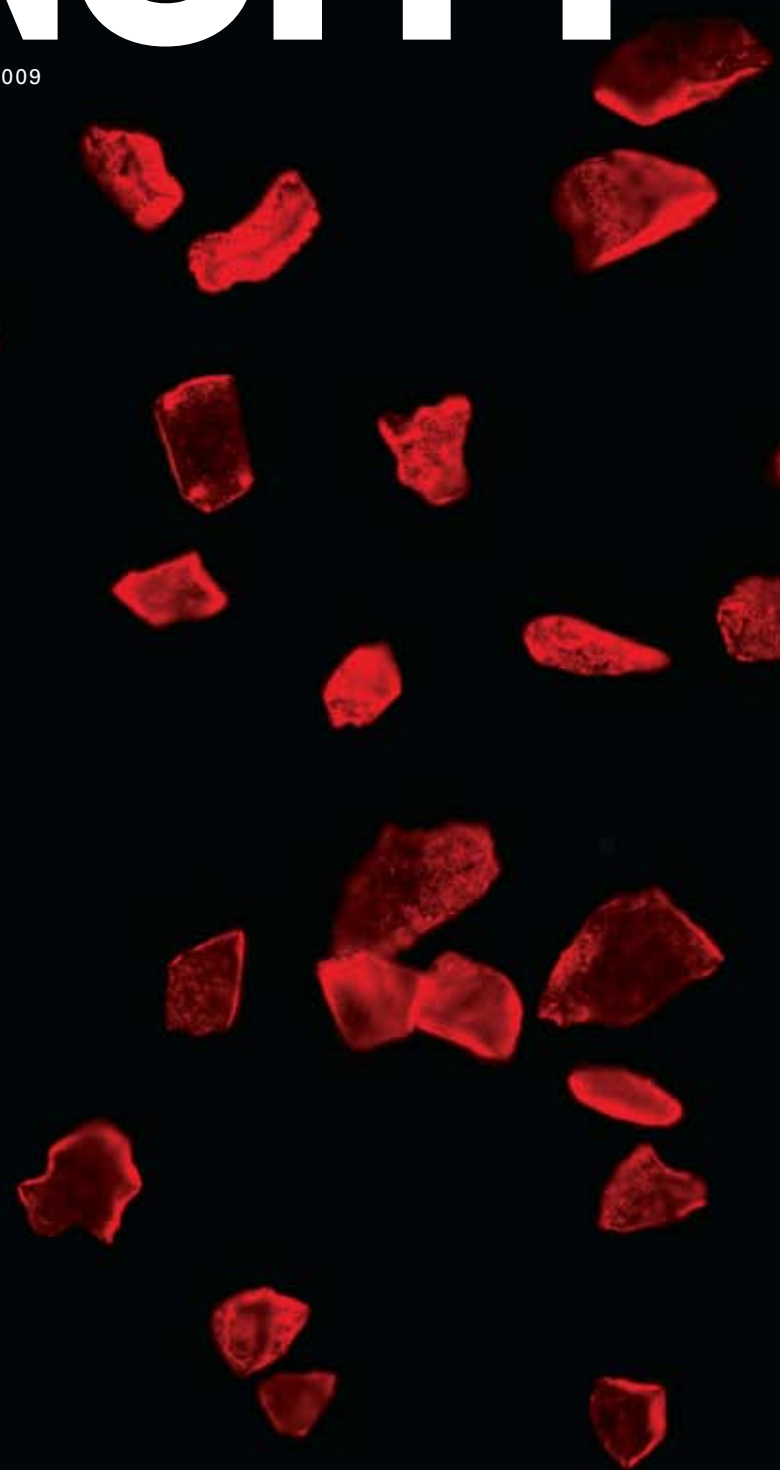
INGENUITY

FACULTY OF APPLIED SCIENCE ENGINEERING NEWS / SUMMER 2009



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THE UNIVERSITY OF BRITISH COLUMBIA

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On the Cover: *Bacteriophage that bind to sphalerite (zinc sulphide), tagged with a fluorescent antibody. Here they are shown attached to sphalerite particles, glowing under the light of a fluorescent microscope.*

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INGENUITY
is published by the Faculty of Applied Science, The University of British Columbia.
www.apsc.ubc.ca

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Dean's Message

The Dean: *Dr. Tyseer Aboulnasr was appointed Dean of UBC's Faculty of Applied Science on September 1, 2008.*

PHOTO CREDIT: JANIS FRANKLIN

"We should never forget that we engineers create what never existed before to solve real, existing problems for society." **DEAN TYSEER ABOULNASR**

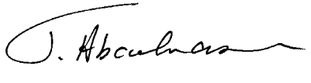
One can talk about the excellence of UBC Applied Science, its ranking, research funding, awards and recognitions. All these have been used as ways of assessing the performance of academic institutions. It is critical, though, for us to remember that our real goal is to have a positive impact on people's lives in society at large. Excellence, rankings, funding and recognition are simply ways that have been used to measure the impact academic institutions have on our collective well-being.

I have spent the last few months getting to know our engineering faculty. It has been a steep learning curve, given our size and diversity. One thing did not take long to learn: the real strength of our faculty lies with its people—professors, students, staff and, indeed, alumni. People diligently working on real solutions for real problems.

As a profession licensed by government, engineering requires advanced, sophisticated scientific and technological knowledge that empowers engineers to "create what never existed before." As our knowledge has advanced and the problems we are handling have become more complex, we have collectively become consumed with what we do and at times forget why we are doing it.

We should never forget that we engineers create what never existed before to solve real, existing problems for society. With that creative power comes enormous responsibility. It is critical that we never lose sight of our goal and the fact that excellence, rankings, funding and awards are simply our ways of measuring progress towards our goal.

I hope this issue of *Ingenuity* gives you an idea of what our people are doing to contribute in ways large and small to a really big goal: improving our collective lives by tackling and resolving society's complex challenges. I am proud of our people, and I know that after reading this issue you will be equally proud of your faculty and the contributions it makes to our world.



