

# INGENUITY

FACULTY OF APPLIED SCIENCE ENGINEERING NEWS / SPRING / SUMMER 2011

## WHEN ENGINEERING MEETS MEDICINE

The Phone Oximeter provides diagnostics where healthcare is not available.

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## ENGINEERED VISION BECOMES REALITY

UBC's School of Engineering celebrates continued success and moves into its permanent home this summer.

8



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA



# Dean's Message

It has been said that there are no limits to what engineers can do. This was demonstrated yet again when engineering met medicine in a collaboration between Drs. Guy Dumont (Electrical and Computer Engineering) and Mark Ansermino (Anesthesiology, Pharmacology and Therapeutics). They have already had a significant impact over the years, which led to their recent recognition as the winners of the highly prestigious NSERC Brockhouse Canada Prize for Interdisciplinary Research in Science and Engineering.

However, what they are preparing to do with the funds awarded with this honour is even more exciting than what they have already done. The powerful team of engineers and doctors led by Guy and Mark is on a mission to bring affordable medical care to remote areas in Canada and around the world, solving a global challenge by providing millions of people access to inexpensive, reliable, simple-to-use technology.

We are also very proud to have recently secured NSERC funding for our Engineers in Scrubs program, again aiding our health-care system in leveraging the technological power engineers have at their fingertips. This is consistent with our goal of ensuring that our work in research and education does indeed benefit our society in British Columbia, Canada and the world.

We are all looking forward to even more celebrations and excitement as we finalize several construction projects in Vancouver (the Wayne and William White Engineering Design Centre and the Coal and Mineral Processing Laboratory expansion and renovation) and, in the Okanagan, the Engineering, Management and Education Complex.

After many years in portables and most-challenging conditions, our School of Engineering at UBC's Okanagan campus will finally move into the complex, its permanent new home — and what a home it is! I am floored by the amazing accomplishments that have already taken place in the school's young history — and from a temporary home, no less. I look forward to the official opening in the fall and to the equally amazing achievements that the future will bring. It will be a big party, and you will all be invited!

Thank you for your continued readership and support. I appreciate the feedback I have been receiving from you. Keep sending it! I can be reached at dean@apsc.ubc.ca.

Tyseer Aboulnasr, P. Eng.  
Dean, Faculty of Applied Science

*"... again aiding our health-care system in leveraging the technological power engineers have at their fingertips. This is consistent with our goal of ensuring that our work in research and education does indeed benefit our society in British Columbia, Canada and the world."*

Dean Tyseer Aboulnasr

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## UBC ENGINEERING AT A GLANCE\*

215	Faculty (full-time tenure-track faculty and lecturers)
4,510	Undergraduate students
782	Undergraduate degrees awarded
1,280	Graduate students
272	Graduate degrees awarded
18	Canada Research Chairs
13	Endowed Chairs & Professorships
4	NSERC Industrial Research Chairs

\* Statistics compiled from academic year 2010-11

**INGENUITY**

is published by the Faculty of Applied Science,  
The University of British Columbia.  
[www.apsc.ubc.ca](http://www.apsc.ubc.ca)

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Geological Engineering  
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INGENUITY / SPRING / SUMMER 2011

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UBC *Ingenuity* Magazine saved the following resources by using 6615 pounds of Reincarnation Matte, made with 100% recycled fiber and 60% post-consumer waste, processed chlorine free, designated Ancient Forest Friendly™ and manufactured with electricity that is offset with Green-e® certified renewable energy certificates.

43 trees preserved for the future.  
19,592 gal wastewater flow saved.  
1,190 lbs solid waste not generated.  
4,068 lbs net greenhouse gases prevented.  
14,000,000 BTUs energy not consumed.

ENGINEERING RESEARCH

# WHEN ENGINEERING MEETS MEDICINE

The feast is found in Canada and the rest of the industrialized world, where anesthesiologists are inundated with data from over 70 different measurements that, if not taken together, can obscure subtle signs of danger. Not surprisingly, the famine exists in the developing world, where the monitoring of patients under anesthesia is often limited to keeping a finger on someone's pulse.

Professor Guy Dumont, from the Department of Electrical and Computer Engineering, and Dr. Mark Ansermino, an assistant professor in the Department of Anesthesiology, Pharmacology and Therapeutics, have collaborated for years on the problem of too much information.

One of their inventions, NeuroSense, instantly and precisely monitors a patient's level of consciousness. Another device, the Intelligent Anesthesia Navigator (IAN), is a "dashboard" that displays a synthesis of the flood of physiological data, emphasizing the pattern changes that herald danger for patients under anesthesia and their physicians. They also created a vibrating belt that transmits one of 24 different tactile alerts to an information-overloaded physician.

NeuroSense is already on the market in Europe, and clinical trials are scheduled to begin this year in Vancouver. And this year the Natural Sciences and Engineering Research Council of Canada (NSERC) awarded the team the prestigious Brockhouse Canada Prize for Interdisciplinary Research in Science and Engineering, which honours collaborations between scientists in engineering and the natural sciences.

"Our objective is to provide doctors with better tools so they are free to spend more time with their patients," says Dumont. "Better automated-control systems enable doctors to focus on higher-level decision making."

Now, having achieved some critical momentum, as well as a \$250,000 grant with the Brockhouse Prize, the duo is turning its attention to the famine side of the issue.

One avenue they consider particularly promising is pulse oximetry — noninvasively measuring blood oxygen levels. Over the past two decades, pulse oximetry has contributed immensely to making anesthesia safer by alerting physicians to a lower than normal level of oxygen in the blood, which can

To hear Guy Dumont and Mark Ansermino expound on the challenge of anesthesia safety is to hear a discussion of feast or famine.



The Phone Oximeter: A prototype of the first cell phone-based pulse oximeter.

cause brain damage or death.

Dumont and Ansermino's research cluster, Electrical & Computer Engineering in Medicine (<http://ecem.ece.ubc.ca>), has developed an iPhone-based pulse oximeter — a simple mobile device for respiratory-disease diagnosis and management that uses a probe attached to the finger to measure oxygen levels by use of light shined through the tissues.

In June the research team received \$432,816 from the Collaborative Health Research Projects program, a partnership between NSERC and the Canadian Institutes of Health Research, to further develop the Phone Oximeter.

Their next step is to make the technology universal, so it can work on any mobile phone, and to develop a way for the probe to be manufactured for \$20 or less. Their team of graduate students is also exploring the possibility of capturing other information with the finger probe — for example, a patient's breathing rate.

The technology may have a significant impact in the early identification of children with pneumonia — a disease two million children in the developing world

die of each year. Administering simple treatments such as penicillin and supplemental oxygen can reduce the mortality rate by at least 30 per cent.

The team is also developing additional diagnostic tools. One application can detect a delay in capillary refill — the time it takes for someone's nail bed to regain normal colour after being compressed, and a strong indicator of illness or infection.

"I can give this tool to someone with limited medical training, and they can determine whether a child is sick," says Ansermino. "This builds on the work we've done that focused on anesthesia, but it goes far beyond that — to colds, intestinal disorders, malaria and even newborn screening. The technology enables us to make tremendous improvements in global health care." ■

To watch a humorous video of the Phone Oximeter in action, visit [www.youtube.com/ubcengineering](http://www.youtube.com/ubcengineering).

ENGINEERING PROGRAMS

# ENGINEERS IN SCRUBS

## NSERC CREATE funding leads to critical mass in UBC Biomedical Engineering

UBC's Engineers in Scrubs program recently received a \$1.65 million grant from NSERC's CREATE (Collaborative Research and Training Experience) Program to foster innovation in medical technology over the next six years by training biomedical engineers in clinical environments.

Developed to help engineers understand and appreciate the needs and uses of technology in health care, the Engineers in Scrubs program will help biomedical engineers learn to navigate the interfaces among engineering research, medical research, clinical practice and product development. Students will receive a significant portion of their training in hospital, and the program will focus on the medical-technology innovation process.

"This will have a significant impact on the pool of highly qualified graduates in the medical-device industry in B.C.," says Professor Antony Hodgson,

principal investigator of the Engineers in Scrubs grant and director of UBC's Biomedical Engineering (BME) program.

Hodgson, along with nine co-applicants from six UBC departments, developed the idea for Engineers in Scrubs in response to research findings indicating that most medical-device innovations arise from those individuals, usually clinicians, who are closest to the point of need — namely, in hospital.

