

INGENUITY

FACULTY OF APPLIED SCIENCE
ENGINEERING NEWS
SPRING 2014 / SUMMER 2014

EARTHQUAKE ENGINEERING
EARLY WARNING AND MONITORING SYSTEMS
DESIGNED TO KEEP PEOPLE SAFE

POWER DRILLS IN THE OPERATING ROOM
PASSION FUELS CO-OP STUDENTS



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA



Dean's Message

Dear UBC Engineering alumni and friends,

Thank you sincerely for your gracious welcome over the past year. By sharing your experience as former students and professionals, you have not only advanced my personal understanding, you have also contributed your wisdom to the future of UBC Engineering.

From your thoughtful questions, it has become increasingly apparent that UBC Applied Science is uniquely positioned to play a critical role in shaping the world. From our interdisciplinary nature — which includes a spectrum of professions, from nursing to engineering — and through our teaching and research, we have the ability to influence the critical issues of our time.

Occasionally I field questions about our involvement in controversial areas pertaining to natural resources. And although it may be easier to shy away from such controversy, it is our responsibility as publicly funded academics and educators to address these complicated challenges and engage with various stakeholders to find the most sustainable solutions.

Due to British Columbia's abundance of natural resources, we at UBC have the unique opportunity to help protect the environment within the current fossil-fuel based economy, as well as the opportunity to develop renewable energy sources and a much more sustainable bio-economy.

For example, within the current economic framework, our civil and materials engineers study pipeline integrity to mitigate risks to the environment. And as we strive to reduce and replace our global reliance on finite fossil resources, researchers in our Pulp and Paper Centre are creating new fuels, chemicals and materials from residual forest biomass. And those within our Clean Energy Research Centre continue to develop alternative renewable energy sources including wind, solar and hydrogen fuel cells. As we engineer new technology, we also educate skilled people to deliver sustainable solutions to society's challenges.

I look forward to engaging more with you in the future to discuss partnering together. Developing new professional master's programs that focus on industry needs, collaborating on research and connecting you with our undergraduate and graduate students are examples of these opportunities.

Please join me on September 29 at UBC Robson Square for Innovate 2014 — a showcase of UBC Applied Science research in the broader community. Discover how faculty make an impact and why they are passionate about their research. We will feature a broad range of topics, from earthquake engineering to mining to clean water and artificial muscles. I hope you will take this opportunity to network and partner with us to advance our collective future.

Sincerely yours,

Marc Parlange
Dean, Faculty of Applied Science

"UBC Applied Science is uniquely positioned to play a critical role in shaping the world. From our interdisciplinary nature — which includes a spectrum of professions, from nursing to engineering — and through our teaching and research, we have the ability to influence the critical issues of our time."

Marc Parlange
Dean, Faculty of Applied Science

ON THE COVER

Sensors on the Port Mann Bridge are part of the BC Smart Infrastructure Monitoring System. The system, developed by UBC earthquake engineers and their government and industry partners, monitors seismic effects on the bridge and ensures it is safe for travel.



To view past issues of Ingenuity, visit www.engineering.ubc.ca/publications.

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POWER DRILLS GO FROM THE TOOLBOX TO THE OPERATING ROOM

Engineering students develop a simple alternative to an expensive surgical tool for the developing world.

Engineers in Scrubs student Marianne Black uses the surgical drill cover designed to provide an inexpensive sterilization solution for operations in the developing world.

The sight of a power drill in an operating room might make North American patients shudder, but in many parts of the world, a drill like the one you find in a hardware store could be a lifesaver.

Expensive surgical drills are few and far between in developing countries, leaving many orthopedic surgeons to find alternatives. Some use manual, hand-powered drills, which are slower and nowhere near as precise.

Power drills are a better option — and are already being used in some extreme cases — but are difficult to sterilize. That's why a team of UBC students, at the request of surgeons from Mulago Hospital in Kampala, Uganda, has developed a drill cover that speeds up the sterilization process, creating the potential to give more people access to surgical treatment.

ENGINEERS HAVE YOU COVERED

Putting a drill in a sterilization machine, known as an autoclave, can damage the machinery. It can also be time consuming.

"This is a really bad problem because the longer it takes to get treatment, the less positive the outcomes are," says Michael Cancilla (MEng '13 MECH/BME), who is working on the drill-cover project.

Their solution? A waterproof cloth bag that prevents anything from entering or exiting the power drill and can easily be sterilized. The bag seals off the body of the drill, exposing only a drill chuck — the piece of metal that connects the drill to the drill bit. The chuck can be tossed into the autoclave along with the cover, which prevents the drill itself from being exposed to the blood, bones and tissue that can transmit disease.

"One power drill with five chucks and five covers means that there could be five operations in a day in one operating room," says Marianne Black (BASc '12 ENPH, MASc '14 BME), one of the inventors of the drill cover. The team has calculated that a drill with five covers and five chucks can be purchased for about \$500 to \$800 — far cheaper than a \$30,000 surgical drill.

Cancilla and Black are part of a team of students from the Engineers in Scrubs project, which brings surgeons and engineers together to identify and

solve problems in hospitals. They partnered with the Uganda Sustainable Trauma Orthopaedic Program (USTOP), a group of UBC surgeons who visit Mulago Hospital twice a year to assist with operations.

Orthopedic surgery is in particularly high demand in low-income countries, where car accidents are a major cause of injury.

"The burden of musculoskeletal injury is significant in the people who are most frequently hurt — that is, young working people," says Peter O'Brien, a UBC orthopedic surgeon and a member of the orthopedic-surgery team that visits Uganda. "With traditional methods of treatment, they're often left with a disability that prevents them from returning to their normal work."

RAMPING UP EFFORTS IN KAMPALA

The UBC group is now taking their drill cover to the next level with some guidance from the entrepreneurship@UBC program. They received money to develop a prototype and search for a fabric that has antibacterial and antiviral properties and is also waterproof and strong.

UBC also connected the students with mentors to help them with the business involved in producing and providing the covers. Black says wrapping their heads around the practical issues was more challenging than they expected. Developing a medical device means there are plenty of regulations and procedures to follow.

Currently 18 drill covers are being used at Mulago Hospital, and students will begin a bigger trial in September. One member of the team will travel to Uganda to help train the hospital staff to use the covers. They've also hired a local Ugandan to track costs and efficiency so they can be sure the covers are helping solve the problem.

"We want to ensure that the drill covers are doing a good job and that we're providing an optimal solution," says Black. "We don't want to give them a second-rate solution." ■

For more information about the Drill Cover Project, visit: www.drillcover.com

ELECTRIC PASSION INSPIRES EMPLOYER AND STUDENTS ALIKE

Walking through the door at Automotive Fuel Cell Cooperation (AFCC), you feel a buzz. It's neither overhead lights nor caffeine generated — rather, each team member emits it. With the company's overriding mission of “putting a fuel cell in every driveway,” the energy comes from passion and passionate people working towards the goal of reducing greenhouse-gas emissions.

While several alternative-power technologies can reduce greenhouse-gas emissions, only the hydrogen fuel cell produces zero emissions. In fuel cell vehicles, hydrogen is pumped into the tank instead of gasoline. Within its fuel cell stack, hydrogen electrochemically converts into electricity without combustion, and only water vapour remains.

“When AFCC engineers figure out something new, and that happens almost every day, your supervisor will come up to you and say, ‘Hey! There’s something new, you should come see it,’” says Albert Lagman, a third-year UBC Mechanical Engineering Co-op student working at AFCC. “The passion is contagious and it surrounds you.”

Since the company's establishment in 2008, AFCC fuel cells have powered vehicles 8.5 million kilometres. The vehicles have run in various climates, weight and production costs have decreased, and performance has constantly improved. Indeed, AFCC engineers make discoveries daily.

Named UBC Engineering Co-op 2014 Employer of the Year, AFCC provides students with unique and challenging learning opportunities while helping the

company see its mission come alive. This electric partnership not only invigorates the students who have the opportunity to learn outside of the classroom, it also allows the employer to tap into an often overlooked talent pool.

Glenn St. Onge, Head of Human Resources at AFCC, says Co-op students are involved in nearly every aspect of the company, from developing architecture to modeling simulation. AFCC has hired 49 UBC Engineering Co-op students in the last six years.

“Having Co-op students is a win-win. We get bright, energetic, enthusiastic, creative students who have a lot of knowledge, and they get an opportunity to work on real-time, cutting-edge technology and to work with some of the brightest people in the fuel cell industry. It's an opportunity to really learn from each other.”

