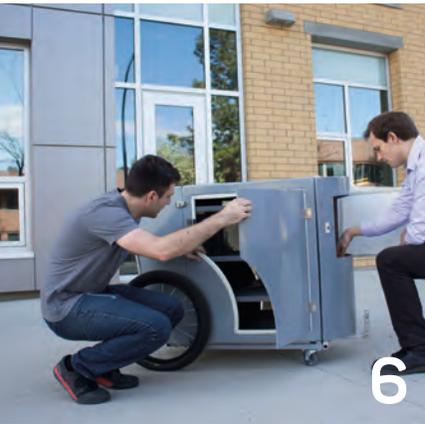


INGENUITY





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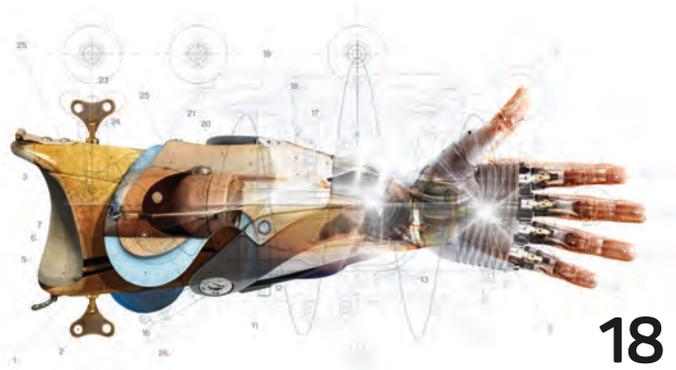


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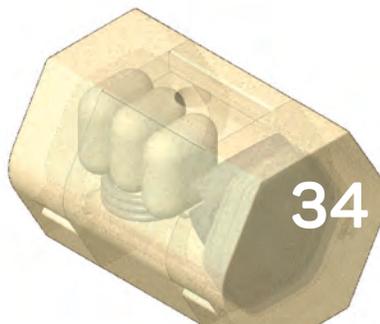
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ON THE COVER

UBC Applied Science is transforming our world through innovative, sustainable and equitable solutions to today's challenges, as illustrated by Viktor Koen.

INGENUITY

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ILLUSTRATIONS

Viktor Koen

DESIGN

Marasigan Design

THE FACULTY INCLUDES:

School of Architecture and
Landscape Architecture
School of Biomedical Engineering
School of Community and
Regional Planning
School of Engineering
School of Nursing

Engineering departments and programs

Biomedical Engineering
Chemical and Biological Engineering
Civil Engineering
Electrical and Computer Engineering
Engineering Physics
Environmental Engineering
Geological Engineering
Integrated Engineering
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Mining Engineering

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Clean Energy Research Centre (CERC)
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Inequities (CRIHHI)
Gerontological Education Research &
Outreach (GERO)
Institute for Computing, Information and
Cognitive Systems (ICICS)
Men's Health Research
Michael Smith Laboratories
Planning Evaluation Lab (PEL)
Pulp and Paper Centre (PPC)
(Research on Active Transportation
(REACT)
Stigma and Resilience Among Vulnerable
Youth Centre (SARAVYC)
Water Planning Lab

DEAN'S MESSAGE

UBC's Faculty of Applied Science (APSC) has long held a distinctive position within the university. Encompassing a broad range of high-impact fields, it offers uniquely practical, often interdisciplinary learning opportunities that help students succeed in an increasingly competitive job market. At the same time, many of these opportunities also enable students to make a real-world difference by contributing to innovative research or entrepreneurial endeavours in diverse areas like biomedical engineering, adolescent health, clean energy and Indigenous community planning.

But the needs of students, faculty members, employers and society are not static. Local and global forces — economic, social and technological, among others — are constantly reshaping the landscapes in which nurses, engineers, planners, architects and landscape architects operate. This means that we must frequently reevaluate how APSC can best serve the interests of all relevant stakeholders — including UBC as an institution, which recently released a new strategic plan that outlines its “vision, purpose, values, goals and strategies for the years ahead.”

APSC is ideally positioned to support this plan on multiple fronts. From interdisciplinary research clusters and experiential learning to sustainability initiatives and Indigenous engagement, our schools and departments are making great strides in nearly all the areas that UBC leadership has identified as holding significant transformational potential. One need only read this issue of *Ingenuity* to see examples of how our remarkable students, faculty members and alumni are achieving research excellence, furthering transformative learning and fruitfully partnering with communities both near and far.

Still, much work remains to be done. Addressing evolving student educational needs; helping to advance government and societal priorities through bold new projects, programs and partnerships; finding ways to more efficiently transfer knowledge from the campus to the outside world — these are just some of the challenges that we must grapple with every day. To do so more effectively, we need to establish a new strategic framework for APSC which ensures that our efforts synergize not only with those of UBC, but also with those of APSC-related professional bodies, the public and private sectors and society as a whole.

To this end, we have embarked on a 12- to 18-month process to develop a strategic plan that charts APSC's course over the next five to 10 years. Involving the input of staff, faculty, students, alumni, industry partners and friends of the APSC community. The project offers a prime opportunity for the APSC community to come together to establish common goals and ultimately elevate the Faculty to new heights — all while reinforcing the culture of collegiality, collaboration and innovative thinking that has been a hallmark of APSC for over 100 years.

Best regards,



James Olson, PhD, FCAE, PEng
Dean, UBC Faculty of Applied Science



To view past issues of *Ingenuity*, visit apsc.ubc.ca/publications.

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Dr. James Olson

began his five-year term as the Dean of the Faculty of Applied Science on March 1, 2018. He is a professor in the Department of Mechanical Engineering and former associate dean of research and industry partnerships, and director of UBC's Pulp and Paper Centre. Olson is an internationally recognized forest products researcher who has been actively involved in the transformation of the forest sector into a vibrant, diversified bio-products industry.



Q+A with the Dean

What quality do you most admire in a leader?

There is what I consider a baseline of good leadership, which includes honesty, integrity and transparency. You cannot be a leader if you don't possess these qualities. Beyond that, I have always admired the ability to motivate people and create a sense of community. I have tried to create that sense of community in the Faculty. To create a community of practice, including both industry and academic partners.

What makes UBC different?

Being situated on the west coast of Canada makes UBC special and instills an inherent entrepreneurial spirit, as well as a strong environmental ethos. In addition to this, UBC is its own small municipality, which allows us to create our own "sandbox" for developing smart, sustainable, green city technology and policy. For our students and faculty within Applied Science, this

means we are ideally placed to lead the way in developing new ways to focus on the human-centred, built environment.

What is the most important lesson you've learned in your career to date?

I would say that the lesson I have learned is: "It's more about the journey than the destination." You cannot invest everything in the end game. You have to enjoy and celebrate the progress at every step, as you never know for certain how things will turn out.

How do you like to recharge?

There is a particular spot on Shuswap Lake that I love to spend time at with my family and friends. It is way out in the woods with no electricity or Wi-Fi. It's a fantastic place to read a book, think and recharge.

What is the best advice you were ever given?

The outgoing Dean gave me some advice. He said: "Don't let the things that you can't change drive you crazy." And he was right. Some things you can work on and other

things are simply outside of your control. It is important not to lose sleep over the things you cannot change.

What potential does the Faculty of Applied Science hold?

The built environment covers almost everything. Just about every object people use in their everyday lives has been mined or engineered. It extends to transportation, communication, energy, safe water and buildings (to name a few).

The Faculty of Applied Science has the potential to impact almost all the grand challenges facing society today, from climate change and health care, to economic development and creating safe, liveable cities. For us, the potential is endless!

James Olson, PhD, FCAE, PEng
Dean, UBC Faculty of Applied Science

Find James on Twitter and Instagram:
[@JamesDeanAPSC](#)

BITS AND BITES



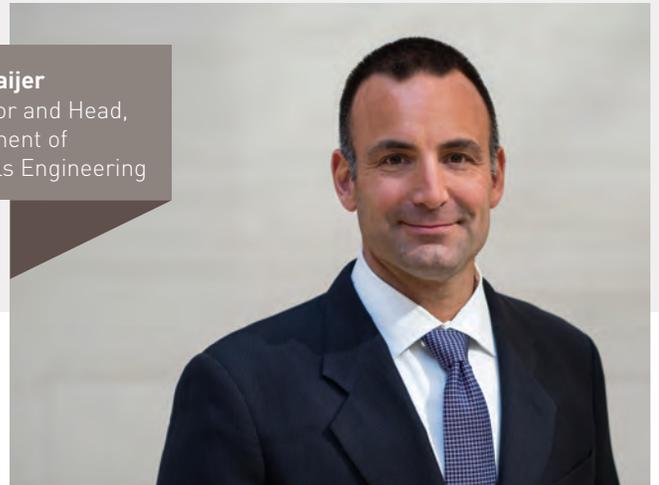
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Professor and Head,
Department of Electrical
and Computer Engineering



Steve Feng
Professor and Head,
Department of
Mechanical Engineering



Daan Maijer
Professor and Head,
Department of
Materials Engineering

■ APSC WELCOMES NEW HEADS AND DIRECTORS |

In 2018, UBC Applied Science welcomed a number of heads and directors into their new roles.

Heather Campbell, professor and director, School of Community and Regional Planning is one of the world's foremost planning theorists. She previously headed the University of Sheffield's Department of Urban Studies and Planning. Her research explores how ethical values can be incorporated into public policy planning.

Steve Wilton, professor and head, Department of Electrical and Computer Engineering is part of the UBC System-on-a-Chip research group and a member of the Institute for Computing, Information, and Cognitive Systems. His research is in the areas of computer architecture and VLSI design.

Steve Feng, professor and head, Department of Mechanical Engineering is the recipient of a UBC Killam Teaching Prize and is a Fellow of the American Society of Mechanical Engineers. His research

interests are in the area of CAD/CAM/CAI (Computer-Aided Design, Manufacturing and Inspection).

Daan Maijer, professor and head, Department of Materials Engineering co-leads UBC's Advanced Metals Processing Group, and directs both the Integrated Engineering program and the Advanced Materials Manufacturing Masters of Engineering Leadership program at UBC. His research focuses on the modeling of industrial materials processing including: heat transfer, fluid flow and stress.



PERSONAL BELONGINGS CART READY TO ROLL |

Graduate students at UBC Okanagan’s School of Engineering have developed a personal belongings carrier. Specifically designed with Kelowna’s homeless population in mind, the cart offers a secure alternative to grocery store shopping carts.

The carrier, which is partially constructed with composite materials designed in the Okanagan node of UBC’s Composites

Research Network, is strong yet light, so that it can be easily manipulated along city streets. They are lockable and users can leave them while they attend appointments, get a meal or access other support services.

“The average person on the street has no desire to be there, nor do they want to use shopping carts. This provides a dignified alternative while they seek to get their lives back on track,” says Metro Community Church partner, Devon Siebenga.



SALA WORKS |

This two-week exhibition in downtown Vancouver presented a range of projects by SALA faculty. Exhibited in support of accreditation of the School’s professional Master of Architecture and Master of Landscape Architecture degrees, the works illustrated the diversity of research, scholarship and creative practice within SALA through drawings, texts, digital visualization and models.



PROVINCE INVESTS \$115 M IN NURSE PRACTITIONERS |

In May 2018, Adrian Dix, Minister of Health, announced the province will invest \$115 million over three years to create 200 new nurse practitioner (NP) jobs. In addition, the province has pledged to increase the number of NP education seats by six per cent.

The announcement was hosted by the School of Nursing at UBC’s Point Grey

Campus and led by Director Elizabeth Saewyc. The School will benefit greatly from the outcomes of this announcement — a team of NPs, NP students and NP faculty from the School were in attendance to show support.

According to Dix, “This is the largest investment in NPs in the province’s history and is a critical building block of a broader plan to improve access to primary health care.” *Read more at kelownanow.com.*



AFFORDABILITY CRISIS REACHES VANCOUVER SUBURBS |

A joint study between UBC SCARP and the Union Gospel Mission examines the growing threat of homelessness in Vancouver suburbs, as vacancy rates continue to decrease and rental costs keep rising.

Co-author Penny Gurstein, SCARP professor, says the trend has reached a boiling point, “The affordability crisis is particularly pronounced for low-income families because of low vacancy rates, rising rents and lack of adequate housing.”

Key recommendations from the report include increasing the stock of subsidized housing for low-income families, addressing income security and continuing the development of temporary modular housing are crucial steps in reducing homelessness within Metro Vancouver. *Read the full report at ugm.ca/affordability.*



NEW FINDINGS IN TEEN DATING VIOLENCE |

A collaborative study by Elizabeth Saewyc, director of UBC School of Nursing, and researchers from Simon Fraser University is the first in Canada to look at dating violence trends among adolescents over time, and the first in North America to compare trends for boys and girls. The findings show that while overall, teen dating violence is down, boys are more likely to report being the victim of violence than girls.

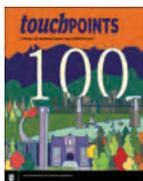
Read more at news.ubc.ca.

CELLPHONES AND CROSS-WALKS |

Distracted drivers are responsible for more collisions in Canada than impaired drivers, but with smartphones becoming ubiquitous, distracted walking is also on the rise. UBC civil engineering Professor Tarek Sayed and his team have analyzed how mobile device use affects pedestrians, and the findings could help develop safer roads and program autonomous cars in the future.

“We found that more than a third of pedestrians were distracted by their cellphones, texting and reading or talking and listening,” said lead author Rushdi Alsaleh, a civil engineering PhD candidate. “Distracted pedestrians had more trouble maintaining their walking speed and gait and took longer to cross the road, increasing the potential for conflict with vehicles.”

Read more at news.ubc.ca.