"According to a National Academy of Engineering report a few years ago, these 'inventive users' are the driving force behind most medical-device innovations," says Hodgson. "But, unfortunately, many or even most of these users' valuable ideas don't end up being implemented."

He explains that it's often challenging for users to learn about and plug into a commercialization path. Therefore, the Engineers in Scrubs program focuses



PHOTO CREDIT: MARTIN DEE

on training biomedical engineers to understand clinical problems and help clinicians move their ideas toward widespread use and deployment.

“Our long-term goal is to build UBC’s Biomedical Engineering program into the pre-eminent training program in Canada for engineers who want to develop high-impact medical-technology innovations,” he added.

With the new funding for clinical training, the BME program will add several unique aspects to its curriculum, including a one-month intensive orientation to the clinical environment at the onset of the program, an interdisciplinary team-design project in medical innovation, professional skills workshops and an internship and preceptorship program.

“BME students must learn how to interact with clinicians and understand what they are trying to accomplish in order to see opportunities for applying their engineering knowledge to real problems,” says Hodgson. “The Engineers in Scrubs program will teach students to work routinely with clinicians in those crucial early stages of technology development when problems are identified and potential solutions are developed and tested.”

The new interdisciplinary project course will focus on identifying and prioritizing clinical problems in a context that will draw on the engineers, clinicians, allied health professionals and entrepre-

neurs associated with each research cluster represented in the biomedical engineering community at UBC and its affiliated hospitals. The student teams will then design, build and evaluate prototype medical devices aimed at meeting the needs identified.

Biomedical engineering at UBC involves researchers in multiple engineering departments and many clinical departments. Research areas include a wide range of topics, such as medical imaging, anatomical modeling, surgical-intervention devices (including medical robots), anesthesiology controllers, “lab-on-a-chip” devices, drug-delivery implants and devices, neural interfaces, orthopaedic and dental implants, and rehabilitation technologies.

The Engineers in Scrubs funding will enable UBC’s graduate BME program, which was established in 2006, to expand enrolment by an additional 10 to 15 students each year. The program offers Master of Engineering (MEng), Master of Applied Science (MASc) and doctoral (PhD) degrees. For more information, visit [www.bme.ubc.ca](http://www.bme.ubc.ca). ■

BME Program Director Antony Hodgson and postdoctoral fellow Ilker Hacihaliloglu discuss a study being done with orthopaedic surgeon Dr. Pierre Guy (not shown) on using 3D ultrasound to obtain accurate bone surface models of patients with fractured pelvises.



Members of the Innovation Okanagan Network (ION) toured the \$68-million Engineering, Management and Education Complex at UBC's Okanagan campus during the spring.

# ENGINEERED VISION BECOMES REALITY AT UBC'S OKANAGAN CAMPUS

Undeterred by operating from portables and off-campus leased research and borrowed laboratory space throughout their first six years, the School of Engineering's students and faculty have been accumulating impressive results. Last summer they celebrated significant milestones — the School graduated its inaugural class and received full accreditation from the Canadian Engineering Accreditation Board.

School of Engineering students have already shown excellence in many ways. Engineering graduate Ska-Hiish Manuel (BASC '11, see page 21), a member of the Shuswap Nation, who holds multiple NSERC undergraduate research awards, has taken on a leadership role with the Neskonlith Indian Band in teaching and healing, presented to the United Nations Human Rights Council in Geneva, won UBC Engineering's 2011 Outstanding Future Alumnus award, and recently received NSERC support to plan and deliver a robotics

workshop for on-reserve elementary and secondary school students with the goal of promoting Aboriginal participation in engineering. He is now working toward his MASc in electrical engineering at the School.

And students engaged in the development of their school's new home. The student branch of the Institute of Electrical and Electronics Engineers (IEEE) on campus received \$5,000 to establish a workspace for electronic prototyping. Emily Landry, a third-year engineering student, pursued the grant from the IEEE Canadian Foundation's McNaughton Learning Resource Centre Grant program and from the School of Engineering's Engineering Professional Academic Fund. Landry is also working as an undergraduate research assistant in electrical engineering.

"Learning should be driven by curiosity and a desire to explore the unknown," says Landry, who also created a peer tutoring initiative within the Academic Resource



PHOTO CREDIT: JON JACOBS



PHOTO CREDIT: BARRETT HANSCHEIDT

Centre and founded Okanagan's student chapter of Engineers Without Borders. "If students are given an outlet for exercising curiosity and applying what is learned in the classroom, it helps us develop the ingenuity required as we head out into the world as graduates."

Other examples of the School's successful students are Rachael L'Orsa (BASC '10, see page 18), who received UBC's 2010 Outstanding Future Alumnus award and will begin working on her MASc this fall, and Chris Collier (BASC '11), who has already established himself as a strong researcher, publishing a journal article and two conference proceedings, as well as winning numerous awards and major scholarships.

The School's successes are not limited to these motivated students; researchers are also producing impressive, tangible results by averaging \$576,923 each in funding awards and bringing the total funds raised to over \$15 million in just over five years. Research within the School of Engineering is directed toward the following themes: Global Solutions to Environmental Challenges, Infrastructure Systems for Modern Society, Integrated Engineering Solutions for Complex Systems, and Innovative Materials and Manufacturing.

One project, led by School of Engineering Robotics Professor Homayoun Najjaran, focuses on developing a robot that travels through water mains and sewer pipes, identifying defects and relaying information for municipal engineers to determine how money

should be invested in the repair and renewal of piping infrastructure.

The project is a collaborative effort with fellow UBC Engineering Professors Solomon Tesfamariam and Rehan Sadiq, as well as Inuktun, a company in Nanaimo, B.C., that manufactures robotic inspection systems. The robot could save municipalities millions of dollars by helping determine which infrastructure systems are in the most critical condition and, therefore, first priority for costly upgrades.

With such exciting accomplishments so early in the School's history, a physical home and positive space to grow in will bring about further success.

"We are very excited about the future of engineering research and education that this new facility enables," says School of Engineering Director Spiro Yannacopoulos. "The future is looking very bright." ■

Third-year engineering student Emily Landry helps develop her school by pursuing grants and new initiatives.

Professor Spiro Yannacopoulos (centre), director of the School of Engineering, leads ION Secretary Jack Van der Star (BASC '77, MASc '82, ECE) (left) and Chair Dick Fletcher on a tour of the new facility.

# Newsworthy

The news items in this section represent a portion of UBC Engineering's recent media coverage. For a complete listing, visit the News & Events section at [www.engineering.ubc.ca/news-events](http://www.engineering.ubc.ca/news-events).

## STUDENTS

### Student entrepreneurs win big



ReFlex Wireless—from left: Andy Tsai, Carol Lee, Jinting Zhu and Peter Guan with New York City Mayor Bloomberg (centre).

On April 8, Engineering students Peter Guan (ECE), Carol Lee (ECE), Andy Tsai (ECE) and Jinting Zhu (IGEN) took first place in the undergraduate track of the international NYC Next Idea competition with their team, ReFlex Wireless. The team beat out competition from France and Singapore to claim the prize of \$15,000 as well as six months' rent-free office space in New York City in which to launch their business. The prototype design for their current product, the ReFlex monitoring system, uses wireless technology to monitor the torso orientation and body temperature of multiple patients simultaneously in real time. It was designed to increase the efficiency of medical operations and reduce the number of wires cluttering hospitals, all while staying flexible and affordable.

ReFlex Wireless, which formed through APSC 496 Interdisciplinary Engineering Design Project, also

took second place in the 2011 Nebraska Innovation Competition.

Tsai took APSC 486 New Venture Design—a two-term course that brings together teams of Engineering and Commerce students to create new products or engineering solutions and bring them to market—last year and credits much of the team's success to connections made through both courses.

ReFlex Wireless isn't the only 2010-2011 entrepreneurship team that has done well in recent business-plan competitions.

Partnering through APSC 486, Engineering students Mustafa Abousaleh (ECE), Levi Stoddard (ECE) and Thomas Zhou (ENPH) and Commerce students James Clift, Melissa Jang and Paul McLaughlin won the \$10,000 first prize at the Evansville New Venture Creation Competition, as well as \$5,000 worth of prizes at the Tony Brower Innovation Exposition. Their product, the Luminex EcoLight System, is a set of reflective aluminum window blinds that saves energy by maximizing the amount of sunlight in a room and automatically adjusting the room's artificial light accordingly.

