

# INGENUITY

FACULTY OF APPLIED SCIENCE ENGINEERING NEWS / FALL 2011 / WINTER 2012

## TURNING GLOBAL PROBLEMS INTO SOLUTIONS

Energy — one of the most important challenges facing humanity today — needs to come from a sustainable source and impact-free method. And for worldwide peace and stability, it must be cheap and democratic. Learn how CERC researchers are addressing this challenge by using the sun's energy to convert carbon dioxide to fuel.

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## WAYNE AND WILLIAM WHITE ENGINEERING DESIGN CENTRE

APSC's newest facility opens, supporting design engineering teaching and research.

8



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA



*"we are about improving people's lives"*

Dean Tyseer Aboulnasr

## Dean's Message

As some of you may already know, I am stepping down as dean at the end of December 2011.

I have served as dean for a little over three years, but when I look back at what we have achieved together, it feels like quite a bit longer — which is extremely gratifying. When I started my term, we clarified the goal of the UBC Faculty of Applied Science, recognizing that we are not, and should not be, about excellence, innovation or the advancement of knowledge — and certainly not about rankings. Rather, we reemphasized that we are about improving people's lives through excellence, innovation and the advancement of knowledge. It was a subtle difference in articulation but one that ensures that we do not focus exclusively on our tools to the extent that we forget what we aim to do with those tools.

This simple articulation has been my guide throughout my deanship.

We have changed our admission process to ensure that from among our top academically qualified applicants, we seek out well-rounded students who share our goal of "changing the world for the better." Our guidelines for tenure and promotion have focused on the impact of scholarly work as opposed to the tools for assessing such work — such as the number of and venue for publications — opening the door for alternate assessment tools. We have raised the profile of Applied Science by telling the "stories" of our people and how they are effecting positive change in society. And we established the entrepreneurship@UBC program to help our students develop an entrepreneurial mindset and, when possible, to provide them with mentorship, incubation space and initial funding for their start-ups.

All the above was achieved with significant input and support from you, our alumni. Over the last three years, I was able to meet so many of you in person, to hear about your contributions and seek your advice. A sincere thank-you for making me feel so welcome at UBC and for being an incredible source of inspiration and support. As I head off on my leave of absence, I will hold dear to my heart the friendships I forged with many of you — UBC is indeed fortunate to have such an impressive alumni community.

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

Editor's note: Professor Eric Hall has been named dean pro tem. See article p. 13.

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

### ON THE COVER



Vertically aligned metal-doped titanium dioxide nanotubes for catalytic conversion of carbon dioxide to chemical fuels.

Photo by: Arman Bonakdarpour



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Printed in BC, Canada, on a Forest Stewardship Council certified paper that is 100% recycled. A total of 183 kilograms of greenhouse gases (GHGs) were emitted during the transportation of the paper. These GHG emissions together with GHGs emitted during the printing process of *Ingenuity* will be offset through investments in energy efficiency and non-fossil fuel technologies.



25 trees preserved for the future.  
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ENGINEERING RESEARCH

# TURNING GLOBAL PROBLEMS INTO SOLUTIONS

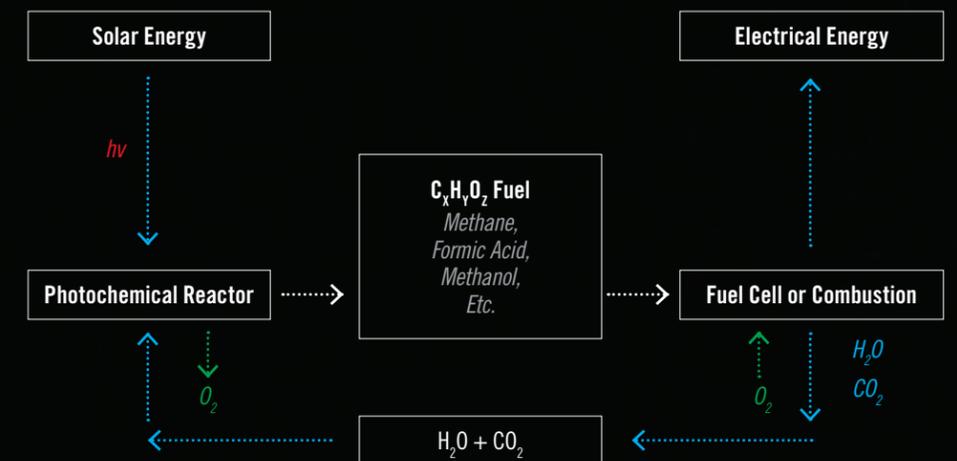
Nature makes it look so easy. Using sunlight, flowers and trees convert carbon dioxide and water into useful sugars and oxygen.

At UBC's Clean Energy Research Centre (CERC), Director David Wilkinson is exploring how to convert carbon dioxide (CO<sub>2</sub>) into fuels.

CERC is an interdisciplinary facility dedicated to improving existing energy technologies and developing new, sustainable sources of energy. The centre supports more than 60 faculty and 200 graduate students whose research includes clean-burning engines, fuel-cell systems, process emission reductions, energy efficiency, and hydrogen and biofuels.

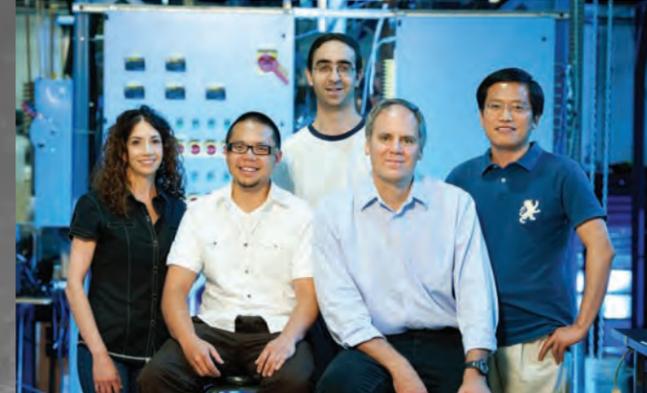
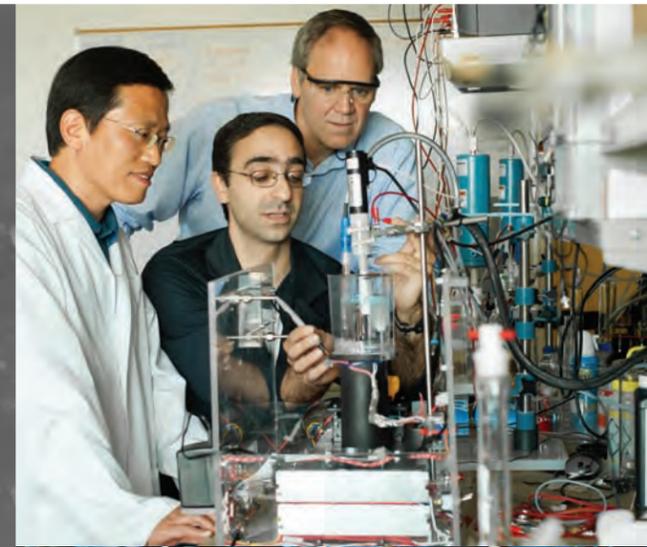
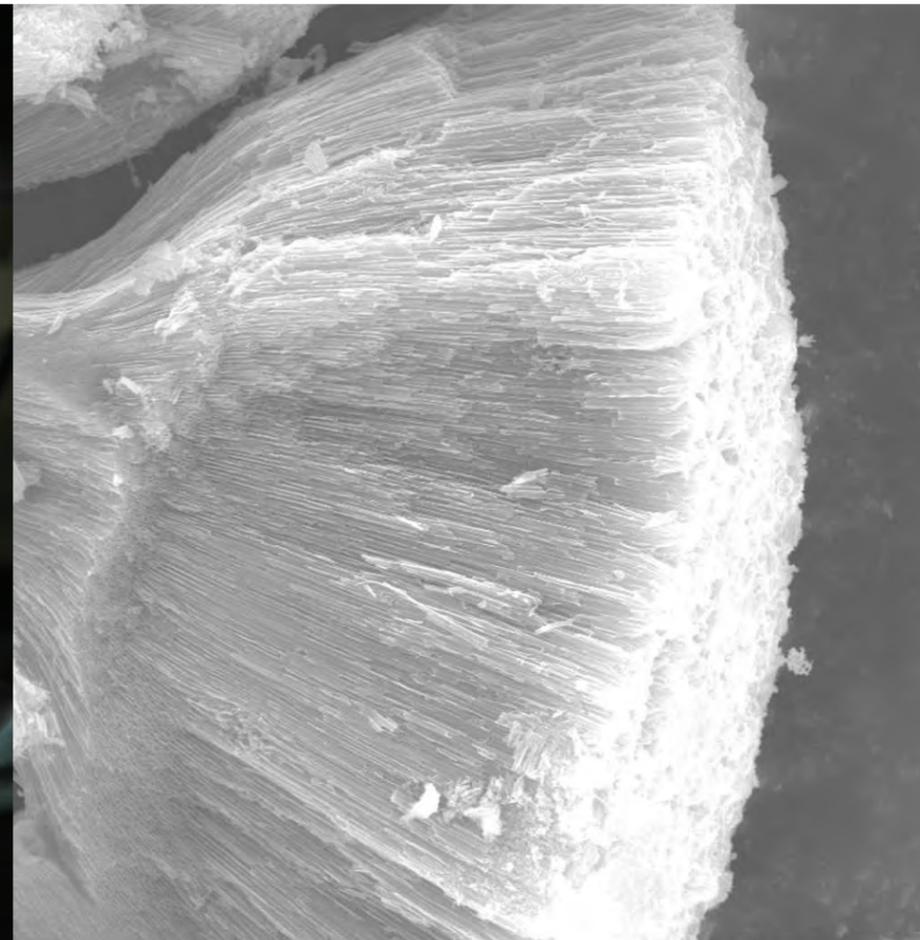
Scanning electron microscopy of a mesoporous carbon fiber showing an average pore diameter of 20 nanometres. Structures like these are ideal for catalyst supports for transfer of the reactants (here CO<sub>2</sub> and H<sub>2</sub>O) to catalytic sites.