TOUCHPOINTS

Get caught up with the latest news from UBC Nursing with the fall/winter Touchpoints magazine — available online at nursing.ubc.ca/newsletters.

RING THE ALARM | To prepare his recreational boat for the summer, Ian Grant (BASC '71, ELEC) replaced two dead batteries with fresh ones from the lazarrette. With a wrench he wound the terminals down, as he had many times before. Only this time he smelled burning flesh.

Soon he couldn't feel his finger.

Grant realized his wrench — and his UBC Engineering iron ring — had created a current, almost an arc weld. Scorched to the nerve, the third-degree burn on his finger was painless, necessitating a visit to the burn clinic. The gauze dressing had to be changed daily for three weeks.

“I'm usually careful — and I'm an electrical engineer,” says Grant. “But sometimes your mind wanders.”

Grant advises other alumni to be cautious with their rings. He shares the story of a friend with the Vancouver Police who, while pursuing a suspect, caught his iron ring on a fence. “We forget we're wearing our alumni rings sometimes,” he says. “We become attached to them.”

But Grant isn't seeking a replacement ring. “I've got a permanent one on my finger — this scar.”



GRIP ASSISTIVE DEVICE FOR QUADRIPLLEGIC ATHLETES |

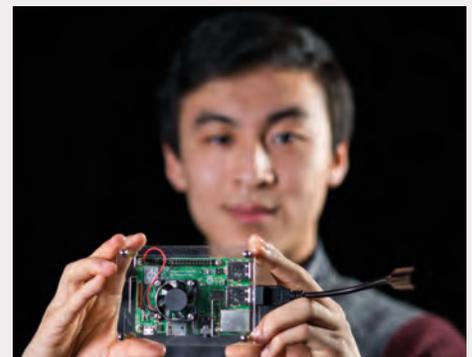
As part of the UBC Engineers in Scrubs (EiS) program, a team of students has developed a grip assistive device targeted at quadriplegic tennis players. Partnering with the Rick Hansen Institute (RHI) — a not-for-profit organization focused on spinal cord injury research and care — the team produced a customizable “molded prototype” that combines hard plastic and softer fabric pieces to ensure a secure and repeatable grip while minimizing pressure and maximizing comfort.

The device placed second in the Innovative Design for Accessibility (IDeA) student competition, which aims to inspire students to use their creativity to develop innovative, cost-effective and practical solutions to accessibility-related issues resulting in communities that are more accessible for persons with disabilities.

BROTHERLY LOVE | In the summer of 2017, Michael Ko (third-year, Engineering Physics) received some devastating news: his brother, Daniel, who has muscular dystrophy, had gone into cardiac arrest. Thankfully, Daniel survived. But the event left him bedridden and with impaired speech due to a tracheostomy.

As Ko watched his brother struggle to execute tasks like turning on the lights or music, he knew he had to help. Gaining inspiration from some of his engineering physics courses, Ko designed and built a voice recognition assistive AI device that Daniel now uses to control electronics around his room.

Ko — who taught himself everything he needed to know for the project using



online resources like YouTube and Stack Overflow — is continuing to optimize and expand the capabilities of his technology, which he plans to make public and hopes will help and inspire others in similar circumstances.

Read more at apsc.ubc.ca/news.

REWRITING THE FUTURE IN BIOINK

One morning in March 2006, eight men gathered in a hospital ward in northwest London. Young and healthy, they were there to participate in a clinical trial for TGN1412, an experimental arthritis and leukemia drug. At eight o'clock, the first patient was intravenously infused with either the drug or placebo. The others were infused at ten-minute intervals after that.

Within hours of infusion, the six men who received TGN1412 were screaming and writhing in pain. Within two days, they were nearly dead. The men experienced a range of adverse effects — from crushing headaches and nausea, to lung and muscle pain and severe breathing problems — that culminated in multi-organ failure. In stark contrast to its impact on mice and monkeys, the drug had triggered an inflammatory onslaught from which their bodies may never fully recover.

While experimental drugs rarely kill or harm people, cases like TGN1412 serve to remind us what a risky and costly process drug development really is. Nine out of every 10 drugs fail in human trials, despite having shown promise in animal models or the lab. And each one of those failed drugs costs an average of \$200 million — not to mention years of effort by a small army of people — before their ineffectiveness is confirmed.

This is partly why 3D bioprinting is one of the most talked-about scientific advances of recent years. By providing the ability to fabricate functional tissues, organs and possibly even entire biological systems in the lab, it has the potential to transform

drug development. It may also allow regenerative medicine, personalized medicine and basic, translational and clinical research to progress more rapidly than ever before.

One of the brightest spots in the 3D bioprinting landscape is Aspect Biosystems, a UBC spin-off company co-founded by Tamer Mohamed and Simon Beyer, graduates of UBC's Department of Electrical and Computer Engineering (ECE); Konrad Walus, an ECE professor; and Sam Wadsworth, a researcher at UBC's Centre for Heart Lung Innovation. Building on a decade of microfluidics research conducted in the Walus Lab, they have developed what may be the most sophisticated bioprinting device on the market today.

Powered by their Lab-on-a-Printer™ platform technology, the RX1™ Bioprinter enables researchers to create complex, highly customized tissues in a precisely controlled manner. This flexibility is attributable in part to the company's proprietary tissue design and fabrication software, as well as special printheads the company has designed, which can combine different cell types, growth factors and other tissue components into cell-laden fibers and

dispense these "bioinks" to print uniquely patterned 3D structures. Loaded with muscle cells from a donor lung, for example, the technology can fabricate a human airway that researchers can use to study bronchoconstriction and relaxation.

Testing a drug on 3D-bioprinted tissues would provide important safety and effectiveness information before it is administered to live humans — potentially saving billions of dollars, decreasing reliance on animal testing and producing drugs that are better, cheaper and safer. It could also enable the design of customized medical treatments and the fabrication of replacement organs from a patient's own cells, thereby avoiding organ rejection.

Since 2016, Aspect has grown from eight staff members to nearly 30 and partnered with pharmaceutical and biotechnology companies such as Johnson & Johnson. Already recognized as one of Canada's most innovative companies, Aspect is on a path to remain at the forefront of this fast-growing and revolutionary field. |

For further information visit ubcinnovationprecinct.ca and cm.ubc.ca.

Elevated Signals technical co-founders analyze data at Tantalus Labs' SunLab cultivation facility in Maple Ridge, BC.



ROCKETING TO SUCCESS

Within a few years of its inception, the Master of Engineering Leadership (MEL) program is already bearing fruitful successes. In 2018 program graduates either founded or are integral to two companies on the Cleantech Emerging Rocket List, recognized for their “great potential for investment and market breakthroughs in the coming year” — the Rocket Builders’ lists recognize both established and emerging companies in the British Columbia’s tech sector.

While completing his degree, Amar Singh (MEL '17, Integrated Water Management) developed the concept for Elevated Signals: a crop optimization software. Attracted to the idea, a team of lead developers who had previously built and sold a company to Adobe — a top ranked Silicon Valley tech firm — became involved in the project. Shortly after winning a year of free tech office space at Discovery Parks, the company was accepted into Canada’s most elite tech accelerator (Creative Destruction Lab), and has, already raised over \$1 million in venture capital from investors in Vancouver, Toronto, California and New York. Singh has also established a partnership with Tantalus Labs, giving Elevated Signals access to an active sandbox in which to build and test their innovations.

Elevated Signals provides a digital cultivation management platform that leverages wireless IoT sensors and data science to optimize controlled environment crop production. The solution encompasses Health Canada cultivation compliance record-keeping, strain-specific workflow management, high-resolution environmental monitoring linked to plant IDs, as well as reporting and analytics. Using this technology, Elevated Signals helps producers make data-driven decisions that reduce crop loss, ensure quality and boost profits while minimizing the ecological footprint of production.

Learn more at elevatedsignals.com.

Andrew Belletti (MEL '17, Clean Energy Engineering) is Director of Research and Development Marketing at Ionmr Innovations Inc — a company that designs and manufactures advanced ion-exchange polymers and membranes. He is responsible for evaluation and growth of new co-development opportunities, supply partnerships and market outreach. With ground-breaking efficiency and durability, the company has raised over \$3 million in angel funding and has been awarded \$3.5 million dollars for its development of next generation materials enabling applications in the hydrogen economy, energy storage and industrial waste remediation for the circular economy.

Ionmr’s product applications have a global reach, empowering companies in the low-carbon transportation and energy transition to optimize their system performance and cost, as well as bringing efficient solutions to treat waste and recover harsh chemicals from environmentally damaging industries using Ionmr’s advanced ion-exchange materials. Belletti is a key influencer in the company’s business development. His extensive knowledge in the energy and electrochemical fields has been critical to his success, being attuned to the cost sensitivity and efficiency demands of the industry, while ensuring minimal impact to operations during the transition to new membrane systems. |

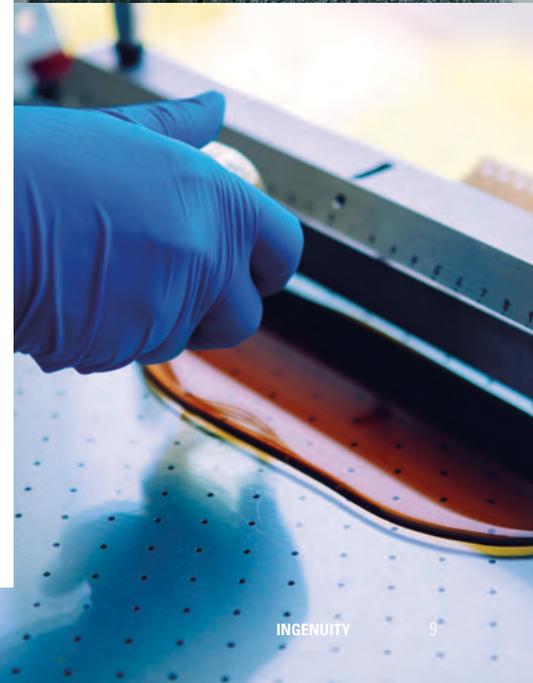
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COULD A DIY ULTRASOUND BE IN YOUR FUTURE?

Imagine an ultrasound device that is no bigger than a band-aid, which is both wearable, portable and can be powered by a smartphone. UBC electrical and computer engineering Professor Edmond Cretu and PhD candidate Carlos D. Gerardo, and mechanical engineering professor Robert Rohling have developed a new ultrasound transducer (patent-pending), or probe, that could dramatically lower the cost of ultrasound scanners to as little as \$100.

Conventional ultrasound scanners use piezoelectric crystals to create images of the inside of the body and send them to a computer to create sonograms. The researchers replaced the piezoelectric crystals with tiny vibrating drums made of polymer resin, called polyCMUTs (polymer capacitive micro-machined ultrasound transducers), which are cheaper to manufacture.

"Transducer drums have typically been made out of rigid silicon materials that require costly, environment-controlled manufacturing processes, and this has hampered their use in ultrasound," said study lead author Carlos Gerardo, a PhD candidate in electrical and computer engineering at UBC. "By using polymer resin, we were able to produce polyCMUTs in fewer fabrication steps, using a minimum amount of equipment, resulting in significant cost savings."

Sonograms produced by the UBC device were as sharp as or even more detailed than traditional sonograms produced by piezoelectric transducers, said co-author Edmond Cretu. |

Read the complete story at news.ubc.ca.



BACTERIA-POWERED SOLAR CELL CONVERTS LIGHT TO ENERGY, EVEN UNDER OVERCAST SKIES

UBC chemical and biological Professor Vikramaditya Yadav lead a study that has found a cheap, sustainable way to build a solar cell using bacteria that convert light to energy.

Their cell generated a current stronger than any previously recorded from such a device, and worked as efficiently in dim light as in bright light.

This innovation could be a step toward wider adoption of solar power in places like British Columbia and parts of northern Europe where overcast skies are common. With further development, these solar cells — called "biogenic" because they are made of living organisms — could become as efficient as the synthetic cells used in conventional solar panels.

"Our solution to a uniquely BC problem is a

significant step toward making solar energy more economical," said Yadav.

Solar cells are the building blocks of solar panels. They do the work of converting light into electrical current. Previous efforts to build biogenic solar cells have focused on extracting the natural dye that bacteria use for photosynthesis. It's a costly and complex process that involves toxic solvents and can cause the dye to degrade.

This solution leaves the dye in the bacteria. They genetically engineered E. coli to produce large amounts of lycopene — a dye that gives tomatoes their red-orange colour and is particularly effective at harvesting light for conversion to energy. |

Read the complete story at news.ubc.ca.



ENGINEERING A DISASTER PLAN

As the frequency of natural hazards around the world continues to rise, the need for resilient cities has become more urgent than ever. So José Martí, a professor in UBC's Department of Electrical and Computing Engineering, and his team are developing a powerful simulation tool to fortify our critical infrastructures (CIs) — those facilities and systems whose failures would lead to death, economic devastation and societal upheaval.

How does the tool do this? First, by identifying the interdependencies that exist among the complex networks — water, health, electricity, transportation — upon which all our cities depend. In the event of a disaster, the tool rapidly assesses the damage sustained by these key sectors, then determines the optimal allocation of the city's available resources to minimize loss. In this way, it can provide real-time assistance to disaster response managers as they make crucial decisions following a catastrophe.

Known as the Infrastructures Interdependencies Simulator, or i2SIM, the tool has already been used to map CI interdependencies across eleven European countries, as well as to prioritize steps to restore electrical power in Rome when a major blackout occurs. The success of i2SIM in these and other cases suggests that it could play a key role in strengthening mitigation strategies and emergency response plans on a multinational scale.