Socialappetite—the team of Engineering students Frankie Angai (ECE), Eric Villeneuve (CIVL) and William Yan (ECE) and Commerce students Adrien Herberts, Joey Tai and Peter Yang—won \$5,000 at the Alerus Entrepreneurship Challenge at the University of North Dakota and \$2,000 at the UBC Venture Capital Private Equity Entrepreneurship Competition for their location-based social media app Weev. Unlike other location-based apps, Weev is designed exclusively for students, aiding them in making relevant and timely connections with friends, classmates and academic tutors in the campus setting. The team also formed through the New Venture Design course. ■

## RESEARCH

## Can radiation escape from black holes?



Professor Greg Lawrence investigates an analogy between water waves and black holes.

UBC civil engineers and physicists have successfully tested a theory by eminent physicist Stephen Hawking. In 1974, Hawking posited that black holes emit a weak level of radiation even as they exert gravitational pulls so strong that little can escape, not even light.

Civil Engineering Professor Gregory Lawrence co-authored the UBC study, in which he helped design simple experiments that featured water flowing over an obstacle in a six-metre flume, normally used for undergraduate experiments. Holder of a Canada Research Chair in Environmental Fluid Mechanics, Lawrence provided expertise in investigating an analogy between water waves and black holes to help prove the theory.

In 2002, UBC Professor of Physics and Astronomy Bill Unruh and his postdoctoral fellow, Ralf Schützhold, demonstrated a mathematical analogue between a black-hole horizon — the surface beyond which light cannot escape — and a hydraulic control in water flow over an obstacle — since water waves cannot propagate upstream through a hydraulic control.

They intrigued Lawrence with the idea, and for the next few years Lawrence and Unruh experimented in the Hydraulics Laboratory. The experiments became

more sophisticated, and intense, with the addition of three other researchers: European Union Madame Curie Postdoctoral Fellow, Dr. Silke Weinfurtner, recent UBC Civil Engineering PhD graduate Edmund Tedford, and UBC physics undergraduate Matt Penrice.

By placing a streamlined obstacle into an open channel flow, the team created a region of high velocity over the obstacle. Long waves propagating upstream toward this region were arrested by the flow and converted into a pair of short (deep-water) waves.

This wave pair is the closest analogy to Hawking radiation observed to date. After enthusiastic encouragement by Weinfurtner, the UBC team was able to measure the amplitudes of these waves and demonstrate that they matched Hawking's predictions. Their results were published in January in *Physical Review Letters* (see <http://prl.aps.org/abstract/PRL/v106/i2/e021302>).

Not only are the results making waves in the theoretical physicist community, they have also raised a number of fluid-mechanics questions of interest to engineers, including the behaviour of tsunamis as they propagate up rivers. ■

## FACULTY

## UBC engineering entrepreneurship to double

In 2005, UBC Professors Peter Lawrence (ECE) and Darren Dahl (Sauder School of Business), with the support of Dr. Ken Spencer, created New Venture Design, a new course that pairs engineering and business students and challenges them to create a product and a business plan that will succeed in today's marketplace.

The success of the course was overwhelming. In the past six years, students have attended 15 international business-plan competitions, earning prizes and praise for their work. Several groups of students have gone on to use the ideas and plans they created in the course to develop businesses — meaning jobs for themselves and economic growth for Canada.

The course has been so successful that demand for it has quickly outpaced its availability: in 2010, only 30 percent of students who wished to take the course could

enrol due to space restrictions. Dr. Spencer, recognizing the course's value to students and to Canada's economy, urged Applied Science to double the size of the course, and he pledged \$250,000 toward the expanded course, at \$50,000 per year.

Enrolment in the course, now under the leadership of the current NSERC Chairs in Design Engineering, Senior Chairholder Professor Philippe Kruchten and Associate Chairholder Professor Antony Hodgson, will increase from the current 30 students to 45 in 2011 and 60 in 2012, ensuring that more students will be able to broaden their knowledge of new venture creation and success.

Dr. Spencer is a UBC alumnus (BASc '67, PhD '72 ECE) and prior to his retirement was the co-founder and CEO of Creo Products. He was recently inducted as a business laureate of the British Columbia Hall of Fame.

Applied Science extends its sincere thanks and appreciation to Dr. Spencer for his support of engineering students and the promotion of entrepreneurship at UBC. ■

## Engineering Student Centre Class Challenge



Artist rendering of the Engineering Student Centre, courtesy of Michael Kingsmill, Alma Mater Society (AMS).

How important was space to your engineering student experience? While engineering undergraduate enrolment has almost quadrupled since 1970, space for engineering student activities has declined — as a result, nonacademic-activity space per student today is less than half of what it used to be. And if you've visited the Cheeze recently, you'll understand why the need for new student space is so great.

The much anticipated Engineering Student Centre (ESC) will provide space for group work, learning, socializing, relaxing and extracurricular activities on campus. Open to students from all engineering disciplines, the building will help integrate engineering studies and facilitate networks among students that will enhance their professional lives.

The ESC has been a student-led initiative since its conception. Engineering students voted in favour of increasing student society fees, which will provide \$2.5 million toward the new centre. However, an additional \$2.5 million in support from donors is still needed to make the project a reality.

The ESC Campaign Committee — comprising engineering students, alumni, faculty and staff — has been working tirelessly to garner support and hopes every engineering alumnus will participate in the "ESC Class Challenge." To date, the following classes have joined together to establish class goals of \$25,000 and above:

- Electrical Engineering Classes of 1977 through 1980
- Mechanical Engineering Class of 1982
- Mechanical Engineering Class of 1984

If you would like to initiate a class gift for this much-needed student space or would like more information about the Engineering Student Centre and naming opportunities, please contact Debbie Woo, associate director of development, at 604-822-6856 or [debbie.woo@ubc.ca](mailto:debbie.woo@ubc.ca). You can also donate online at [www.supporting.ubc.ca/esc](http://www.supporting.ubc.ca/esc). ■

### EDUCATION

## Electrical and Computer Engineering receives energy-management software from Alstom Grid

The Department of Electrical and Computer Engineering (ECE) has received Energy Management System software valued at more than \$1 million US from Alstom Grid, which will provide students and researchers with access to state-of-the-art software used by BC Hydro and other leading power systems around the world.

The department will integrate the software into its existing modeling and simulation facilities to create an advanced power system control centre simulation facility for learning and research.

Students will gain valuable hands-on experience using the software, preparing them to work proficiently in power network control functions. Researchers will use the software to study power transmission and distribution in the context of real-world-sized integrated energy systems operations.

"The Alstom Grid donation ties very nicely into our existing facilities, training programs and research," says ECE Professor José Martí.

Alstom Grid provided this support to UBC in recognition of its relationship with BC Hydro. The Faculty of Applied Science extends its thanks and appreciation to Alstom Grid and BC Hydro for their tremendous support of education and research at UBC. ■

## FACULTY

## entrepreneurship@UBC receives further support

One year ago, in the spring/summer 2010 issue of *Ingenuity*, we announced the launch of entrepreneurship@UBC, a new program spearheaded by the Faculties of Applied Science, Science, Sauder School of Business and the University Industry Liaison Office. The program was created to encourage a campus-wide culture of entrepreneurship among students and faculty, with the intent of cementing UBC as Canada's top university for innovation, commercialization and start-up company creation.

Applied Science is extremely pleased to have received \$1.25 million toward the program — funds that will be used to establish the necessary infrastructure to develop this “ecosystem” of entrepreneurship. Contributions have been received from UBC; the Industrial Research Assistance Program, a National Research Council Canada program; and the British

Columbia Innovation Council. The contributions will fund curriculum development across all faculties, networking-support programs, mentorship events, and on-campus workshops, all with the aim of promoting entrepreneurship as a career option for students.

We are pleased to announce that Paul Geyer (BASc '88 ECE), a local Vancouver entrepreneur, has contributed \$50,000 toward the capital fund. With the program infrastructure now in place, UBC is ready to provide seed funding for new student start-ups. The call for applications is anticipated this summer, with the first student financing to be announced this fall.