A simplified schematic diagram showing cyclic production and consumption of CO<sub>2</sub>.





PHOTOS: MARTIN DEE



Professor David Wilkinson, director of the UBC Clean Energy Research Center, examines a benchtop electrochemical reactor for electro-reduction of CO<sub>2</sub>.

"It's one of the holy grails," says Wilkinson, professor and Canada Research Chair in the Department of Chemical and Biological Engineering. "Being able to convert the greenhouse gas CO<sub>2</sub> into cleaner energy fuels on an industrial scale would not only help to offset the future shortage of fossil fuels but would help to offset CO<sub>2</sub> emissions to reduce the risk of global warming."

The process requires capturing CO<sub>2</sub>, combining it with water, and then using the sun's energy to trigger a photochemical reaction. With enough light, the photocatalyst transforms carbon dioxide into simple low-carbon fuels such as methane, methanol and others that can be used for combustion or in fuel cells for many different applications.

Since CO<sub>2</sub> is a very stable molecule that can last up to 100 years in the atmosphere, the challenge is developing photocatalysts that can use solar radiation to break down CO<sub>2</sub> efficiently and at practical conversion rates without using another energy source.

In recent months, Wilkinson and his team have been

developing photocatalysts — in their case, nanoscopic structures of titanium oxide mixed with copper and other elements for improved performance. These "nano titanium-oxide" catalysts are configured into complex shapes, one even resembling a spiny sea urchin.

"We're looking at ways to improve how efficiently the photocatalyst works, its stability and sensitivity to light, and how best to incorporate it into a photocatalytic reactor," says Wilkinson, who is working with research assistants Arman Bonakdarpour, Baizeng Fang and Alfred Lam.

"It's conceivable that we could have a small pilot prototype within five years," Wilkinson says, adding that CERC is one of only a few centres in the world tackling solar-carbon conversion, an emerging research area.

He notes, "UBC is uniquely positioned, given the scope of our sustainable clean energy research and our progress in such related fields as catalysis, fuel cell and electrosynthesis technology, and advanced electrolysis, including solar splitting of water."

The new technology would initially target industries in which large quantities of CO<sub>2</sub> are produced, such as power plants that use natural gas or coal.

"Until recently, there have been very few options to use waste CO<sub>2</sub> as a useful input to other processes, instead of releasing it into the atmosphere or burying it underground," says Wilkinson.

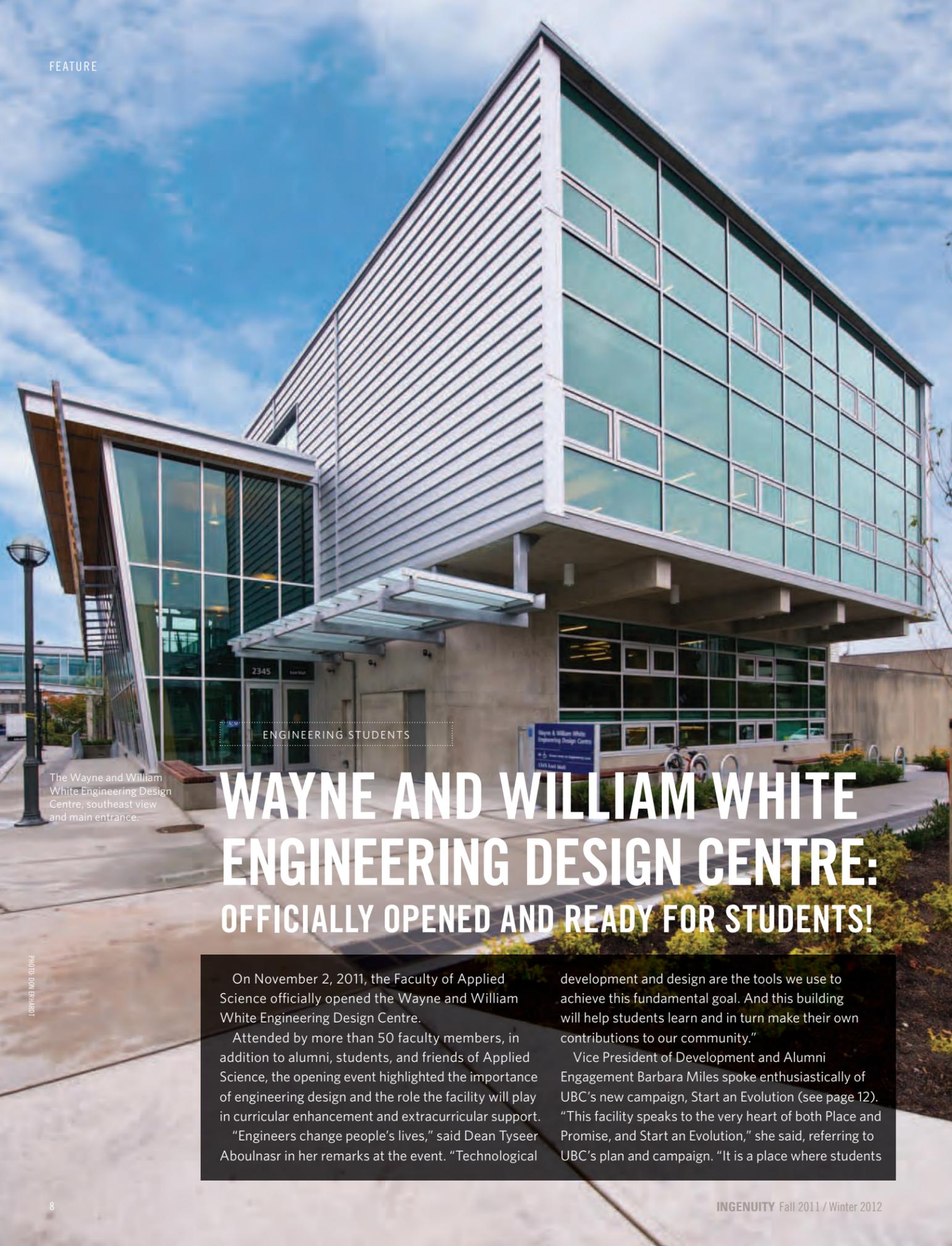
Wilkinson's team will also look at developing a practical method for converting CO<sub>2</sub> to solar fuels directly from the atmosphere in a process analogous to nature's. This approach could, for example, be applied to external building walls with solar fuel-collection capability.

To date, the research has received more than \$600,000 in funding from the B.C.-based Pacific Institute for Climate Solutions and from Carbon Management Canada Inc., one of the Network of Centres of Excellence of Canada. ■

For information about UBC's Clean Energy Research Centre, visit [www.cerc.ubc.ca](http://www.cerc.ubc.ca).