Tyseer Aboulnasr, P. Eng.
Dean of Applied Science

Looking Closely: *Ross MacGillivray, Scott Dunbar and Sue Curtis (left to right) examine a Petri dish of infected E.coli bacteria.*

MINING ENGINEERING

Mining with Viruses

Researchers often make progress by applying a proven scientific method from one realm to another, connecting seemingly disparate disciplines. Such interdisciplinary research is becoming an increasingly powerful tool in reshaping traditional approaches to science and engineering. But who would ever dream of applying viruses to mining?

Professor Scott Dunbar of UBC's Norman B. Keevil Institute of Mining Engineering would.

"I read an article about bacteriophage—viruses that infect bacteria—being used to create nano-devices in which proteins on the phage surface are engineered to bind to gold and zinc sulfide," says Dunbar. "And it struck me: if zinc sulfide, why not copper sulfide? And if so, then it might be possible to use these bio-engineered proteins to separate common economic sulfide minerals from waste during mineral extraction."

Bacteriophage, commonly called phage, refer to viruses that infect bacteria. They are the most abundant life form on Earth, numbering as many as 10^{31} and observations suggest there are as many as 10^{7} phage per millilitre of coastal seawater. Phage replicate by infecting bacteria but are harmless to humans, animals and plants. Only a few nanometers in diameter, hundreds could fill the diameter of a single human hair.

Current methods of sulfide mineral separation add detergent-like chemicals called collectors to a tank containing a slurry of finely ground ore particles. Collectors render specific sulfide particles in the ore hydrophobic ("afraid" of water) so that they attach to bubbles in the tank and float to the surface, forming a sulfide concentrate. However, in some cases, particularly with ores that contain several sulfide minerals, the recovery of specific sulfide minerals can be poor.

Dunbar has partnered with UBC colleagues Sue Curtis and Ross MacGillivray from the Centre for Blood Research and the Department of Biochemistry and Molecular Biology to bring the idea from concept to laboratory. Together they recently published a paper entitled "Biomining with bacteriophage: Selectivity of displayed peptides for naturally occurring sphalerite and chalcopyrite" in the journal *Biotechnology and Bioengineering*.

The researchers found that it is possible to identify sequences of amino acids (or peptides) on bacteriophage that bind to minerals of economic interest such as sphalerite (zinc sulfide), the chief ore mineral of zinc, and chalcopyrite (copper iron sulfide), the chief ore mineral of copper. The procedure is called "bio-panning," a type of genetic engineering. (See diagram below)

"You begin with a phage library, which may contain one billion phage particles, each with different peptide sequences displayed on their coat proteins. A few of these have the binding sequence of interest. When the entire library is exposed to the mineral of interest, these few will bind to the mineral," explains Dunbar.

"You wash away the nonbinding phage, then expose the binding phage to E. coli, which they infect and reproduce. The resulting phage would have DNA that contains the 'codes' for the binding peptide sequences of interest.

"The procedure is repeated four or five times to amplify the number of binders. It's somewhat like breeding animals for particular features."

"I knew we had phage that could bind specifically to sphalerite and to chalcopyrite," says Dunbar. "But then, so what? The phage had to do something to the mineral surfaces to be useful."

It turns out that the phage that bind to a mineral do affect the mineral surfaces, causing them to have a different electrical charge than other minerals. The proteins on the phage also form links to each other, leading to aggregation of the specific sulfide particles.

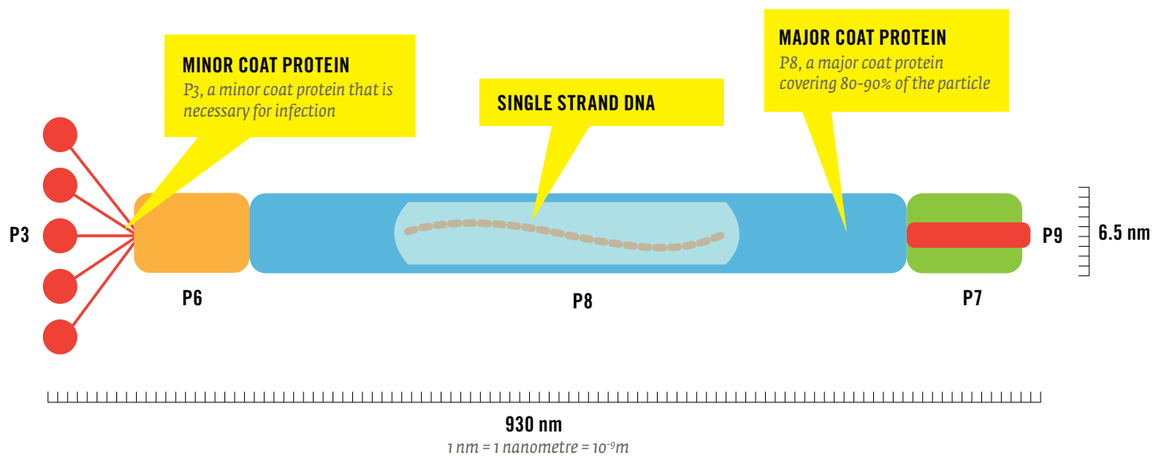
"The physical and chemical changes caused by phage may be the basis for a highly selective method of mineral separation with better recovery. Another possible application is bioremediation, where metals are removed from contaminated water," says Dunbar.

Dunbar and his colleagues are the first to apply phage to mineral processing. Their work is supported in part by the Applied Research and Technology group of Teck Corporation and the Michael Smith Foundation for Health Research. Professor Valery Petrenko of Auburn University supplied a phage library.

PHOTO CREDIT: MARTIN DEE

HOW IT WORKS

A filamentous bacteriophage called M13: *The M13 particle infects the bacterium E coli. The particle consists of single-stranded DNA molecule coated with proteins P3, P6, P7, P8 and P9. Foreign peptide sequences displayed on P3 and P8, that bind to minerals, can be identified by a process called "bio-panning."*



FEATURE

ELECTRICAL AND COMPUTER ENGINEERING

Bio Solar Cells

Imagine plugging your laptop into a tree. Sounds like the basis for science fiction, but perhaps it's not too far-fetched.