But the applications of the technology do not end there. "Theoretically, the simulator could be helpful in any area that involves thousands of data nodes," says Martí. He and his partners are currently exploring the roles i2SIM might play in smart homes and smart power and distribution systems, as well as the financial sector: How should a city's limited funds be allocated in order to achieve the greatest societal benefit? |

INNOVATION TO BRING CLEAN WATER TO MILLIONS

Circumstances sometimes bring the right people together to produce something very special. When Manoj Singh, president and CEO of Acuva Technologies, left the UBC-founded company Westport Innovations in 2014, he set off a chain of events that led to a water purification solution that is poised to have a major impact on the world.

Looking for a new business opportunity, Singh was particularly struck by an invention disclosure submitted by Professor Fariborz Taghipour (UBC Department of Chemical and Biological Engineering) describing a drinking water purification method that used ultraviolet (UV) radiation generated by light-emitting diodes (LEDs).

Dr. Taghipour, an expert in photoreaction engineering, has worked on UV-based water treatment technologies for many years. "Every year several million people die as a result of water-related diseases, making them the leading cause of disease and

death around the world," Taghipour states. "When UV-C LEDs became available, my research group saw the potential and built an efficient UV photo-reactor operating with LEDs that worked brilliantly."

LEDs have low power requirements, run cool, are long-lasting and maintenance-free, and do not have a negative environmental impact.

Singh and Taghipour quickly realized their shared interests and decided to start their own company.

Together, they developed a product strategy that initially leveraged the LED UV reactor's low-power requirements for mobile, off-grid applications ideal for developing countries, where the need for safe water is the most evident. Their focused approach created a standalone, low-power, portable water purifier for off-grid use.

Driven by improvements in LED technology and the team's patented innovations in optics, hydrodynamics, thermal management and more, Acuva was able to modularize their technology so that it could be used in water coolers/dispensers, refrigerators and



even coffee machines.

This development has dramatically expanded Acuva's potential, and brought the founding duo's ideal of providing clean drinking water to millions within view.

In the near future, schoolchildren and office workers round the world could enjoy uninterrupted access to clean drinking water, all while potentially eliminating the use of up to 1.2 million plastic bottles over each unit's lifetime. |

Read the full story at apsc.ubc.ca/news/ACUVA-Ingenuity

SGAAWAA

2004

Sandercock launches a new UBC course called "Digital Ethnographies in Urban Planning." One of her first students is Jonathan Frantz (SCARP, MA 2006), whose thesis focuses on the use of multimedia to enrich planning discourse and processes.

2010

Sandercock's documentary film *Finding our Way: Beyond Canada's Apartheid* is released. It is an exploration of the struggles faced by Indigenous people [through the stories of two First Nations in BC].

2012

A group of Sandercock's students engages with the Haida community of Skidegate, which names language revitalization, job creation and protecting the natural resources of Haida Gwaii as its top priorities. Sandercock believes that a documentary film about the Haida may advance these priorities and receives support from the Council of the Haida Nation.

2012

Frantz moves to Igloodik, Nunavut, a small Arctic community that is home to the production company Isuma (now Kingulliit). He begins creating video stories celebrating Inuit culture, history and perspectives with Zacharias Kunuk, one of Isuma's co-founders and the director of *Atanarjuat: The Fast Runner* (2001) – the first Inuit-made, Inuit-language feature film (voted in 2015 by filmmakers and critics as the best Canadian movie ever made).

2012

Frantz introduces Sandercock to Norman Cohn, another Isuma co-founder.

The community planning of a feature-length film

S *Gaawaay K'uuna* (*Edge of the Knife*) is a supernatural mystery - thriller set in 19th century Haida Gwaii; it is the first Haida-language feature film ever made.

The movie retells a Haida legend about a man's transformation into *Gaagiixid/Gaagiid*, or the "Wildman." But *SGaawaay K'uuna* has more in mind than telling a captivating tale. It also aims to inspire more people to learn the Haida language, which only a couple dozen people speak fluently today, as well as to promote economic development in the Haida archipelago.

The film was co-conceived and co-written by Leonie Sandercock, a professor in

UBC's School of Community and Regional Planning (SCARP), who has long been interested in the use of collaborative storytelling to help achieve real-world community goals. Supported by funds from the Social Sciences and Humanities Research Council (SSHRC), she will now study the film's impact on the Haida community over the coming years.

"I think every member of the Haida community knows or has heard a version of the Wildman story," says Sandercock. "The more we thought about that story, the more we thought that metaphorically it has contemporary relevance to Haida people since European contact ... People

have lost themselves — their culture, their language, their sense of humanity and connection. They lost them in residential schools. And today, people lose themselves to drugs. So the story could work on multiple levels, including metaphorically about addiction, and how you lose yourself when you become addicted. Can you be brought back into the community or not?"

Below is a timeline of this unique community planning project, from its earliest origins to release. |

Y K'UUNA

2013

Cohn suggests that Sandercock make a fiction film instead of a documentary (for which funding might be harder to come by). The film — "about Haida, for Haida, by Haida" — could integrate both Haida dialects and employ Haida as cast and crew members.

2014

The project receives a \$200,000 Social Sciences and Humanities Research Council (SSHRC) Partnership Development Grant — the Council of the Haida Nation, SCARP and IsumaTV begin to develop the film's core concepts.

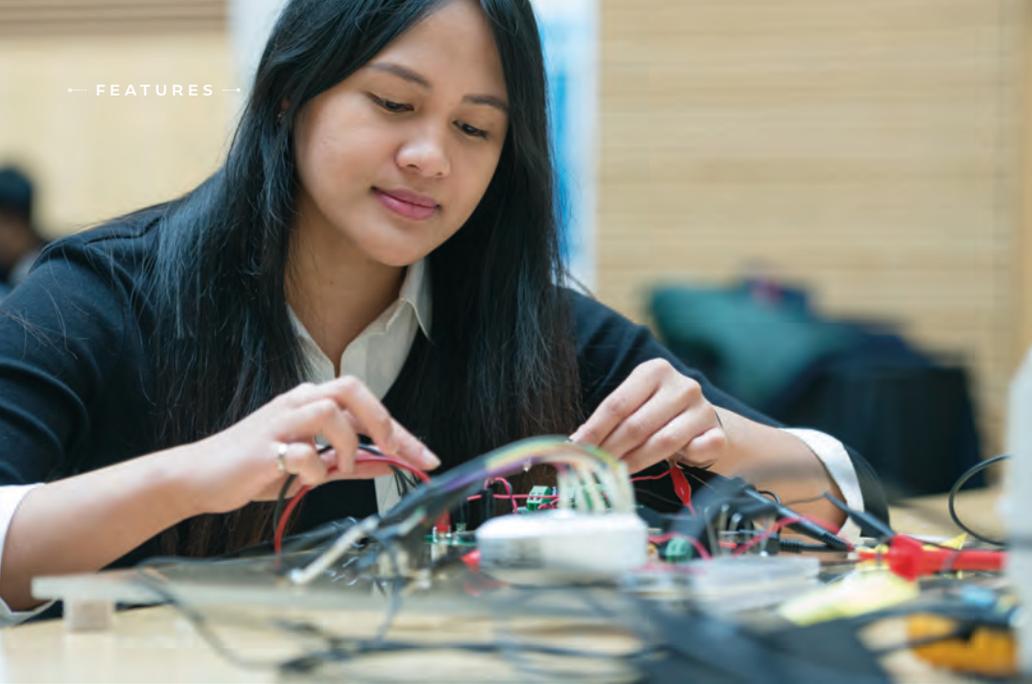
2014

Sandercock and partners organize community-based content-gathering and screenwriting workshops. One story stands out: *Gaagiixit* (or *The Wildman*). It is the tale of a survivor who, when a canoe capsizes begins his struggle to survive on his own — it becomes the focus of the film.

2018

In September 2018, *SGaawaay K'uuna* makes its debut at the Toronto and Vancouver International Film Festivals. It receives the VIFF awards for Best Canadian Film, Best BC Film and Most Popular Canadian Feature. In October, it receives the imagineNATIVE Film + Media Arts Festival's Sun Jury Prize.





a seat at the table

By Sheryl Staub-French, PhD, PEng
Professor of Civil Engineering
Goldcorp Professor for Women in Engineering
Dean's Advisor on Equity, Diversity and Inclusion



I

am the only woman at the table. Again. I have been invited to speak to a project team, given my expertise on building information modeling. Although I have done this many times and have worked with many project teams, I still feel hesitant. I have been invited to the table but no one is speaking to me. As the silence stretches out, I get the familiar feeling that maybe I do not belong.

Then I speak. I present my experience, the results of my research and offer some

recommendations. I am competent, confident and strong. The feeling in the room shifts. They give me their full attention. They treat me with respect. I leave the meeting feeling excited, relieved and included. This was 10 years ago but that experience still resonates today. The power of being invited and (eventually) included.

Now, I sit comfortably at the table. And I work to invite and include more women and other represented groups to the table. Not just because it is the right thing to do, but because it is the smart thing to do. Teams with gender diversity are smarter and more innovative. Diverse organizations perform better. And in any industry, better performing teams have better project outcomes.

At UBC, I have been working on this issue for the past five years. First as the inaugural holder of the Goldcorp Professorship for Women in Engineering, and more recently as the dean's advisor on equity, diversity and inclusion. Our goal at UBC is 50:50 in engineering; we believe the engineering profession should reflect the society it serves, which means proportional representation of women and other underrepresented groups. Over the past eight years, we have gone from 18 to 30 per cent women entering engineering. We have been inviting girls, and they have responded.

But to truly reach parity, equal representation at the table, will require an exponential shift.





Although progress on STEM occupations has moved moderately faster ... it would take Canada 140 years to reach full parity.¹

We cannot wait that long. Industry and academia must work together to recruit and retain women in engineering. Now.

At UBC, we have significantly expanded our outreach efforts. Last year we reached 17,000 youth, half of which were girls. We now offer programming for girls in Grades 8 to 12, which allows them to try out engineering, to see how engineers are helping to solve important problems for society, and to meet role models. We are looking at the whole ecosystem in the pathway to engineering, offering training and support to parents, teachers and counsellors.

But to keep women in engineering, we have to look at the pathway to the engineering profession. The first five years is critical. We must provide a soft landing for women entering the profession and we must create truly inclusive cultures to keep women in the profession. At UBC, the long-term goal is to embed diversity and inclusion in all of our systems and structures. We recognize that this must be core to how we work. Within engineering, all of our first-year engineering students now receive training on bias, equity and inclusion. All students in the civil engineering program learn about the importance of teamwork and the critical ingredients of respect and inclusion in creating high-performing teams, which is taught in our core

construction management class. We are now looking at how to incorporate this training and other mechanisms to create an inclusive and welcoming culture for all.

In every industry, organizations must thoughtfully and deliberately embed the principles of diversity and inclusion within their systems and structures as well. Think of what we have accomplished to create a culture of safety in our industry. How can we do the same thing to create a culture of inclusion? |

¹ McKinsey & Company (2017). *The Power of Parity: Advancing Women's Equality in Canada*.



One of the many students leading change is Onyinye Ofulue (BASc '18, CHBE) who heads a small student club in collecting waste cooking oil from UBC Food Services and converting it into a fatty acid-based fuel known as biodiesel. *Read more at apsc.ubc.ca/news/Onyinye-Ingenuity.*

changing the conversation

N

aturally brilliant at math and science. Independent, analytical, male. This is the stereotype that continues to stand in the way of women and a fulfilling career in engineering. Simply put, engineering is in desperate need of an image overhaul.

"It wasn't until university, talking with my engineering friends, that

I even began to

"Many younger students from studies we've seen, still believe 'engineers' drive trains!"

consider it," recalls Colleen Ogilvie, a UBC Engineering graduate student. Because of her life-long immersion in

competitive sports, including stints as a national and professional volleyball player, Ogilvie says that kinesiology — and not engineering, despite her

aptitude for math — felt like the "obvious" academic choice for her.

To appeal to young people, particularly women, the engineering "narrative" that students are exposed to must include more than aspiring professionals with an aptitude for STEM subjects and a proclivity for tinkering. If few can relate to this singular story, is it any wonder that women still overlook engineering as a professional option? As opportunities for engineering are not widely known, the need for new, more inclusive "stories" has become a cornerstone of UBC efforts to increase female engineering enrollment to 50:50.

"There is a prevailing misunderstanding about the engineering profession, especially among young people," says Sheryl Staub-French, a UBC professor of civil engineering and Applied Science dean's advisor on equity, diversity and inclusion. "In various studies, students have been asked to describe an engineer. Often they'll say they drive trains!"

And yet many aren't aware that engineers are attuned to problems in the everyday world. As a competitive swimmer and UBC graduate student in the fledgling field of biomedical engineering, Ogilvie noticed something about the swim bench in your average pool: it does not accommodate those with limited lower body strength and balance.

"I was always strong at math, but also interested in arts and design," Ogilvie says. "I realized I could study engineering and design for health and rehabilitation." Awarded an NSERC Engineers in Scrubs (EiS) fellowship in 2016, Ogilvie is now a member of the Collaborative Advanced Robotics and Intelligent Systems (CARIS) Lab, where her research focuses on emerging trends in assistive technology. She has also worked on a project to design a swim bench specifically for athletes with cerebral palsy.

Demystifying engineering — showing how STEM subjects relate to everyday lives in a fun, engaging way — has been at the forefront of UBC’s engineering outreach efforts. The reality is that even teachers struggle to articulate what engineering is. Beyond engaging with K-12 students, UBC offers professional development workshops for teachers and information sessions for parents to help change the conversation.

Last year also marked the launch of Engineering Stories, a YouTube video-blog aimed at transforming gendered perceptions of engineering. Why? To imagine yourself becoming an engineer, Dr. Staub-French says, students require “near peers” — those who have experienced the same challenges just a year or two before you. “If you can see it, you can be it,” says Staub-French, citing an oft-quoted phrase among those working to change how women view potential careers in STEM.