Applied Science and its partners in e@UBC are continuing to work toward a \$10 million venture capital fund for investments in student companies. If you would like to get involved with e@UBC and get on board with the next generation of entrepreneurs, please contact Debbie Woo, associate director of development and alumni relations, at 604-822-6856 or [debbie.woo@ubc.ca](mailto:debbie.woo@ubc.ca). ■

## EDUCATION

## Student-directed learning takes hold—the global engineer emerges

The impact of technology on society is a fundamental consideration for engineers. The Canadian Engineering Accreditation Board requires its study for licensure as a professional engineer in Canada. And UBC Engineering has long offered APSC 261 and 262 Technology and Society — courses that deal with the influence of technology on the social, political, economic and environmental aspects of society.

But in 2002, UBC Engineers Without Borders (EWB) students were interested in the impact of technology on society in the context of sustainable development and believed it should be brought forth to the attention of all students.

Led by Jordan Ko (BASc '02, ENPH), EWB students worked with UBC's Provost Vice President Academic Office to launch “Sustainable Development and Appropriate Technology,” a student-directed seminar. As an expansion of the directed-studies option offered by departments, student-directed seminars enable senior undergraduate students to initiate and coordinate small, collaborative, group learning experiences for credit and are intended to pilot new ideas and topics at UBC.

Students in the EWB seminar investigated appropriate technology and infrastructure, trade and finance, transportation, energy, water access, communication, health and gender in the developing world.

Normally each student-directed seminar runs only once. However, the EWB appropriate-technology seminar ran five times between 2002 and 2008, each iteration developed and coordinated by EWB students. As the exceptional seminar gained momentum, it became apparent that in order for it to continue, it needed a permanent home.

EWB students connected with faculty members Annette Berndt and Carla Paterson about the possibility of transforming the student seminar into a regular curricular offering.

Through the combined efforts of students, staff and faculty, the student-run initiative was converted into APSC 263, Technology and Development: The Global Engineer. According to Berndt and Paterson, this was the first “global engineering” type of course at UBC.

The course takes an experiential approach to learning (see “Community Service Learning,” *Ingenuity* spring/summer 2010), in which students tackle challenges brought forth by community partners. APSC 263 students have recently addressed challenges faced by artisanal communities in rural areas such as Rajasthan, Gujarat and the far south of India.

APSC 263 is open to third- and fourth-year engineering students. Like APSC 261 and 262, it fulfills the Impact of Technology on Society requirement. ■

EDUCATION

## UBC Engineering Co-op now offers entrepreneurial work terms

Recognizing the value of student-initiated entrepreneurship, UBC Applied Science and Engineering Co-op recently launched the new Entrepreneurial Engineering Co-op work term. Students interested in starting their own business can now count their entrepreneurial experience toward one or more of their Co-op work terms.

“This is an exciting addition to our program because it provides our Co-op students with the opportunity to launch their business idea in a supported environment,” says Engineering Co-op Director Jenny Reilly.

Within the monitored work term that counts toward Co-op standing, students are matched with mentors who provide guidance, monthly check-ins and support to ensure that the learning experience is valuable and rewarding. Students gain access to physical workspace on the UBC campus while spending four or more months focusing on their entrepreneurial goals.

In support of the initiative, Applied Science will pay the Co-op tuition fees for approved Entrepreneurial work terms for Engineering Co-op students.

If you are a student or potential mentor interested in Entrepreneurial Engineering Co-op, please email [eng.coop@ubc.ca](mailto:eng.coop@ubc.ca) for more information. ■

PARTNERSHIPS

## Sustainable, clean energy brings people together



From left: UBC Dean Tyseer Aboulnasr, Chair of BC Hydro Dan Doyle, UBC CERC Director David Wilkinson, Assistant Deputy Minister Les MacLaren and UBC Director of Strategic Initiatives Brent Sauder.

UBC’s Clean Energy Research Centre (CERC) hosted its inaugural summit, “Collaborating for Sustainable Clean Energy,” on May 13, 2011, connecting leaders within British Columbia’s clean-energy sector.

CERC welcomed representatives from industry and government to meet with faculty and researchers, with the goal of building and strengthening collaborative solutions that will drive the clean-energy economy in B.C. The event, attended by more than 200 people, provided a valuable context for energy priorities and current challenges, in addition to connecting professionals with common interests.

“We all agree that with power comes responsibility,” said Applied Science Dean Tyseer Aboulnasr in her

introductory remarks. “We have massive intellectual power in the sustainable-energy field within UBC, the Faculty of Applied Science and the Clean Energy Research Centre — it is our responsibility to use that knowledge to effect positive change in the world.”

In supporting connections and collaborative initiatives to fuel the industry’s development, CERC was described numerous times throughout the summit as an “intellectual powerhouse.”

“We want B.C. to be the very best example of how you take care of the kind of aging infrastructure we have,” said Dan Doyle, chair of BC Hydro and a keynote speaker at the summit. “B.C. can be a clean-energy leader in the world — certainly here in North America.”

Doyle’s message was echoed by the second keynote speaker, Les MacLaren, assistant deputy minister in the Electricity and Alternative Energy Division of B.C.’s Ministry of Energy, Mines and Petroleum Resources. MacLaren summarized the B.C. government’s position, stating, “The big focus is for us to be a leader in clean energy, a leader in climate action and to also grow our clean-energy technology export markets to create more jobs.”

Two panels of experts from around the country discussed collaborative approaches in support of these goals, providing concrete examples of their efforts, and highlighted some of the key organizations within the community that are making a difference.

The day was rounded out with a CERC tour and a tour of the Advanced Materials and Process Engineering Laboratory, with highlights of specific examples of clean-energy research at UBC.

For more information, visit [www.cerc.ubc.ca](http://www.cerc.ubc.ca). ■

## RESEARCH

## Research leads to better cancer treatment

Electrical and Computer Engineering Professor Purang Abolmaesumi uses real-time ultrasound imaging to diagnose prostate cancer and monitor patients during cancer treatment. His groundbreaking research could lead to the development of new diagnostic and therapeutic tools that dramatically reduce the need for painful and invasive needle biopsy by enabling accurate ultrasound-based diagnosis.

“This research program will provide more effective patient treatment and reduce the economic burden on the health-care system,” says Abolmaesumi.

“Researchers trained in this program will learn to apply their technical knowledge to the development of tools with practical implications for high-impact medical problems.”

By aligning the ultrasound-imaged three-dimensional anatomical models to the patient during therapeutic procedures, Abolmaesumi’s research will enable real-time, safe, continuous monitoring of the patient’s anatomy, something currently possible only through use of ionizing radiation.

“This is especially important for children and pregnant women, for whom the use of X-rays in a surgical procedure should be minimized.”

Abolmaesumi’s research focuses on spine procedures and on laparoscopic surgery with urologic applications. His team will also develop new methods for cancer diagnosis by correlating features extracted from a time series of ultrasound signals through use of advanced pattern-recognition techniques.

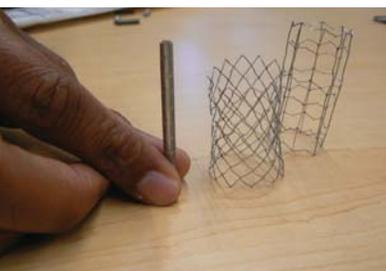
Abolmaesumi co-directs the Robotics and Control Laboratory along with ECE Professors Peter Lawrence, Rob Rohling and Tim Salcudean. The laboratory has strong ties with Vancouver General and BC Children’s and Women’s Hospitals. Abolmaesumi also runs an interdisciplinary collaborative research group that brings together experts in Electrical and Computer Engineering, Mechanical Engineering, Surgery, Radiology and Computer Science, with local, national and international collaborations.

This past winter Abolmaesumi was awarded a new Tier 2 Canada Research Chair (CRC) in Biomedical Engineering, which provides \$500,000 over five years, with matching funds from the UBC Department of Urologic Sciences, to further his research.

The federally-funded CRC program aims to advance research across Canada. For more information, visit [www.apsc.ubc.ca/research/chairs](http://www.apsc.ubc.ca/research/chairs). ■

## RESEARCH

## Geometric patterns lead to improved structural materials



Compare the heights of the three stents: before expansion (left); stent with a diamond geometry which shrinks in height as it is expanded (middle); a stent geometry does not shrink after it is expanded (right).

The secret to improving structural materials may be held in the repetition of tiny three-dimensional, geometric patterns. These structures — microscopic lattices — enable a range of advancements to improve safety and performance in the aerospace, automotive, biomedical and communications industries.