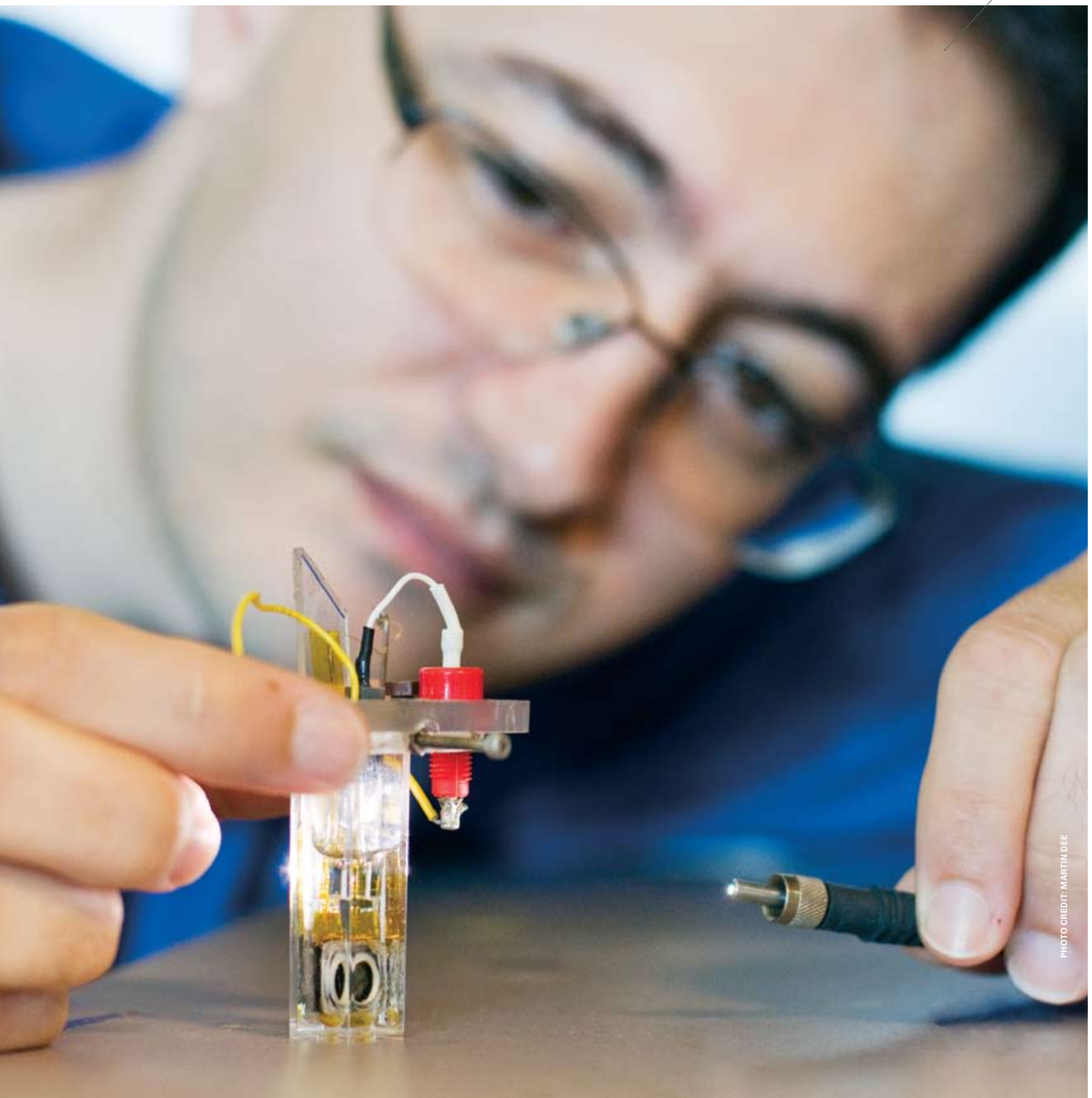


PHOTO CREDIT: MARTIN DEE

Bright Light: *Arash Takshi shines light on the bio solar cell to produce electrical energy*

Arash Takshi, a Postdoctoral Associate in the Department of Electrical and Computer Engineering (EECE), is developing bio-photovoltaic (bio-PV) devices made of materials obtained from photosynthetic organisms.

In other words, he's developing a solar cell by replicating how plants naturally convert sunlight to energy.

"An efficient solar-energy technology can provide electricity for many residents throughout British Columbia and help preserve the natural environment," explains Takshi.

It's no secret that British Columbia has a lot of cloudy days and a low winter-sun angle. Recognizing that plants grow naturally in such climates, Takshi, with supervisors Professors John Madden (EECE) and Tom Beatty (Microbiology and Immunology), is investigating how humans can harness the principles of photosynthesis, the efficient energy-production method plants have utilized for billions of years.

Pigment molecules in plant cells harvest photons with a broad range of wavelengths, including visible and near-infrared. Because of the elegant arrangement of pigment molecules, essentially all photons gathered by proteins called reaction centers (RCs) are converted to charge.

In an RC, photon energy is converted to electrochemical energy, which in a living organism drives chemical reactions for building glucose from water and carbon dioxide. Pigment molecules resemble antennas, which collect photons from a wider area and direct them to RCs, resulting in a high flux of photons. The high protein efficiency means plants can thrive in places with low-light intensity, such as the floor of a rain forest or deep in the sea.

Such exceptional properties in plants inspired the UBC team to explore the possibility of making solar cells with photosynthetic materials—RCs and pigment molecules. The technology of bio-PV cells can dramatically expand the application of solar cells to many low-light-level places around the world. In contrast to conventional solar-cell technology, the fabrication process for making a bio-PV is inexpensive and clean, with harmless, biodegradable waste materials.

In Takshi's research, bio-PVs are made by coating the surface of a carbon electrode with a single layer of RCs from the photosynthetic bacterium Rhodobacter sphaeroides. By harnessing the electrochemical energy released during photosynthesis, the bio-PV can produce electrical energy.