UBC alumna Sara Badiei (MAsc ’07, ELEC) could certainly “see it.” Despite engineering being her first choice,

and her years in the energy sector, she craved traveling and sought to use her skills in areas of the world that might need them.

“After a couple of years in the energy sector, I was having doubts about whether I had chosen the right field,” she says, until one afternoon one of her colleagues invited her to sit in on a presentation by Doctors without Borders. “Humanitarian aid and international development desperately need engineers, but it’s not really well known. The moment I discovered that, I knew in my heart that’s what I needed to do.”

In the last seven years, Badiei has travelled the world working with the Canadian Red Cross, the World Bank and Doctors without Borders. She has coordinated relief efforts in countries devastated by natural disasters, worked to restore essential services in conflict zones, and has helped to improve the energy supply to over 1.5 million people.

Badiei, like Ogilvie, represents the new face of engineering and sharing stories like theirs will help to shape

a new engineering identity — one that is multifaceted, relatable and inspiring. With female enrollment at UBC Engineering now over 30 per cent — up from 18 only eight years ago — the Women in Engineering initiative has found its initial success not by changing admission standards to fill a set quota, but by focusing on awareness, engagement and empowerment.

Reflecting on her journey, Badiei feels an overwhelming sense of gratitude that the right opportunity had “found her.” Now she is eager to share her story to help students have their “eureka moment” sooner. “There’s not a lot of information out there to help young people understand engineering, so they can make an informed choice,” she adds. “That sense of direction early on opens you up to so many more possibilities.” |

“Humanitarian aid and international development desperately need engineers, but it’s not really well known.”

Sara Badiei has worked on emergency relief efforts in conflict zones including Gaza and Afghanistan, launched rehabilitation projects after natural disasters in the Philippines, and coordinated emergency medical operations for disease outbreaks in Chad and Congo.



THE NEXT GENERATION OF BIONIC DEVICES

Inspired by the iconic scene of Luke Skywalker receiving an artificial hand in *The Empire Strikes Back*, UBC is focusing on the future of bionics and the next generation of bio-integrated devices.

Led by electrical and computer engineering Professor John Madden, the newly-formed Bionics Network connects over two dozen principal investigators at UBC, Simon Fraser University and the University of Victoria, working in areas such as advanced prosthetics, rehabilitation robotics, regenerative medicine and 3D-printed electronics. With specialties ranging across science, engineering and medicine, what brings these investigators together is a desire to deliver on the promise of bionics: the restoration or enhancement of human capabilities.

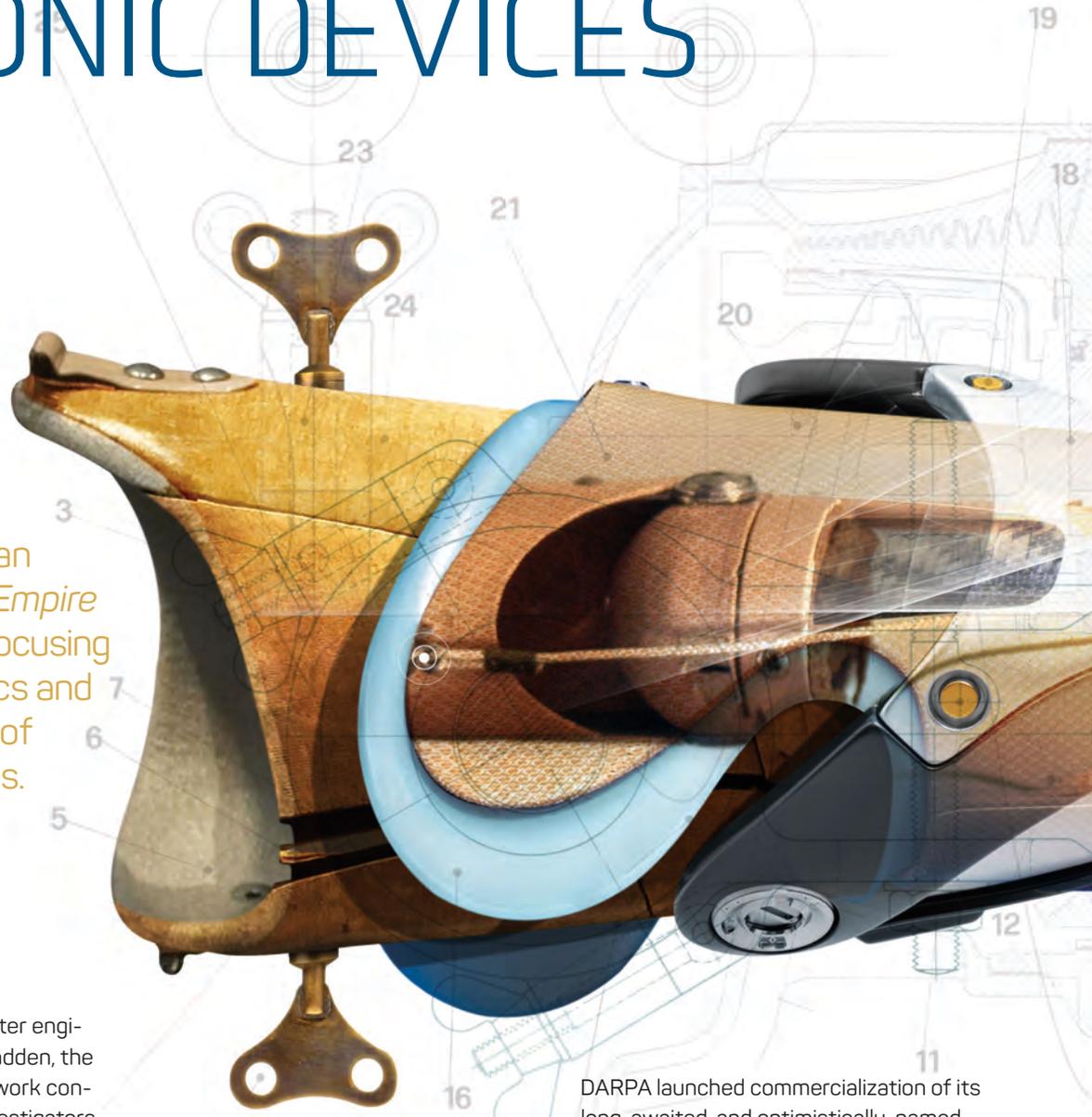
[Bionic: using artificial materials and methods to produce activity or movement in a person or animal]

Bionics heating up

2016 was a watershed year for bionics. July saw the founding of Elon Musk's new company, Neuralink, which coincided with the launch of the US Defense Advanced Research Projects Agency (DARPA)'s new Neural Engineering System Design program, both aiming to develop implantable neural interfaces. In October, the world's first Bionics Cybathlon was hosted in Switzerland, with all the latest prosthetic technology on display. And climactically, in December, after nearly eight years of development,

DARPA launched commercialization of its long-awaited, and optimistically-named, LUKE Arm. LUKE (Life Under Kinetic Evolution) represents the leading-edge of commercial prosthetics: controlled by wireless sensors attached to a patient's feet, the artificial limb has an anthropomorphic design and natural weight (around eight pounds), 18 degrees of freedom and a responsiveness of one to two seconds using electrical actuators.

Watching the LUKE Arm in motion is an inspiration to many. As one recipient, retired US Army Captain Artie McAuley, put it, "I'm getting to do a lot of things ...

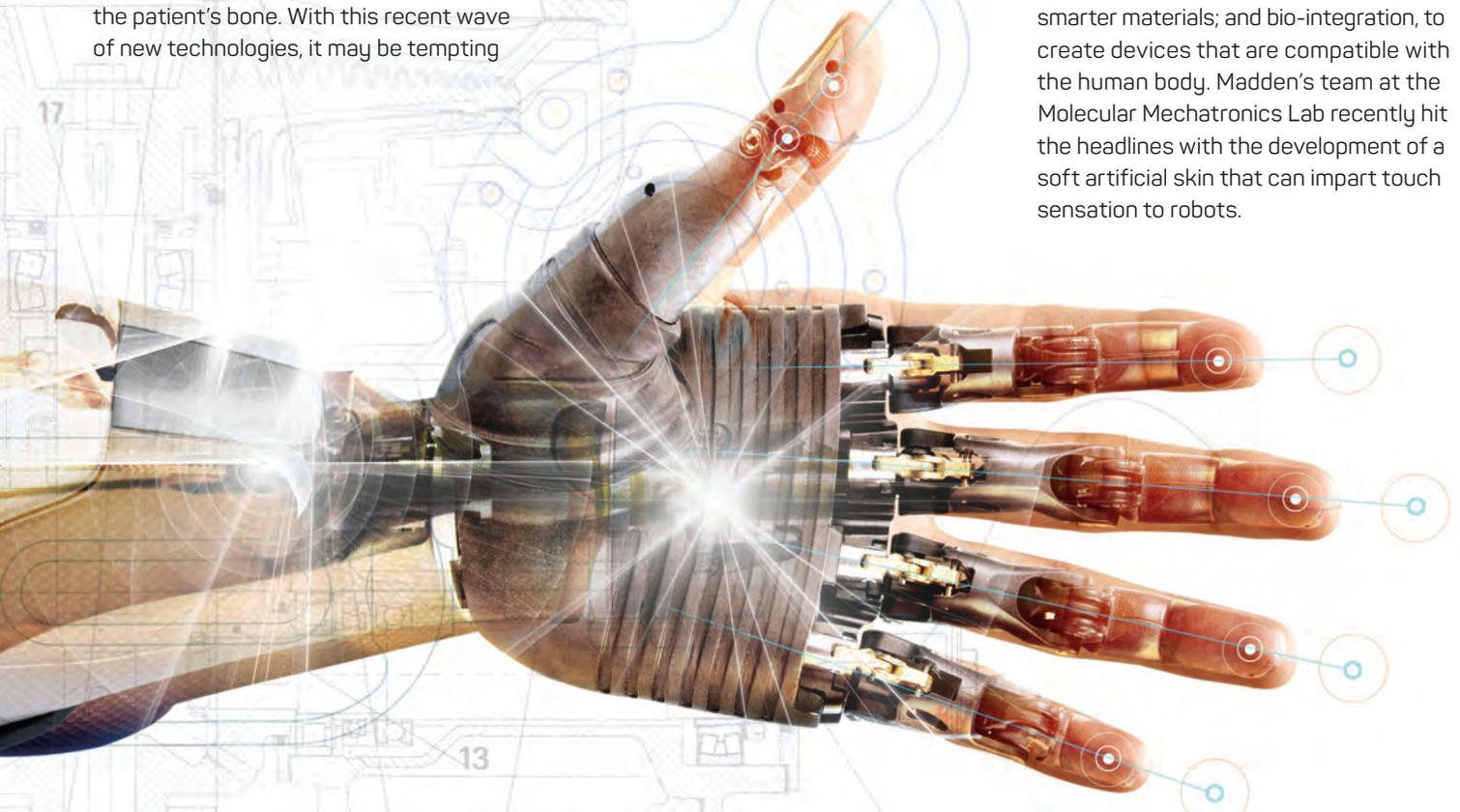


I never thought I could. This has given me the opportunity to enrich my life." And more changes are on the horizon. Brain-controlled neuroprosthetics are passing lab tests with flying colours, helping patients with locked-in syndrome to move objects using only their thoughts. Osseointegration is also gaining traction, which provides more natural and greater control by attaching a prosthetic device directly to the patient's bone. With this recent wave of new technologies, it may be tempting

which they feel are more reliable and less complicated.

The complexity of the human arm and the challenge it represents is a true marvel. Not only does it have great agility, with 34 degrees of freedom (27 in the hand, seven in the arm), and the ability to manipulate a wide range of differently shaped objects, but it also has fast-twitch response

better patient care is the goal of the Bionics Network," says Madden. "This means working across boundaries to integrate teams and develop a new generation of devices that are softer, smarter and more sensitive." For the Bionics Network, this will involve three key research themes: 3D printing to produce custom-fitted parts and reduce costs; soft robotics to exchange rigid components for softer, smarter materials; and bio-integration, to create devices that are compatible with the human body. Madden's team at the Molecular Mechatronics Lab recently hit the headlines with the development of a soft artificial skin that can impart touch sensation to robots.



to believe we're tantalizingly close to the spectacle of science fiction. But, as Madden puts it, "We're still a long way from the technological superheroes we see on-screen."

Challenges to overcome

This year marks 25 years since the world's first electrical limb, the Edinburgh Modular Arm System, was unveiled by David Gow. In that time, major advances have seen the production of softer, lighter, stronger and more life-like artificial limbs, leading to the LUKE Arm. However, the challenge of translating lab technology into better patient care is still as great as ever. Studies show that despite these major advances, up to 56 per cent of patients abandon the most cutting-edge electrical devices in favour of simple mechanical systems,

(hundreds of milliseconds) and an average grip strength of around 100 pounds. In addition, the human hand contains over 17,000 nerves capable of detecting weight, firmness, shape, temperature and texture, feeding this information back to the brain via a two-way signalling network. And, if that wasn't enough, the whole system is wrapped in a soft exterior suitable for human-to-human interaction.

How can bionics deliver on its promise?

The LUKE Arm would be indistinguishable from magic 50 years ago and it stands as a testament to how far we've come from Götz von Berlichingen's 16th century mechanical hand. But there is much ground to cover in bringing artificial devices to life. "Translating our technologies into

At a time when bionics is more popular than ever, the Bionics Network is bringing together scientists, engineers and clinicians to be at the forefront of this new generation of devices. By combining human biology, biomimetic design and the perspective of the patient, the group aims to deliver mobility, freedom and life back to many. |

The Bionics Network is supported by the UBC Vice-President, Research & Innovation Office, in collaboration with the Institute for Computing, Information and Cognitive Systems (ICICS).