*"Until recently, there have been very few options to use waste CO<sub>2</sub> as a useful input to other processes, instead of releasing it into the atmosphere or burying it underground," says Wilkinson.*

A bundle of TiO<sub>2</sub> nanotubes synthesized in Wilkinson's lab (left); David Wilkinson and research associates Arman Bonakdarpour and Baizeng Fang with their photoelectrochemical reactor setup (top); research members from left: Caroline Cloutier, Alfred Lam, Arman Bonakdarpour, David Wilkinson and Baizeng Fang (bottom).



The Wayne and William White Engineering Design Centre, southeast view and main entrance.

# WAYNE AND WILLIAM WHITE ENGINEERING DESIGN CENTRE: OFFICIALLY OPENED AND READY FOR STUDENTS!

On November 2, 2011, the Faculty of Applied Science officially opened the Wayne and William White Engineering Design Centre.

Attended by more than 50 faculty members, in addition to alumni, students, and friends of Applied Science, the opening event highlighted the importance of engineering design and the role the facility will play in curricular enhancement and extracurricular support.

"Engineers change people's lives," said Dean Tyseer Aboulnasr in her remarks at the event. "Technological

development and design are the tools we use to achieve this fundamental goal. And this building will help students learn and in turn make their own contributions to our community."

Vice President of Development and Alumni Engagement Barbara Miles spoke enthusiastically of UBC's new campaign, Start an Evolution (see page 12). "This facility speaks to the very heart of both Place and Promise, and Start an Evolution," she said, referring to UBC's plan and campaign. "It is a place where students



can excel and where research and curriculum can move forward. It shows what happens when faculty, students, community and alumni come together."

Professor Philippe Kruchten, NSERC Chair in Design Engineering, noted the importance of design in engineering, and thanked Applied Science and his predecessor as chair, Professor Peter Lawrence, who spearheaded the drive toward greater curriculum emphasis on design.

The Wayne and William White Engineering Design Centre will also be home to UBC Engineering's 17 competition teams. Tagg Jefferson (IGEN), chair of the Engineering Student Team Council, thanked the Whites for their support and spoke enthusiastically about the facility, noting, "The building has been full of students since before the paint was dry."

The facility was made possible with a \$2.5 million gift from UBC alumni Wayne and William White, twin brothers who graduated from UBC in 1967 with bachelor's degrees in applied science — Wayne in metallurgical engineering, and William in mechanical engineering.

Planning for the building, which was originally envisioned by former Dean of Applied Science Michael Isaacson, began in 2007 — the same year Wayne and William White attended an alumni roundtable breakfast in Toronto. It was there that the Whites first heard about the engineering centre and decided that this was a golden opportunity to fulfill their personal philanthropic goals and support the engineering program that had launched their successful careers. At the building's opening event, both spoke of their desire to give back and urged students to stay the course, succeed, and, in their own turn, give back when they can.

The Wayne and William White Engineering Design Centre received significant support from additional alumni and donors, including the Ledcor Charitable Foundation, which provided funding for the composites workshop.

The \$8.5 million centre is the first and only building on campus specifically intended to connect students from all of UBC's engineering programs in order to promote interdisciplinary team work, increasingly the norm in industry. UBC Engineering's 4,020 undergraduate and 1,279 graduate students will be able to collaboratively plan, design, assemble and exhibit their projects — from biomedical devices to ultra-lightweight, fuel-efficient vehicles.

Features of the three-storey, 20,322-square-foot (1,888 square metres) facility include three major spaces for design instruction, communal learning and competitions, along with meeting rooms and a student lounge. Two workshops are particularly prized: one where students can safely fabricate fiber-glass and carbon-fiber composites, and another for electronics fabrication.

The Faculty of Applied Science thanks everyone who supported this new facility — a tremendous addition to the engineering precinct, and a facility that will greatly enhance engineering education at UBC. ■

Wayne and Barbara White, UBC VP Barbara Miles, Dean Aboulnasr, Bill and Gale White unveiling the dedication plaque for the building. / Students working on the electric car in the EDC Competition Space — a workshop dedicated to student team projects.



Students investigate how farmers in India could supplement their income by producing cakes of natural indigo dye.

# THE GLOBAL ENGINEER AT UBC

“The role of engineers can’t be limited to increasing the bottom line of a company. We have a bigger responsibility than that. Teachers and nurses take on the responsibilities of a healthy society and a healthy world, and so should we.”

— Robin Farnworth, BAsc '05 ENPH, UBC Engineers Without Borders

Collaboration between Applied Science and UBC’s chapter of Engineers Without Borders (EWB) has given rise to a new initiative at UBC: the Global Engineer. Its tenets include developing student leaders, equipping engineers to find and pursue their passions, and becoming a national and worldwide leader in global engineering.

For the past 10 years, EWB has consulted with Applied Science on engineering curriculum. On the whole, engineers are well prepared to solve problems. Their coursework at UBC gives them the technical skills and the drive to find solutions. But, as a new regulation by the Canadian Engineering Accreditation Board (CEAB) acknowledges, technical skills aren’t everything. New guidelines require that engineers “have an ability to analyze social and environmental aspects of engineering activities.”

The Global Engineering initiative arises from this gap in traditional engineering education, and now UBC Engineering provides courses that align with the program’s tenets.

### Curriculum Enhancements: APSC 263, Technology and Development — The Global Engineer

“This course lets you take a step back and remind yourself why you became an engineer.” — Chris Prychon, BAsc '11 MECH

APSC 263 takes a socio-technical approach to considering problems in the developing world. The course evolved from an EWB-developed student-directed seminar first held in 2001. In 2008, after directing the seminar, Duncan McNicholl (BAsc '09 CIVL), with Anna-Marie Silvester (PhD '09 ECE), approached Applied Science Instructors Annette Berndt and Carla Paterson about offering the seminar as a course.

Students in APSC 263 work in teams and propose solutions to address challenges faced by artisanal communities in rural India. A Technical Advisory Committee evaluates the proposals, and students pursue implementation of the best ideas. Student Harshul Srivastava (fourth-year, ECE) says, “It is very hard and maybe impossible to go out and solve the world’s problems. But through this course, we were engaged in trying.”

### MECH 410: Global Engineering Leadership

“We need to graduate engineers able to develop solutions that incorporate broader societal needs. We need them to be able to lead.” — Professor Elizabeth Croft, co-developer of MECH 410

MECH 410 introduces senior engineering students to the concepts, theories and practices of engineering leadership in an international-service learning context. The first part of the course is a classroom-based technical elective with multiple guest lectures and a Community Service Learning (CSL) project. The optional, second part of the course, features on-site learning; this summer students worked in Mexico with Tsomanotik, a two-year-old ecoagricultural centre for just and sustainable development. “I realized that the main difference between a developing and developed country is lack of structure and organization in the developing country,” says Shalaleh Rismani (fourth-year, MECH). “Lack of structure creates chaos, but it is easier to initiate change because there is no rigid system in place.”

### Educating Global Engineers

“There’s a push from students but also from faculty,” says Alaya Boisvert, Community Service Learning Coordinator, Applied Science. “Both stakeholders feel the need for this.”

With the new CEAB accreditation criteria, the shift towards global engineering is gaining traction at UBC and more broadly in society.

“The Global Engineering program envisions an engineering profession that truly serves global society,” says Florin Gheorghe (BAsc '11, MECH), UBC EWB’s former director of Global Engineering. “To me, a global engineer is someone who is a multiversed leader, living by his or her values as an engineer, who is committed to lifelong learning and contributing positively to society.” ■

While indigo dye is a highly marketable product, the plant is a nitrogen-fixing crop that enhances soil.

# start an evolution



Images from the Start an Evolution campaign launch, September 2011.

*UBC generates ideas that start evolutions. Ideas that change the way people think and the way the world works. We see this change as an evolution, one that improves upon what has come before and inspires the generations that follow.*

This fall, UBC launched the largest fundraising and alumni engagement campaign in Canadian history, named Start an Evolution. Its twin goals: to raise \$1.5 billion for the university and to double the number of alumni engaged with the university annually by 2015.

By combining philanthropic gifts and alumni talents, UBC seeks to enhance student learning, expand research capacity, and extend its community engagement initiatives. In the planning years leading up to September's launch, the university raised \$760 million and increased the number of alumni involved with the university by more than 50 per cent.

At the launch events earlier this fall, UBC President and Vice-Chancellor Stephen Toope spoke passionately about the launch and about UBC. "As one of the world's top ranked universities, UBC is already at the forefront of many of the major issues facing us today," he said. "We are inviting our alumni, donors and friends to join forces with us so that together we can be more effective in finding long-term solutions to our world's most pressing problems."

"Many generous donors and committed alumni have helped us to reach half way to our goal," said Barbara Miles, Vice President, Development & Alumni Engagement. "Through the Start an Evolution campaign we want to connect with many more donors, alumni and friends. If you have a passion for an issue, there's a good chance UBC is already working on it in some way."