After genetically modified RCs are attached to the surface of the electrode, an aqueous-based electrolyte solution is applied to mimic the natural environment. A counter-electrode is then used to complete the device. The RCs release electrical charges upon illumination. Negative charges are collected by the electrode adjacent to the RCs, and ions in the electrolyte solution transfer positive charges to the counter electrode. The electrical potential developed between the two electrodes can supply electrical energy.

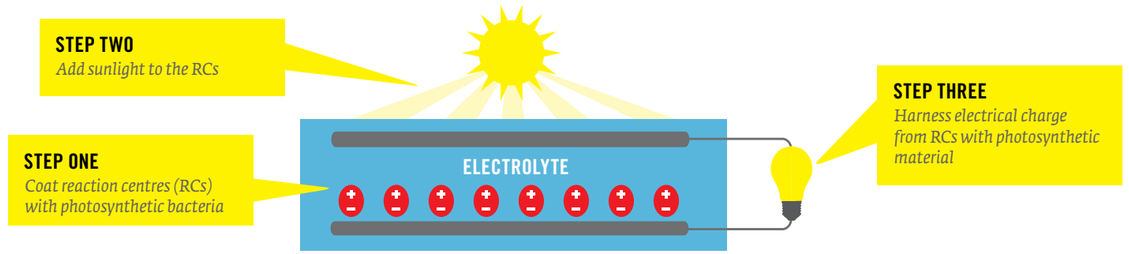
Takshi, along with collaborators from UBC and the Australian Centre for Electromaterials Science, has recently developed a model that explains the charge-transfer mechanism in bio-PVs. Takshi, Madden and Beatty's recently published *Electrochimica Acta* article "Diffusion model for charge transfer from a photosynthetic reaction center to an electrode in a photovoltaic device" explains the model.

Bio-PV devices are only in experimental stages, but with proof of concept now demonstrated, they are one step closer to application. Taking advantage of the evolution in nature, Takshi envisions that bio-PV devices will one day supply energy to various regions of the world, with scant environmental impact.

"A photovoltaic device that can efficiently harvest light energy in various climates and that doesn't have negative effects on nature could be a tremendous solution to the energy crisis now facing us—this could be a solution for centuries," he says.

This research is supported in part by a National Sciences and Engineering Research Council of Canada (NSERC) Special Research Opportunity grant.

HOW IT WORKS



MECHANICAL ENGINEERING

Powered by Blood

The product of his research may have been deemed "the Vampire Battery" by the popular press, but Chin-Pang-Billy Siu prefers to describe it as "a yeast-powered fuel cell that feeds on the glucose in blood."

Fuel cells differ from batteries in that they consume a reactant from an external source—in this case, glucose—as opposed to a battery, which stores electrical energy chemically.

What Siu's innovation means is that in the future, pacemakers, hearing aids and other medical implants may be able to run on electricity generated by the glucose in patients' blood, eliminating the need for regular and costly surgery to replace batteries. The fuel cell also prevents patient exposure to the toxic chemicals currently used in batteries.

A PhD student in the Department of Mechanical Engineering, Siu has developed the tiny microbial fuel cell by containing yeast in a flexible capsule. The yeast metabolizes glucose from a droplet of blood, and electrons—the resulting by-product—can then be used to power a small device.

Siu offers a simple explanation of the technology: "We employ the yeast to generate electricity, and then we harvest the electricity from the yeast."

Because the fuel cell is made by a unique micro-machining process using polydimethylsiloxane (PDMS), it can be easily integrated with the next generation of biomedical devices, micro-electro-mechanical systems (MEMS). PDMS allows for a flexible design for a variety of implants, from prostheses to pacemakers.

"Right now we're focusing on lower-voltage needs, such as for electrode simulators used in hearing aids," says Siu. "But the polymer can be fabricated on an increasingly micro-scale and in any shape, enabling a broad range of applications."

Siu's work, based on earlier discoveries made by his supervisor, Professor Mu Chiao, Canada Research Chair for MEMS and Nanotechnology for Biomedical Devices at UBC, was recently described in the *Journal of Microelectromechanical Systems*. Siu and Chiao's article, "A Microfabricated PDMS Microbial Fuel Cell," demonstrates further proof of concept that the glucose fuel cell can power implanted devices in a self-sustaining manner.

The first prototype has generated an open-circuit voltage of 297mV and a wattage of 481nW from a droplet of human plasma—enough to evoke nerve-cell function from degenerate organs for one hour.

Siu is collaborating with UBC's Centre for Blood Research for further testing with human plasma.

"I'm the MEMS guy on the team," explains Siu. "We're currently looking for additional collaborators from other disciplines, such as chemical engineering and microbiology, for the next phase of research."

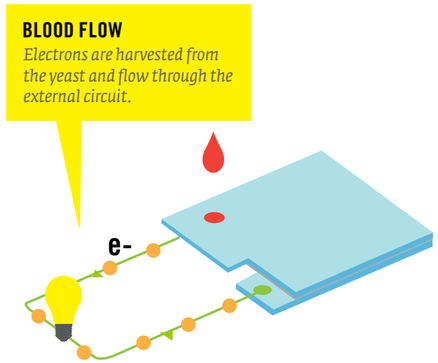
That next phase will include nanotechnology-enhanced electrode design, selectively glucose-permeable structure material synthesis, metabolic manipulation of micro-organisms inside the fuel cell, and biosafety analyses.

It may be 20 years or so before the technology will see widespread implementation. But the potential of these tiny fuel cells is enormous.

"The fuel cells can be used anywhere—within the skull, to treat Parkinson's disease; the spinal column, for prostheses; the heart, for pacemakers; anywhere," says Siu. "And they can eventually help a vast number of people."

This research is supported in part by Sweet Power Inc., a B.C. enterprise in Victoria, which evolved from an earlier collaboration with the National Research Council's Institute for Fuel Cell Innovation in 2005. Additional support has been provided by NSERC and the Canada Foundation for Innovation (CFI).