As Canada Research Chair in Dynamics of Lattice Materials and Devices, UBC Mechanical Engineering Professor Srikantha Phani studies the fundamental mechanical response behaviour of these new lattice materials. Using computational studies backed by experiments, Phani seeks to tailor microstructural patterns in materials to optimize properties such as stiffness, strength and vibro-acoustic response.

“By studying lattice materials, we can investigate structures with attention to multifunctional applications,” says Phani. “Fifty years ago this was simply not possible. But now, because of advanced machining and computer modeling, vast improvements are possible on

the smallest scale. This fundamental research opens up a rich set of multidisciplinary applications.”

Phani’s research has significant applications in the strong and lightweight materials needed in the aerospace and automotive industries. Lattice sandwich structures combined with low-density foam fillers may offer high specific stiffness, high strength and high damping and energy-absorption capabilities. And innovative micromechanical lattice filters can potentially influence the design of signal-processing circuits on the Micro-Electro-Mechanical Systems (or “MEMS”) scale. Phani is working with Professors Edmond Cretu and Alireza Nojeh, researchers from UBC’s Microsystems and Nanotechnology (MiNa) group, on the application of lattice mechanics on small scales.

“We can make fascinating advancements by simply studying geometry and how various repeating shapes perform under different loading conditions,” says Phani.

Phani was awarded a Tier 2 Canada Research Chair, which provides \$500,000 over five years for his lattice-materials research. This research program has also received an award from the Canada Foundation for Innovation with matching funds from British Columbia Knowledge Development Fund totaling \$806,215. ■

## Awards & Achievements

Chemical and Biological Engineering Professor **Xiaotao Bi** received a UBC Killam Faculty Research Fellowship.

Chemical and Biological Engineering Professor Emeritus **Norman Epstein** received a UBC Engineering Outstanding Emeritus Award.

The Canadian Medical and Biological Engineering Society honoured Chemical and Biological Engineering Associate Professor **Ezra Kwok** with its Outstanding Canadian Biomedical Engineer Award.

The Engineering Institute of Canada awarded Civil Engineering Professor Emeritus **Liam Finn** with the K.Y. Lo Medal.

Civil Engineering Professor **Don Mavinic** received a UBC Killam Research Prize.

The Institute of Transportation Engineers presented Civil Engineering Professor **Tarek Sayed** with its Wilbur S. Smith Distinguished Transportation Educator Award.

Electrical and Computer Engineering Associate Professor **Purang Abolmaesumi** has been appointed a Tier 2 Canada Research Chair in Biomedical Engineering.

The NSERC Brockhouse Canada Prize was awarded to Electrical and Computer Engineering Professor **Guy Dumont** and Dr. Mark Ansermino, assistant professor of anesthesiology, pharmacology and therapeutics.

The Engineering Institute of Canada elected Electrical and Computer Engineering Professor **André Ivanov** as a Fellow.

Electrical and Computer Engineering Professor **Vikram Krishnamurthy** received a UBC Killam Research Prize.

The IEEE Antennas and Propagation Society honoured Electrical and Computer Engineering Associate Professor **David Michelson** and graduate student **Simon Chiu** (MAsc '09) with the 2011 R. W. P. King Award for their paper, "Effect of Human Presence on UWB Radio Wave Propagation within the Passenger Cabin of a Midsize Airliner," published in the March 2010 issue of *IEEE Transactions on Antennas and Propagation*.

The German Information Technology Society presented its 2010 Best Paper Award to Electrical and Computer Engineering former postdoctoral research fellow **Jan Mietzner** and Professors **Lutz Lampe** and **Robert Schober** for "Distributed Transmit Power Allocation for Multihop Cognitive-Radio Systems" published in the *IEEE Transactions on Wireless Communications* in October 2009.

The Canadian Academy of Engineering named Electrical and Computer Engineering Professor **Robert Schober** as a Fellow.

The Confederation of University Faculty Associations of BC honoured Electrical and Computer Engineering Professor **Rabab Ward** with the Paz Buttedahl Career Achievement Award.

The Extraction and Processing Division of the Minerals, Metals and Materials Society awarded Materials Engineering Assistant Professor **Edouard Asselin** with its 2011 Young Leader Professional Development Award.

The UBC Engineering Co-op Office honoured Materials Engineering Professor **David Dreisinger** with the Faculty of the Year Award.

Mechanical Engineering Professor **Yusuf Altintas** received the Gold Medal Award from Engineers Canada, as well as a UBC Killam Teaching Prize.

Mechanical Engineering Associate Professor **Peter Cripton** has been appointed holder of the Patrick Campbell Chair in Design.

The Open University of Sri Lanka awarded Mechanical Engineering Professor **Clarence de Silva** with an honorary degree.

Mechanical Engineering Professor **Ian Frigaard** received the 2011 CAIMS/MITACS Industrial Mathematics Prize.

The Canadian Academy of Engineering named Mechanical Engineering Professor **Thomas Oxland** as a Fellow.

Mechanical Engineering Professor **A. Srikantha Phani** has been appointed a Tier 2 Canada Research Chair in Dynamics of Lattice Material and Devices.

Mechanical Engineering Manager of Computing and Electronics **Alan Steeves** received the 2011 UBC Applied Science Dean's Award for Excellence in Service.

Engineers Canada has elected Mining Engineering Associate Professor **Rimas Pakalnis** as a Fellow.

The UBC Engineering Co-op Office has awarded School of Engineering Assistant Professor **Mina Hoorfar** with the Faculty of the Year Award.

School of Engineering Senior Instructor **Carolyn Labun** received the Teaching Excellence and Innovation Award and was appointed the first director of the Centre for Scholarly Communication at UBC's Okanagan campus.

The National Research Council Institute for Research in Construction awarded School of Engineering Associate Professor **Rehan Sadiq** with the External Partnership Award.

## FACULTY

# Professor Peter Lawrence, enthusiastic inventor and teacher, retires



Professor Peter Lawrence looks forward to retirement and time for new (ad)ventures.

After 37 years in the Department of Electrical and Computer Engineering (ECE), Professor Peter Lawrence retired June 30. Lawrence worked with faculty from 10 different UBC departments, numerous industry collaborators and thousands of students — both undergrad and graduate — throughout his career, and his many contributions will continue to have an impact on UBC and beyond.

Named as co-inventor on 30 different technology disclosures, Lawrence's wide range of devices and methods include a handwriting sensor for signature verification, 3-D imaging ultrasound for cancer treatment, hydraulic controls and human eye-tracking for display interfaces.

"Dr. Lawrence always had such enthusiasm for technology and the new possibilities that were coming, and that enthusiasm was infectious in his teaching and research," says Kevin Huscroft (BASc '79, MASc '84 ECE), who co-founded PMC Sierra after working with Lawrence.

Three undergraduate courses and programs shine as gems of Lawrence's efforts to develop a relevant curriculum for engineering students. In 1982, with former ECE graduate student (and later CEO of AC Statpower)

Konrad Mauch (BASc '77, MASc '84, ECE), Lawrence launched Introduction to Microcomputers, a one-term elective course where any student could learn how to design a complete microcomputer-based system for a real-world sensing and control application.

Lawrence was also very involved in the 1999 launch of the Project Integrated Program (PIP), a project-design-based learning approach to engineering education. Designed with five faculty members from the department, PIP replaced all ECE content in the second-year program.

The New Venture Design course, piloted in 2003, shines as a third example of Dr. Lawrence's passion to educate. Lawrence, then the inaugural holder of the Senior NSERC Chair in Design Engineering, collaborated with Sauder School of Business Professor Darren Dahl to co-instruct the course.

"Working with Peter on the New Venture Design course was a highlight of my career," says Dahl. "His vision in marrying business and applied science at the undergrad level resulted in a course that has inspired students and led to numerous successful start-ups and new ventures."

Lawrence will continue his research as an emeritus professor.

To read more about Professor Lawrence, visit: [www.ece.ubc.ca](http://www.ece.ubc.ca) ■

## FACULTY

# Professor Sheldon Duff, "Environmental Guy" retires



Never pressed to find interesting things to do, Professor Sheldon Duff intends to learn Spanish, surfing and guitar upon retirement.

Professor Sheldon J.B. Duff retires from the Department of Chemical and Biological Engineering (CHBE) this August after 19 years at UBC. He leaves a legacy of dedication to his students, commitment to administrative programs and the joint-degree program he helped found.