He notes that students excel at AFCC because of their adaptability. And the real ‘X-factor’ is the invigorating energy students bring to the organization.

“What I really like is their energy and passion,” says St. Onge. “The excitement, the ‘we’re going to change the world’ mentality — I hear so many stories of students

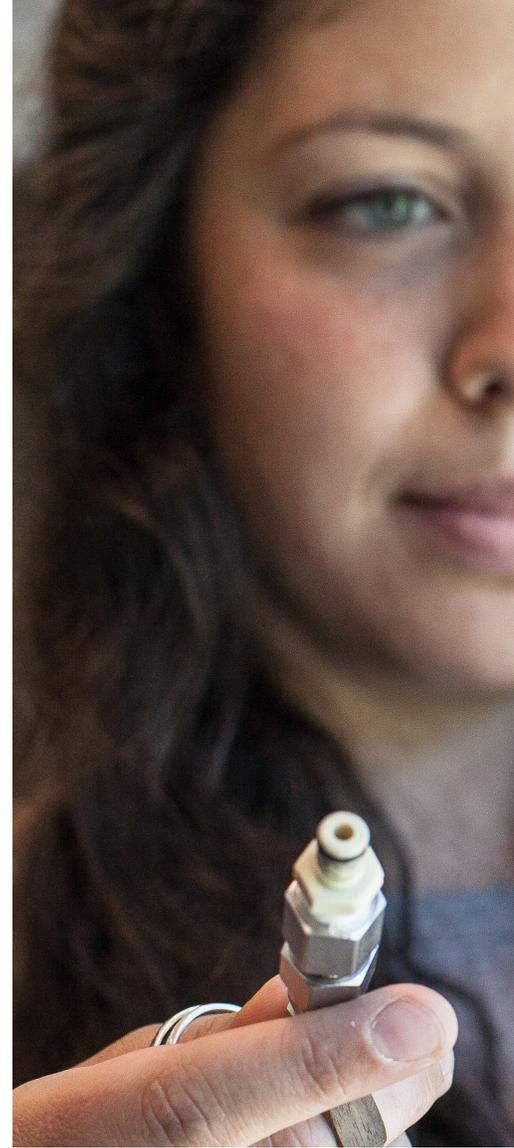




PHOTO CREDITS: MALJACOBSON

coming in and wanting to do cool and great stuff. That energy, it's contagious for our company."

Kati Megale, another third-year Mechanical Engineering student working in her second Co-op work term at AFCC, agrees that the energy of the company and the excitement of what she and her colleagues are creating is what drew her to the position.

"We're working with something tangible and something real," she says in reference to AFCC's goal of creating mass-marketable fuel cells by as early as 2018.

Bridging the gaps among the technical, theoretical and the practical motivates Alexander Murdock, a second-year Chemical Engineering student currently on an eight-month Co-op work term at AFCC.

"It's a very technical research environment. We're running tests and doing labs to gain understanding and put it to use. This is a technology that could potentially be used by everyone."

In the future, St. Onge would like to see more UBC Engineering Co-op students at AFCC and more students coming back to work with the company after graduation. Since its inception in 2008, AFCC has hired

13 of its former Co-op students into full-time positions. Many more existing employees were in a Co-op program in the years predating the company and have grown to become integral parts of the company. "Co-op students are leaps and bounds ahead of people who do not have Co-op because they have the experience," says St. Onge.

Jenny Reilly, Director of UBC Engineering Co-op and Professional Development, notes that it is precisely the energy of talented and motivated Engineering Co-op students, coupled with the mentorship and front-running technology developed at companies like AFCC, that creates an unparalleled experience.

"The experiential learning our students acquire on Co-op at companies such as AFCC proves invaluable to their professional engineering development," says Reilly. "Co-op work experience is integral in enabling students to develop a clear career path after graduation, one that they can be passionate about and that will truly make a difference in an engineering context." ■

To hire a UBC Engineering Co-op student, visit:
www.coop.apsc.ubc.ca

Kati Megale, UBC Engineering Co-op student at AFCC, gains hands-on work experience. Inset: UBC Engineering Co-op and Professional Development Director Jenny Reilly (left) with AFCC Head of Human Resources Glenn St. Onge.

KEEPING PEOPLE SAFE

From developing an early-warning system to monitoring the safety of bridges, schools and buildings after an earthquake, UBC engineers work to ensure public safety.

 SAINT PATRICK REGIONAL SECONDARY



EARTHQUAKE EARLY-WARNING SYSTEM

What can you do in less than a minute if you know an earthquake's on its way? If you're experimenting with a Bunsen burner, you can turn off the gas, seek cover and avoid dire consequences.

UBC Civil Engineering Professor Carlos Ventura, P.Eng., and his team of earthquake engineers are working to provide that precious time to ensure safety. Ventura, Director of the Earthquake Engineering Research Facility (EERF), and his team have developed an earthquake early-warning system that triggers an alarm before a major earthquake hits.

The team developed a highly customized, novel sensor for this purpose in collaboration with the BC Ministry of Transportation and Infrastructure and began installing the sensors in 2013 throughout the 51 elementary and secondary schools of the Roman Catholic Archdiocese of Vancouver. And they are currently working with the BC Ministry of Education on a project to install the sensors at public schools throughout the province. "The technology is proven to save lives," says Ventura. He projects that the system could provide more than 30 seconds of warning for a massive quake off the west coast of Vancouver Island.

HOW IT WORKS

The alert system consists of motion-sensor detectors, called TETRA; signal-transmission software and hardware; data analysis; alarms; and training. The result of a strong collaboration between UBC Research Engineer Kent Johansen and Ventura, a TETRA contains 78 tiny sensors called accelerometers, which are installed on a pyramid-like assemblage and inserted into small plastic devices, each about the size of a coffee mug. Two TETRAs are buried about 100 feet apart at each school site. They measure motion

and detect primary waves (P-waves), the quickest of the four types of shock waves typically released by an earthquake. P-waves generally cause no damage. The slower shear waves (S-waves) follow P-waves in a major earthquake and can cause significant damage.

Time between the initial P-waves and S-waves can be used to estimate distance to the epicentre. The system is sensitive and intelligent enough to disregard vibrations caused by large vehicles, such as buses, construction or even children playing in the vicinity of the sensor.

Sensor boxes in schools relay signals through a network of sensors to the UBC Earthquake Engineering Research Facility, where software analyzes the waves and determines whether they are the beginning of a significant earthquake. If they are, the system triggers an immediate alarm that sounds for one minute.



Sensor installation at Saint Patrick Regional Secondary School. From left: UBC's Dr. Sheri Molnar, Adam Ostereicher, Dr. Yavuz Kaya and Ragnar Jubany.

HOW IT WORKS

Photos courtesy of UBC EERF.



INSTALLATION AND TRAINING

Principals and teachers first come to UBC to learn about earthquakes and watch earthquake simulations on the research facility's Shake Table. Then students and personnel at each school practice the alarm drill. Each system takes about three hours to install, and UBC Engineering students drill holes, conduct soil analysis and train students and school personnel at the schools.

When the alarm sounds, "in less than five seconds, students are under their desks. As soon as they hear the alarm, they recognize they have to do something and take action," says Ventura. "It's fascinating."

After the alarm sounds — and, in the case of a true earthquake, after the shaking stops — children count to 60 before resurfacing from under their desks.

"The children are under their desks for at least two minutes," says Ventura. "This practice is essential to maintaining calm during an earthquake. Students are prepared and have practiced, and they know what to expect."

PART AND PARCEL

UBC's earthquake early-warning system is becoming part of a larger provincial seismic upgrade initiative that began in 2004. In partnership with the British Columbia Ministry of Transportation and Infrastructure, UBC's earthquake engineers have developed a tool called the BC Smart Infrastructure Monitoring System (BCSIMS) that uses sensors installed on bridges, schools and buildings to assess the structures following an earth-

quake. The tool provides vital information for engineers to rapidly respond in the case of emergency and ensure public safety. The sensor data is also used to inform the Ministry on necessary retrofits and the general health of the structures.

"Incorporating our work into a system strengthens our network. The partnership from practicing engineers and government organizations is essential," says Ventura.

The Ministry of Transportation is planning to install more than 40 P-wave sensors on bridges, tunnels and roads in the near future. UBC is also collaborating with Ocean Networks Canada, which deployed TETRA sensors offshore, west of Vancouver Island, to monitor the subduction zone, enabling an earthquake and tsunami alert.

