN



ECAPTURES HISTORY G ESTUARY AND SPIT

AMY HAAGSMA



PHOTO: ISLAND PACIFIC MAPPING, WWW.ISLACMAP.CA



In 2021, the Town of Qualicum Beach re-established an estuary at Beach Creek, after waterfront development that had led to shoreline erosion and compromised fish habitat.

The estuary and associated marine spit are the latest in a series of waterfront habitat improvements that began in 1993 after the town completed a comprehensive drainage study. “In the early part of the twentieth century,” said Bob Weir, P.Eng., the town’s director of engineering and capital projects, “the shoreline consisted of an extensive and attractive sand and gravel shoreline. Over time, the construction of seawalls along much of the waterfront has led to accelerated coastal erosion, in particular the loss of the fine sand component of the upper intertidal area.”

The estuary will restore natural conditions to the creek outlet, enhance

fish passage, and reduce predation on spawning salmon. The project won the 2021 Association of Consulting Engineering Companies British Columbia Award of Merit in the Natural Resource and Habitat category.

RESTORING NATURAL PROTECTION

The Beach Creek watershed covers an area of 700 hectares, including the Qualicum Beach commercial core and the Village Neighbourhood. Previous development had highly altered the creek outlet, with the estuary being infilled and the stream rerouted through culverts that inhibited fish passage. Pollutant-laden runoff was degrading the habitat and the natural condition of the creek.

“The old storm outfall was not great for fish, so the objective was to provide better refuge for the fish and improve their chances, and to re-establish the fish population along Beach Creek,”

said Kevin Dougan, P.Eng., of Koers & Associates Engineering, project engineer for the estuary and marine spit. The project was driven by “protection of the waterfront and its infrastructure, as well as of the estuary habitat.”

“One of the issues leading up to this was erosion of some of the beach material that undermined the seawall, as well as concern for future sea level rise and larger wave and sea action,” Dougan explained. With infrastructure improvements underway in the area, more resilient protection measures were needed. “There was quite a significant storm event last winter, and some of the private properties along the waterfront were damaged quite badly,” said Matt Palmer, P.Eng., partner and project manager at Koers & Associates.

BUILDING THE ESTUARY, SPIT, AND ROUNDABOUT

In 2016, Qualicum Beach developed a Waterfront Master Plan, with the vision to adapt and respond to climate change and sea level rise, restore natural shoreline conditions, and mimic natural coastal processes to protect important assets. The concept of a marine spit for restoration of the estuary habitat was developed in 2018. “The Waterfront Master Plan identifies the benefits of soft-shore solutions,” said Weir, “and the marine spit project was ideal for the twofold purpose of re-establishing the estuary and protecting new infrastructure.”

The approval process was very lengthy because the area is very ecologically sensitive. Work was overseen by



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A street view of the re-established estuary and spit.
PHOTO: TOWN OF QUALICUM BEACH.



Early construction of the roundabout.
PHOTO: ISLAND PACIFIC MAPPING, ISLPACMAP.CA

environmental monitors, and best management practices were employed for erosion and sediment control, contaminated soils, and work near and within fish-bearing waters. But probably the biggest challenge, said Weir, “was convincing the authorities having jurisdiction that constructing a soft shoreline adaptation on the crown foreshore was the necessary alternative.”

Coordination was also required with multiple third parties, in particular the Regional District of Nanaimo, which has an interceptor sewer running through the area. The construction of the spit involved placing a tremendous weight of material over top of the sewer. Geotechnical drilling and soil sampling were performed to confirm the new load would not cause unacceptable settlement

of the interceptor. A program of location monitoring and condition assessment using CCTV and LiDAR is being conducted at regular intervals to provide a georeferenced point cloud to detect any shifts in the pipe’s geolocation over time. As part of re-establishing Beach Creek, Koers & Associates designed a sediment trap upstream of the Qualicum Beach

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The estuary and spit before construction of the roundabout.

PHOTO: ISLAND PACIFIC MAPPING, ISLPACMAP.CA



Qualicum Beach estuary and marine spit, under construction.

PHOTO: ISLAND PACIFIC MAPPING, ISLPACMAP.CA

Memorial golf course to remove fine sediment, which had been accumulating in the golf course irrigation pond. The golf course was using clamshell dredging to remove the sediment, which impacts the local trout population. The Town of Qualicum Beach had previously constructed a sediment control structure, but it was challenging to isolate it from the fish population to remove sediment. The new sediment structure

concentrates the collected sediment by directing it to box culvert sections that can then be hydro excavated, with minimal impact on fish habitat.