HOW IT WORKS



Tiny Cell: *The tiny yeast-powered fuel cell is flexible and made of materials compatible with human tissue, offering a new solution for battery-powered, implanted medical devices*

PHOTO CREDIT: MARTIN DEE

Newsworthy

Read the latest developments in education, research and programming coming from Applied Science. Discover how friends of the Faculty support these endeavours and how our people are recognized for their contributions in making a positive difference in society.

From left to right: *Mr. Fred Kaiser, Chairman of The Alpha Group, and Ms. Lynda Hogarth, Trustee of the Kaiser Foundation, at the welcome reception for Dean Aboulnasr.*

FACULTY

Kaiser Foundation for Higher Education Plays Leading Role in Alternative Energies Research and Learning

The Kaiser Foundation for Higher Education recently pledged $1 million to establish The Fred Kaiser Alternative Energies Endowment Fund within the Faculty of Applied Science. The fund will support faculty members in their educational activities and research in alternative energies and is applicable to initiatives across engineering disciplines.

"Our founder, Fred Kaiser, has always been a strong advocate for green energy. In fact, one of the companies in The Alpha Group is completely dedicated to finding green solutions for power needs. We are pleased to partner with UBC Applied Science to further important discoveries in this realm," says Lynda Hogarth, Trustee of the Kaiser Foundation.

The Faculty of Applied Science is helping to address global environmental issues in a number of ways. For example, in 2002 UBC Applied Science established an undergraduate degree program in Environmental Engineering in collaboration with the University of Northern British Columbia. And UBC's Clean Energy Research Centre (CERC) brings together 26 faculty members across campus to investigate clean-energy issues. The new funding from the Kaiser Foundation will allow Applied Science to expand its efforts in alternative energies, to complement other programs of education and research.

This is not the first gift the Kaiser Foundation has made to Applied Science: in 2002 the Foundation pledged $4 million towards a new engineering building, which opened in September 2005 as the Fred Kaiser Building. Since 2001, the Kaiser Foundation has maintained a close relationship with Applied Science, with Mr. Kaiser acting in an advisory role as a member of the Dean's Engineering Advisory Council. This latest gift in support of alternative energies initiatives arose when the Kaiser Foundation, through their relationship with the Faculty and former Dean Michael Isaacson, became aware of Applied Science's goals and needs and generously stepped forward to help promote and support its clean energy initiatives.

"The Kaiser Foundation's generous pledge will provide UBC Applied Science with much-needed funding to bolster our leading-edge research and educational programs in alternative energies," says Dean Tyseer Aboulnasr. "The Kaiser Fund will help our engineers provide real solutions for global warming, one of the fundamental challenges we are facing today. We are truly grateful to Mr. Fred Kaiser for his continued involvement with the faculty and to the Kaiser Foundation for Higher Education for their support of this key area of research and learning within Applied Science."

PHOTO CREDIT: RUBY MAWIRA

STUDENTS

Ledcor Group Supports UBC Applied Science Students

The Ledcor Group (Ledcor) marked its 60th anniversary with a gift of $260,000 to the Faculty of Applied Science as part of an overall $300,000 contribution to the University of British Columbia. Ledcor's generous commitment will help fund a variety of initiatives in support of UBC's students.

Of the gift to Applied Science, $200,000 will go towards construction of the planned Wayne and William White Engineering Design Centre to support undergraduate student education across engineering disciplines. The new building will include an engineering design studio, several student project rooms, and a student workshop for the development, assembly and fabrication of student-led extracurricular and competition projects. Ledcor's gift will help to transform the educational experiences of UBC Engineering students by providing the spaces needed for collaborative design work.

Ledcor's gift to UBC has also endowed $100,000 towards five UBC Centenary Award scholarships. UBC Centenary Awards were created in 2008 to celebrate the university's 100th anniversary and provide support to students in every field of study.

Ledcor's contribution to the Student Centenary Awards include two scholarships in the Department of Civil Engineering, one in the School of Architecture and Landscape Architecture, one in the Sauder School of Business, and one in Varsity Athletics, with preference given to a student in Engineering, Architecture or Commerce.

Ledcor's support will make a significant difference in the academic life of UBC Applied Science students.

"The Faculty greatly values its partnership with Ledcor and believes strongly that the relationship brings benefits and future prosperity to engineering and architecture education and industry alike. Innovation is essential if we are to continue improving our global competitive edge, and we are pleased to be able to work with Ledcor towards educational advancement," says Dean Tyseer Aboulnasr.

"Giving back to the community is a core value at Ledcor. This philosophy is entrenched in the company's culture and is reflected in our business practices. Supporting students in their pursuit of higher education and partnering with post-secondary institutions, such as UBC, is just one of the ways which Ledcor gives back to the community," says Peter Hrdlitschka, President, Ledcor Construction.

Founded in 1947, the Ledcor Group is one of North America's leading privately held, employee-owned construction companies, specializing in building, civil, industrial and telecommunication projects.

EDUCATION

New Advanced Degree in Clean Energy Engineering

This fall Applied Science and the Clean Energy Research Centre (CERC) will launch an innovative master's degree in Clean Energy Engineering—the first of its kind in Canada.

"The Master of Engineering in Clean Energy Engineering is intended for those with an undergraduate engineering degree who are interested in advanced training related to environmentally advantageous, energy-efficient technologies—technologies that will help meet the global need for energy while reducing electricity usage, greenhouse gases and other emissions," says Professor John Grace, CERC Acting Director.

The curriculum will focus on energy conservation, social-change concepts, efficient use of electricity and methods for comparing and evaluating alternative energy scenarios. The program includes studies in renewable energy sources, such as biomass, solar, wind and small-scale hydro.

Clean Energy: *The Master's in Clean Energy Engineering includes studies in renewable energy sources such as biomass, solar, wind and small scale-hydro.*

The master's degree program will take 12–16 months to complete and includes a program co-op work term and project. Students will acquire new skills and build on their knowledge to advance their careers.