"Because we have developed the hardware and software at UBC, we have the unique ability to improve the technology as we go. With a network of sensors across the province, we can provide alerts much earlier than by simply measuring P-waves at a school," says Ventura.

"This unique ability to enlist a network of stations, allowing them to communicate and confirm the measurements of an earthquake, vastly improves the reliability of the network and, ultimately, public safety." ■

For more on this story, visit: news.ubc.ca/earthquake-alert.

Newsworthy

ALUMNI

Mining alumni establish the Blue Evans Student Support Endowment

Mining alumni have generously contributed toward an endowment that will provide significant and permanent support for UBC Mining student initiatives. The new Blue Evans Student Support Endowment Fund combines two existing funds established by alumni — the endowed Mining Engineering Alumni Student Development Fund, and an annual student fund created in 2010 in memory of former faculty member Dr. John “Blue” Evans.

Evans served as head of the UBC Department of Mining Engineering — now the Norman B. Keevil Institute of Mining Engineering — from 1969 to 1978 and had a significant impact as a professor, researcher, educator, mentor and friend.

Following Evans’ much-revered example, Sandy Laird (BASc ’57 MINE) stepped forward in leadership of this new campaign and generously offered in October 2013 to match all donations to the endowment, up to \$250,000.

Mining alumni answered Laird’s challenge. To date, nearly 30 graduates of UBC Mining have joined faculty and friends in contributing over \$600,000 to the fund. The campaign has exceeded its fundraising goal by over \$100,000, with such momentum that the Keevil Institute hopes to grow the fund to \$1 million.

The endowment will provide significant annual discretionary funding in support of student activities and services in the Keevil Institute, from field trips, student competition teams and professional-development initiatives to employment assistance, safety training and equipment upgrades.

“Many of us were recipients of the concern and encouragement of the faculty and staff of the UBC Mining Department, and especially of Professor Evans,” recalls Laird. “A significant contribution to the Blue Evans Fund will ensure that future generations of mining students will benefit from discretionary support, just as I did.” ■

The Faculty would like to thank all alumni and donors. For information on contributing to the Blue Evans Student Support Endowment, please contact Debbie Woo in the Applied Science Development Office, at debbie.woo@ubc.ca or 604-822-6856.

RESEARCH

Engineering tool links health risks, poor household air quality

New UBC Engineering research suggests that lives, as well as millions of dollars, could be saved in health-care costs.

PhD candidate Craig Hostland, P.Eng (BASc ’82 CIVL), has developed an indoor environmental assessment tool that has the potential to reduce respiratory illness from household mold and dampness. The tool utilizes building science and measurable site criteria by modelling a home’s indoor environment based on its construction type, maintenance characteristics and history of moisture events. The model then determines with a 95 per cent probability at what level the home may be a source of respiratory distress. An added feature is that, based on the occupant’s health condition, the model can confirm which house repairs

could improve the conditions leading to illness, saving thousands of dollars in unneeded repairs.

“I found in my research that patients who may be stricken by the most severe effects of asthma can not only partially or fully recover their health through simple remediation of their residence, the public health-care system can potentially save tens to hundreds of millions of dollars annually,” says Hostland, a senior professional engineer dedicated to designing a solution to the health consequences of indoor molds. “I estimate there are almost 500 such patients in the Interior health region and more than 3,000 in British Columbia alone that can be helped,” Hostland says.

Hostland’s paper, “HEALTH2: A Holistic Environmental Assessment Tool,” was delivered at the Canadian Society of Civil Engineering Annual Conference, environmental division. His co-investigators are UBC School of Engineering Professors Rehan Sadiq, Deborah Roberts and Associate Professor Gordon Lovegrove. ■



PHOTO CREDIT: MARTIN DEE

Sheryl Staub-French encourages women to pursue engineering as the Goldcorp Professor in Women in Engineering at UBC.

EDUCATION

Goldcorp Professorship in Women in Engineering at UBC encourages women to consider engineering careers

The Faculty of Applied Science has partnered with Goldcorp in a leading initiative aimed at encouraging and developing gender parity in UBC Engineering programs — and in the engineering profession. Made possible by a \$500,000 gift from the Vancouver-based mining company, the Goldcorp Professorship in Women in Engineering at UBC will focus on outreach and recruitment in order to increase the diversity of students applying to UBC.

The long-standing underrepresentation of women in engineering education and industry is a significant challenge for the profession. In Canada, women currently account for less than 20 per cent of students in university engineering programs and only 11 per cent of registered professional engineers.

UBC and Goldcorp recognize that women represent an underutilized talent pool of potential engineers. They also realize that the diversification of the profession can bring a wide range of economic and cultural benefits to companies, while at the same time proactively address a looming national shortage of skilled engineers.

Associate Professor Sheryl Staub-French, P.Eng., in UBC's Department of Civil Engineering, has been appointed the inaugural Professorship holder. A strong advocate for women in engineering since she joined UBC in 2002, Staub-French participates in numerous outreach activities through her work with UBC Women in Engineering and Westcoast Women in Engineering, Science and Technology, the program led by Professor Elizabeth Croft, P.Eng., NSERC Chair for Women in Science and Engineering, BC and Yukon Region. Staub-French is also a mentor and past board member for the student mentoring program at UBC.

As holder of the Goldcorp Professorship, Staub-French will reach out to high school students, parents and counsellors to encourage young women with aptitude in science, engineering and math to pursue careers in those fields. Her first step will be to expand "Go Eng Girl!," currently an outreach program for high school students in Ontario, to BC universities. The program brings students to local universities to learn about engineering from women engineering students, industry representatives and faculty.

"We will be connecting professional engineers, engineering students and schools and creating hands-on activities that help young people understand what engineering actually is," Staub-French explains. "Engineering is a creative, engaging and rewarding profession about solving problems, designing solutions and helping our communities. It is a critically important profession, and I believe if everyone understood what we do, equal numbers of young men and women would aspire to careers in engineering."

The Faculty of Applied Science sincerely thanks Goldcorp for their partnership in support of Professor Staub-French and her efforts in developing an engineering student population that reflects society — one in which women comprise half its student population. ■

RESEARCH

Eye of the beholder — improving the human-robot connection



AJung Moon (left) and Charlie improve human/robot interactions.

UBC Engineering researchers are programming robots to communicate with people through use of human-like body language and cues — an important step toward bringing robots into homes. They enlisted the help of a human-friendly robot named Charlie to study the simple task of handing an object to a person. Past research has shown that people have difficulty determining when to reach out to take an object from a robot because robots fail to provide appropriate nonverbal cues.

“We hand things to other people multiple times a day, and we do it seamlessly,” says AJung Moon, a PhD student in Mechanical Engineering. “Getting this to work between a robot and a person is really important if we want robots to be helpful in fetching us things in our homes or at work.”

Moon and her colleagues studied what people do with their heads, necks and eyes when they hand

water bottles to one another. They then tested three variations of this interaction with Charlie and 102 study participants.

Programming Charlie to use eye gaze as a nonverbal cue made the handover more fluid. Researchers found that people reached out to take the water bottle sooner when the robot moved its head to look where it would hand over the water bottle. This happens to be the gaze pattern people frequently use during handovers. People also liked it best when the robot looked to the handover location and then up at the person to make eye contact.

“We want the robot to communicate using the cues that people already recognize,” says Moon. “This is key to interacting with a robot in a safe and friendly manner.”

The researchers’ paper on the study won best paper at the 2014 ACM/IEEE International Conference on Human-Robot Interaction. ■

See video at: apsc.ubc.ca/apsc-eng/news/2014/04/eye-beholder-improving-human-robot-connection.

EDUCATION

Estate gifts create a lasting legacy



Former Applied Science Dean Michael Isaacson (left) thanks Les Gould at a 1999 reception.

In 1999, when Leslie “Les” Gould (BASc ‘37, MASc ‘38 CHML) and his wife, Elizabeth (“Elma”), were making their estate plans, they wanted to give back to something meaningful to them. Les’s career spanned more than 40 years and took both of them to places in Canada, England, Sweden, Spain and the United States, primarily through his work for Imperial Oil. He remembered his years at UBC as some of the best of his life — a place where he acquired his passion for engineering, as well as friendship and mentorship from fellow students and faculty members.