After finishing his PhD at McGill University, Duff worked at the National Research Council in Ottawa and at Canada's Department of Energy, Mines and Resources before coming to UBC in 1992.

Duff co-designed the UNBC/UBC Environmental Engineering program in 2002. The joint program was created to meet a demand for engineering specialists in the growing environmental industry and to facilitate the introduction of an engineering program at the University of Northern British Columbia.

"I was at the initial meeting because I was the 'environmental guy' in CHBE," says Duff. "UBC Civil Engineering Professor Greg Lawrence and I designed the program and became the first UBC co-directors."

Duff continued as co-director until 2010. He also developed and implemented new undergraduate courses and Environmental and Biotechnology options for UBC's undergraduate Chemical Engineering curriculum.

Duff published extensively in the area of biofuels, with interests ranging from environmental design to the environmental impact of industrial effluents and biotechnology. His research often led to consultations with industry, such as Tembec and Noram Engineering and Constructors.

His parting advice to newer colleagues: "Devote a significant amount of effort toward undergraduate [in addition to graduate] education." He also recommends getting involved in administrative work, because it is "critically important to a well-run university." ■

# Our People



Rachael L'Orsa (BASC '10) named UBC's 2010 Outstanding Future Alumnus.

ALUMNI

## School of Engineering alum named UBC's Outstanding Future Alumnus

Rachael L'Orsa, an engineering and arts student leader at UBC's Okanagan campus, has been chosen as the 2010 Outstanding Future Alumnus by UBC. She received the recognition at the December 2010 Alumni Achievement Awards in Vancouver.

L'Orsa received her BSc degree in June 2010 with the first Okanagan School of Engineering graduating class and this June received a Bachelor of Arts degree in French and Spanish with a minor in computer science, also at UBC's Okanagan campus.

"This award recognizes someone whose commitment to academic excellence and significant involvement in university affairs inspires others and improves the campus community," says Brenda Tournier, Senior Manager of Alumni Relations at UBC Okanagan.

Tournier notes that away from the university, L'Orsa works as a paramedic and, in the summers, as a wildland firefighter. She has completed Ironman Canada four times.

*"Rachael excels in everything she does while inspiring others around her to do the same. She is an academic, an athlete, a volunteer and, above all, a leader,"*

"Rachael excels in everything she does while inspiring others around her to do the same. She is an academic, an athlete, a volunteer and, above all, a leader," says Tournier. "Her contributions to her community and to UBC are extraordinary, and she is an extraordinary person — definitely an outstanding alumnus, and one who has an incredible future ahead of her."

Completing two degrees while serving on UBC's Okanagan Senate and working as a paramedic and student researcher may sound like a lot for most people, but L'Orsa accomplished all to an exceptionally high standard.

Despite a demanding academic schedule, L'Orsa became highly involved in the university community. While working toward her BSc in mechanical engineering, L'Orsa was a member of the Engineering Undergraduate Society, taking the lead on a variety of workshops and events. She also represented her peers and earned the respect of her seniors as a student senator on the University Senate.

Her leadership ability and willingness to volunteer was also evident in her roles as team leader for her fourth-year capstone project group and for several successful competition teams for the Faculty of Applied Science.

L'Orsa was a science ambassador with the Irving K. Barber School of Arts and Sciences, delivering dynamic, engaging science and engineering presentations to school children to pique their interest in science-based activities, education and careers. Two of the Grade 7 students she mentored won honourable mentions in the 2010 Canada-Wide Science Fair. She has also worked as a student coordinator for the Women in Engineering program aimed at female high school students.

L'Orsa consistently placed in the top five per cent

of her class while receiving numerous merit-based scholarships — including the largest awarded by the Canadian Aeronautics and Space Institute as well as three separate NSERC awards and a UBC Okanagan Undergraduate Student Research Award.

L'Orsa plans to pursue a Master of Applied Science degree this fall. ■



David Lee works hard during his Co-op term with Recon helping to develop the Transcend goggles.

## STUDENTS

## Co-op experience transcends expectations

By David Lee  
Integrated Engineering Co-op Student

Recon Instruments is a Vancouver-based start-up that created Transcend, the world's first snow goggles equipped with a head's-up display and GPS technology. My story with Recon began in May 2010, when they were looking for a Co-op student to do field testing of their new goggles.

The job description indicated they were looking for a skier/snowboarder and fourth-year electrical engineering student.

I had the skier part covered. But I had only just completed my second year in the Integrated Engineering program, so I didn't expect to get the job. Then a few days after my interview, I got a call, and to my surprise and great delight, I had been hired.

Because this was my first Co-op job, I did not really know what to expect. At the time, I was still sorting out which field to specialize in during my last two years of studies at UBC. My plan was to use this Co-op experience to help me figure out my strengths and interests and guide me toward a suitable career path.

Luckily the job proved to be a great fit for me. My responsibilities involved testing the hardware and firmware of the goggle. Some of the tests could be conducted in the office, but features like the altimeter and GPS needed to be tested in the field.

Testing a snow goggle in the summer meant glacier skiing at Whistler and at Mount Hood in Oregon — as well as getting strange looks from people in downtown Vancouver as I rode my bike around in 30-degree heat wearing ski goggles. One of my projects involved collecting data from the goggle's inertial sensors, as well as using video analysis to develop an algorithm that can detect jump airtime and produce statistics such as jump distance and height.

In addition to field testing, I got a chance to dive into the firmware code and help tweak the user interface, which turned out to be fun and challenging. Since no

one has ever produced a product like this, there were a few hurdles to overcome in the manufacturing stage. I had the chance to go to the factory to help with refining the assembly and quality-control process. It was very exciting to see the results of so many people's hard work coming together in a final product.

One of the best aspects of my Co-op experience at Recon is that I was given the opportunity to interact with other employees from many different backgrounds. When I introduced myself as an Integrated Engineering Co-op student, I had to explain that the program included a broad spectrum of engineering fields and that students could choose one or two fields of specialization.

And herein lies the brilliance of the Integrated Engineering program. In the real world, I do not expect to work strictly with engineers from only one discipline. Integrated Engineering teaches you to speak the language of all engineers, and I have found it to be very valuable in my experience so far.

I remember that when I was struggling during my job search last spring, I was asked about what kind of job I wanted to have in the future and what my career goals were. I answered with something along the lines of, "I want to have the kind of job where you think to yourself, 'I can't believe I get paid to do this.' And I want to be able to ski as much as possible." I laughed and mentioned that it was likely naive.

I know my Co-op experience is unusual in that I found a job that was not only fun and interesting but that also fed my passion for skiing. I feel very fortunate to have been given the opportunity to prove myself in this position. This job and company are proof that it is possible to incorporate your passions — in my case, skiing — with a career in engineering. ■

*The idea for the head-mounted display goggles took shape in a UBC technology entrepreneurship course (APSC 541 /BAEN 506-507) in which teams of Engineering and MBA students generate technology concepts and business plans for new ventures. Recon Instruments was established in 2008 by Hamid Abdollahi (M.Eng '08), P.Eng.; Dan Eisenhardt; Darcy Hughes (MBA '06); and Fraser Hall (MBA '06).*

ALUMNI

## MEng grad develops project for UBC energy reuse



PHOTO CREDIT: MARTIN DEE

Jeff Giffin (MEng '11), a graduate of the inaugural class of Master of Engineering in Clean Energy Engineering, intends to help UBC's Aquatic Centre increase energy efficiency by more than 60 per cent.

The UBC Aquatic Centre is getting a major clean-energy makeover, thanks to a class project by graduating green engineer and UBC staff member Jeff Giffin.

The \$500,000 project, designed by Giffin in UBC's new Master of Engineering in Clean Energy program, will harvest waste steam condensate from neighboring buildings to heat the popular recreation centre's indoor and outdoor swimming pools.

The environmental payoff will be big, reducing UBC's carbon emissions by 450 tonnes (the equivalent of taking 100 cars off the road), saving three swimming pools' worth of water annually and improving the centre's energy efficiency by more than 60 per cent.

"Projects like this are what engineers live for, to work on something that actually makes the world a better place," says Giffin, who moved from Boulder, Colorado, to Vancouver three years ago. "I learned so much on this project, but knowing the university values it enough to make it real is a special feeling."

That feeling didn't stop once he graduated on May 31, because Giffin will help oversee the project when construction begins. He has resumed a full-time position at UBC's Building Operations, after working part-time during the program.