STRUCTURES + COMMUNITIES DESIGNED

Building safer, sustainable and more efficient homes and communities is the focus of urban infrastructure and green construction researchers at UBC's Okanagan campus as they strive to find innovations that will change the future of way we live. The engineering researchers are partnering with researchers in other disciplines to bring a more holistic approach to the building process.

"From an engineering perspective, we're taught early on to identify a problem and find a solution," explains School of Engineering Associate Dean Rehan Sadiq, "but the real key is to bring together a strong team with different strengths and build upon those strengths in the quest for a solution."

From life cycle analysis of the impacts of urban densification on the City of Kelowna, to detailed research and development of new building innovations, UBC Okanagan's School of Engineering is teaming up with researchers from management, economics and health and social development to address the challenges within structural and community development.

From the structures to the communities, UBC engineering researchers and their interdisciplinary colleagues are building the urban environments of the future.

Wilden Living Lab

Two years into a three-year intensive research study comparing a home built to today's standards to a home built with the latest energy-efficient materials and systems, researchers have already determined that the "home of tomorrow" results in energy savings of 65 per cent and cost savings of 35 per cent.

Lead investigator Shahria Alam says these results may not be entirely surprising, "but providing homeowners and homebuilders with this type of analysis gives them the tools to make more informed decisions about what approach they wish to take in the future."

The interdisciplinary project, funded by the Natural Science and Engineering Research Council (NSERC), brings together stakeholders from developers and builders to researchers and utility companies.

"Ultimately, our goal is to determine the best methods for creating a sustainable home of the future through material innovations, net-zero building planning, healthy neighbourhoods and renewable energy planning."

Lean more at wildenlivinglab.com.

Timber-Steel Hybrid Structures

The rapid growth of Canada's urban population and the associated environmental concerns are partly influencing city planners and construction stakeholders to consider *sustainable urbanization* alternatives. Sustainable urbanization has emerged as a viable solution towards smart and liveable cities that are more resilient, and environmentally friendly. With the advent of modern mass timber products, such as glued laminated timber, cross-laminated timber and structural composite lumber, these products are enabling builders to safely increase the height of wood buildings.

The building height limit can be increased, however, with consideration of timber-based hybrid building. Professor Solomon Tesfa-mariam and his group are leading research into this area, specifically the effective use of wood in mid- and high-rise buildings. They are developing hybrid structures that incorporate cross-laminated timber infill shear panels within steel and concrete frames. Through advanced modeling and testing, the researchers are assessing the effectiveness of hybrid buildings and their seismic performance. The results, along with other research currently underway into structural and life-safety building



Left: Building the Wilden Living Lab in Kelowna, BC, where UBC researchers are conducting energy usage experiments in a real-life environment.

Right: Professor Solomon Tesfamariam with doctoral students Selamawit Dege Dires, Nurbaiah Mohammad Noh and Kostantinos Skandalos in UBC Okanagan's Structures Lab.



performance and building systems, are key to establishing new building code amendments and revisions.

Their work was supported through NEWBuildS – a multi-disciplinary NSERC strategic research network for engineered wood-based building systems – and Forestry Innovation Investment. Tesfamariam is extending this research further to incorporate green roofs to mitigate urban flooding.

Urban Densification Impacts on Kelowna

Working in conjunction with researchers in political science, economics and management, School of Engineering researchers at UBC's Okanagan campus investigated the potential impacts of urban density on overall greenhouse gas (GHG) emissions.

The multi-tiered plan evaluated four possible growth scenarios (ultra-compact, hub and spokes, urban centre and suburbs, and suburban development) and considered likely public acceptability to forecasted GHG emissions.

Professor Sadiq, who led the project, says the insight from the other disciplines was integral to their results. "We were provided with many additional tools and variables

that are typically outside the engineering scope, but enable us to make more intricate and educated findings."

Despite the research identifying ultra-compact as the most effective GHG emission reduction development approach, interview data with land-use experts concluded that Kelowna would most likely continue to develop in accordance with the hub and spokes scenario.

"Our recommendations to the City [of Kelowna] were to engage the public to learn more about the impacts of varying types of developments," explains Sadiq. "Ultimately, it is up to the public to make decisive choices to reduce GHG emission reductions."

Although the research focused on the City of Kelowna, its findings are applicable to other similarly-sized communities across the country.

New Monaco Development

Designing the community of the future is in the hands of researchers at the Okanagan campus. Developers of a 125-acre parcel of land in Peachland have sought the expertise of researchers to help build a multi-use urban development that will eventually see a fully sustainable community of more than

5,000 residents. Working alongside colleagues from management and fine arts, engineering researchers are working on a range of projects including sustainable water and electricity supplied to recycling and transit.

According to Professor Kasun Hewage, the opportunity for researchers to undertake such a diverse interdisciplinary project is unique. "Even in industry you aren't often afforded the opportunity to diversify your knowledge and skills, and this project is enabling us to discover innovative solutions to help build Canada's healthiest sustainable community." |

Lean more at newmonaco.ca.

UBC SCHOOL OF NURSING CELEBRATES CENTENARY

ONE HUNDRED YEARS AGO, THE “DEPARTMENT OF NURSING,” AS IT WAS KNOWN THEN, JOINED THE FACULTY OF APPLIED SCIENCE AT UBC. IN DOING SO, IT BECAME THE FIRST NURSING PROGRAM TO OFFER A UNIVERSITY DEGREE IN CANADA. IN FACT, THE GRADUATES OF THE CLASS OF 1923 WERE THE FIRST TO RECEIVE A UNIVERSITY DEGREE IN NURSING IN THE ENTIRE COMMONWEALTH.

Arveen Sandhu
fourth-year undergraduate student

Devin Landis
fourth-year undergraduate student

Ranjit Dhari
Instructor



1919

The School of Nursing opens at UBC. Undergraduate degree program begins (BSN)

Ethel Johns is first head of the Department of Nursing (1919-1925)



ethel-johns-first-director 1919

1925-1941

Mabel Gray, Head of Department



1967-1971

Beth McCann, Director

Muriel Uprichard, Director

1971-1977

PhD program opens. Nursing research commences



1991

Participated in The Great Trek to encourage building of Point Grey campus



1922



1941-1967

Evelyn Mallory, Director of the School of Nursing

Master of Science in Nursing program opens (MSN)

Helen Mussallem is the first guest lecturer for the new Marion Woodward Lecture

1968



1977-1993

Marilyn Willman, Director

Nursing students have a long history of engagement with UBC, beginning with those students who, in protest of governmental delay in building the campus, joined a parade — the Great Trek — from downtown Vancouver to Point Grey. In a photograph that may be familiar to UBC alumni, the nursing students can be seen holding their banner on the second story of the unfinished science building following the trek. In April 1923, the first nursing students initiated the UBC Nurses' Club for graduates and undergraduates, in order to facilitate continued communication among nurses after graduation — an early alumni association. At around the same time, Florence Innes and Margaret Kerr, of

the class of 1926, started a group for undergraduates in the degree program — the first iteration of our current Nursing Undergrad Society. According to Nurse Innes, "it was called the Science Girls' Club because we were under the Faculty of Applied Science and our degree was Applied Science."

After graduating, some of the earliest graduates took positions in distant villages in desperate need of public health nurses — a practice that continues today. They travelled to their outposts by train and mail cart without as much as a telegraph to connect them to their families. Some of their duties included visiting schools where they checked for lice and tonsillitis and trained children who couldn't afford

toothbrushes how to clean their teeth with a soft cloth and salt. Other graduates accepted posts closer to home, in hospitals with the most current technologies, and in sanatoriums where they cared for patients with tuberculosis, still a leading cause of death at the time. Other graduates, as well as former faculty members, entered hospital administration, or banded together to form unions and associations to advocate for nurses across British Columbia and Canada at large.

And while graduates were changing the face of nursing, the School of Nursing continued to develop. The basics of research had always formed part of Bachelor of Science in Nursing (BSN) training, but



Sabrina Wong
Professor



Fuchsia Howard
Assistant Professor

2000-2010

Sonia Acorn,
Interim Director
(2000-2002)

Sally Thorne,
Director
(2002-2010)



The Critical Research in Health and Healthcare Inequities (CRiHHI) research unit launches



2009

The school launches its first research centre: Stigma and Resilience Among Vulnerable Youth Centre (SARAVYC)

Suzanne Campbell, Director
(2012-2017)

2012

Elizabeth Saewyc,
Director (present)



2017

One Hundred Year celebration begins!



2019

Katharyn May,
Director

Nurse Practitioner program launches (MN-NP)

Colleen Varcoe,
Director *pro tem*

The Master of Health Leadership and Policy (MHLP) in Seniors Care launches

- The MHLP in Clinical Education launches
- First Vancouver Summer Program initiated with 2 courses
- First general electives are offered outside of Nursing with 3 courses

1994-2000

2004



2011-2012

2016



2018

the school's first distinct course in research began with the introduction of the Master of Science in Nursing (MSN) degree in 1968. The school's view of producing a core group of future researchers has been extremely successful, generating exemplary research and advocacy over the years. In 1991, the first PhD students took the next step to advancing their careers; a step which has contributed greatly to further enhancing our school with eminent scholars and mentors and attracting new educators to engage with current faculty in world-leading research.

Over these hundred years our graduates have defined and redefined what it means to be a nurse. From the first steps of the Great Trek, through women's movements of the 60s and 70s — at the forefront of changes to abortion laws and the opening of birth control clinics — our alumni have not shied away from controversy. Both locally and around the globe, our nursing alumni advocate for vulnerable populations and push for changes in policy and practice. Today you will find them at work in women's shelters and harm reduction clinics, striving to end the fentanyl crisis, breaking ground in the reduction of mental health stigma, developing policy for such important initiatives as medical assistance in dying, and presenting important facts and practical guidelines to Senate on legalization of marijuana (Bill C-45).

Last September, we welcomed a new cohort of 120 undergrad students from a variety of disciplines who will, like their predecessors, continue to stretch the boundaries of nursing through research, knowledge transfer, clinical practice, policy making, technological advances, and fields and enterprises that haven't even been invented yet. We are as excited to celebrate our one hundred years at UBC throughout 2019 as we are eager to learn how our amazing alumni will enhance the health of generations to come. |

2019 CENTENARY EVENTS CALENDAR

DIALOGUE ON NURSING'S ROLE IN INDIGENOUS HEALTH IN BC JANUARY-ONGOING 2019

Beginning in January, look for a series of dialogues that will align with the Truth and Reconciliation Commission calls to action, hosted by Nursing's Indigenous Cultural Safety Strategic Initiatives Committee.

UBC NURSING DIALOGUES Nursing Leadership, Excellence, and Best Practice within Medical Assistance in Dying (MAID) FEBRUARY 12, 2019

The first in a luncheon series on pressing issues (all moderated by Dr. Sally Thorne, professor, UBC School of Nursing, and Associate Dean, Faculty of Applied Science). Look for three more of these quarterly UBC Nursing Dialogues planned throughout the year.

CONSORTIUM FOR NURSING HISTORY INQUIRY SYMPOSIUM 100 Years of University Nursing Education: Looking Back and Looking Forward MARCH 14, 2019

Opening lecture presented by keynote speaker and UBC School of Nursing alumna, Dr. Susan Duncan, Professor and Director, School of Nursing, University of Victoria.

EDGE FESTIVAL APRIL 4, 2019

At this one-evening event, plan to be captivated by theatre, photography, painting, gaming and other arts that originate from or disseminate the findings of ground-breaking UBC Nursing research.

GALA MAY 2, 2019

Join us as we celebrate the gifts and talents of our colleagues and partners. In honour of our centenary, we will be awarding 100 Centenary Medals to recognize individuals connected with our school who have made distinguished contributions and support to nursing practice, research or nursing education.

CONGRESS OF THE HUMANITIES AND SOCIAL SCIENCES JUNE 1-7, 2019

At the 2019 congress, themed, Circles of Conversation, is a joint conference of the Canadian Association for the History of Nursing and the Canadian Society for the History of Medicine. Visit congress2019.ca for more details.

ORIENTATION OF THE CENTENARY CLASS AUGUST — SEPTEMBER 2019

Each year we choose our students from a pool of remarkable, clever and astonishingly accomplished applicants. This year each one also has the distinction of being among the one hundredth cohort of nursing students to attend our school, and will be recognized with a special welcome at orientation.

VERNA HUFFMAN SPLANE PUBLIC HEALTH NURSING LECTURE OCTOBER 2019

A Member of the Order of Canada, Dr. Verna Huffman Splane was a public health nurse and an internationally recognized health leader and champion of global health. Huffman Splane became the first woman Chief Nursing Officer in the Canadian Department of National Health and Welfare, the highest office of any nurse in the country.

MARION WOODWARD LECTURE NOVEMBER 2019

This annual event is made possible through the generous support of the Mr. and Mrs. P. A. Woodward's Foundation. The event will take place at Robson Square on a Thursday evening in November. The Afternoon Symposium is a brief panel discussion on a companion topic to the lecture.



DIGITAL DESIGN REVOLUTION

Over the past decade, the field of architecture has undergone a dramatic transformation. Thanks to advanced robotics and technologies like 3D modeling software and printers, today's architects not only create innovative new designs for physical structures, but actually execute them in the real world.

At the University of Stuttgart, for instance, designers used digital fabrication tools to create a pavilion modeled on a spruce cone. Featuring a wood composite "skin" with 1,100 apertures that naturally open and close in response to changes in humidity, the structure represents what can be accomplished when modern technology is creatively applied to one of the oldest construction materials in the world. Merging mimetic design, materials and structural engineering, advanced fabrication and architecture, it also represents the benefits of taking an interdisciplinary approach to design and fabrication.