Les and Elma decided to establish two charitable remainder trusts with Applied Science as beneficiary. The funds were to be used to support student recruitment, scholarships, teaching excellence, laboratory expansion and mentorship. Since 2006, more than 30 students have directly benefitted from scholarship funding, and all CHBE students have benefitted from the additional support to professors, expansion of laboratory courses and provision of software and

equipment for student laboratories made possible through the Gould estate.

Planned gifts allow you to support Applied Science in ways that are most meaningful to you. And you have several options for doing so:

- **Gifts by will**, which cost nothing during your lifetime and can provide substantial tax savings for your estate
- **Gifts of publicly traded securities**, which bring significant savings through the elimination of capital gains taxes at the time of donation
- **Life insurance policies**, when Applied Science is named the beneficiary of your plan
- All or a portion of your **RRSPs and RRIFs** directed to Applied Science, which can reduce deferred taxes and probate fees on your estate
- And UBC’s **international foundations**, for U.S., U.K. and Hong Kong residents, which secure the maximum taxation benefits for you in your country of residence. ■

For more information, please contact Andrea Wink in the Applied Science Development Office at 604-822-1329 or andrea.wink@ubc.ca.

RESEARCH

Who owns a 100-year-old car?



Professor Ordonez (left) describes for Minister Findlay how he studies intermittent, renewable power.

New Canada Research Chair draws parallel to antiquated electrical system

As the new Canada Research Chair in Power Converters and Renewable Systems, Professor Martin Ordonez, P.Eng., aims to maximize the use of renewable energy from wind, solar and waves by developing the next generation of power converters — intelligent, cost-effective systems — to produce low-emissions power.

Minister of National Revenue Kerry-Lynne Findlay announced UBC's two new Canada Research Chair recipients and six renewals this spring on the Vancouver campus. Speaking at the event, Ordonez illustrated the opportunities we have for change in our energy system: "Who owns a 100-year-old car? Who is using a 100-year-old electrical system?"

Explaining that we currently rely on very old power technology and on infrastructure designed to work with fossil fuels, Ordonez stressed that there is a huge opportunity to advance our electrical system

with renewable power, replacing over 80 per cent of the energy consumption involving fossil fuels with clean energy.

"Now we have to ask ourselves how much progress the world has made with solar, wind and ocean power generation?" The answer — less than one per cent of power consumption.

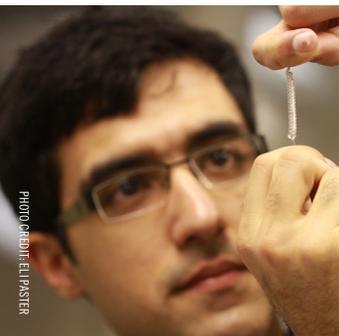
As a power engineer, Ordonez advances techniques and technologies that will bring Canada's 100-year-old power grid up to speed and introduce as much renewable energy as possible. He investigates intermittent renewable-power resources — such as wind or solar energy — and studies what end-users need and how those needs fluctuate. He then combines these data in order to develop renewable-energy systems.

"Energy generation must work like a fine-tuned ecosystem that integrates with the environment seamlessly," he explains.

Ordonez's research goal is to maximize green-energy capture, utilization and storage (all intermittent), while providing a reliable power supply to end-users. His Tier 2 Canada Research Chair appointment, renewable once, provides \$100,000 in funding annually over five years. ■

RESEARCH

Engineers create powerful artificial muscle with fishing line



PhD candidate Seyed Mohammad Mirvakili is shown with an artificial muscle that can lift a two-litre soda bottle.

Researchers are using fibres from fishing line and sewing thread to create inexpensive artificial muscles that could be used in medical devices, humanoid robots and prosthetic limbs or woven into fabrics.

In a study recently published in *Science*, international researchers, including University of British Columbia Electrical and Computer Engineering Professor John Madden, P.Eng., and PhD candidate Seyed Mohammad Mirvakili, detail how they created inexpensive artificial muscles that generate far more force and power than human or animal muscles of the same size.

"In terms of the strength and power of the artificial muscle, we found that it can quickly lift weights 100 times heavier than a same-sized human muscle can, in a single contraction," says Madden. "It also has a higher power output for its weight than that of an automobile combustion engine."

In the past, artificial muscles have been made successfully out of materials like metal wires and carbon nanotubes. But researchers and device makers have found them expensive to fabricate and difficult to control.

Madden and his colleagues used high-strength polymer fibres made from polyethylene and nylon, common materials used in fishing lines and sewing thread. The fibres were twisted into tight coils — as one would twist the rubber band of a model airplane — to create an artificial muscle that could contract and relax. The artificial muscles contract and relax in response to changes in temperature, which can be controlled by an electrical heating element.

Artificial muscles created in this new way have previously been used to demonstrate manipulation with surgical forceps. Artificial muscles may also find use in robots and low-cost devices that help those with impaired mobility, the researchers say. ■

See video at apsc.ubc.ca/apsc-eng/news/2014/02/scientists-create-powerful-artificial-muscle-fishing-line.

EDUCATION

Kiewit and alumni support the Engineering Student Centre



Kiewit supports UBC Engineering Student Career Fair 2014. From left: Rachel Krueger, Joseph Kim, George Toews and Jade Frost.

The Faculty of Applied Science is pleased to announce the new Kiewit Study Room in the Engineering Student Centre (ESC). The Kiewit Vancouver office, together with Kiewit's head office, has donated \$250,000 toward the ESC, and the Study Room will be named in honour of their support. The donation was championed by UBC alumni at Kiewit, who are providing one-third of the funding for the room themselves. More than 130 alumni currently work for the company.

The Kiewit Study Room will fill the urgent need for student study space and, because the ESC is open to all disciplines, will help students gain a better understanding of how engineering disciplines overlap and interact. The room will also be available for meetings and smaller seminars, industry-engagement or extracurricular events, and can host up to 75 students at a time.

The room will include a display space featuring Kiewit work in BC and beyond, recognizing Kiewit's contributions to student support at UBC. In addition to their partnership in support of the ESC, the company has sponsored student teams in the Faculty for close to 15

years and established a scholarship for students in mechanical engineering.

"Kiewit has made major contributions to BC's infrastructure, and they are also a top employer — not just in Vancouver, but everywhere they work," noted Dean of Applied Science Marc Parlange. "We are delighted with this partnership in support of this priority project and look forward to showcasing Kiewit's work to our students."

"We're very excited to be a part of this historic opportunity to partner with UBC Engineering. Kiewit and UBC have had a long-standing, solid relationship through various initiatives such as career fairs and the Co-op program, so this just helps to further cement that relationship," said Ross Gilmour, P.Eng., Kiewit's BC Area Manager and UBC Civil Engineering Class of 1983 graduate. "The fact that the new ESC replaces the Cheeze Factory, which most UBC Engineering alumni have fond memories of, makes this a great initiative for our alumni employees to take part in as well."

UBC broke ground on the Engineering Student Centre in May 2014, and the facility is slated for occupation in fall 2015. The Faculty sincerely thanks Kiewit for their support, with special thanks to the many alumni who are making this possible. ■

Test your metal!

Think you could still pass an Engineering exam? We've included a question below from a first-year midterm exam to test your brass! Send in your answer to alumni@apsc.ubc.ca to be entered to win a UBC Engineering prize if you answer it correctly!

Three metal rods of equal radii and length are made of copper, aluminum and brass, respectively, and placed end to end with the aluminum in the middle, as indicated in the diagram. These three rods act as a thermal conductor between two heat reservoirs that are held at constant temperatures of 0°C and 100°C . What are the temperatures T_1 and T_2 of the junctions in steady state?

$$k_{\text{aluminum}} = 205.0 \text{ W/m}\cdot\text{K}; k_{\text{brass}} = 109.0 \text{ W/m}\cdot\text{K}; k_{\text{copper}} = 385.0 \text{ W/m}\cdot\text{K}$$



FACULTY

Amazing (Prof) Grace Retires



Although Professor John Grace, P.Eng., officially retired from UBC on June 30, 2014, you'll still see him around. Since coming to UBC as Head of Chemical and Biological Engineering in 1979, Grace has made a resounding impact on research and with students.

As Canada Research Chair in Clean Energy Processes, Grace has taken on two important environmental issues: overproduction of greenhouse gases and the gas emissions that cause acid rain.