"Unlike research-focused degrees, the Master of Engineering program provides the unique opportunity to focus on areas such as management, business and leadership in the engineering profession," says Deb Feduik, Master of Engineering Program Manager.

Through a partnership with UBC's Sustainability Office and Applied Science, BC Hydro Power Smart will support the energy conservation and efficiency components of the program by providing expertise, co-funding up to 10 Engineering Co-op work placements related to energy efficiency, supporting a BC Hydro Power Smart Instructional Fellowship and contributing to curriculum development.

The Master of Engineering in Clean Energy Engineering will be offered for the first time beginning September 2009, subject to final approval. For more information on the program, please visit *www.cerc.ubc.ca*.

IN MEMORIAM

Memorial Award Established in Honour of Garreth Thomas

In September 2006, third-year mechanical engineering student Garreth Ewan Thomas lost his life in a tragic car accident. Garreth was working on the Sea-to-Sky Highway improvement project during a Co-op work term with Peter Kiewit Sons' Co. to gain practical work experience and enhance his engineering education.

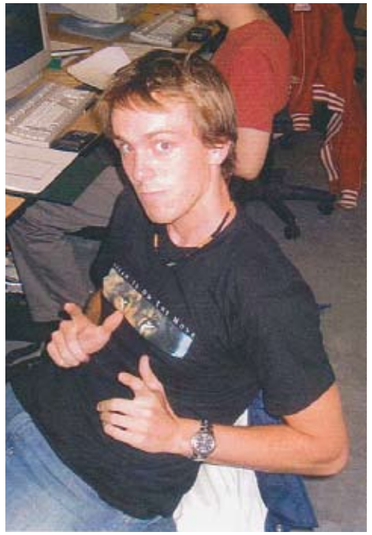
Garreth was both a talented student and a leader among his peers. He took the initiative when he saw a need and was a skilled organizer. During his short time at UBC, he worked with the elementary school outreach program GEERing Up! and was active in several student and community groups. Living with an acute awareness of the global community, Garreth travelled extensively and was looking forward to joining Engineers Without Borders and using his engineering skills to help others overseas.

He enjoyed sports and had earned a Black Belt in Tae Kwon Do, loved the outdoors and was an avid camper. Garreth was active in his church and spent several summers working as a youth counsellor at a Bible camp in the interior of B.C. He was a musician, poet and songwriter and had a band, Corban. The band members have honoured Garreth by keeping his insightful, thoughtful songs on their roster.

Garreth had an unhinged sense of humour. He will be remembered for his infectious laugh and a smile that could light up a room. He conducted his life with passion and focus and will be greatly missed.

In his memory, Peter Kiewit Sons' Co. has contributed $40,000 towards an endowment to establish the Garreth Ewan Thomas Memorial Award in Mechanical Engineering. Fellow students, family and friends also made generous contributions towards the endowment.

The award will provide annual funding for Mechanical Engineering students enrolled in Co-op. In honour of Garreth's many activities and interests, the award will be given to a student with "proven leadership skills and community involvement who demonstrates a strong interest in social responsibility and international development," to encourage students to be as active and involved in their world as Garreth was himself. The first Garreth Ewan Thomas Memorial Award will be presented in fall 2009.



Applied Science is truly saddened by the loss of a talented student who had the potential to become both a skilled engineer and a community leader. We would be pleased to accept further donations to this award in Garreth's name. To make a contribution, please contact Emma Starritt, Major Gift Officer, at 604-822-6197 or emma.starritt@ubc.ca.

Design from the start: *Daniel Franck shows a cam-driven marble-lifter powered by a descending weight.*

EDUCATION

Design from the Start

UBCO's unique approach to engineering

Students often get excited about engineering because they get to "do" things—build bridges, electrical circuits and robots. The School of Engineering offers a unique curriculum that enables students to work on design projects from the beginning.

"The Design from the Start approach developed from student and industry feedback," says Associate Dean Engineering Programs Bruce Dunwoody. "The young Okanagan campus is capitalizing on the collective experience of UBC Engineering and integrating the best."

During first and second year, students receive a solid foundation relevant to future discipline-specific study in civil, electrical or mechanical engineering. Their project work culminates in competitions or capstone design projects. All courses are taught by Engineering faculty members, providing context directly relevant to engineers.

"Students rise to the challenge of developing a sophisticated project during first year," explains School of Engineering Director Spiro Yannacopoulos. "We have found that the Design from the Start approach reinforces classroom learning and provides students with an immediate opportunity to apply newly acquired knowledge. Feedback from Co-op employers indicates they are pleased with our students."

The School of Engineering's first graduates will receive their diplomas spring 2010.

From left: *Don Ryan, Stk'emlupsemc Facilitator; Malcolm Scoble, Robert R. Hallbauer Chair in Mining Engineering; Linda Thomas, Tk'emlups Indian Band Land Claims Program Coordinator/Policy Analyst; Martha Manuel, First Nations Coordinator; Dawn Mills, Mining and Communities Resident Scholar; Olga Druecker, Third Year Mining Engineering Student and Summer Placement Student.*

FACULTY

Norman B. Keevil Institute Launches Highly Anticipated Mining and Communities Outreach Program

Finning spearheads innovative social responsibility initiative

The Norman B. Keevil Institute of Mining Engineering recently launched the Mining and Communities Outreach Program. This program is part of a larger effort on behalf of the Keevil Institute to address social, economic and environmental issues facing the mining industry today and in the future.

Finning (Canada), an active participant in many of Canada's mining communities, was proud to spearhead the program with a $125,000 donation.

"This initiative will help us better understand the dynamic between industry and community and will bring key players together in a socially responsible and respectful way," says Gordon Finlay, Finning (Canada)'s Vice-President, Mining. "We support the program and feel it is an important piece of the puzzle for all stakeholders."

Dr. Dawn Mills, who holds a PhD from UBC's Faculty of Law in Native Law, History and Anthropology, with an emphasis on reconciliation, has been appointed as the inaugural Resident Scholar who will spearhead the program.