As architectural practice has come to require more than design and construction knowledge, schools of architecture need to offer training in engineering, computer science and other relevant disciplines if their students are to meet today's professional demands. At UBC's School of Architecture and Landscape Architecture (SALA), these skills are being imparted through a new program called Integrated Design Learning through Making and Building (IDLMB@SALA), supported by the UBC Teaching Learning Enhancement Fund.

"The Making and Building initiative at SALA is not just another curriculum design project, but

rather one that mirrors and responds to a profound technology-driven revolution in the profession," says Ronald Kellett, the director of SALA. "We need to reimagine the ways in which we teach courses in digital media, design and technology if we are to remain at the forefront of this rapidly evolving field."

In the past, design and fabrication were segregated processes that called for largely distinct skillsets. But with the emergence of powerful new digital technologies, the two now go hand in hand. Computational design methods are heavily informed by the performance of fabrication tools (and vice versa), and understanding the foundational principles that govern these technologies — not just learning the software that happens to be popular at the time — is crucial for any architect who intends to thrive professionally.

In order to help its students achieve this, SALA has embarked upon a three-year plan to expand its core curricula and design- and building-related infrastructure. Students now have access to tools like laser cutters and 3D printers, which have already been incorporated into three SALA courses, as well as to a growing number of opportunities — both small-scale, "culture-and-skill-building" design-making projects and larger-scale, community-serving and field-based design-building projects — to learn existing practices and explore new architectural possibilities.

IDLMB@SALA is being spearheaded by Blair Satterfield, an associate professor at SALA. He and colleagues including AnnaLisa Meyboom, who leads the Robotic Fabrication Workshops for UBC, aim to help train a new generation of architects who are inspired to create structures that merge form and function in practical, sustainable and beautiful ways.

"It's probably safe to say that the future of architectural practice will involve an even stronger fusion of technology and traditional methods than exists today," says Satterfield. "But whatever happens, it's clear that we can no longer be content to simply refine our methods. We must enter the black box and program it, disrupt it and redirect its output to reach exciting new destinations." |



RES'

For as long as they could remember, many members of the Lytton First Nation in British Columbia had been wary of tap water. Even as children, they had known that if they drank it, they might get sick.

So in the summer of 2016, it was with cautious optimism that the residents of five homes in two Lytton reserves watched as a new water treatment system was installed in their basements. Could this refrigerator-sized device, developed by researchers at UBC really give them the clean tap water they had needed for years?

When it comes to providing potable water to under-resourced communities, Canada's track record is spotty at best. While a number of communities that have received government funding now have good water systems in place, the federal government has struggled to help others — especially smaller and more remote communities — escape drinking water advisories, some of which date back decades.

For communities like Lytton First Nation, the situation may be even more challenging. With an on-reserve population of around 1,000, Lytton First Nation is largely composed of pockets of just two, three or four homes — so-called “micro-communities” — that the government considers to be too small to qualify for capital infrastructure funding. Effectively left to fend for themselves, they have no choice

but to buy bottled water or boil water drawn from nearby creeks or rivers in order to meet their daily drinking, washing and sanitation needs. There are thousands of them scattered across BC alone.

When Madjid Mohseni, a professor of chemical and biological engineering at UBC, first visited one of these underserved communities, he was startled by what he saw. Although a substantial portion of the world's population has always lacked access to safe drinking water — as of 2018, it is about a quarter, or 2.1 billion people — the water conditions Mohseni observed were closer to what one might encounter in a developing nation, not a so-called developed country like Canada. And the damage, he knew, was more than physical; it was also moral — depriving people of their sense of dignity and self-worth.

“As the United Nations has declared, access to sufficient safe water is not just a human right, but essential to the realization of all human rights,” says Mohseni. “As an engineer, I feel compelled to do what I can to help address a solvable problem that has persisted for far too long.”

To this end, Mohseni has served for nearly a decade as the scientific director of RES'EAU WaterNET, a UBC-based research network which aims to develop and deliver effective and affordable water treatment technologies that are tailored to small, rural and Indigenous communities — historically neglected



RES'EAU

Customized and
community-driven
clean water solutions



groups which continue to seek proper recognition. The first and only organization of its kind in Canada, the Network currently includes 17 professors from eight Canadian universities, as well as numerous partners from the public and private sectors.

But it is the partner communities that lie at the heart of RES'EAU, shaping and driving all of the work that it does. Through group and individual meetings, community members provide the network with valuable information about their needs, preferences and expectations. In doing so, they help co-create solutions that meet the unique requirements of their community. Dubbed the "Community Circle" approach, this enables Mohseni and his colleagues to not only provide the best technology possible for that particular community, but also build trust and form lasting relationships with the residents themselves.

"RES'EAU is about respecting the cultures and lives of the end users as much as it is about research, technology and policy," says Mohseni. "Our approach to research is to treat communities and operators as co-developers and valued partners, and they will respond by becoming the projects' most valuable resources. More often than not, the user communities and operators provide better ideas than anything we could have come up with ourselves."

For several months after UBC's water treatment devices — equipped with filters and ultraviolet disinfection technology — were installed in the two Lytton First Nation reserves, local operators monitored their performance (good), energy consumption (minimal) and homeowner response (positive) on a weekly basis. And in January 2017, after the First Nations Health Authority reviewed the information that had been collected, the boil water advisories were lifted — and remain so today.

Since then, RES'EAU has installed similar point-of-entry systems, as well as centralized water treatment systems, in several other BC communities that have been under decades-long boil water advisories. As the federal government seeks to end all long-term drinking water advisories on public systems on reserve by March 2021, RES'EAU will continue working to advance its goals: creating and implementing innovative new water technologies, enhancing dialogue and collaboration among stakeholders, and improving governmental policy and regulations relating to small water systems.

"We hope that our Community Circle strategy offers a promising model for small water systems that will eventually be adopted not just across Canada, but around the world," says Mohseni. "A cookie-cutter approach to addressing issues of this magnitude can take you only so far." |

Everyone knows what pain is. Or do they? Though we have all felt pain, we seldom think about its nature, its causes and the fact that it is all in our heads — or, more specifically, our brains.

Pain is a complex, biopsychosocial phenomenon that arises from the interaction of multiple neuro-anatomic and neurochemical systems with a number of cognitive and affective processes. Put simply, pain is a response to a biological stimulus: when an internal or external stimulus presents itself to the body, a message is sent through your neurons to the spinal cord and relayed to the brain, where the brain decides whether or not the stimulus is a threat. If a threat is perceived, your brain will elicit a pain response to protect you from the harmful stimulus.

Put even more simply? Pain is your brain saying, “I don’t want you to do this, so I’m going to make it hurt.”

A pain response that lasts longer than 12 weeks is referred to as chronic pain — and it’s a different kind of beast. When the neurons and brain cells that produce pain are stimulated for extended periods of time, they become increasingly sensitive and less precise, producing pain in response to smaller and more nonspecific stimuli. Eventually, your body may try to protect you from a stimulus that is no longer a serious threat, or even one that no longer exists. This kind of chronic pain is very difficult for health practitioners to treat.

An estimated one in five Canadian adults suffers from chronic pain, resulting in \$43-60 billion per year in health care expenditures and lost productivity; this exceeds the cost of cancer, heart disease and HIV combined. In BC, chronic pain affects approximately 800,000 people, and with the province’s aging population, this number continues to rise.

UBC School of Nursing Drs. Bernie Garrett and Tarnia Taverner, along with Dr. Diane Gromala (Simon Fraser University), are conducting studies to support the growing body of research around the use of virtual reality (VR) as a treatment for chronic pain.

“[VR] offers a powerful form of distraction, far more immersive than other forms of multimedia ... where by the user is placed in a simulated environment that looks and feels just like the real world,” says Garrett. “As VR is computer-mediated, we can total-ly control the experience of the user and what

happens within this world. We can tailor VR environments to be specifically targeted at specific things, such as pain research.”

“Currently we’re testing the use of virtual reality in patients with chronic pain associated with cancer diagnosis and we are finding for some people it does have an effect,” says Taverner. “The best approach to chronic pain is a multi-modal approach [which may include medication, relaxation, VR or other tools and techniques] ... and each individual will find what is best for them.” By temporarily relieving the pain sensation, if only briefly, the therapy is in a sense pressing a reset button that with continued exposure may enable the individual to begin retraining their nervous system not to respond with pain messages.

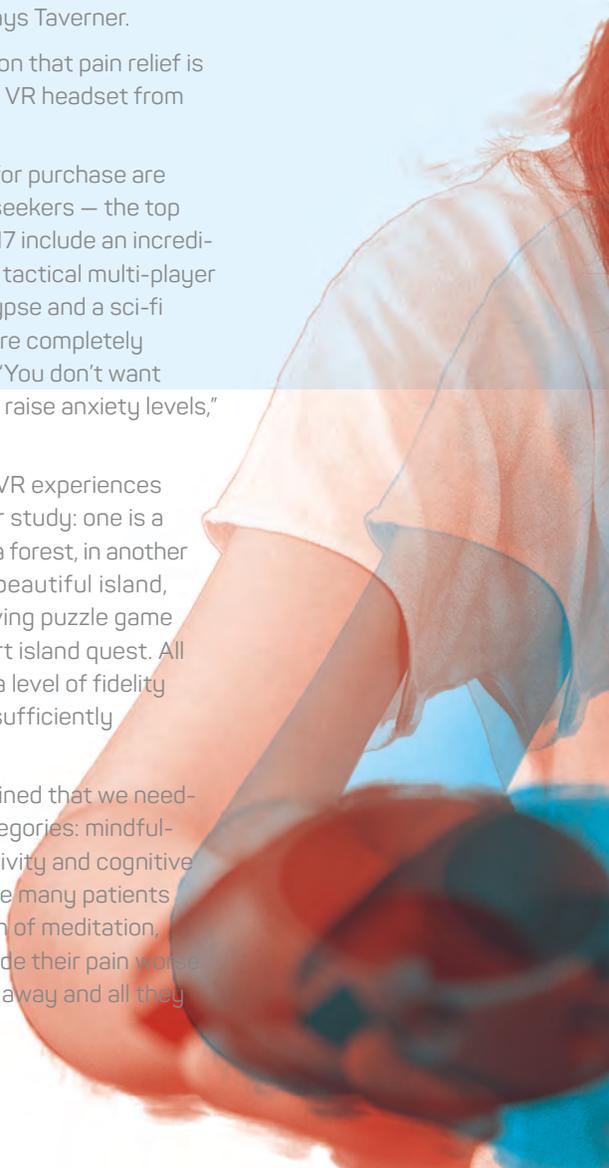
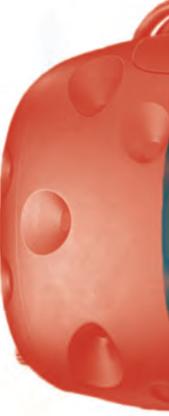
“If you’ve had pain for years from the moment you wake up to the moment you go to bed and then suddenly you are immersed in an environment and the pain goes, that is significant,” says Taverner.

However, the researchers caution that pain relief is not as simple as plugging in to a VR headset from your local electronics store.

Most VR applications available for purchase are designed for young adrenaline seekers — the top grossing VR experiences of 2017 include an incredibly violent gladiator simulator, a tactical multi-player shooter game, a zombie apocalypse and a sci-fi futuristic technothriller — and are completely unsuitable for cancer patients. “You don’t want anything that will induce fear or raise anxiety levels,” says Garrett.

With that in mind, four distinct VR experiences were custom-designed for their study: one is a virtual meditative walk through a forest, in another you are an eagle flying over a beautiful island, another involves a problem solving puzzle game and the fourth involves a desert island quest. All have been designed to employ a level of fidelity that ensures the patients feel sufficiently immersed in the experience.

“From previous work, we determined that we needed applications in two basic categories: mindfulness-focused introspective activity and cognitive stimulation,” says Garrett. “While many patients really benefitted from relaxation of meditation, others found that it actually made their pain worse because it took all other stimuli away and all they could focus on was the pain.”





THE PAIN IS ALL IN YOUR BRAIN

Chronic pain can take many forms and individual responses to pain cannot be predicted. “Chronic pain in cancer patients may result from the actual development of the cancer, from the treatment or even nerve damage following successful treatment. And pathophysiology doesn’t necessarily correlate to degree of pain,” explains Garrett. “You’d think that the people with the worst pathophysiology would have the worst pain, but that’s not always true. This really speaks to the fact that there is a neurophysiological element to the experience of pain.”

For 30 minutes a day over four weeks, the researchers measure pain relief resulting from all four of the custom experiences. And with more than 60 participants completed thus far, they can say with certainty that there are some immediate benefits. While in the VR environment, participants report varying degrees of pain relief. While this in itself is significant, the fact that for some patients this relief has lasted up to 30 minutes after the session ends is indicative of an extended neurological impact. Although the statistical analyses are not complete, the researchers are keen to find out whether a patient’s overall experience of pain was reduced as a result of repeated exposure to the VR – this would have significant implications for the treatment of chronic pain.

Currently, magnetic resonance imaging (MRI) is the only way to effectively analyze the neurological effects of VR treatment, but you can’t put a VR headset inside a giant magnet. However, in early 2019, the study will initiate an electroencephalography (EEG) component that will provide information about the patients’ brain waves – potentially adding to existing research that suggests that brain wave modification can occur with certain meditation and mindfulness techniques. |

For more information on this study, or to participate, visit: tiny.cc/VRforCancerPain.