His research has led to over 500 publications, including six books, and numerous awards and accolades. Most recently, he was named an Officer of the Order of Canada. He plans to continue his research in his retirement, saying there are still aspects of CO₂ capture and fundamentals of fluidized beds that keep him curious.

Although he will not teach undergraduates anymore, he will continue to supervise 10 graduate students. Over the course of his 35 years at UBC (and 11 years at McGill University prior to UBC), he has supervised approximately 115 graduate students, including some

familiar faces within the UBC Engineering community: Clive Brereton (BASc '82, PhD '88 CHML), Vice-President at Noram Engineering and Constructors Ltd., and UBC Engineering Professors Naoko Ellis, P.Eng. (PhD '03 CHML), Xiaotao Bi, P.Eng. (PhD '95 CHML) and the late Chad Bennington, P.Eng. (BSc '79 CHEM, MAsc '83, PhD '88 CHML).

At UBC Grace has been involved in creating a number of centres and programs, including the Pulp and Paper Centre, the Clean Energy Research Centre, the master's program in Clean Energy Engineering, the Bioenergy Research and Development Facility, the Fisheries Centre and Green College.

"I get bored of things quickly, which is why the variety of being a faculty member is wonderful. By teaching, by doing research, by doing administration, you're able to be intellectually driven — which I think is greatly important."

Though Grace has no intention of stopping his UBC research and supervision activities, he plans to enjoy retirement from daily teaching. A fan of opera, he hopes to travel in Europe this fall and experience opera in Italy. ■

FACULTY

After 29 years of supporting undergrads, Bruce Dunwoody retires



It was a typical Monday morning in 2001 when Bruce Dunwoody, P.Eng. (BASc '74 MECH), got a call from a San Francisco radio station, asking for an interview. "I should have clued in," he says. "It was the first week of February." Undeterred, he agreed to the interview, learning live on air what that year's E-week prank was. But after 15 years as Associate Dean, nothing, not even a VW Beetle hanging off the Golden Gate Bridge, surprised him.

Whether giving future AMS presidents advice, helping students navigate their courses or "cleaning up the mess" when VW Beetles mysteriously end up in places they shouldn't be, Dr. Dunwoody has been a stalwart supporter of undergraduate engineering students. He retired June 30, 2014, after 29 years with UBC Engineering.

Dunwoody quickly found out over the years that he gets a great deal of enjoyment helping others reach their goals. "Sometimes what I told students was not always what they wanted to hear, but if they came back and said thank you, I knew it worked out well in the end."

On his desk, he proudly displays a one-inch-thick aluminum plate inscribed with his name — a present from a student who "was having a rough go of it." He had helped the student obtain a Co-op position with a water-jet cutter in Washington state, and the student ended up thriving in the position. As a thank-you, the student cut him a one-of-a-kind name plate.

Always humble about his impact at UBC, Dunwoody says what he remembers most fondly are the people, whether from talks with students in his office or the influence of those around him — including Professor Martha Salcudean, P.Eng., (DSc '01), Engineering Student Services Director Mary Murphy and former Dean of Applied Science Michael Isaacson, P.Eng., to name a few. ■

FACULTY

Awards & Achievements

CHEMICAL AND BIOLOGICAL ENGINEERING

Professor **Peter Englezos**, P.Eng., has been reappointed Head of the Department of Chemical and Biological Engineering for a five-year term, effective July 1, 2014.

Professor **James Feng**, P.Eng., has been named a 2014 Peter Wall Institute Scholar and awarded a 2014 UBC Killam Teaching Prize.

Professor **John Grace**, P.Eng., Canada Research Chair in Clean Energy Processes, has been inducted as an Officer of the Order of Canada and has received a mentoring award from Carbon Management Canada.

Adjunct Professor **Alfred Guenkel**, P.Eng., has been awarded the 2013 Meritorious Achievement Award by the Association of Professional Engineers and Geoscientists of BC (APEGBC).

Professor **Mark Martinez**, P.Eng., was named Director of the Pulp and Paper Research Centre for a two-year term, effective January 1, 2014.

Professor **David P. Wilkinson**, P.Eng. (BASc '78), was awarded the 2013 Canadian Hydrogen Fuel Cell Association Lifetime Achievement Award and the association's 2014 Grove Medal. His research has been selected by the Climate Change and Emissions Management Corporation as one of the top 25 most innovative projects for carbon dioxide conversion and reduction. Wilkinson is also Canada Research Chair in Clean Energy and Fuel Cells.

CIVIL ENGINEERING

Professor **Perry Adebar**, P.Eng., has been appointed Head of the Department of Civil Engineering for a five-year term, effective July 1, 2014.

Professor **Nemy Banthia**, P.Eng. (PhD '87), was awarded the 2013 Aftab Mufti Medal of the International Society for Structural Health Monitoring of Intelligent Infrastructure; his position as Senior Canada Research Chair in Infrastructure Rehabilitation and Sustainability has been renewed.

Professor **Ken Elwood**, P.Eng. (BASc '93), received the Delmar L. Bloem Distinguished Service Award from the American Concrete Institute and has been appointed as Chair in Earthquake Engineering at University of Auckland.

Professor **Don Mavinic**, P.Eng., has been appointed to the board of directors of the Global Institute for Energy, Environment and Sustainability at the Massachusetts Institute of Technology.

Professor **Tarek Sayed**, P.Eng. (MAsc '92, PhD '95), has been inducted as a Fellow of the Engineering Institute of Canada.

ELECTRICAL AND COMPUTER ENGINEERING

Professor **Purang Abolmaesumi**, P.Eng. (PhD '02), received a 2014 UBC Killam Research prize.

Associate Professor **Lukas Chrostowski**, P.Eng., received a 2014 UBC Killam Teaching prize.

Professor **Guy Dumont**, P.Eng., and the Electrical & Computer Engineering in Medicine research group have won two awards at the Society for Technology in Anesthesia 2014 meeting: the Excellence in Technology Award for "Robust Closed-Loop Control of Anesthesia in Adults Undergoing Elective Surgery" and honourable mention for "Detecting Sleep Apnea Events in Children Using the 'Phone Oximeter.'"

Senior Instructor **Carol Jaeger**, P.Eng. (MAsc '95), was reappointed Associate Dean, Undergraduate Engineering Programs, for a three-year term, effective January 1, 2014.

Professor **Tim Salcudean**, P.Eng., Charles A. Laszlo Chair of Biomedical Engineering and a Canada Research Chair, has been elected Fellow of The Medical Image Computing and Computer Assisted Intervention Society.

Professor **Rabab Ward**, P.Eng., received a 2013 UBC Killam prize for Excellence in Mentoring.

MATERIALS ENGINEERING

Professor **Akram Alfantazi**, P.Eng., has been awarded a 2013 Teaching Award of Excellence by APEGBC.

Associate Professor **Edouard Asselin**, P.Eng. (PhD '07), Canada Research Chair in Aqueous Processing of Metals, won the Brimacombe Award of the Society of the Canadian Institute of Mining, Metallurgy and Petroleum.

MECHANICAL ENGINEERING

Professor **Yusuf Altintas**, P.Eng., was awarded the Engineering Science Special Award from

the Scientific and Technological Research Council of Turkey; his NSERC Industrial Research Chair with Pratt & Whitney Canada was renewed for a third term.

Professor **Elizabeth Croft**, P.Eng. (BASc '88), NSERC Chair for Women in Science and Engineering, BC and Yukon Region, was appointed Associate Dean, Education and Professional Development, for a three-year term, effective Nov 7, 2013.

Professor **Clarence de Silva**, P.Eng., Senior Canada Research Chair in Mechatronics and Industrial Automation, has been named a 2014 Peter Wall Institute Scholar.

Associate Professor **Walter Mérida**, P.Eng., has been reappointed Director of the Clean Energy Research Centre for a three-year term, effective July 1, 2014.

Professor **James Olson**, P.Eng. (BSc '89, BASc '91, PhD '96), has been awarded the FPInnovations Professorship in Pulp and Paper Engineering and was appointed Associate Dean, Research and Industrial Partnerships, for a three-year term, effective January 1, 2014.

MINING ENGINEERING

Associate Professor **Scott Dunbar**, P.Eng. (BSc '72), has been appointed Head of Norman B. Keevil Institute of Mining Engineering for a five-year term, effective July 1, 2014.