As Manager, Special Projects Alternative Energy Projects, Giffin is responsible for helping UBC achieve its ambitious carbon-reduction targets, including the elimination of institutional greenhouse gases by 2050. Despite working on more than \$110 million in clean-energy projects, Giffin admits he was a little nervous about sharing this project.

"One day I mentioned the project to my supervisor, kind of in passing, saying that I was looking at using waste energy to heat the Aquatic Centre," says Giffin, who previously received a bachelor of inventions degree at the University of Colorado and has three patents to his name, including ski and snowboard bindings and a self-powered bike light.

"My boss asked me if there was a business case in which the project would pay for itself in savings over two years — and there was," says Giffin.

"We confirmed the technical assumptions with our internal experts, and there's been tremendous support for the project. It's been pretty amazing." ■

*Reprinted with permission from UBC Reports, May 6, 2011*

*"Projects like this are what engineers live for, to work on something that actually makes the world a better place."*

# UBC ENGINEERING EXCELLENCE 2011



On March 18, 2011, Applied Science hosted the second annual Engineering Excellence Celebration, and we are pleased to announce that it was a rousing success! Held at the Marriott Pinnacle Downtown Hotel in Vancouver, the event welcomed close to 250 guests — students, alumni, faculty and supporters — all of whom enjoyed an evening of music, talent and a showcase of engineering achievement.

Mark your calendars! We will be hosting the third Engineering Excellence Celebration on March 1, 2012, and we hope to see you there! Details will be available on our website ([www.apsc.ubc.ca](http://www.apsc.ubc.ca)) and in the next issue of *Ingenuity*.

## 2011 ALUMNI AWARD WINNERS

### Outstanding Future Alumnus Award:

**Mr. Ska-Hiish Manuel (UBCO) and Ms. Lin Watt (UBCV)**

Ska-Hiish Manuel (BASC '11 ELEC), a member of the Neskonalith Indian Band within the Secwepemc Nation, was recognized for his deep and sustained desire to contribute to his community, as well as his intent to use his degree to apply technology within the framework of Indigenous values, with two goals: to encourage productivity in Aboriginal communities and to encourage Aboriginal young people to pursue engineering as a career.

Lin Watt (BASC '11 CHBE) was recognized for her involvement in both UBC Engineering and campus-wide initiatives and committees, as well as her success with her engineering-inspired start-up venture, Dragonfly Instruments.

### Outstanding Young Alumnus Award:

**Ms. Robin Farnworth**

Robin Farnworth (BASC '05 ENPH) was recognized for her long-time leadership in Engineers Without Borders (EWB) at UBC while a student, in Africa as an engineer and as Director of West Africa Programs, and now back in Canada as Director of Overseas Sending.

### Community Leadership Award:

**Mr. Paul Geyer, P.Eng.**

Paul Geyer (BASC '88 ECE) was recognized for his business leadership at LightIntegra Technology Inc., Neovasc Inc. (formerly Medical Ventures Corp.) and Mitroflow International Inc. He was also lauded for his community service as a member of the board of directors of MEDEC (Medical Devices Canada) and the Medical Device Development Centre in Vancouver, a member of the Technology Commercialization Advisory Council for the Alberta Heritage Foundation for Medical Research and a founder of the LifeSciences British Columbia Excels Program. Geyer is the 2011 recipient of the LifeSciences British Columbia Leadership Award.

### Lifetime Achievement Award:

**Dr. Eric Newell, P.Eng.**

Eric Newell (BASC '67 CHEM, LLD '03) was recognized for his 14-year leadership of Syncrude Canada Ltd. — during which time Syncrude, the world's largest producer of crude oil from oil sands, became a key player in the Western Canada economy — as well as for his active role in promoting and creating opportunity for the wider community. He is an Officer of the Order of Canada, a member of the Alberta Order of Excellence, and has had honorary doctorates conferred on him by five universities.

### Outstanding Emeritus Faculty Award:

**Dr. Norman Epstein**

Norman Epstein, Professor Emeritus in the Department of Chemical and Biological Engineering, was recognized for his long and distinguished career at UBC (1951-present), his dedication to his profession, and his many achievements as a chemical engineer. In addition to making exceptional, pioneering contributions to several fields of research in chemical engineering, Epstein is also an outstanding teacher, mentor and supervisor of graduate researchers who has inspired many generations of chemical engineers.

### McEwen Family Teacher Recognition Award:

**Mr. Douglas Park**

The McEwen Family Teacher Recognition Award was established by Dr. Jim McEwen (BASC '71, PhD '75, ECE) to highlight the contributions high school teachers make to our students and communities through their mentorship. The award celebrates teachers who go above and beyond teaching curricula, to ensure that their students succeed academically and personally. UBC Engineering students nominated their high school teachers for the award.

This year's winner of the McEwen award was Douglas Park, from the Hugh Boyd Secondary School in Richmond, B.C. Park was nominated independently by both Paul Milaire (BASC '11, MECH) and second-year student Kohle Merry (MECH). Park was recognized and celebrated for his positive impact on students through his role as a Biology and Video Production teacher. Both students credited him with boosting their confidence and encouraging them to work toward their dreams.

### 2012 Alumni Awards: Call for submissions!

We want to hear from you! Tell us which of our alumni, students or emeriti faculty deserve to be lauded for their many contributions.

Visit [www.apsc.ubc.ca/awards/alumni\\_awards](http://www.apsc.ubc.ca/awards/alumni_awards) to nominate someone for our 2012 Alumni Awards and read more about this year's award winners!



Ska-Hiish Manuel



Lin Watt



Robin Farnworth



Paul Geyer



Eric Newell



Norman Epstein



Doug Park (centre) with Paul Milaire (left) and Kohle Merry (right)

# Alumni Updates

## Event Highlights

### GEOLOGICAL ENGINEERING ALUMNI AND INDUSTRY DINNER

JANUARY 22, 2011

The ninth annual alumni and industry dinner for Geological Engineering was a grand success. Michael Davies, P.Eng., P.Geo., vice president, mining for AMEC, gave a keynote presentation. As our alumni cohort grows, we invite all GeoRox grads to join us next year!

### 16TH ANNUAL MINING ENGINEERING ALUMNI DINNER

JANUARY 29, 2011

Alumni, friends, students and faculty of UBC's Norman B. Keevil Institute of Mining Engineering gathered for their annual dinner, and guests enjoyed a keynote presentation from Jim O'Rourke, P. Eng. (BASc '64), chief executive officer of Copper Mountain Mining Corporation, on the corporation's development and growth.

### OLD RED NEW RED

FEBRUARY 3, 2011

This annual tradition, brought to you by the Engineering Undergraduate Society and Applied Science Alumni Relations, had one of its best turnouts ever! Two engineering alumni, Steve Whitelaw (BASc '65, AGIE) and Art Stevenson (BSAc '66, CHEM), photo below, recounted one of the best hoaxes ever pulled on the UBC masses, the statue stunt of 1963! Cecil Green Park House was packed with students and alumni, including three generations of the Elfstrom family (bottom photo) who enjoyed the creative storytelling recounted (second-hand information, of course) by these two entertaining graduates. Help us continue the storytelling traditions of ORNR by suggesting speakers or alumni who have been a part of the rich history of UBC Engineering!



### CLASS OF 1971 40TH REUNION

MAY 28, 2011

The Class of '71 celebrated their anniversary by wearing red at UBC's Alumni Weekend! Alumni were welcomed with a special 40-year alumni pin and lunch. In her inspiring address, the dean described how UBC Engineering has continually improved and "raised the bar" for students, not only academically but socially as well. Classmates toured the engineering buildings and were given the opportunity to see their departmental class photos. The class ended the day with a campus dinner at Mahony & Sons restaurant, organized by Class Vice President Gary Wong (BASc '71, ECE), to celebrate their health, fond memories of UBC and lasting friendships. — Submitted by Gary Wong ECE '71



### UBC ENGINEERING AT ALUMNI WEEKEND

MAY 28, 2011

The university welcomed over 2,000 alumni and friends to campus on May 28, and UBC Engineering proudly showcased our research, programs and people. The program began with "Takes from Quakes," a lecture by Professor Carlos Ventura, director of the Earthquake Engineering Research Facility. Ventura spoke about earthquakes — their various types and effects on structures and soil, his impressive learnings from research within shake-testing laboratories and the devastating aftermaths of major quakes around the globe. After the lecture, we celebrated UBC Engineering at the Annual Engineering Reunion Reception. Alumni celebrating 10-year reunions received anniversary pins and class photos outside with the E Cairn.