CONTRIBUTING CYCLE

RESTORING ONE OF VANCOUVER'S LAST SALMON STREAMS



In his short-lived blog *Pancreatic Times*, Kevin Watson documented his struggles with cancer — his dance, he called it. On March 15, 2012 he shared his distaste for chalky tinctures, syrups, sticky energy gels. “I’ve been pretty clear that I don’t want people feeling sorry for me,” he wrote, “but given these remedies, I am asking you now.”

The blog, however, soon became difficult to write. On May 5, the 43-year-old apologized for his “lack of energy and creativity.” Five days later the father of two died at home while holding his wife Christi’s hand. His last blog entry reads, “Au revoir but not goodbye.”

Shortly after his passing, *Pedal* magazine ran an obituary and image of Kevin racing at a Toronto cycling competition. After all, Kevin’s life had many directions: besides being a father and competitive cyclist, he worked as a creative director at Shaw Media, determining the “look and feel” of *History Canada* and

other specialty channels. “Kevin was self-admittedly a happy, fulfilled guy in every way,” says his father, Colin Watson.

While Kevin grew up in Toronto, the city of Vancouver loomed large in his early life. In the early 1990s, he attended UBC with his brother, riding his cyclocross bike through the thick-necked cedar trees around campus. No doubt Kevin often passed Acadia Creek — the unassuming stream that, decades later, and after his death, his family would restore in his name.

Of the over 100 streams in Vancouver that once bore salmon, only three are left: Musqueam, Spanish and Stanley Park’s Beaver Creek. Four streams, actually, if you count the one alternately called Salish by the Musqueam First Nation, Acadia or Hillary Creek by Google — and Unnamed Creek by Metro Vancouver. And while a city report designated Salish or Unnamed Creek as “one of the last, seemingly healthy streams in the area,” that bill of health was revoked in 1947 with the introduction of a culvert.



Few biologists assumed coho salmon could ever wriggle through the barrier, let alone spawn upstream. In 2011, however, Streamkeepers — a creek restoration group — captured some revealing video: an adult coho attempting to flip into the colossal culvert. Although the fish presumably gave up without spawning, the video was shared among fisheries folks associated with Streamkeepers and the Department of Fisheries and Oceans (DFO). “That raised awareness,” says Robyn Worcester, biologist with Metro Vancouver. “Wild coho salmon were actually using the stream.”

After Kevin’s passing, Colin and Barbara Watson decide that “UBC needed some attention from us.” Passions of children can often be sourced back to their parents, and Colin Watson, too, loved the outdoors and had attended UBC. A former CEO of Rogers Cable Systems — and subsequently Spar Aerospace — Colin had grown up in Vancouver, a childhood spent many weekends at the gossamer end of a fishing reel, casting into Capilano River and the high-rising Lynn Canyon. To this day Colin flies to New Brunswick to catch-and-release Atlantic salmon on the renowned Restigouche River.

Although other options for their UBC donation emerged, it was Kevin’s connection to landscape that prompted his parents to fund the Salish Creek restoration. “If he were alive today,” Colin says, “Kevin would

have thought it a dandy way to spend \$250,000 of family money.”

The six-year project would involve so many partners and government jurisdictions that it almost emulated the layering and complexity of nature itself. How complex? The federal government oversees the tidal waters and creek itself, while the province protects the streambanks and land surrounding it. The drainage, meanwhile, winds through UBC Endowment Lands and Metro Vancouver manages Pacific Spirit Park, through which the lower creek becomes Burrard Inlet. And the Musqueam history runs under it all, having the longest stake in their unceded land. Just one century ago the peninsula was a diverse, thriving ecosystem.

“The reestablishing of this creek has not only significance to Musqueam people and for the long-term benefits to our wild salmon,” says Morgan Guerin, a Musqueam First Nation fisheries officer, “but also the identity of the area involved. With the cooperation of UBC and Metro Vancouver and the respect they have endeavoured to show Musqueam, this project is breathing life into this place that is well within our historical memory. Rather than ‘Here is something we used to own,’ we can say instead, ‘Here is something we belong to.’”

Yet the restoration would be slow. It would involve many government permits and stakeholder meetings, not to mention the cycles of provincial, federal and municipal

sign-off. And as the project partners all understand, when humans attempt to revise nature, nature often resists, recon-figuring these efforts in unexpected ways.

After the Streamkeepers video was captured in 2011, engineers added baffles to the culvert: little ledges designed to interrupt and slow the current and allow spawning coho to amble and lever themselves upstream. But, in 2017 the project leaders discovered these weren’t enough to facilitate spawning.

“The fish couldn’t access the culvert,” says Barry Chillibeck, principal engineer at Northwest Hydraulic Consultants (NHC), the company contracted by UBC to carry out the engineering portion of the project in partnership with Ken Ashley, director of the Rivers Institute at BCIT. “The drop was too great, with the pool water too low.”

A healthy stream runs in a classic pool/riffle sequence, but Unnamed Creek had few riffles or pools. “This was impacted habitat,” Chillibeck says, “so we connected the creek to the ocean, restructuring the channel to make it more natural and complex.” NHC strategically arranged rocks to create riffles — adding oxygen as water bumbles over them — and log sills to fashion sandy pools in which salmon could spawn and hide from predators. Yet the area was still scribbled with English Ivy: an invasive species that shoulders out indigenous plants, many of which provide habitat for salmon



and other animal and plant species.

Then, in September, 2017, the project leaders found something unexpected. As an archaeological impact assessment was being conducted to ensure that the reestablishment of Salish Creek wouldn't disrupt the cultural heritage of the Musqueam, the digging unearthed what looked like human bones. The RCMP were immediately called.

"The bones were human and archaeological in origin," as Greg Morrissey, the project manager of Kleanza Consulting, wrote in an email thread to other project members. "These remains will be handled, stored and reburied following protocols by the Musqueam."

Another complication arose that spring, when a flood flashed the drainage; immediately the team grew concerned about displaced sills and rocks. The spring flood, DFO quickly ascertained, had fortunately spared their riffles and pools. Once again, the project was on, though it was four years along now, in part because the timing of this multi-partnered, collective effort had to follow the increasingly unexpected rhythms of the seasons.

"I admit I tried to talk Colin into moving to other projects," says Don Mavinic, the UBC civil engineering professor who acted as principal investigator of the restoration. "But he had perseverance. He said, 'I would rather have it happen here, because this is where my son went to school.'"

THE REESTABLISHING OF THIS CREEK HAS NOT ONLY SIGNIFICANCE TO MUSQUEAM PEOPLE AND FOR THE LONG-TERM BENEFITS TO OUR WILD SALMON, BUT ALSO THE IDENTITY OF THE AREA INVOLVED.

One summer day last year, Mavinic checked on the restoration site. As bulldozers groaned around the forest, replanting shrubs and trees, a Musqueam elder and Metro Vancouver employee chatted creek-side. Not long after Mavinic introduced himself, a family of otters glided up the creek.

As Don recalls, "The elder said, 'Our friends have come to welcome us.' And I thought, 'Wow, this is incredible. An out-of-body experience.'"

Since then, DFO has detected the occasional scurrying of salmon fry in the creek. While the fish, Robyn says, may not have originated from a "spawner," it's too early to determine whether salmon are actually returning to Salish; only time can reestablish the population. "Improvements to the creek," Robyn adds, "have made it a more

functional ecosystem. We are seeing contributions to other species as a result of the habitat restoration."

On a recent visit to Salish Creek, Mavinic (now retired) noticed a school of cut-throat trout

winnowing across the creek mouth. Unlike salmon, trout are plentiful here. "And I didn't have my fly rod," he joked.

Three small salmon also appeared, inscribed with the tell-tale markings of a coho. "I would recognize their spots anywhere," he says. The fish were meandering upstream past boulders and logs and "to this day I don't know if they spawned or not. I'll never know because I had to return to class." |

They have endured torture and starvation; witnessed the abduction and murder of family and friends; watched as their houses were looted and burned to the ground; been forced to flee their homelands, perhaps forever. But for many refugees, ending one nightmare has only meant beginning another: life in a refugee camp, where danger and disease continue to lurk around every corner.

Indeed, they are places where even a simple visit to the toilet can be fraught with indignity and fear. Each day, unaccompanied women, adolescents and children are faced with a grim dilemma: either relieve yourself at a remote communal pit latrine while it is still light, when you will likely be in full view of strangers, or else try your luck after dark, when you may become a victim of sexual violence. A third option is to stay at home and potentially contaminate the space where you and others live.

Thanks to an innovative new technology developed by students at UBC, however, refugees may soon be able to go to the washroom in the relative safety of their homes. Called the MYCOmmunity toilet, the device not only processes human biological waste

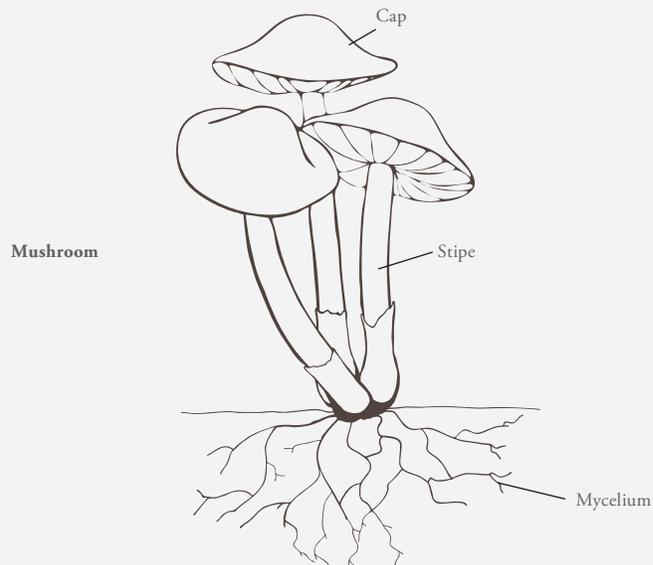
without water, plumbing or electricity, but also is portable, low-cost and scalable — making it ideal for use in under-resourced communities like refugee camps.

Existing portable or composting toilets are too expensive, unwieldy or environmentally unfriendly to serve the needs of their communities.

“At first we envisioned our toilet being used at outdoor concerts, camping grounds, places like that,” says Patrick Wilkie, a graduate of UBC’s Department of Electrical and Computer Engineering. “But we soon realized that it could have a much bigger positive impact in refugee camps and other underserved environments, where proper hygiene, sanitation and personal security systems aren’t usually available.”

Made almost entirely from live mycelium, or the fibrous part of mushrooms, the MYCOmmunity toilet collects urine and fecal matter in separate tanks before treating them with different microbe/enzyme/mineral blends: magnesium and urease for the urine, a designer mix of bacteria for the feces. These blends transform the waste into fertilizers, and when the toilet is full (after around 30 days for

MYCOMMUNITY TOILET



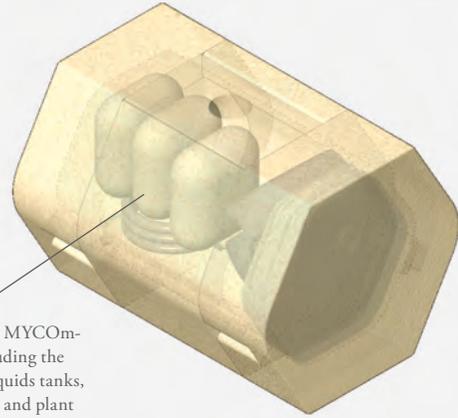
a family of six), the entire unit can simply be placed in the ground, where it will decompose and provide nourishment for crops, grasses and trees.

Formed to participate in the 2018 Biodesign Challenge in New York City, the UBC group spent five months designing and building a half-scale prototype of the technology for the event. And despite the stiff competition — 100 university teams from around the world participated — they ended up taking first place overall, having impressed a judging panel full of design-world luminaries with both their technology and a presentation of their work. The toilet was subsequently displayed for several days at the Parsons School of Design’s Making Center.

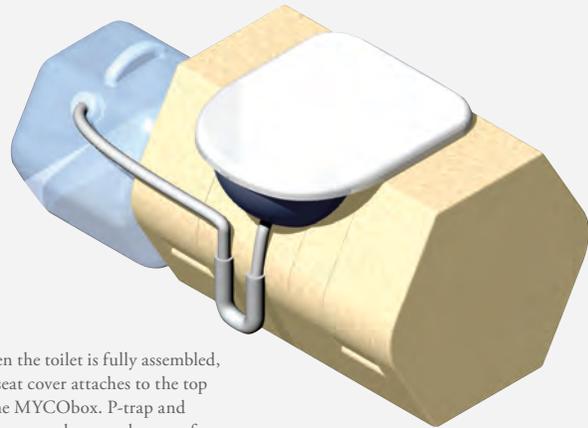
“This is another example of the immense value of interdisciplinary collaboration,” says Joseph Dahmen, a professor in UBC’s School of Architecture and Landscape Architecture, who led the team together with Steven Hallam, a UBC professor of microbiology and immunology. “Architecture, engineering, forestry, land and food systems, microbiology, immunology — all were represented by the group members, who probably wouldn’t have been able to achieve what they did without everyone’s unique perspectives and contributions.”

The Biodesign Challenge team was supported by the Peter Wall Institute for Advanced Studies, where Dahmen and Hallam were both Scholars in Residence, and by the Ecosystem Services, Commercialization Platforms and Entrepreneurship (ECOSCOPE) Natural Sciences and Engineering Research Council of Canada Collaborative Research and Training Experience Industrial stream training program, in which many of the UBC team members are involved.