"We want our 260,000 alumni to see UBC as a place where they can continue to pursue their passions," said Jeff Todd, executive director of the Alumni Association and associate vice president Alumni Affairs. "We want our alumni actively participating in intellectual, cultural, and social activities – both at UBC and in their communities – by donating, mentoring or by re-connecting with their alma mater, faculty or classmates."

We invite you to get involved and combine your energy with ours. You can help start an evolution through involvement and investment. This can be as simple as reconnecting with UBC or as generous as making a donation. Together with UBC, you can help create solutions for the issues you care about. This is your opportunity to make a contribution with long lasting effects. This is your chance to help start an evolution and support thinking that can change the world. ■

*For more information on UBC's campaign, please visit [startanevolution.ca](http://startanevolution.ca).*

*For more information on Applied Science campaign priorities, please visit [www.support.apsc.ubc.ca](http://www.support.apsc.ubc.ca).*

## Newsworthy

FACULTY

### Eric Hall appointed dean pro tem of Applied Science



Dean pro tem Eric Hall.

UBC Provost and Vice President David Farrar recently announced that Civil Engineering Professor Eric Hall has been appointed dean pro tem of Applied Science. Dr. Hall follows Dean Tyseer Aboulnasr, whose resignation became effective December 31, 2011.

Hall received his bachelor's and master's degrees in biochemistry at McMaster University and pursued studies in McMaster's Water Research Group, earning a PhD in chemical engineering. In 1979, he joined Environment Canada's Wastewater Technology Centre, working as a senior process engineer while also serving as a part-time associate professor of civil engineering at McMaster. In 1992, Hall came to the UBC Department of Civil Engineering as Senior NSERC/COFI Industrial Research Chair in Forest Products Waste Management. From 2003 to 2008, Hall served as Civil Engineering department head, and he most recently served as associate dean, faculty matters.

Hall was awarded the Willem Rudolfs Medal from the Water Environment Federation in 1994 and received the I.H. Weldon Award by the Pulp and Paper Technical Association of Canada in 2000.

He was elected Fellow of the Canadian Academy of Engineering in 2010. He is author or co-author of hundreds of publications and reports and has supervised more than 30 master's and PhD theses.

"I look forward to working with my talented colleagues, as well as connecting with alumni and industry partners to continue the objectives of UBC Applied Science," says Hall. "We are dedicated to educating global citizens and conducting research to address the challenges facing society today."

While serving as dean pro tem, Hall will provide leadership, direction and support to Applied Science and help facilitate a smooth transition until a new dean is appointed.

Dr. Farrar will chair the forthcoming committee to recruit Applied Science's next dean. ■

STUDENTS

### The Engineering Student Centre: Update



Architect's rendering of the proposed ESC, aerial view.

Thank you to all of our alumni who have stepped forward to discuss class challenges and room naming opportunities for the Engineering Student Centre! Those of you eagerly awaiting this new student facility will be pleased to know that the project is moving forward through UBC approval: we are scheduled to go to Board 2 approval in April, which will allow us to develop detailed drawings and to begin the tendering process, and then Board 3 in June, which will permit us to begin construction. If we continue to make these deadlines, we should have our new building as early as 2013!

Applied Science needs to raise \$2.4 million from alumni and supporters to move the project forward. This funding has been matched by the students and augmented by UBC. We have already raised

\$500,000; we need to raise the additional \$1.9 million by May 2012, so we can get approval from the Board of Governors to begin construction in June.

At left is the latest architectural drawing for the building — a two storey facility with flexible, multi-purpose spaces and exterior courtyards. We will share with you more detailed drawings as the building progresses — we are investigating the possibility of a modular design and a green roof to support UBC sustainability initiatives. Stay tuned!

In this issue of *Ingenuity* is a pull out card that you can use to make your own donation to the Engineering Student Centre. Please consider making a gift and getting involved with nurturing and supporting the next generation of engineers. ■

*For more information, please contact Debbie Woo, senior associate director of development and alumni relations, at 604-822-6856 or [debbie.woo@ubc.ca](mailto:debbie.woo@ubc.ca).*

## Student invention wins first investment competition for new UBC entrepreneurship fund



Colin O'Neill and Nick Seto with UBC President Stephen J. Toope at the entrepreneurship@UBC event in Silicon Valley.

Aeos Biomedical is finalizing a \$50,000 injection from the entrepreneurship@UBC Seed Accelerator Fund. The fund is an investment fund owned and operated by UBC and capitalized by UBC alumni and supporters, with matching donations from the British Columbia Innovation Council, to support early-stage companies from the UBC community.

Aeos Biomedical emerged from UBC's New Venture Design course (APSC 486), a collaborative entrepreneurial course that partners undergraduates from UBC Engineering and the Sauder School of Business. During 2009-10, undergraduate engineering students Patricia Backlund (ENVE) and Colin O'Neill (IGEN) worked with commerce students Nicholas Seto, Wylie Spencer and Emi Yamada to develop the Aeos business concept. Aeos was first supported by entrepreneurship@UBC in August 2010, when it was selected as one of six companies to present their business ideas

to venture capitalists and distinguished UBC alumni in Silicon Valley. Now alumni, O'Neill (BASC '10) and Seto incorporated the company in 2011 to bring its signature product, Target Tape, to market.

The Seed Accelerator investment comes as a result of Aeos Biomedical's win at the inaugural seed-funding competition, which saw five startups pitch to a panel of seasoned investors and entrepreneurs led by Haig Farris, a well-known Canadian venture capitalist, on October 20.

It was Target Tape that won over the competition's judges. Target Tape is an adhesive medical tape developed to allow doctors to make more precise incisions during surgery. The tape is inscribed with locational markings that show up on medical imaging, such as X-rays. It is applied to the patient's skin over the area of interest, allowing doctors to more precisely measure what lies underneath. When the Target Tape is removed, it leaves behind an ink imprint of locational markings, allowing doctors to more accurately correlate the image with the patient's skin before surgery. ■

## UBC innovator receives major Manning Foundation award for green engine technology



Professor Emeritus Phil Hill.

Mechanical Engineering Professor Emeritus Phil Hill has been named the 2011 recipient of the \$100,000 Encana Principal Award by the Ernest C. Manning Awards Foundation. Hill was chosen for his discovery of a technology that enables diesel engines to run on clean-burning natural gas.

The high-pressure direct injection (HPDI) technology, which is being commercialized by UBC spinoff company Westport Innovations, allows diesel engines to operate on natural gas with the same power and efficiency diesels are known for but it reduces emissions of smog-forming nitrogen oxides and particulate matter. It also reduces emissions of greenhouse gases by up to 27 per cent.

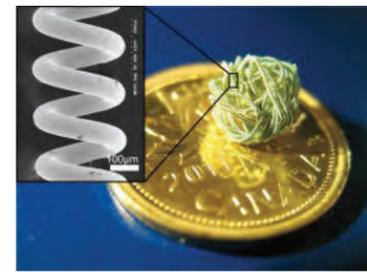
Hill conceived of HPDI and first developed the technology in the late 1980s in his research lab at UBC's Department of Mechanical Engineering. His research group's work led to the founding of Vancouver-based Westport Innovations Inc. in 1995. Westport is now a publicly traded company with over 650 employees and whose technology portfolio includes more than 200 patents, many of which stem from Hill's original series of inventions.

The Manning Innovation Awards, which honour Canadian innovators in any sector, are selected by a distinguished independent body recruited from across Canada.

"There is a critical need for more innovation in Canada," said David B. Mitchell, president of the Manning Foundation, in announcing its 2011 award winners. "Canadians need to create and commercialize innovations to compete in the global economy. We want to support, celebrate and draw attention to Canadian innovators, and young Canadians showing potential to become future innovators, who have the imagination to innovate and the stamina to succeed."

"As a university particularly concerned with sustainability and environmental issues, UBC is proud of this recognition of Professor Hill's work and of the resulting development of one of its most successful spinoff companies in Westport Innovations," said UBC President Stephen J. Toope. "In addition to the environmental and economic impacts of his work, new generations of students and faculty at UBC now benefit from the legacy of his discoveries through multiple ongoing and productive research relationships and employment opportunities with Westport." ■

## New technology to monitor brain aneurysms



Aneurysm coil (courtesy of Ken Takahata and A.R. Mohammadi).

Electrical and Computer Engineering Assistant Professor Kenichi Takahata and his research team have developed a new technology for monitoring brain aneurysms — an approach that is potentially less invasive and more accurate than current methods, and one that is simple enough for patients to use at home for frequent monitoring.