With the new marine spit and estuary, the creek is now much deeper, which offers protection against predators for salmon fry when they are transitioning from fresh water to salt water. The project also restores a more natural

sloping beach profile, which dissipates wave energy and protects waterfront infrastructure, while also sustaining the ecological integrity of the foreshore.

Along with waterfront improvements and the re-establishment of the estuary, Qualicum Beach has also been improving infrastructure, like the Memorial Avenue Uptown Waterfront Connector project, which connects to the outlet to Beach Creek. A roundabout was proposed as an alternative to the previous T-intersection to improve safety and improve traffic flow.

Limited space was a significant challenge for the roundabout, as was the need for adequate separation for pedestrians and cyclists. The roundabout diameter used most of the road dedication space, requiring a portion of the intersection to extend shoreward. Fill was not permitted on the foreshore, so the design incorporated a cantilevered section out over top of the foreshore for pedestrians and cyclists. This was also in line with the Waterfront Master Plan, which calls for raising the infrastructure along the waterfront to protect it from sea level rise and wave action events. The roundabout meets other objectives of the Waterfront Master Plan as well with its striking design: a compass rose in the centre,



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PHOTO: ISLAND PACIFIC MAPPING, ISLPACMAP.CA

with coloured concrete and stainless steel lettering. Matt Palmer of Koers & Associates noted, “There have been many times since it’s been finished that I’ve gone for a walk or driven up there and you see people out for a walk or riding their bikes, and it makes you feel good.”

CONSTRUCTION SEQUENCE AND IMPACTS TO BUSINESSES AND THE PUBLIC

The foundation of the spit, comprising large rocks and foreshore materials, was placed between July and September 2019; work proceeded quickly because of the limited fish-protection construction windows. After a period of settlement and exposure to the coastal winter storms, the foundation materials were reoriented to optimize the design of the spit and estuary. Final placement and landscaping were completed in summer 2021. The roundabout was also completed in 2021, following detailed design between 2018 and 2020. The total project cost to date is \$6.45 million, with just under \$2 million attributed to the marine spit and associated investigations and monitoring.

In general, while the waterfront improvements and habitat restoration have been well received, there was some frustration among local businesses and

the public during construction. Traffic flow was mostly maintained during construction of the spit, although some parking needed to be used as laydown areas for construction materials. During construction of the roundabout, traffic impacts were much more severe and required lane closures, and at one point the intersection needed to be fully closed off for several months. A detour route was established, and the impact of the

increased traffic was partially mitigated by the installation of multiple speed tables. The town’s website and social media channels communicated detour routes and project status, and Koers & Associates assisted local businesses with installing additional signage to help direct customers to their locations. And as Kevin Dougan pointed out, “as much as closing the intersection limited the traffic through the area, it also helped to expedite the

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construction and limit the amount of time the impacts were felt by the businesses.”

FUTURE PLANS

“The primary objectives of the project,” said Weir, “were to re-establish the Beach Creek estuary and provide infrastructure

protection capable of withstanding the impacts of climate change and sea level rise.” In January, the marine spit was put to the test by heavy winds and high tides that caused severe damage to some of the businesses and residences along the waterfront. Weir reported that the spit “performed extraordinarily well” and that the storm was “a perfect example of it being the right solution.”

The ecological benefits are more long-term, with improvements to the ecosystem expected to be evident within the next ten years or so. “There are numerous benefits that will take a while to establish, but probably within a decade that will be quite a nice little ecosystem,” said Matt Palmer.

The next stage of the project is an elevated walkway and observation deck over the refuge pool of the coastal spit. The walkway provides connection across the roundabout for pedestrians and cyclists travelling on the multi-use path along Highway 19A. As an additional benefit, it will also provide shelter and shade for a portion of the estuary. Once the walkway is installed, the town plans

to increase plantings to further restore the estuary habitat between the roundabout and the marine spit to mitigate any impact of the walkway, and to remove any invasive species in the estuary habitat.

As the walkway is on the shoreward side of the roundabout, it will be constructed on piles to maintain the natural beach profile, habitat, and connectivity. This makes it the most exposed piece of infrastructure, so the design needed to consider the potential for complex wave and impact forces associated with sea level rise and storms.

When asked about the most interesting or innovative aspect of the project, Bob Weir replied, “It might be the walkway and viewing platform that are yet to be built.” The walkway design resembles a finning salmon, and Weir looks forward to its completion. “The waterfront is a favoured recreational amenity that attracts residents and tourists alike. The completion of the walkway and viewing platform will improve safety for pedestrians and cyclists, draw more users to the waterfront, and support the waterfront businesses,” he said. ♦



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DISCIPLINE NOTICE: MICHAEL CHRISTIE, P.ENG.