SCHOOL OF ENGINEERING

Assistant Professor **Kenneth Chau**, P.Eng., Assistant Professor **Ahmad Rteil**, P.Eng., Associate Professor **Abbas Milani**, P.Eng., and Instructor **Ray Taheri**, P.Eng., made the 2013-14 Provost Teaching Honour Roll for Teaching Excellence and Innovation at UBC's Okanagan campus.

Associate Professor **Kasun Hewage**, P.Eng., and Assistant Professor **Shahria Alam**, P.Eng., received the Judit Moldovan Memorial Award for their contributions to teaching and research into the ecological footprint at UBC.

Associate Professor **Mina Hoarfard**, P.Eng., has been awarded a UBC Teaching Excellence and Innovation Award in the junior faculty category.

Professor **Rehan Sadiq**, P.Eng., has been named Researcher of the Year at UBC's Okanagan campus. ■

Our People



ALUMNI

Grad Raymond Lee turns packing paper into big business

Lee received an honorary doctorate from UBC in May 2014 for his business innovation, commitment to sustainability and contributions to education around the world.

In 1998, Raymond Lee (BASc '93 ECE) watched the first ton of packing paper roll out from his mill in Dongguan, China, a mill that had taken four years to establish. Just over 16 years later, Lee & Man Paper is the second-largest producer of container board in the world and vies for the title of most-sustainable packing-paper manufacturer as well. Lee recalls how he built his business — and what he learned along the way.

“My father was the one who encouraged me to go into business,” he recalls. “We saw opportunities in the paper business, because he had a handbag business in China. He would export these handbags, but we had difficulty buying paper to make the boxes for shipping. That was the reason I decided to give paper-making a shot.”

In China at that time, there were few paper manufacturers. Lee had to start his business from scratch. “My initial mill took four years to build, when it should have taken two. When we finally had production, there was a recession, and the price of paper dropped.” He credits his engineering education at UBC for helping him overcome many challenges. “I used my technical education from UBC, of course, but more important, my engineering background taught me how to analyze and solve problems. But because it was so challenging to start with, it just made it that much more rewarding when I started selling my first ton of paper.”

Lee & Man has made some innovative changes to the manufacturing process for packing paper and is also leading the way in sustainability. The mills use only recycled paper, and use less water and less electricity than other mills their size. “Back then in China, nobody cared about environmental issues, but from a corporate standpoint, it was important to me to make sure that this is one of the cleanest, most environmentally friendly companies in the world,” he says. He credits his time in Canada for his commitment to the environment. (Lee came to Canada at nine years of age and says, “Canadians are natural environmentalists.”) He has both business and personal reasons for his sustainability push. “I want to build a long-term business, and the only way to do that is to be conscious of the environment.” Lee and his family also live at the Dongguan mill, so the cleanliness of the water, soil and air are something he can see every day. His advances in this area have been notable enough that he has been asked to consult with China’s government to address the country’s environmental challenges.

Bringing sustainability consciousness to China isn’t the only advancement in business practices Lee has brought to the country: he also makes an example of giving back to his community, making philanthropic contributions to education. “The world is not always fair,” he says. “But education is one of the only ways to help young people to get ahead and get out of poverty.”

Lee acknowledges his family — his father is one of his personal role models — his education and his luck for his success and adds, “I know I am a hard worker, and nothing replaces that. Just being smart isn’t enough.” He is looking forward to continuing to develop his business, noting that there are always ways to improve.

Lee remembers his time at UBC with great fondness. If he had any advice for students, he says, it would be to practice communication skills, so they are able to explain their ideas to others. “And foster your people skills,” he says. “This is one of the most important things I have learned. Once you leave UBC, you don’t work with things anymore — you work with people. And it is the relationships I have formed and the people I have helped that give me my greatest sense of achievement.” ■

For more on the interview with Lee, please see: engineering.ubc.ca/apsc-eng/spotlight/raymond-lee.

UBC ENGINEERING EXCELLENCE 2014



PHOTO CREDITS: EDWARD CHANG



Dean Marc Parlange and Shannon Hoekstra

The Engineering Excellence Celebration brings together alumni, faculty and friends to celebrate the achievements of members of the UBC Engineering community. Randall Findlay, P.Eng. (BASc '73 CHML), hosted a wonderful evening on April 10, 2014.

OUTSTANDING FUTURE ALUMNUS AWARD

Shannon Hoekstra

Accomplished Materials Engineering student Shannon Hoekstra has won several academic awards, including the Education Award from the Canadian Federation of University Women and the Christina Lim Huckvale Scholarship. She is also a committed student leader, advocate, mentor and role model, serving as President of the UBC Chapter of Engineers Without Borders and the Materials Engineering Undergraduate Club. Hoekstra has also contributed to her community as a volunteer member of Habitat for Humanity.



Dean Marc Parlange, Hannah Forward and Dr. Gordon Forward



Dean Marc Parlange and Brent King

LIFETIME ACHIEVEMENT AWARD

Dr. Gordon Forward

Dr. Gordon Forward (BASc '60 METL, MASc '62 METL, DSc '96) has made extraordinary contributions to industry, research, education and sustainability. He served as President and CEO of Chaparral Steel in Texas for 16 years and was named 1987 CEO of the Year (*Fortune*) and 1997 U.S. Steelmaker of the Year (*New Steel Magazine*). For his contributions to the engineering profession, he received the 1988 Benjamin Fairless Award from The American Institute of Mining, Metallurgical, and Petroleum Engineers and election to the National Academy of Engineering in 1996. Despite all his professional accolades, Forward values his family and giving back to his community among his top achievements.



Dean Marc Parlange and Stephanie Gnissios

COMMUNITY LEADERSHIP AWARD

Brent King

Brent King, P.Eng. (BASc '96 MECH), is a successful biomedical engineer and winner of a 2009 Manning Innovation Award for his SPIDER limb positioner. A "serial philanthropist," King contributes to his community by identifying and solving problems. In 2009, he tackled the nationwide problem of chronic underwear shortages for homeless adults by establishing GotGinch, a cross-Canada underwear drive. Brent also mentors entrepreneurs, fosters start-ups and inspires young engineering minds by volunteering and lecturing at UBC and the University of Calgary.



Dean Marc Parlange and Duncan McNicholl's parents, Chuck and Theresa McNicholl



Dean Marc Parlange and Prof. Martha Salcudean

OUTSTANDING YOUNG ALUMNUS AWARD

Stephanie Gnissios

Stephanie Gnissios, P.Eng. (BASc '10 MECH), is a Project Engineer at Hatch, where she leads an inclusive team environment and continually advocates for



Peter Gajda, Dr. Jim McEwen and Tyson Costa

lifelong learning. As Co-Chair and Chair of the Hatch United Way Campaign Committee, she has also helped raise over \$110,000 in her community. Gnissios is a dedicated volunteer and advocate for women in her profession, and encourages high school and university students to consider engineering as a career.

Duncan McNicholl

As a dedicated member of Engineers Without Borders while at UBC, Duncan McNicholl (BASc '09 CIVL) gave several lectures and coordinated a seminar on engineering, design and sustainable international development. Since graduating, he has been working with the Malawi Water and Sanitation Program to improve access to clean water and treatment of wastewater in poverty-stricken rural and periurban Malawi. In September 2014, McNicholl will begin doctoral studies in Engineering at the University of Cambridge in England.

OUTSTANDING EMERITI FACULTY AWARD

Professor Martha Salcudean

Professor Martha Salcudean, P.Eng. (DSc '01), is a nationally recognized and one of the most accomplished faculty members within UBC Engineering. She was appointed Head of the Department of Mechanical Engineering in 1985 — the first woman to head an engineering department in Canada — and served as UBC's Associate Vice-President, Research, from 1993 to 1996. Salcudean's contributions have been recognized through more than 15 awards, including being named Officer of the Order of Canada and the Order of British Columbia, and honorary doctorates from UBC, the University of Ottawa and the University of Waterloo.

MCEWEN FAMILY TEACHER RECOGNITION AWARD

The McEwen Family Teacher Recognition Award was established to highlight the contributions high school teachers make to our students and communities through their mentorship. This year's winner was Peter Gajda, from Osoyoos Secondary School, who was nominated by current UBC Engineering student Tyson Costa.

2015 ALUMNI AWARDS: CALL FOR SUBMISSIONS!

Tell us which of our alumni, students or emeriti faculty should be recognized. For nomination information, visit: www.engineering.ubc.ca/alumni-awards.

Alumni Updates

Event Highlights



CHEMICAL ENGINEERING 1964 50TH REUNION MAY 23-24, 2014

Submitted by Gordon Thomson (BASC '64 CHML).