Brain aneurysms occur when a weakened area in the wall of an artery carrying blood to the brain begins to bulge and balloon out. If the artery ruptures, the hemorrhage can lead to stroke, brain damage or death. To create a plug that will prevent blood flow to the weak area, surgeons typically insert an "embolization" implant made of microscopic coils of platinum into the artery.

Takahata, a Canada Research Chair in Advanced Micro/Nanofabrication and MEMS, and his team have devised a monitoring technique that is compatible with existing coil-implantation tools and procedures.

In the first study of its kind, the team proved that it is possible to use the platinum implant as an "antenna" to detect blood levels wirelessly and indicate implant failure. Their results will appear in a forthcoming issue of the journal *Biosensors and Bioelectronics*.

"This is a completely brand-new approach to monitoring cerebral embolization, and our tests in the lab have been quite successful," says Takahata, who led the study with UBC postdoctoral fellow Abdolreza Rashidi Mohammadi.

"As an early detection method, what we're proposing could be carried out by patients at home on a continual basis," says Takahata, whose research areas include microsensors, smart implants, nanotechnology and wireless microdevices. "We anticipate having a prototype within two to three years."

Currently, the only way to check whether an embolization is still working is to expose patients to high-dose X-rays for a CT scan or through an angiography — an invasive procedure that involves catheters and the injection of dyes to highlight brain arteries. Both methods preclude frequent patient checkups.

(continued p.23)

## Making green roofs greener — Engineers at UBC's Okanagan campus develop construction process with global potential

Professor Kasun Hewage, P.Eng., and Civil Engineering MAsc student Fabricio Bianchini are taking a good idea and making it better, perhaps even creating a new construction technology for use in arid countries worldwide in the process.

Since last fall, Hewage, the assistant professor of Project and Construction Management at the School of Engineering at UBC's Okanagan campus, has been looking at ways to make green roofs even more environmentally friendly. Green roofs — composed of plants grown on specially designed matting — act as insulators, meaning less energy is needed to heat or cool buildings. They are no longer a novel idea, but there is room for improvement, and Hewage and Bianchini are looking at recycling waste building materials to form the base layers of a green roof.

Materials for these layers are currently made out of plastic. And while the lifespan of a manufactured green roof is about 50 years, it takes 25 years to compensate for the environmental damage caused from making the plastics contained in the roof layering material.

But finding the best material is not the only challenge. Hewage said the material must not be too heavy — plastic is light, thus making it a popular material — and cannot be too expensive to integrate into a building.

Construction projects produce many types of waste virtually from day one. Hewage said once a type of waste is identified as the optimum material, it can be stored and used at the end of the construction project for green-roof applications.

Their project began last year, and Bianchini is monitoring several green-roof plant beds on campus that were donated by green-roof manufacturing company Xeroflor, which has taken an active interest in the project. Bianchini will compare the results of the manufactured material against a green roof he constructed using discarded, crushed concrete as drainage material.

One of the key elements Bianchini will monitor is water runoff, to see whether contamination occurs from the construction waste.

"We want to use runoff water for irrigation, but if the water is contaminated, then it is no good," said Bianchini, adding when a suitable material is found, that will mean less landfill waste and reduced water consumption.

(continued p.23)

## RESEARCH

## UBC and Toyota receive federal funds to re-invent wheel manufacturing



Yongning Wang, CAPTIN;  
Steve Cockcroft, UBC;  
Daan Maijer, UBC;  
Deryl Sturdevant, CAPTIN.

UBC Professors Steve Cockcroft, Daan Maijer and André Phillion, in partnership with Toyota, together received a \$727,000 grant from the Natural Sciences and Engineering Research Council of Canada (NSERC) to develop a new process for producing stronger, lighter and lower-cost aluminum wheels through water-cooled die casting. Toyota will provide more than \$1 million in cash, personnel, equipment and other resources for the project.

Aluminum wheels are one of the most challenging automotive parts to make because of safety requirements and the need for extensive styling and finishing. Using a water-cooled method for casting molten aluminum into a die creates a lighter and stronger product in less time than other methods. However, Canadian Autoparts Toyota Inc. (CAPTIN), wants to refine this proven process further by improving product quality, lowering costs to make and maintain the dies, and minimizing excess aluminum.

"This isn't about re-inventing the wheel; it's about re-inventing the process to make the wheel to drive

down manufacturing costs," says Steve Cockcroft, P.Eng., UBC professor of materials engineering. "As a technology, casting is very old, dating back to approximately 3000 BC, so you would think we would know precisely what is happening in a modern casting process. Yet the fact is we don't. It's an exceedingly complex process involving the transport of heat and mass across a range of scales, from metres to a millionth of a metre."

By using sophisticated computer-aided design tools to understand the fundamental science happening in the casting process, the research team expects to rein in the water-cooled technique's costs. "Even though our process provides a higher value to customers, it is not economical to proceed if we can't bring the cost down," says Yongning Wang, P.Eng., CAPTIN's general manager.

UBC has been collaborating with CAPTIN since the late 1990s to develop a computer model for optimizing the design of low-pressure die casting. That research resulted in Toyota's transferring its die-design operations from Japan to the CAPTIN manufacturing plant in Delta, B.C., in 2003. UBC and Toyota are planning to have the new technology deployed by 2014. ■

## RESEARCH

## UBC pulp and paper research receives funding from Canfor Pulp — Unique Okanagan-Vancouver collaboration receives first grant



Joe Nemeth, President and CEO of Canfor Pulp Products Inc., with UBC Professors André Phillion, Mark Martinez, Eric Hall, dean pro tem of Applied Science, and Paul Watson, director, Canfor Pulp Innovation Centre.

At the opening of the new Canfor Pulp Innovation Centre in Burnaby in June 2011, Canfor Pulp Limited Partnership (CPLP) announced a research-grant program in collaboration with UBC and the University of Northern British Columbia (UNBC) that will provide a total of \$225,000 over three years for novel research pertaining to northern bleached softwood kraft (NBSK) pulp.

"Canfor Pulp's investment will directly support faculty and graduate-student research aimed at serving the needs of current and future industry," said Professor James Olson, director of UBC's Pulp and Paper Centre. "BC has the opportunity to lead the transformation into forest-based bio-materials and we applaud Canfor Pulp for its vision and leadership in supporting transformative research that is vital to the future of BC's strategically important renewable industry."

School of Engineering Assistant Professor André Phillion (PhD '07 MTRL) and Chemical and Biological Engineering Professor Mark Martinez (PhD '95 CHBE) are recipients of the first grant at UBC, valued at \$75,000 over three years, for their research project, Three-dimensional Structure and Strength Characterization of Pulp Fibre. Their research brings together a unique combination of UBC laboratories to enhance the competitive advantage of softwood chemical pulp produced from BC's northern interior forest base. Through X-ray imaging using computed micro-tomography at UBC's Okanagan campus and low-consistency refining at UBC's Vancouver campus, UBC researchers intend to provide insight into strengthening mechanisms in NBSK pulp. An award of \$75,000 for another project has been made to researchers at UNBC.

"We're honoured that our research was selected as the inaugural grant project," says Phillion. "Our research will assist Canfor in developing guidelines that link processing conditions with paper properties for a range of customer refining systems and NBSK/ hardwood mixtures."

(continued p.23)

## STUDENTS

## UBC Hosts Canadian Engineering Competition

The 27th annual Canadian Engineering Competition (CEC), From Sea to Sky, will be held March 8-11, 2012, at UBC Robson Square. Bringing together 150 of the nation's most innovative and creative undergraduate engineering students, the CEC features six categories of competition — Engineering Communication, Consulting Engineering, Extemporaneous Debate, Innovative Design, Team Design and Senior Team Design — all of which challenge participants to expand their frame of reference and identify solutions to real-world engineering problems.

Students who placed first and second in each category at the Western Engineering Competition (or their regional equivalent) are invited to attend this elite national competition.

"We take great pride in the diverse natural beauty of our city and the technical excellence of the University

of British Columbia, and we are honoured to have the opportunity to share it through the 2012 Canadian Engineering Competition," says Sean Heisler, fourth-year UBC Engineering student and CEC 2012 co-chair. "We look forward to welcoming Canada's best and brightest engineering students and showcasing their talent to industry leaders."

In true Canadian style, CEC is a bilingual event, permitting English- and French-speaking students to compete in their native language, with simultaneous translation available for judges and observers in both languages.

In addition to CEC's six competitions, From Sea to Sky will include a career fair and a welcome reception.