On August 12, 2022, Mr. Christie agreed to a Consent Order prohibiting him from affixing his seal or authenticating any document until he has made arrangements for an approved peer reviewer to review his projects for a period of six months or six projects, whichever comes later.

In 2018, Mr. Christie signed and sealed drawings for a glass guardrail system. The drawings were missing material information and did not clearly indicate that they were prepared for the limited purpose of a load test layout, rather than a complete glass guardrail system. Despite Mr. Christie's indication to the contrary, the drawings did not comply with the load magnitude requirements of the BC Building Code or adhere to other standards and guidelines regarding guardrail systems.

In the Consent Order, Mr. Christie admitted that he demonstrated unprofessional conduct with respect to the drawings and that he acted contrary

to the Bylaws of Engineers and Geoscientists BC. Mr. Christie agreed that he failed to:

- undertake an adequate testing process with respect to the drawings, particularly by failing to carry out an appropriate physical failure test for the aluminum short posts depicted on the drawings;
- include sufficient information on the drawings to describe what standards were used, the test performed, and the load factors applied; and
- maintain complete project documentation, including testing documentation and data.

Following the peer review period, Mr. Christie must undergo a practice review.

Mr. Christie paid \$7,500 toward the legal costs of Engineers and Geoscientists BC. Mr. Christie must also complete the Professional Engineering and Geoscience Practice in BC Online Seminar.

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as it adapts to challenges,” Baliga said. They project visual stimuli on the sides of a flight tunnel in the lab and observe the reactions of hummingbirds and zebra finches during flight.

Baliga’s team published their research on wing morphing relating to RPAS design and their academic research is freely available to the engineering industry to pursue. Ferbey’s results will be partially released at the Association of Mineral Exploration’s Roundup in January, and he hopes that by using commercially available


technology, the geoscience industry will be able to use the methods described in their research. Ferbey encourages other researchers to consider using RPAS technology in their research: “Start out small...being out in the field, using the technology, you start to think about other ways you can use it in your work.”

The study “*Range of motion in the avian wing is strongly associated with flight behavior and body mass*” is available at www.science.org/doi/10.1126/sciadv.aaw6670. ♦

PHOTO: DR. VIKRAM BALIGA/UBC



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IN MEMORIAM

Engineers and Geoscientists BC announces with regret the passing of the following registrants.

- Pradeep Appasani, P.Eng.
- Colin Harrington Campbell, P.Eng. (Retired)
- Bradford James Cooke, P.Geo.
- William Stuart Donald, P.Eng.
- Lyman Douglas Ford, P.Eng. (Retired)
- Fiyaz Janmohamed Popat Hasham, P.Eng. (Non-Practising)
- Keith Jardine Horne, P.Eng.
- Matthias Jakob, P.Geo., P.L.Eng.
- David Bruce Kirk, P.Eng. (Non-Practising)
- David Murray Lawrie, P.Eng. (Retired)
- David Ross Letendre, P.Eng. (Non-Practising)
- Willy Rempel, P.Eng. (Non-Practising)
- Richard Alan Savage, P.Eng. (Retired)
- Hans Juergen Steinberg, P.Eng. (Non-Practising) ♦

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CONTINUING EDUCATION: REQUIREMENTS

CONTINUING EDUCATION REQUIREMENTS

The Continuing Education Program is mandatory and applies to all registrants with practice rights. Registrants without practice rights (Non-Practising or Retired) must complete minimum requirements to maintain ethical and regulatory competency. Engineers-in-training, geoscientists-in-training, and Life Members are exempt. The end of the first reporting year is June 30, 2022. By June 30 each year, the Ethical Learning and Regulatory Learning Modules and CE Plan must be completed and recorded in the online reporting system. More information, including our Guide to the Continuing Education Program, a CE Plan Template, a CE Plan Example, and a link to the Reporting System is provided at egbc.ca/Continuing-Education.