The dean gave her annual presentation, in which she quizzed alumni on the history of UBC Engineering and surprised them with statistics on demographics and programming today. The event ended with tours of engineering departments, showcasing the research and work of our students and faculty. Over 300 prospective students, alumni and friends gathered to celebrate and learn more about UBC Engineering. We hope to see you next May.

### GRADUATION

MAY-JUNE 2011

Congratulations to the class of 2011! Over four ceremonies, more than 950 engineering students received their degrees this spring and joined the ranks of our engineering alumni community, which reaches nearly 23,000! We are proud to call these young men and women UBC alumni and invite all of you, young and old, to inform us of your achievements and whereabouts — please stay in touch!

Contact APSC Alumni Relations at 604-822-9454 or [alumni@apsc.ubc.ca](mailto:alumni@apsc.ubc.ca).

# 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](http://www.apsc.ubc.ca/news-events/newsletters).

## UPCOMING EVENTS

### CREATING CONNECTIONS 2.0:

#### A NEW PERSPECTIVE

SEPTEMBER 24, 2011

An energizing day of personal and professional development, insightful keynote speakers, and the opportunity to create connections with other women in engineering. [www.wwest.ca/cc](http://www.wwest.ca/cc)

### BIOMEDICAL ENGINEERING GRAND ROUNDS SEMINAR SERIES

MONTHLY, SEPTEMBER TO MARCH

Distinguished speakers from industry and academia across Canada present and discuss current topics in biomedical engineering research, development and practice. [www.bme.ubc.ca/news-events](http://www.bme.ubc.ca/news-events)

### CERC SEMINARS

MONTHLY, SEPTEMBER TO MARCH

The CERC seminar series provides insights into both the supply and demand sides of energy. [www.cerc.ubc.ca](http://www.cerc.ubc.ca) or email [sarah@cerc.ubc.ca](mailto:sarah@cerc.ubc.ca)

### RES'EAU-WATERNET BIENNIAL KNOWLEDGE TRANSFER WORKSHOP

OCTOBER 5-6, 2011

Big Value in Small Systems. Held at the Hyatt Regency Vancouver, 655 Burrard Street, Vancouver. [www.reseauwaternet.ca](http://www.reseauwaternet.ca)

### ENGINEERING PHYSICS HIGH SCHOOL SESSION

NOVEMBER 4, 2011, 12 P.M. - 4 P.M.

Spend an afternoon meeting UBC Engineering Physics students, viewing projects and touring labs. Open to students in Grades 10, 11 and 12. Registration is limited. [www.engphys.ubc.ca](http://www.engphys.ubc.ca)

### UBC ENGINEERING OPEN HOUSE

NOVEMBER 26, 2011, 9 A.M. - 4 P.M.

From the everyday to the extraordinary, find out how engineers are improving our world. Meet our professors, students and staff, who will introduce you to the wonderful and diverse world of engineering through one-on-one conversations, presentations, hands-on demonstrations and lab tours. Bring your friends and family to explore engineering. [www.engineering.ubc.ca/connects](http://www.engineering.ubc.ca/connects)

### BLUE AND GOLD REVIEW

NOVEMBER 28, 2011

Join UBC President Toope for the annual Blue and Gold Review — a showcase of UBC faculty, staff and student accomplishments. <http://annualreview.ubc.ca>

### ECE 474/375 PROJECT FAIR

DECEMBER 2011

View team projects from the Instrumentation and Design Laboratory, where students design complex engineering projects within a team environment. [www.ece.ubc.ca](http://www.ece.ubc.ca)

### ENPH 479 SENIOR PROJECT SEMINAR SESSION

JANUARY 12TH, 2012 6 P.M. - 9 P.M.

A formal seminar session for APSC 479 students. Students discuss their four-month projects, giving them experience in speaking publicly about a technical subject, informing the project sponsors of the progress made by each student group and informing sponsors about the diversity of projects undertaken by UBC undergraduates. [www.projectlab.engphys.ubc.ca](http://www.projectlab.engphys.ubc.ca)

### MECH CELEBRATION OF ACHIEVEMENTS

JANUARY 17, 2012

The reception and awards ceremony recognize the outstanding achievements of Mechanical Engineering students. Email [undergrad@mech.ubc.ca](mailto:undergrad@mech.ubc.ca).

### ANNUAL JUNIOR CO-OP RECEPTION

JANUARY 2012

The annual Junior Reception, held in Vancouver and the Okanagan, welcomes new Engineering Co-op students from all Engineering disciplines into the program. Co-op employers are invited.

### UBC ENGINEERING HIGH SCHOOL COMPETITION

FEBRUARY 2012

Start your design engines — we're looking for high school students who love solving math and science problems. Vie for prizes that will make your eyes pop. You can even submit a video entry. [www.engineering.ubc.ca/connects](http://www.engineering.ubc.ca/connects)

## UPCOMING ALUMNI EVENTS

### MECHANICAL ENGINEERING CLASS OF 1986 REUNION

SEPTEMBER 17, 6 P.M.

MECH 1986 classmates are celebrating 25 years since graduating from UBC. Join us at Mahoney and Sons Public House, 5990 University Blvd. Info at: [www.ubcmecheng1986.com](http://www.ubcmecheng1986.com).

### CIVIL ENGINEERING CLASS OF 1961 REUNION

OCTOBER 14 AND 15, 2011

Will Phillips is organizing a reunion to celebrate the 50th anniversary of the Civil Engineering Class of 1961! Classmates will return to the

Point Grey campus for lab tours, followed by dinner at the Jericho Tennis Club.

### NOMINATIONS FOR UBC ENGINEERING ALUMNI AWARDS

DECEMBER 1, 2011

UBC Engineering is looking for outstanding alumni who are making a difference and achieving the extraordinary! Nominations are accepted in the following categories: Lifetime Achievement, Community Service, Young Alum, Future Alum, and Emeriti or Retired Faculty. To nominate someone, visit [www.apsc.ubc.ca/awards/alumni\\_awards](http://www.apsc.ubc.ca/awards/alumni_awards).

### ANNUAL MINING ENGINEERING DINNER

JANUARY 2012

UBC Mining Engineering will host its annual dinner for alumni, guests, students and faculty — everyone is welcome. This tradition recognizes scholarship winners, offers a keynote address from industry and brings the B.C. mining community together. For details, email [info@mining.ubc.ca](mailto:info@mining.ubc.ca).

### OLD RED NEW RED

FEBRUARY 2012

Reminisce about your time in UBC Engineering...hear about some of the best stunts of all time...talk to current students or check out their Ball Models — Join us for ORNR 2012 and be sure to inform us of any alum who would be a great speaker or storyteller.

### UBC ENGINEERING EXCELLENCE CELEBRATION

MARCH 1, 2012

Join us for our third annual Engineering Excellence Celebration! This new tradition celebrates the achievements of alumni with UBC Engineering Alumni Awards. It's not all accolades, though; unique entertainers will share their talents. [www.apsc.ubc.ca/awards/alumni\\_awards](http://www.apsc.ubc.ca/awards/alumni_awards)

# Can you help?

The UBC Engineering Mentoring Program needs enthusiastic engineers to mentor students.

Mentor activities — roughly 15 hours over six months — are recognized by APEGBC toward professional development.

Please share your knowledge and experience with the next generation by mentoring tomorrow's engineers.

For more information, contact Emily Wyatt at [emily.wyatt@ubc.ca](mailto:emily.wyatt@ubc.ca) or 604-822-6720.

[www.cpsd.apsc.ubc.ca/mentoring](http://www.cpsd.apsc.ubc.ca/mentoring)

 **Engineering** | MENTORING PROGRAM

 **Engineering**

September 24, 2011 | UBC - Vancouver

## Creating Connections 2.0: A New Perspective

An energizing day of personal and professional development, insightful keynote speakers, and the opportunity to create connections with other women in engineering.

For more information and to register:

[www.wwest.ca/cc](http://www.wwest.ca/cc)



*Refresh.  
Re-energize.  
Re-engineer your world.*

 Westcoast Women in Engineering,  
Science & Technology

[www.engineering.ubc.ca](http://www.engineering.ubc.ca)