The competitions are open to the public for viewing and provide a valuable opportunity for industry participation. For details about observing the event, email [logistics@cec2012.ca](mailto:logistics@cec2012.ca); for sponsorship queries or to learn more about the event, email [sponsors@cec2012.ca](mailto:sponsors@cec2012.ca). ■

For more on the competition, visit [www.cec2012.ca](http://www.cec2012.ca).

## IN MEMORIAM



## Remembering John "Blue" Evans

On June 4, 2011, former UBC Mining Head and Professor John "Blue" Evans passed away. An extremely popular and personable teacher and colleague, he mentored many UBC mining engineers who have gone on to successful careers.

Blue began his nine-year tenure as head of the mining department at UBC in 1969, after a successful career in the mining industry in Australia, Canada and the United States. His broad career meant he was not only able to share his technological expertise with students but his practical experience as well.

His contributions to his students' personal and professional lives were so significant that in 2010, Blue's former students — Mining Engineering alumni from the 1970s — came together to honour him with contributions of over \$120,000 to create the John "Blue" Evans Student Enrichment Fund.

"Blue was a great teacher, mentor, supporter and role model for young adults aspiring to become engineers," says Alf Hills (BASc '77), a former student who

led the fundraising efforts together with Bill Weymark (BASc '77). "Blue's students felt very strongly that we give something meaningful back to the Mining Engineering department that represents what he stood for and to serve as an example for future mining classes."

After a professional career that spanned almost 50 years — including work as a consultant, practical mining engineer, researcher and academic — Blue slowed down to spend his last few years living in Richmond, B.C. Despite his ailing health, he was able to attend a celebration of the fund's establishment on June 25, 2010, with an intimate group of former students, colleagues, friends and family.

A memorial for Blue was held in Vancouver on June 11, 2011. His professional legacy will live on through his colleagues in industry and academia, through the students whose lives he touched and through the fund they established to support future generations of students. ■

*If you would like to make a contribution to the John "Blue" Evans Student Enrichment Fund, please contact Debbie Woo, senior associate director of development and alumni relations at 604-822-6856 or [debbie.woo@ubc.ca](mailto:debbie.woo@ubc.ca).*

## Awards &amp; Achievements

Chemical and Biological Engineering Professor and Department Head **Peter Englezos** has been reappointed holder of the Advanced Paper-making Initiative Professorship for October 1, 2011, through June 30, 2014.

Chemical and Biological Engineering Professor **John Grace** has been recognized for his efforts in reviewing applications to the Canada Research Chairs Program.

Chemical and Biological Engineering Professor **Savvas Hatzikiriakos** received the 2011 Journal of Rheology Publication Award for the article "Viscoelasticity and Extensional Rheology of Model Cayley-Tree Polymers of Different Generations," (co-authored with E. van Ruymbeke, E. B. Muliawan, T. Watanabe, A. Hirao and D. Vlassopoulos) published in the May/June 2010 issue of the *Journal of Rheology*.

The Canadian Society for Chemical Engineering honoured Chemical and Biological Engineering Professor **Jim Lim** with the 2011 Bantrel Award in Design and Industrial Practice.

Chemical and Biological Engineering Professor **Mark Martinez** has been appointed director of UBC's Advanced Papermaking Initiative.

The Royal Society of Canada inducted Civil Engineering Professor **Nemkumar Banthia** as a fellow. Banthia has also been reappointed as director of the APSC Office of International Initiatives for a three-year term, from July 1, 2011, to June 30, 2014.

Civil Engineering Professor **Eric Hall** has been appointed dean pro tem of the Faculty of Applied Science, effective October 13, 2011.

The Association of Professional Engineers and Geoscientists of B.C. honoured Civil Engineering Professor **Don Mavinic** with a Meritorious Achievement Award.

The Vancouver Section of the IEEE honoured Electrical and Computer Engineering Professor Emeritus **Hermann Dommel** with a Centennial Award.

**Fariborz Musavi, Wilson Eberle and William G. Dunford** won the First Prize Paper Award from the IEEE Industrial Applications Society's Industrial Power Conversion Committee for their article, "A High-Performance Single-Phase Bridgeless Interleaved PFC Converter for Plug-in Hybrid Electric Vehicle Battery Chargers," published in the July-August 2011 issue of *IEEE Transactions on Industry Applications*. Eberle is an assistant professor at the School of Engineering at UBC's Okanagan campus, and Musavi (PhD '08 ECE) and Dunford, associate professor, are from the Department of Electrical and Computer Engineering at UBC's Vancouver campus.

The Vancouver Section of the IEEE honoured Electrical and Computer Engineering Professor **Victor Leung** with a Centennial Award.

The Vancouver Section of the IEEE honoured Electrical and Computer Engineering Professor **José Martí** with a Centennial Award.

Electrical and Computer Engineering Professor and ICICS Director **Panos Nasiopoulos** has been reappointed holder of the Midnet and Dolby Professorship in Digital Multimedia from July 1, 2011, to June 30, 2012.

Electrical and Computer Engineering Associate Professor **David Michelson** was elected chair of the Wavefront Wireless Commercialization Centre's Academic Advisory Board and to a seat on Wavefront's board of directors.

Electrical and Computer Engineering Professor **Tim Salcudean** has been reappointed holder of the Charles A. Laszlo Chair in Biomedical Engineering from October 1, 2011, to June 30, 2014.

Electrical and Computer Engineering Professor **Rabab Ward** has received a Centennial Award from the Vancouver Section of the IEEE and the Paradigm Shifter Award from the Society for Canadian Women in Science and Technology.

Geological Engineering Professor **Erik Eberhardt** has been appointed director of the Geological Engineering Program from August 16, 2011, through June 30, 2014.

Materials Engineering Associate Professor **Rizhi Wang** has been elected president of the Canadian Biomaterials Society.

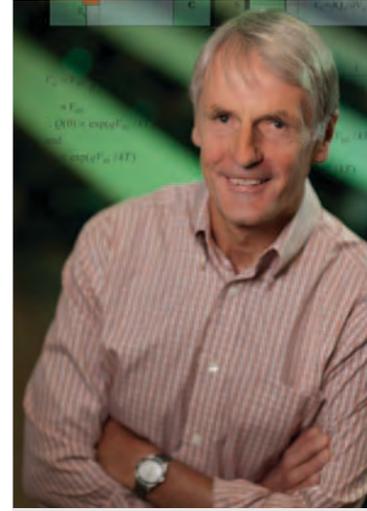
The Ernest C. Manning Awards Foundation honoured Mechanical Engineering Professor Emeritus **Phil Hill** with the 2011 Encana Principal Award.

School of Engineering Laboratory Manager **Russell LaMountain** received the 2011 Staff Award for Excellence in Sustainability at UBC's Okanagan campus.

School of Engineering Senior Instructor **Carolyn Labun** has been appointed the first director of the Centre for Scholarly Communication, a new two-year pilot program at UBC's Okanagan campus.

School of Engineering Department Administrator **Teija Wakeman** received the 2011 Staff Award of Excellence for Leadership at UBC's Okanagan campus.

## Our People



FACULTY

## Professor Pulfrey, known for "concise, crystal-clear derivations" retires

When Professor David Pulfrey, P.Eng., came to UBC in 1968 as a postdoctoral teaching fellow, he planned to stay only a year. Forty-three years later, he's retiring from the Department of Electrical and Computer Engineering after a distinguished career.

Named a Fellow of IEEE (2000) and the Canadian Academy of Engineering (2002), Pulfrey published over 130 refereed articles on semiconductor devices, ranging from solar cells to nanotransistors. The author of three books, he describes them as "a labour of love." He adds, "My last book on transistors and diodes was a wonderful way to bring closure to my career. I've written down everything that I think is important for students to know and for me to refer to when I've forgotten what I used to know!"

Pulfrey notes his teaching awards — received at the university, provincial and international levels — as major highlights of his career. "Two of the awards came from completely unsolicited student nominations and were very pleasant surprises," he says. Department

colleague, Professor Emeritus Peter Lawrence adds: "Over his career, David has been very dedicated to the refinement of the classroom learning experience of engineering students. He is known for providing concise, crystal-clear derivations of difficult basic equations and then probing students' understanding through a series of challenging questions about them."

Always working "in the trenches" with a small group of graduate students, Pulfrey has become lifelong friends with many. And by maintaining his own technical skills, he has contributed to the work of others during his sabbatical leaves, taken in industry (Canada and England), at universities (Western Australia, Vienna and Santa Barbara, Calif.), and at a national laboratory in France.