DESIGNATION	TOTAL HOURS REQUIRED	ETHICAL/REGULATORY	TECHNICAL, COMMUNICATIONS AND LEADERSHIP	CE PLAN
P.ENG., P.GEO, P.L.ENG., P.L.GEO.	60 CE HOURS PER 3-YEAR ROLLING PERIOD	THE MANDATORY REGULATORY LEARNING MODULE (ONCE PER REPORTING YEAR) ONE CE HOUR OF ETHICAL LEARNING (ONCE PER REPORTING YEAR)	BALANCE OF HOURS	REQUIRED
NON-PRACTISING/RETIRED	2 CE HOURS PER 3-YEAR ROLLING PERIOD	THE MANDATORY REGULATORY LEARNING MODULE AND ONE CE HOUR OF ETHICAL LEARNING PER 3-YEAR ROLLING PERIOD	OPTIONAL	OPTIONAL
STRUCT.ENG.	120 PER 3-YEAR ROLLING PERIOD	THE MANDATORY REGULATORY LEARNING MODULE (ONCE PER REPORTING YEAR) ONE CE HOUR OF ETHICAL LEARNING (ONCE PER REPORTING YEAR)	BALANCE OF HOURS, INCLUDING 60 TECHNICAL HOURS	REQUIRED
EIT/GIT, NON-PRACTISING LIFE MEMBER	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL

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January 6-March 31, 2023 | Eligible for 4.5 CE Hours

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. ●

EMBRACE YOUR LEADERSHIP IDENTITY

January 19, 2023 | Eligible for 1 CE Hour

In this session, participants will explore the concept of leadership identity and its importance to communicating with confidence. Here they will explore traditional assumptions about what it takes to be a leader and contrast them with more contemporary understandings of leadership. They will reflect on their current leadership identity and explore what's working and what's not. ●

EROSION AND SEDIMENT CONTROL: MASTER CLASS FUNDAMENTALS

January 24, 2023 | Eligible for 3.25 CE Hours

This is a comprehensive introductory online course, which will challenge participants to leverage their understanding of ESC essentials, apply industry innovations and deploy best practices in a fiscally responsible and approvable manner for successful implementation. ○

EROSION AND SEDIMENT CONTROL: ADVANCED MASTER CLASS

January 25, 2023 | Eligible for 3.25 CE Hours

This is a comprehensive advanced online course, which will challenge participants to

apply best practices to achieve compliance and deploy best practices in a fiscally responsible and approvable manner for successful implementation. ○

SHARE YOUR IDEAS WITH CONFIDENCE

January 26, 2023 | Eligible for 1 CE Hour

In this session, participants will explore how to communicate ideas with clarity and confidence by learning the elements of The Leader's Script. They will learn the importance of having a positive message and clear call to action, even in the most challenging situations. They will also learn the power of language and how to choose words with intention. ●

NATURAL GAS PROCESSING PRINCIPLES

January 31, 2023 | Eligible for 3.5 CE Hours

This course reviews the physical, chemical, and engineering principles used to understand the processing of natural gas and its by-products. ○

NATURAL GAS PROCESSING TECHNOLOGY

February 1, 2023 | Eligible for 3.5 CE Hours

This course provides a detailed review of design and operations criteria encountered in the transportation and processing of natural gas; product specifications, three phase separation, gas sweetening, dehydration and hydrocarbon dew point control, and cryogenics. ○

ADOPT A POWERFUL PRESENCE

February 2, 2023 | Eligible for 1 CE Hour

In this session, participants will learn about presence. Here they will learn that the purpose of true leadership presence is to inspire, not to entertain. They will explore

the concept of authentic presence and learn how to connect what they say to how they say it. ●

WOMEN IN LEADERSHIP SERIES

February 7-28, 2023 | Eligible for 4 CE Hours

This series will enable women to view leadership through the lens of communication – supporting them to develop the skills needed to be seen as strong confident leaders. Through 4-webinars and 1-year access to a self-learning course, registrants will learn how to communicate with clarity and intention, unlock the power of their voice, and develop a strong leadership brand. ●

BUILD YOUR LEADERSHIP BRAND

February 9, 2023 | Eligible for 1 CE Hour

In this session, participants learn how to create a leadership brand. They will explore the key elements of brand (authenticity with audience-centeredness) and learn how to balance their own needs with the needs and preferences of their audience. In doing so, they will cultivate a brand that supports their continued success. ●

GEOTECHNICAL EARTHQUAKE ENGINEERING SHORT COURSE

March 6, 2023 | Eligible for 21 CE Hours

The course provides participants with fundamental concepts of geotechnical earthquake engineering and expands those to the key issues related to dynamic soil properties, local site effects and seismic site response analysis, soil liquefaction during earthquakes and the related assessments, seismic slope stability, basics of seismic soil-structure interaction, and seismic design of retaining structures. ○

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As part of the Continuing Education Program, each

year, the Regulatory Learning module will cover essential regulatory topics relevant to all Engineers and Geoscientists BC registrants. This year's module is focused on Truth and Reconciliation with Indigenous peoples and what reconciliation means for engineering and geoscience professionals working in British Columbia. ●

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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.





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