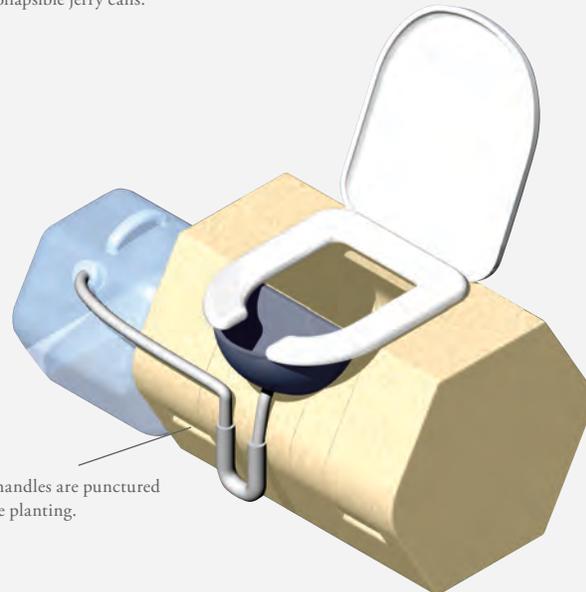
The team is currently working on a full-scale, optimized version of their device, which will be tested at campsites and music festivals. Easily assembled, installed and maintained — and expected to cost under \$20 — the technology has a strong potential to improve the health and safety of the approximately 2.5 billion people around the world who lack safe access to proper sanitation. |



All components of the MYCOcommunity Toilet — including the seat, seat cover, two liquids tanks, and packs of microbes and plant seeds, among other items — are shipped inside the 46L solids tank.



When the toilet is fully assembled, the seat cover attaches to the top of the MYCObox. P-trap and piping extend out to the one of the collapsible jerry cans.



Side handles are punctured before planting.

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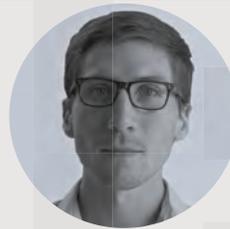
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APPLIED SCIENCE CELEBRATES INAUGURAL HOMECOMING

Vancouver

Alumni and students congregated at the Engineering Student Centre, reuniting with old friends and making new ones. We mingled, laughed and even had the opportunity to chat with James Olson, the dean of UBC Applied Science. And let's not forget the food sizzling on the grill.

The first ever UBC Applied Science Homecoming BBQ – hosted by Dean James Olson, and held on September 22 – saw alumni from all four APSC schools (Architecture and Landscape Architecture, Community and Regional Planning, Engineering and Nursing) celebrate their alma mater. Not long after Dean Olson gave a speech in which he thanked alumni for their support, everyone paraded down to Thunderbird Stadium, where more alumni and students gathered, enlivening the bleachers. While the T-birds lost, we made it a victory by cheering them on. We can't wait to see you all next year!

If you would like to become actively involved in our alumni opportunities, but missed these inaugural homecoming events, there are many more in the coming year! Visit us online at apsc.ubc.ca/alumni to find out how to connect. |

Kelowna

UBC Okanagan also held its inaugural Homecoming, on October 19 and 20. The School of Engineering began the festivities on Friday with an industry night that featured alumni, current students, faculty and industry partners. The evening's keynote speaker was alumni UBC chair, Randall Findlay.

Saturday's Engineering Extravaganza included a number of highlights, one of the most popular being "Dunk the Dean" (a United Way dunk tank fundraiser featuring Dean James Olson and Associate Dean Rehan Sadiq), a catapult construction zone and bouncy castles for all ages. A food truck festival kept everyone well fed.

Homecoming wrapped up with a scavenger hunt hosted by *Amazing Race Canada* host and Olympic gold-medallist, Jon Montgomery, Nourish (a local harvest festival) and a USports men's soccer match featuring the UBC Okanagan Heat and the Thunderbirds.



ALUMNI HIGHLIGHTS



**BACHELOR OF SCIENCE IN NURSING
CLASS OF 1958 – 60TH REUNION**
May 2018

An historic event took place at the UBC School of Nursing in May 2018 when the students in the current cohort met with graduates of the class of 1958. As part of their 60th reunion celebration (planned to coincide with the 2018 UBC Nursing Celebration Gala), the alumni asked for an opportunity to connect with the current class of students to share their experiences of being a nursing student in the 1950s and to hear about the student experiences of 2018. Without hesitation, 25 students signed up, one of whom remarked that this was a once-in-a-lifetime opportunity they didn't want to miss.

Some of the graduates remarked that this event was one of the highlights of their reunion and were pleased by how articulate and mature today's students seemed. The students agreed that it was a positive experience that they would never forget and recommended that this type of event be repeated.

The Class of 1958 then attended the UBC School of Nursing Gala. As anyone who knows them will tell you, the BSN Class of 1958 are thoughtful and efficient. For their 50th reunion, they initiated a fund to assist nursing students through difficult financial times. Ten years later, they combined part of their 60th class reunion with the School of Nursing's Alumni and Partnership Awards Gala, where they were presented with the Donor Partnership Award for 2018.

Written By Heather Swallow, UBC School of Nursing



**CHEMICAL ENGINEERING
CLASS OF 1993 – 25TH REUNION**
May 18-20, 2018

The reunion was an amazing success and over 30 alumni travelled from Singapore, Hong Kong, Connecticut, Texas, Oregon and all over Canada to celebrate. Pub night, on May 18 at Biercraft (in Wesbrook at UBC), had many marvelling at how much campus had changed. On May 19, we were treated to a building

and lab tour by Marlene Chow and special remarks by department head Dr. Peter Englezos. Saturday afternoon required an impromptu repainting of the cairn by Rob Darling and Jillian Cooke to return it to the Class of 1993 icon that had been painted on early that month. A banquet in the Engineering Student Centre that evening was enjoyed by classmates, family, faculty and department staff. Heidi Yang and Su-In Kuah presented Englezos with a cheque for \$10,000 to support future third-year field trips – fondly remembered by many. Paul Herar and Ray Jung MC'd a hilarious "then and now" slide show comparing grad photos, and sharing career, travel and family info about each graduate. A brave few even made it to a coffee gathering the next morning at Granville Island.

Submitted by Jillian Cooke, CHML '93



**CIVIL ENGINEERING
CLASS OF 1968 – 50TH REUNION**
July 10-11, 2018

In 1968, the UBC civil engineering graduating class consisted of one doctorate, 12 master's and 33 bachelor's degrees. Now 50 years later, the 2018 class consists of 21 master's and 115 bachelor's degrees.

The reunion started with the Fraser Arms pub night, on July 10 at the Milltown Bar and Grill (located just below the class' regular weekend watering hole: the Fraser Arms). The reunion dinner was held the following night, at the River Rock Casino Resort.

Submitted by Lloyd Thate, CIVL '68



**MECHANICAL ENGINEERING
CLASS OF 1968 – 50TH REUNION**
September 14-15, 2018

Of the original graduating class of '39, 22 classmates attended over the two nights (plus 12 spouses). The majority attended both nights. A number of attendees traveled from as far as Ontario and Quebec to partici-

pate in the gathering.

On the first night the group was joined by the current Dean of Applied Science, James Olson, and the department head for mechanical engineering, Steve Feng. The main organizer of the event, Brian Callow, proudly introduced his grandson Phil Pomeroy, who graduated in mechanical engineering this year, exactly 50 years after his grandfather.

The consensus of the group was to keep up the tradition of five-year reunions, meeting again at Green College in 2023. (They have celebrated reunions every five years since the 25th reunion in 1993.)

Submitted by Ken Johns, MECH '68



**ENGINEERING
CLASS OF 1958 – 60TH REUNION**

September 21, 2018

Fifty-eight alumni, family and friends celebrated the reunion. We gathered for a wonderful luncheon at Shaughnessy Restaurant, in VanDusen Garden. Registration began at 11 am and within minutes, the noise of happy reunions filled the restaurant.

Alumni came mostly from the Lower Mainland; however, Nerida and Rob Roger (ENPH) came from Australia, Sig Saimoto (ENPH) from Kingston, Ontario, and Margaret and Rod Keech (MECH) flew in from Indiana. Others flew in from many parts of BC. Guests of honour were retired Professors Norman Epstein and John Lund.

The guest speaker was Joe Stott, retired director of UBC Campus Planning, who

illustrated the many changes to the campus since its origins, and particularly since 1958.

The organizing committee included: Craig Clark (CHEM); Bob Dolphin (CIVL); Don Crowson, Ed Frazer (Chair) and Fred Schrack (campus liaison) (ELEC); Zelma Moore (ENPH); Tom Fawsitt (Treasurer), Russ Fraser and Don Swoboda (MECH); Don Gunning (memento) (METL).

The committee has met annually for the past 10 years to organize a reunion lunch at the West Vancouver Yacht Club. This year, being our 60th, we opted for a fancier setting, just before Homecoming.

We look forward to seeing our colleagues at WVYC for our 61st reunion lunch in September 2019.

Submitted by Ed Frazer, ELEC '58



**CHEMICAL ENGINEERING
CLASS OF 1988 – 30TH REUNION**

September 22, 2018

The reunion took place on the UBC Vancouver campus during the 2018 Homecoming weekend. It was a delight to see a total of 14 classmates, along with a few guests who were in attendance to celebrate our 30th anniversary. In the morning, we gathered in the foyer of the Chemical and Biological Engineering (CHBE) building and shared our experiences in our careers and personal lives. Professors Branion, Epstein, Meisen and Watkinson, who had taught the class, joined us during the Dean's Homecoming BBQ, which was held at the Engineering Student Centre. It was amazing to all of us that Professor Epstein, well into his nineties, continues to work every day.

After the BBQ lunch, we took a tour of the CHBE building which was organized by Marlene Chow, the current director of academic programs, administration and facilities for the department. She arranged for us to meet with a group of undergraduate students, who enthusiastically shared their Chem-E-Car and student life experiences with us. It was gratifying to learn that the Chem-E-Car teams placed first and third in a recent international competition. Chow also showed us the computer lab as well as various undergraduate and research labs. The facilities are impressive. After the department tour, we strolled over to the new Robert H. Lee Alumni Centre, followed by a stop at Mahony & Sons Public House. The reunion concluded with a dinner at the Westward Ho restaurant located inside the UBC Golf Club. Everyone enjoyed the dinner and each other's company. We will definitely do another reunion in 2023 and at the same venue.

Submitted by Phillip Choi, CHML '88



**UBC ENGINEERS
CLASS OF 1978 – 40TH REUNION**

October 19, 2018

It started at an Old Red New Red event in 2017, when two '78 grads were shamed into organizing a reunion by '71 grad Gary Wong. An organizing committee was identified, and with APSC alumni engagement support, a venue and catering were established. Parallel to the main reunion, Electricals, Civils, EngPhys, GeoRox and Mining had separate dinners and pub nights. Of 207 '78 Graduates, 62 joined the event with some journeying from as far as Malaysia and Switzerland. We were delighted to have five profs present — thanks to Peter Lawrence, Geoff Vickers, Dave Pulfrey, Alan Freeze and Mike Davies for coming. We minimized formalities to focus on reconnecting, but the APSC presentation given by Associate Dean Carol Jaeger was fascinating, particularly because most of the old farts in the room realized that with current academic admission thresholds they'd never make it into today's program! The event concluded with the reuniting of "Joe's Angels" — our EUS '78 Executive. Despite his earlier protestations of stage fright, a great impromptu speech was delivered by EUS '78 President Joe Uyesugi (including trademark borderline non-PC comments) who made a special journey from California for the occasion.

Organizing committee: Barb Dabrowski, Fred Dennert, Larry Sunnus, Doug Dean

Submitted by Doug Dean ENPH '78



INGENUITY ASKS...

Q&A: Mona Lovgreen

Mona Lovgreen [BEnD '05, MArch '10] is a senior project architect and associate focused on comprehensive planning and mixed-use developments at DIALOG – an integrated design firm with offices in both Canada and the US, whose multi-disciplinary team includes architects, urban planners, interior designers, structural, mechanical and electrical engineers, and landscape architects – in San Francisco.

How would you describe the perfect space?

The perfect space is a space that elevates your senses and enhances your life's quality, for a moment, a day or a lifetime.

What is the riskiest thing you've done?

Leaving a certain career path in an established studio in Vancouver and moving to San Francisco to build up a brand-new studio for my firm and grow the business in an unknown market without any prior business development experience.

What is the most interesting building you've ever visited?

The World Trade Center Oculus by Santiago Calatrava.

What career success are you most proud of?

That is yet to come. I hope!

If your career were a question, what would that question be?

What is next that scares me the most?

What makes a challenge interesting?

An almost impossible yet achievable challenge that could be solved by collaborating with brilliant minds who think outside the box, together.

What do people often overlook when attempting to design a space?

The beauty of an egoless architecture where the focus is not on the designer but the patron.

What are you doing to increase the number of registered female architects?

As an AIBC Councillor, I chaired the Diverse Membership Committee and the Intern-Friendly Initiative, where we primarily focused on promoting diversity within the profession.

What's the most difficult thing about beginning a new design project?

Starting a new design exercise can always be very scary. There is that unknown element and the challenge of staying open and vulnerable to endless possibilities and allowing the design process to guide you.

What is your most memorable UBC moment?

On the first day of B.EnD program, Martin Lewis gave us a blank piece of paper and asked us to place a dot on that paper and said, "You will never look at the world the same way again." It was true!

How does designing differ between Vancouver and San Francisco?

I don't think the design process changes, but what's different is that while using your own unique design process you have to consider and be sensitive to the new variables at play that are inherent in a new city, its past, its people and culture and their collective aspirations.

Which of your designs are you most proud of?

River Mile: A comprehensive community master plan of 15 million square feet of mixed-use transit-oriented development in downtown Denver, stretching along a mile of river, focusing on the public realm and being the link between various neighborhoods.

What is the personal trait you wish your career had better made use of?

Entrepreneurship.

If you had a motto, one that followed your name everywhere it went, what would that motto be?

Set goals that challenge me. Achieve them. Start anew.

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