Pulfrey has enjoyed working at UBC, and the opportunities to cycle to work here each day and to hike and ski with friends from the department. He plans to continue these activities and to play tennis after retiring on December 31, and he looks forward to seeing his five grandchildren more. "Even though I enjoy my work at UBC and have done so for over 40 years, I feel as if it is time to finish," Pulfrey says. "It's better to go when students ask 'Why are you leaving?' rather than when they wonder why you're not!" ■



FACULTY

## With a career objective of saving lives, Professor Pakalnis retires satisfied

Associate Professor Rimas Pakalnis (MSc '82, PhD '86 MINE), P.Eng., started teaching at UBC when his son was born 23 years ago. As Pakalnis retires December 31, he will enter a new stage of his career — full-time consulting, the job he left when he first came to UBC.

Pakalnis's contributions to applied research while at UBC are immense. He and his former graduate students developed empirical design guidelines for the size and stability of tunnels that have been implemented by mining operations throughout the world.

"I've been to 150 mining operations over the last 30 years, and none has ever had a fatality or injury," says Pakalnis. "It is my objective to save lives. The guidelines aren't something we just take off the shelf; they're something we've developed."

Pakalnis has co-authored over 50 papers on mine rock mechanics design over the past 10 years. He has organized and presented professional-development courses for the mining industry on a variety of topics and has consulted for mining operations in many countries, including Guatemala, Australia, Peru, South Africa and Indonesia.

"Rimas Pakalnis is that rare breed of academic who thrives in the real world of the mining industry," says Professor Malcolm Scoble, former head of UBC's Norman B. Keevil Institute of Mining Engineering.

(continued p.23)



Farhan Mohamed working for Muse Research.

ALUMNI

## Advanced degree from UBC sends sound engineer on rock-star trajectory

Farhan Mohamed (MASc '03 ECE) works for Muse Research, a music technology start-up based in Menlo Park, Calif. Innovators of core audio technologies, the Muse management team has revolutionized the world of music composition and advanced the art of recording. With an expanding clientele, the company sells virtual instruments to artists including U2, Phil Collins, P!NK and Madonna.

With a degree in engineering from India and certificates in audio engineering and music production from the Trebas Institute in Vancouver, Mohamed worked as a sound recording and mixing engineer in various studios in the city. Wanting to study computer music and explore the possibilities of improving the workflow in the studio and live music environment, he sought out researchers with similar interests and found UBC Electrical and Computer Engineering Professor Sidney Fels.

"I owe him a lot," Mohamed says. "I met with him a few times to talk about my ideas on creating new tools to improve the workflow in music production and performance, and he offered to take me on as his graduate student." With an undergraduate degree in metallurgical engineering, Mohamed admits he didn't know how to build solutions using computers.

"Professor Fels realized I had good ideas but lacked the skills to realize them," says Mohamed. "With his encouragement, I spent the first year and a half doing course work and a lot of independent learning to pick up the skills I needed to build and test the music tools we wanted to create."

"I could not have imagined working with the same amount of passion if I did not have a background in music and audio," says Mohamed, who plays for several bands in the Bay Area and performs sound engineering at concerts.

The Receptor, Muse's flagship product, is a hardware-based music product, essentially a computer that hosts software synthesizers and effects. "It's an instrument for players who demand unshakeable stability and super-tight performance, whether they play live or in the studio," says Mohamed. "Currently the only other option musicians have is to use their laptops or desktops to perform these functions, which is far from ideal, since they are not built for such specialized tasks."

At UBC, Mohamed worked in Professor Fels's Human Communication Technologies lab, which aims to put people "back in the loop" with regard to rapidly accelerating technology and enable them to communicate with computer systems and each other more effectively. "The resources at the lab helped me immensely," says Mohamed. While there, he worked on a project that moved computer keyboard functions to a piano keyboard for music composition, and he published several papers on the project with Fels.

At Muse, Mohamed integrates and packages content software for the Receptor, working with several third-party developers around the world, such as Native Instruments, IK Multimedia and FXpansion, to bring their music software libraries to the Muse platform. He also works on custom building the content on Receptors for touring bands and composers. "From supporting a certain piano sample for a musician who is about to go on tour to coming up with a complete solution to minimize the amount of gear a band has to lug around, I make the Receptor work for people based on their own needs."

Mohamed admits there are challenges to working for a small company — namely, fewer resources and long hours — but the rewards outnumber the obstacles.

"My work has a direct impact on the company's sales, marketing and strategies," Mohamed says. "It's highly rewarding to see your work in action — sometimes the very next day on a concert stage."

With rave reviews from big names, watch for Farhan Mohamed and Muse Research as rising stars. ■

ENGINEERING A GREENER FUTURE

## UBC Master of Clean Energy Engineering students learn in UBC neighbourhoods



Clean Energy Engineering student Mike Hoy conducts energy assessments at UBC.

Graduate clean energy engineering students on UBC's Vancouver campus are contributing to a greener future through energy assessments in UBC University Neighbourhoods Association (UNA) developments. Their projects are demonstrating clean energy solutions that could potentially be used by other communities on campus and beyond.

Student Mike Hoy is helping homeowners in the Hawthorn neighbourhood (located south of Thunderbird Boulevard on Main Mall) who are interested in implementing alternative-energy systems and energy-efficiency upgrades to reduce consumption and greenhouse gases (GHGs).

Hoy is monitoring energy data, performing an audit and researching efficiency improvements and sustainable solutions, including solar and geothermal systems, for 20 units in the complex. He will also survey 10 homeowners and align their preferences with results from his technical analysis.

"Buildings are responsible for 30 per cent of GHG emissions in North America, so it is important to make them more energy efficient," says Hoy. "UBC provides a unique environment for us to study in, so we can learn from real data and positively influence a real community."

Senthil Rushya, another student in the master's program, is studying residential buildings in the Sitka development under construction at the corner of Agronomy Road and Wesbrook Mall, slated to be completed by fall 2012. He is assessing the environmental and economic aspects of installing a heat-recovery system for grey water from dishwashers, laundry and household sinks. Since any hot water that goes down the drain carries energy away with it, capturing this energy and recycling it to preheat cold water will reduce energy consumption.

"We strive to help students work on real-world energy problems for their master's projects," says Eric Mazzi, Power Smart® Instructor with UBC's Master of Engineering in Clean Energy program. "UBC's living laboratory provides our students with valuable learning that they will carry forward to their future jobs."

Launched at UBC in 2009, the Master of Engineering in Clean Energy Engineering program is intended for people with an undergraduate degree in engineering who have an interest in advanced training in energy-efficient technologies and policies. Twenty-four students graduated in the first class in May 2011, and 90 per cent of the class's graduates are now employed in energy-related positions, Mazzi says.

"It is our goal to inspire innovation in our students so they can take that knowledge forward and effect positive change," Mazzi adds.

"The UNA is fortunate to have access to the talent of the Clean Energy Engineering students," says Ralph Wells, UNA Sustainability Manager. "This is a win for the community and the students, and we hope these are the first of many projects to come." ■

For more information visit [www.cerc.ubc.ca/prospective\\_students/cleanenergy.php](http://www.cerc.ubc.ca/prospective_students/cleanenergy.php).

# Alumni Updates

## Event Highlights

### MTRL 2001 REUNION

JUNE 18, 2011

Materials Engineering Class of 2001 reunited to celebrate 10 years since graduation. Thanks to Gloria Wong for organizing!

### CIVL '48 REUNION

AUGUST 18, 2011

Civil Engineering Class of 1948 enjoyed a reunion luncheon at the UBC Golf Club. Seven of the original 30 graduates are still known — one living in Ottawa and the remaining six in the Greater Vancouver area — and five of the Vancouver six attended the luncheon. Thanks to Mervin Stewart for the report.



### CHBE '61 REUNION

AUGUST 18-20, 2011

Chemical and Biological Engineering Class of 1961 reunited thanks to the organization of Ronald Greene. The festivities included a dinner at the Fish House in Stanley Park, a tour of the CHBE building, a presentation by Head Peter Englezos, and it concluded with lunch at the Sage Bistro, with Professor Emeritus Norman Epstein.

### CIVL '49 REUNION

SEPTEMBER 14, 2011

Civil Engineering Class of 1949 celebrated 62 years since graduation! The luncheon was held at the Beach Grove Golf Club in Tsawwassen. Many thanks to Knute Soros for his tireless work organizing the annual class reunion!

### MECH '86 REUNION

SEPTEMBER 17, 2011

The first reunion of the Mechanical Engineering Class of 1986 was held as the class celebrated their 25-year milestone with a dinner at Mahony & Sons restaurant organized by Rosamund Russel.