The Chemical Engineering class of 1964 celebrated their 50th anniversary at Alumni Weekend May 23 and 24. But this wasn't the first time this remarkable class has celebrated an anniversary. For 50 years the class has come together with a yearly newsletter. And for their 25th and 40th years, they celebrated at private gatherings in Vancouver.

Sixteen of the surviving 22 of 25 graduates attended, many with their wives. On May 23 they gathered for an informal dinner party at the Boathouse on Kitsilano Beach. Old friendships and camaraderie resulted in a raucous party.

On May 24 the class joined other engineering grads for a pancake breakfast in the atrium of the Chemical and Biological Engineering building. Dean Marc Parlange gave a spirited lecture on the current state of Applied Science and his objectives for future excellence. CHBE Department Head Peter Englezos, P.Eng., gave the class a private briefing on the department and conducted a tour of the facility.

The highlight on the 24th was a luncheon at the Royal Vancouver Yacht Club, attended by Englezos and Professor Emeritus Norman Epstein, P.Eng. Epstein was one of the principal professors who taught the class. He is revered by all class members, so it was a very special treat to interact with him on this occasion.

MINING ALUMNI AND STUDENT PUB NIGHT FOR BLUE EVANS

JANUARY 14, 2014

Mining alumni and current students joined forces for the first Mining Alumni and Student pub night, which raised funds for the Blue Evans Student Support Endowment Fund and the Mining & Mineral Processing Graduation Class Research Trip to Poland. Thank you to our fundraising committee and to the many volunteers that pulled this initiative together.

GEOLOGICAL ENGINEERING ALUMNI & INDUSTRY DINNER

JANUARY 18, 2014

The 12th annual Geological Engineering Alumni & Industry Dinner was held at the UBC Golf Club, with over 90 alumni and friends in attendance. As always, the evening served as a wonderful opportunity to catch up with industry colleagues and meet the next generation of UBC geological engineers! Next year we will be inviting all reunion years to gather with their GEOE classmates to celebrate at this event.

HONG KONG RECEPTION

JANUARY 21, 2014

Applied Science alumni and Co-op students in Hong Kong gathered in January at the American Club to attend a reception to meet Dean Marc Parlange. It was a wonderful occasion to update alumni on faculty priorities and highlight opportunities to hire Co-op students from UBC.

MATERIALS ENGINEERING INDUSTRY NIGHT

JANUARY 28, 2014

Now in its sixth year, the Materials Engineering Industry Night is growing bigger each year. Industry speakers at this year's industry night included Matthew Tunnicliffe (BASC '09, MASc '11 MTRL) from FPIInnovations, Chris Hermesmann, P.Eng. (BASC '94, MASc '97 MMAT), from Honeywell Process Solutions, Alberto Gonzalez from Teck and Jessica Mager, P.Eng. (BASC '02 MMAT), from Acuren.

ROUND UP! ALUMNI & FRIENDS RECEPTION

JANUARY 28, 2014

The UBC Faculties of Applied Science and Science teamed up at the conference to host an alumni social for UBC alumni attending. Thanks to the hundreds of alumni, students and industry partners who came to the alumni reception.

MINING DINNER

FEBRUARY 1, 2014

The Mining faculty, students, industry guests and alumni attended the 18th annual Mining Alumni Dinner in Vancouver. Keynote speaker and alumnus, Wes Carson, P.Eng. (BASC '00 MINE), of Sabina Gold & Silver Corporation, spoke about his career achievements and lessons he learned along the way. Graduating Mining students were also celebrated, as awards were handed out to the top academic students and to the mining games and mine rescue teams.



OLD RED NEW RED

FEBRUARY 6, 2014

This year's Old Red New Red 2014 was a great success! Our theme this year was "Cheers to the Cheeze" — a retrospective of the building that housed so many years of engineering students. Dean Marc Parlange attended his first Old Red New Red celebration this year. Our alumni guest speakers — Bill Richardson, P.Eng. (BASc '83 ELEC), Lance Balcom, P.Eng. (BASc '82 MECH) and Bowinn Ma, P.Eng. (BASc '08 CIVL), — spoke about their memories of the Cheeze and described some of the antics their classmates got up to "back in the day." Balcom described some of the "upgrades" that were done to convert the Cheeze from a livestock barn to a functional student space. There is no question that the Cheeze will be remembered as a place where creative ideas were generated and lifelong friendships were forged.

WISE: WOMEN IN SCIENCE AND ENGINEERING

MARCH 13, 2014

Over 25 professionals and 100 students came together to build professional connections at the annual Women in Science and Engineering (WISE) mentoring dinner. Local professionals and keen students were engaged and inspired by the keynote speech from Kim Code (BASc '89 GEOE), Vice President of Development for Heavy Oil at Shell. Each year, students have expanded their horizons and received great advice from industry professionals. Please email sarah.barclay@ubc.ca if you are interested in serving as a mentor for the 2014-15 academic year.

IGEN PROJECT SHOWCASE

APRIL 3, 2014

The newly renamed Integrated Engineering Project Showcase featured the innovative work of 170 second-, third- and fourth-year IGEN students who designed and built 29 multidisciplinary team projects during their two-term Capstone Design courses. Guests were treated to a wide variety of technical solutions that illustrated IGEN students' breadth of knowledge, creativity and design skill. For the first time, the event featured the projects of the

IGEN Challenge, a novel initiative where industry partners provide real-world challenges to the IGEN project courses, and student teams work in competition to solve the problems throughout the year. In doing so, they gain valuable project management and teamwork experience, as well as insight into the competitive and fast-paced realities of technology innovation. The initiative was a significant success, and it contributed to a banner year for the Integrated Engineering program.

ENG PHYS SOCIAL NIGHT

APRIL 7, 2014

Year after year, the "Fizz" social night proves to be an event where you'll have the most fun! Held again this year at the TELUS World of Science, Fizz alumni, industry and friends were asked to contribute a fun fact about themselves during pre-registration and upon arrival, guests were given a human bingo sheet to help alumni and students mix and mingle during the first part of the evening. Guests matched the fun fact to the person, obtained a signature and submitted their bingo sheets to win a prize!

ALUMNI WEEKEND — ENGINEERING REUNION RECEPTION

MAY 24, 2014

Alumni Weekend, a campus-wide event, is a wonderful chance for alumni to return to campus and visit their old haunts, participate in activities such as Classroom without Quizzes and, for Engineering alumni, to attend the annual Engineering Reunion Reception. Engineers Without Borders served up fair-trade banana chocolate chip pancakes to alumni, family and friends, and Dean Marc Parlange marked his first Alumni Weekend Engineering Reception with a presentation of highlights from the past year at UBC Engineering. This year we celebrated milestones of the Engineering classes of 1954, 1964, 1974, 1984, 1989, 1994 and 2004. Over 100 alumni, accompanied by family and friends, were in attendance, and we look forward to next year's event.



CIVL '89 25TH REUNION

MAY 23, 2014

CIVL '89 class celebrated a 25-year milestone with drinks and dinner at the Yaletown Brewing Company in Vancouver on May 23, 2014. Approximately 20 people from a graduating class of 80 attended the event and celebrated a quarter-century of individual accomplishments, both personal and professional. Some came from Massachusetts and others from the BC Interior, with the balance from the Lower Mainland. Future annual events will be organized by our former classmate, and now current Alumni Social Coordinator, Paul Brum.

Submitted by Richard Wong, P.Eng. (BASc '89 CIVL, MEng '93 CIVL, MBA '03).



CIVL '79 REUNION

JUNE 14, 2014

The '79 CIVLs kicked off our 35-year reunion with eight golfers at the University Golf Club. In spite of the rain and wind, our group persevered, bolstered by some stimulating spirits and a hearty sense of camaraderie and humour. Wayne Henderson organized an entertaining game of Wolf, with Bill Frost winning the prize for coming closest to his predicted score, and Alex Morrison winning the award for most strategic golfer.

The celebration continued at the Renaissance Vancouver Harbourside Hotel, with 22 grads and 13 spouses, mainly from BC, Alberta and Yukon Territory. Jeff Herold hosted an enjoyable evening. We kept the oratory to a minimum, devoting our time to catching up on family (eight admitted to still having kids at home, two are proud grandparents and three are retired) and professional experiences.

There was such enthusiasm coming out of the evening that we have already begun planning for the 40-year reunion.