The outreach program aims to bring together communities that are dependant upon and/or affected by mining, including First Nations communities, with students of mining engineering, as well as the mining industry itself. It aims to ensure that mining operations are conducted in a way that respects the rights and needs of the communities and to educate community members about mine operations and employment opportunities.

These activities are intended to assist the First Nations and rural communities in capitalizing on business opportunities created by mine development and ensuring that mine site development is appropriately managed for each community.

Similarly, the activities also aim to help the mining industry understand the needs of neighbouring communities, thus improving working relationships and benefiting the mine site and the mining industry bottom line. The Keevil Institute has worked closely with mine communities in the development of this program and has received letters of support from communities, as well as the Treaty 8 Tribal Association of Fort St. John, the Tahltan Central Council and the Canadian Aboriginal Minerals Association. The program currently focuses on mining development in British Columbia, the Yukon and the Northwest Territories.

As part of her efforts as Resident Scholar, Mills has designed and taught a graduate course, Mineral Resource Development and Canadian Aboriginal People. Amongst her current research projects, she is leading a GIS-based social mapping project that will integrate social mapping with information on mineral-property potentials, current mining companies and First Nations reserve lands within B.C.

The outreach program also aims to benefit the education and experience of the undergraduate mining engineering students in the Keevil Institute. As part of the program, for example, the Institute is engaged this summer in an innovative pilot project to provide Olga Druecker, a UBC Mining undergraduate student, with the opportunity for a jointly sponsored Co-op work term, with her time to be shared equally between a new mining development (New Gold's New Afton Mine, near Kamloops) and its two neighbouring First Nations communities (Tk'emlups and Skeetchesn).

Druecker will assist the communities in developing an understanding about mining and its potential to provide diverse benefits, while respecting the context of sustainable development. These types of work terms are seen as significant ways to contribute to B.C.'s socioeconomic development, as well as to the broadened education of its future mining-industry leaders.

The Keevil Institute is now seeking partners within the mining industry to build and sustain the outreach program. Finning (Canada)'s contribution will provide $25,000 to the program each year for five years. The Keevil Institute is seeking a total of $75,000 per year to support the Resident Scholar's teaching, research and outreach activities and invites all members of the mining community to consider supporting this crucial initiative.

If you would like more information about this program, or would like to make a contribution, please contact Emma Starritt, Major Gift Officer, at 604-822-6197 or emma.starritt@ubc.ca.

Photo caption: *Prof. Madjid Mohseni says unsafe drinking water is the cause of thousands of illnesses every year.*

RESEARCH

Too Many Canadians Without Safe Water: $5.2M to Help

For six million Canadians, quenching their thirst isn't a matter of simply turning on the kitchen faucet.

"Water quality in 1,700 small and rural communities across Canada – some as close a half an hour drive from a major metropolitan area such as Vancouver – can be as bad or worse than that in developing countries," says Madjid Mohseni, Associate Professor of Chemical and Biological Engineering. "For example, nearly 100 First Nations communities live under permanent boil water advisories."

Now with the help of a $5.2-million Strategic Network Grant from NSERC, Mohseni is joining forces with 14 researchers from seven universities to make technology available that ensures clean water for all Canadians. The grant establishes a national network of scientists called RES'EAU-WaterNet to address the social, economic and technological challenges faced by small and rural communities.

Mohseni and other UBC Engineering researchers—Pierre Bérubé, David Wilkinson, Elod Gyenge and Rehan Sadiq—will investigate new and existing technologies for rural areas.

RESEARCH

Magnesium reduces Vehicle Weight and Emissions

The UBC-based Magnesium Research Network (MagNET) was recently awarded $4.8 million in NSERC funding and $425,000 from industry over five years to focus on reducing vehicle weight through use of wrought-magnesium alloys in place of steel or aluminum components.

Under the direction of Materials Engineering Professor Warren Poole, MagNET comprises a team of experts from industry, government and five Canadian universities to advance the study of this strong, lightweight material.

"Magnesium is remarkable, having a density 75% lower than steel and 33% lower than aluminum," says Poole. "By extensive use of magnesium components, the net weight of a car could be reduced by 20-25%, or approximately 300 kg."

It is estimated that a 10% reduction in vehicle weight increases fuel economy by 6-8% and that each kilogram of weight reduction leads to a reduction of 17-20 kg carbon-dioxide emissions over the life of a vehicle.

Magnesium is viewed by industry as a key material for enabling the development of the next generation of electric, hybrid or fuel-cell vehicles.

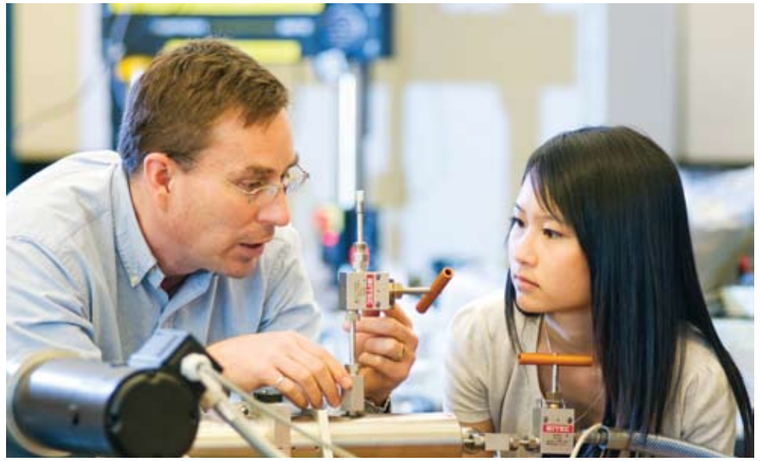


Photo caption: *MagNET Primary Investigator Warren Poole explains magnesium testing to Materials Engineering student Grace Hui.*

MagNET supports the objective of the North American automotive industry to reduce carbon-dioxide emissions produced by the transportation sector, which currently represent 25% of Canada's total greenhouse-gas emissions.

"NSERC and industry funding will enable us to establish Canada as a world leader in magnesium technology. Our team will work with the automotive industry to develop the necessary technology and to transfer this knowledge base to Canadian industry. It will also allow us to educate many highly skilled engineers and scientists in this emerging field," says Poole.