### CIVL '61 REUNION

OCTOBER 14-15, 2011

Classmates returned for their 50th reunion that started off with a tour of the UBC Structures Labs, where alumni were treated to a simulated earthquake by tour leader and lab director Mark Rigolo. Classmates shared memories and consumed beverages later that day at the UBC Golf Course's Westward Ho! restaurant. Saturday evening's dinner was held at the Jericho Tennis Club, with 42 Civils and guests in attendance. Plans were laid to continue with the Class of 61's tradition of reunions every five years. Thanks to Will Phillips for organizing.



### NEWSWORTHY (continued)

#### New technology (pg 15)

Aneurysms can occur in any blood vessel in the body and usually cannot be detected unless there is leakage or a rupture. Aneurysms in the brain are one of the more common types, affecting up to six per cent of the population. Every year, approximately 33,000 North Americans suffer a rupture, leading to stroke, with up to a 60 per cent fatality rate, and permanent disability in about 50 per cent of the survivors. ■

#### Making green roofs greener (pg15)

The Okanagan climate also plays a role in the research. What works in Vancouver or Toronto may not necessarily work in more arid climates, so areas with similar climates around the world will benefit from the research being conducted at UBC, says Hewage.

Bianchini will monitor the progress and results of the experiment for a full year, but both he and Hewage see possibilities for the research that could last for eons.

For instance, Bianchini said there are schools in the United States where students

are growing vegetables on green roofs, another application of the concept.

"With the support of the AVP Administration and Finance, the green-roof project is one of the many ways we are enabling sustainability on campus," said Leanne Bilodeau, director of Sustainability Operations. She adds that the new Engineering, Management and Education Building and the Health Sciences Centre at UBC's Okanagan campus both incorporate green-roof technology, and the technology will be integrated into the campus's district energy geothermal system to reduce energy consumption and greenhouse-gas emissions. ■

#### UBC pulp and paper research (pg 16)

Joe Nemeth, president and CEO of CPLP, noted, "This project will enable Canfor Pulp to better understand its fibre and will enable us to further develop novel end-use applications through our global customer network. Importantly, this complements a major project on pulp refining we are already supporting in the UBC Pulp and Paper Centre."

He added that an additional benefit is the opening of a link to the Engineering program at UBC's Okanagan campus. Nemeth commended the collaboration between the two UBC campuses, noting that the pulp and paper industry offers significant opportunities for the next generation of engineers. ■

#### Professor Pakalnis retires (pg19)

"He has had a significant influence on the development of design practice for safety in underground mining. His students have inherited his dedication and commitment in assuming significant positions of responsibility in the global industry over the years."

Pakalnis will stay at UBC as a Professor Emeritus and plans to travel with his wife "Always be humble," Pakalnis advises students. "Listen to the miner, the fellow who might not have your education. Trust your gut; if you need help, ask." ■

# Upcoming Events

## UPCOMING EVENTS

### ENGINEERING CO-OP JUNIOR RECEPTION

JANUARY 25, 2012, 5:00-8:00 P.M.

Networking event for newly accepted junior Co-op students.

### ENGINEERING CO-OP JUNIOR RECEPTION — UBC'S OKANAGAN CAMPUS

FEBRUARY 15, 2012, 5:00-8:00 P.M.

Networking event for newly accepted junior Co-op students at UBC's Okanagan campus.

### ENGINEERING EXCELLENCE 2012 - A CELEBRATION OF ACHIEVEMENT

MARCH 1, 2012

Committed to making a world of difference, UBC Engineering is proud to have so many alumni, faculty and students positively impacting the world and fulfilling this mission. Join us as we celebrate the achievements of our alumni with the UBC Engineering Alumni Awards! At this gala celebration, now in its third year, we are honoured to continue to recognize the successes in our community and invite you to join us in doing so. You won't want to miss this incredible event! For more information, visit [www.engineering.ubc.ca/engineeringexcellence](http://www.engineering.ubc.ca/engineeringexcellence).

### UBC CELEBRATE RESEARCH WEEK

MARCH 2-9, 2012

Mark your calendar for a week of intellectual expansion. Join Applied Science experts for a discussion on the future of transportation. For details, visit: <http://celebrateresearch.ubc.ca>.

### CHEMICAL AND BIOLOGICAL ENGINEERING SPEAKER SERIES

MARCH 5, 2012, 12:00-1:00 P.M.

Distinguished guest: Dr. Ajay K. Dalai, University of Saskatchewan. Join us at 202 - 2360 East Mall, CHBE building.

### ENGINEERING CO-OP GRADUATION RECEPTION

MARCH 8, 2012, 6:00-10:00 P.M.

Graduation reception for Co-op students.

### CANADIAN ENGINEERING COMPETITION 2012 — FROM SEA TO SKY

MARCH 8-11

Held at UBC Robson Square this year, the competitions are open to the public for viewing. For details, email [logistics@cec2012.ca](mailto:logistics@cec2012.ca).

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).

### CHEMICAL AND BIOLOGICAL ENGINEERING SPEAKER SERIES

MARCH 29, 2012, 12:00-1:00 P.M.

Distinguished guest: Dr. Richard D. Braatz, MIT. Join us at 202 - 2360 East Mall, CHBE building.

### ENGINEERING CO-OP GRADUATION RECEPTION - UBC'S OKANAGAN CAMPUS

APRIL 4, 2012, 6:00-10:00 P.M.

Reception for graduating Co-op students at UBC's Okanagan campus.

### ENGINEERING EXPLORATIONS

JANUARY-MAY 2012

High school and transfer students are invited to UBC Engineering for an afternoon of exploration and insight. Talk to current students, find out about engineering at UBC and tour one of our labs. Sign up at: [www.engineering.ubc.ca/connects](http://www.engineering.ubc.ca/connects)

## UPCOMING ALUMNI

### OLD RED NEW RED 2012

FEBRUARY 9, 2012 6:00-9:00 P.M.

Held at Cecil Green Park House, this event has grown in success each year and is a great opportunity to connect esteemed alumni with the current UBC Engineering student body. Please save the date and watch your email for more updates. If you are not on our email list, contact us to ensure you get your invitation to this event and others. Email [alumni@apsc.ubc.ca](mailto:alumni@apsc.ubc.ca).

### THREE COURSE CONNECTION

MARCH 20, 2012

UBC Applied Science is excited to become a partner of the UBC Three Course Connection! Organized by students, this mentoring dinner is designed to bring together students and alumni from Applied Science, Arts and Commerce. The 3CC Dinner is a fantastic way for alumni to provide mentorship to students from different disciplines and facilitate relationship building over a three-course meal. Please contact the alumni office for information about this mentoring event. Email [alumni@apsc.ubc.ca](mailto:alumni@apsc.ubc.ca).

### ENGINEERING PHYSICS 50TH REUNION

MAY 2012

The class of 1962 Engineering Physics is currently planning their 50th reunion for May 2012 in Vancouver.

### ALUMNI WEEKEND

MAY 26, 2012

Save the date! This year's UBC-wide Alumni Weekend is coming up, and UBC Engineering will host its annual Engineering Reception — all alumni and guests are invited! To commemorate important anniversaries, we will be taking class photos of all 10-year reunions. Calling all grads of 1952, 1962, 1972, 1982, 1992 and 2002 — join your classmates for a reunion and a class photo! For more information visit [www.engineering.ubc.ca/alumni](http://www.engineering.ubc.ca/alumni).

### CHBE CLASS OF 1962 50TH REUNION

MAY 25-26, 2012

Eric Cardey and a 1962 CHEM committee are organizing a reunion to celebrate the 50th anniversary of the Chemical Engineering class of 1962 in May 2012. The day will include a tour of the CHBE building and labs, lunch and lots of catching up with old friends! For more information, please email [alumni@apsc.ubc.ca](mailto:alumni@apsc.ubc.ca).

### CIVIL CLASS OF 1982 REUNION

SUMMER 2012

CIVIL 1982 classmates are celebrating 30 years since their graduation from UBC. Reunion organizer is Tom Lively.

### REUNIONS

If you would like more information on upcoming reunions or are interested in organizing one, please contact the Alumni Relations office for more information! Email [alumni@apsc.ubc.ca](mailto:alumni@apsc.ubc.ca).



# Need Help?

Looking for a cost-effective solution to complement your team for short or long-term projects? Engineering Co-op students can assist you on projects ranging from developing new product designs to building sustainable infrastructures to creating innovative software programs.

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Contact us by phone at 604-822-3022 or email at [eng.coop@ubc.ca](mailto:eng.coop@ubc.ca).