Submitted by Alan Boreham, P. Eng. (BASc '79 CIVL), and Alex Morrison, P. Eng. (BASc '79 CIVL).

Upcoming Events

Here's a snapshot of some upcoming events, but there will be more. Visit our web calendar or subscribe to our monthly e-newsletter at www.apsc.ubc.ca/news-events/newsletters.

CIVIL GRADUATE STUDENT ORIENTATION

SEPTEMBER 3, 2014, 12:30 P.M. - 1:30 P.M.

Civil Engineering graduate students should be sure not to miss Orientation Day, taking place in CEME 1202. Refreshments will follow in the Design Studio.

TORONTO BING THOM MARGOLESE PRIZE LECTURE

SEPTEMBER 10, 2014

The UBC Faculty of Applied Science is pleased to announce that Bing Thom has been chosen as the recipient of the UBC Margolese National Design for Living prize. The award, valued at \$50,000, recognizes a Canadian who has made outstanding contributions to the development or improvement of living environments for Canadians of all economic classes. As winner of this year's prize, Thom will give a free public lecture in Toronto on September 10. For more information, please email sarah.barclay@ubc.ca.

HOMECOMING

SEPTEMBER 13, 2014

The cheers, the football, the tailgate party — Homecoming 2014! On September 13, join fellow UBC alumni and friends as we cheer on the UBC Thunderbirds. Keep an eye on the UBC Thunderbirds home page at www.gothunderbirds.ca for ticket information.

CEEN STUDENT & ALUMNI NETWORKING NIGHT

SEPTEMBER 16, 2014

Please join us for the third annual Clean Energy Engineering (CEEN) Night. After the evening's formal program, we invite you to mix, mingle and network with current students, industry partners, faculty and fellow alumni of the CEEN program. For more information and RSVP, please email courtney.smith@ubc.ca.

alumni UBC ANNUAL GENERAL MEETING

SEPTEMBER 16, 2014

Interested in what's going on with your alumni association? All alumni are invited to attend the *alumni UBC* annual general meeting on September 16, where you'll hear what *alumni UBC* has been up to throughout the previous year. For more information on *alumni UBC*, please visit www.alumni.ubc.ca.

CIVL '49 REUNION

SEPTEMBER 17, 2014

The CIVL '49 class are celebrating their 65th reunion! The class holds their reunion every year, and this year they look forward to a milestone year. The class will get together at the Beach Grove Golf Club for lunch to catch up and reminisce, not only about their time at UBC but at each of the reunion celebrations since.

CALGARY ALUMNI EVENT

OCTOBER 16, 2014

After the success of last year's Calgary alumni beer-tasting event, UBC Engineering is coming back this fall! Calgary-area alumni, keep an eye on your inbox for your invitation to what will be a great event!

INNOVATE 2014

SEPTEMBER 29, 2014, 5:30 P.M.-8 P.M.

Join us at UBC Robson Square for a special showcase of UBC Applied Science research within the broader community. Through short (less than seven minutes each!) presentations, discover the impacts UBC Applied Science faculty make and their passion for their research. Topics include architecture, earthquake engineering, mining, IT and artificial muscles. Network after the presentations. www.innovate.apsc.ubc.ca

CHBE INDUSTRY NIGHT

OCTOBER 2014

Chemical and Biological Engineering alumni and industry are invited to the annual CHBE Industry Night in October. Current CHBE students will have the opportunity to learn and network from alumni and industry members at the event. More information will be available in the fall — be sure to check out our online event calendar for the most up-to-date information on all our Engineering events: www.apsc.ubc.ca/events.

CHBE RESEARCH DAY

OCTOBER 1, 2014

CHBE Research Day is a student-driven initiative hosted by the CHBE Graduate Students Club. The theme of this year's event is "Energy and Environment," featuring global issues with significant importance not only to chemical engineers but to environmentalists, energy stakeholders and economists, as well as society as a whole. This full day of events will feature keynote speeches, a technical presentation session and a panel discussion on job-search strategies for graduate students. For more information, please email sarah.barclay@ubc.ca.

GO ENG GIRL!

OCTOBER 18, 2014

Go ENG Girl! is an exciting opportunity for girls in Grade 9 to learn about the wonderful world of engineering from women in the field. While students enjoy fun hands-on activities and engineering-student exhibits, parents are treated to an informative session on the paths to a career in engineering. Join us for the 10th Annual Go ENG Girl! More information is available at www.engineering.ubc.ca/connects.

METS '69 REUNION

OCTOBER 22-24, 2014

METS '69 are celebrating their 45th reunion abroad! This October the class will be celebrating at the Binna Burra Mountain Lodge near Brisbane, Australia. Some alumni are taking advantage of the locale and are turning the reunion into an extended vacation. We wish them bon voyage!

TEACHER PRO-D WORKSHOP

OCTOBER 24, 2014

UBC Engineering invites Grades 6 and 7 elementary school teachers to a free workshop to broaden their toolkit for teaching math and science. We help you to bring math and science lessons to life using engineering-based, real-life applications. For more information, visit www.engineering.ubc.ca/connects.

APEGBC CONFERENCE

OCTOBER 23-25, 2014

UBC Engineering will once again be on hand at the APEGBC Conference, which is being held in Vancouver this year. Mark your calendars and join us for this annual conference. Don't forget to stop by our UBC Engineering booth to say hi and win a prize!

ECE STUDENT & ALUMNI NETWORKING NIGHT

NOVEMBER 2014

The popular Electrical & Computer Engineering Student & Alumni Networking Night will be coming up in November. Organized by the ECE Student Society, this event allows current students to network and engage with alumni and industry in the ECE community. For more information on attending as an alumnus, industry member or guest, please contact courtney.smith@ubc.ca.

alumni UBC ACHIEVEMENT AWARDS

NOVEMBER 19, 2014

UBC is proud to recognize its alumni at the annual *alumni UBC Achievement Awards*. Honours are given to recipients in seven categories, including the Volunteer Leadership Award, Outstanding Faculty Community Service Award, Global Citizenship Award and the Alumni Award of Distinction. Do you know someone deserving who should be recognized? Please visit www.alumni.ubc.ca/events/awards for nomination criteria.

UBC ENGINEERING OPEN HOUSE

NOVEMBER 29, 2014

High school students, transfer students, friends and families are invited to explore UBC Engineering. Find out how engineers are improving our world, from the everyday to the extraordinary. Meet our professors, students and staff as they introduce you to the wonderful and diverse world of engineering. www.engineering.ubc.ca/connects

OLD RED NEW RED 2015

FEBRUARY 5, 2015

Old Red New Red will be back in February! This beloved yearly Engineering event is a great excuse to dust off your Red, reminisce about your time in UBC Engineering and help judge student Ball Models during E-Week.

ENGINEERING EXCELLENCE

APRIL 2015

UBC Engineering proudly presents alumni awards at our annual Engineering Excellence Celebration. Awards are handed out in the categories of Lifetime Achievement (alumni), Community Service (alumni), Young Alumnus (alumni under 35 years), Future Alumnus (current UBC Engineering student) and

Emeriti Faculty (retired or emeriti). Do you know an engineer who should be nominated for an Engineering Excellence Award? Visit engineering.ubc.ca/eng/alumni/alumni-awards for more information on the nomination criteria and the deadline for submissions.

ALUMNI ENGAGEMENT

The Faculty of Applied Science is committed to keeping in touch with our alumni. Whether helping you organize a class reunion, connecting you with long-lost classmates, engaging you in faculty and student activities or keeping you abreast of your alma mater through the web, newsletters or regional events, we are pleased to help. Please contact Sarah Barclay in the Alumni Relations office at sarah.barclay@ubc.ca for more information.

REUNIONS

If you would like more information on upcoming reunions or are interested in organizing one, please email courtney.smith@ubc.ca in the Alumni Relations office for more information.



UBC ENGINEERING & ARCHITECTURE DIALOGUES

innovate | 2014

INSPIRE
INVIGORATE
IGNITE

SEPTEMBER 29, 2014

5:30 - 8:00 PM

UBC ROBSON SQUARE

Come discover pathways to industry partnership with UBC Applied Science. In an evening of thought-provoking, seven-minute presentations, learn why faculty are passionate about their work, and start the dialogue to open up infinite possibilities to leverage our research.

Network while enjoying wine and hors d'oeuvres after the talks.

Learn more and RSVP at innovate.apsc.ubc.ca



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Applied Science