MagNET includes Poole and UBC Materials Engineering Professors Matthias Militzer and Chad Sinclair. It also includes researchers from École Polytechnique de Montréal, McGill University, McMaster University and the University of Waterloo.

For more information, visit: *www.magnet.ubc.ca.*

PHOTO CREDIT: MARTIN DEE (BOTH PHOTOS) "TOO MANY CANADIANS WITHOUT SAFE WATER" REPRINTED WITH PERMISSION FROM: UBC REPORTS | VOL. 55 | NO. 4 | APR. 2, 2009 ORIGINAL STORY BY BRIAN LIN.

RESEARCH

Doctor Improves Machine Health

Recently appointed Tier 1 Canada Research Chair (CRC) in Mechatronics and Industrial Automation, Mechanical Engineering Professor Clarence de Silva studies machine health, improving machine performance and safety through the prediction, detection and diagnosis of malfunctions in engineering systems and machines.

"Machine control involves the adjustment of input signals such as voltages, currents and parameter settings in order to realize a specified performance," explains de Silva. "It has traditionally involved separate processes, but my research goal is to develop a unified framework for industrial systems and machinery that will integrate machine-health monitoring with intelligent supervisory control. I hope to use the information from the monitoring process not only to diagnose machine health but also to make design improvements to the monitored system."

The added value to the Canadian economy from the manufacturing sector alone is approximately $200 billion annually, and improvement of machine performance can substantially improve this figure. De Silva's research will contribute to associated productivity and product quality, as well as safety and improved working conditions for people across Canada.

In support of de Silva's Research Chair, the Canada Foundation for Innovation's Leaders Opportunity Fund has provided $121,413 for a fully networked and integrated research and industrial applications laboratory to study machine-health monitoring, intelligent supervisory control and automated design evolution. The British Columbia Knowledge Development Fund has provided an additional $121,413.

The facility and integrated technology will enable the online and automated evolution of design improvements through a networked operation from a remote location, leading to improvements in product quality, productivity, cost, resource requirements, energy efficiency, safety, quality of work environments and sustainability of engineering systems.

The federally funded CRC program aims to advance research across Canada. For more information visit: *www.apsc.ubc.ca/research/chairs.*

Achievements

Chemical and Biological Engineering
Senior Instructor Dusko Posarac has received a UBC Killam Teaching Prize.

Chemical and Biological Engineering
Adjunct Professor Shahab Sokhansanj has been elected Fellow of the American Society of Agricultural and Biological Engineers.

Civil Engineering
Professor Emeritus Peter Byrne has received the Julian C. Smith Medal from the Engineering Institute of Canada.

Civil Engineering
Associate Professor Loretta Li has received a UBC Killam Faculty Research Fellowship (Junior Category).

Civil Engineering
Professor Don Mavinic, along with co-authors K.P. Fattah, Y. Zhang and F. Koch, have received the Donald R. Stanley Award from the Canadian Society for Civil Engineering for the paper "Application of carbon dioxide stripping for struvite crystallization – 1: Development of a carbon dioxide stripper model to predict CO_2 removal and pH changes."

Electrical and Computer Engineering
Professor Vijay Bhargava has been appointed a Distinguished Visiting Fellow of the Royal Academy of Engineering.

Electrical and Computer Engineering
Adjunct Professor Gary Birch has been elected an Officer of the Order of Canada.

Electrical and Computer Engineering
Senior Instructor Carol Jaeger has received a UBC Killam Teaching Prize.

Electrical and Computer Engineering
Associate Professor Lutz Lampe has received the 2009 Friedrich Wilhelm Bessel Research Award from the Alexander von Humboldt Foundation.

Electrical and Computer Engineering
Professor Peter Lawrence has received the Faculty Member of the Year Award from the UBC Engineering Co-op Office.

Electrical and Computer Engineering
Professor Victor Leung has been elected Fellow of the Engineering Institute of Canada.

Electrical and Computer Engineering
Professor Robert Schober has received two honours: the UBC Charles A. McDowell Award for Excellence in Research; and selection for the new International Research Chairs Initiative.

Materials Engineering
Professor David Dreisinger has been elected Fellow of the Canadian Institute of Mines, Metallurgy and Petroleum.

Mechanical Engineering
Assistant Professor Peter Cripton has received a UBC Killam Faculty Research Fellowship (Junior Category).

Mechanical Engineering
Professor Clarence de Silva has been appointed a Tier 1 Canada Research Chair in Mechatronics and Industrial Automation.

Mechanical Engineering
Adjunct Professor Dan Gelbart has received a UBC honorary Doctor of Science degree.

Mechanical Engineering
Associate Professors Carl Ollivier-Gooch and James Olson, along with co-authors M. Hamelin and S. Delfel, have received the 2009 Atack Award from the Pulp and Paper Technical Association of Canada for their paper "High Performance Multi-Element Foil (MEF) Pulp Screen Rotor - Pilot and Mill Trials."

Mechanical Engineering
Professor Nimal Rajapakse has been elected Fellow of the Engineering Institute of Canada.

Mechanical Engineering
Computer and Electronics Manager Alan Steeves has received the UBC President's Service Award for Excellence.

Profiles

Meet a few of Applied Science's people and discover the contributions they are making to society. Whether mentoring the next generation, raising money for charity, giving back to a beloved sport or caring for the environment, learn how Applied Science people make a world of difference.

Jack Gin

Entrepreneur, mentor and UBC Engineering alumnus

Spend some time talking to UBC Civil Engineering graduate (BASc '83) and entrepreneur Jack Gin, P.Eng. and you're certain to be on the receiving end of some sage mentoring wisdom—either in the form of practical advice or an inspirational message born of experience.

Mentoring is one of Gin's passions. It's important to him to give back to the next generation and help them succeed because, he says, "I never had a business mentor. If I had, it might have helped me avoid some of the pitfalls and sharks of the business world along the way."

Gin says that, by most measures, he is regarded as successful, but that success came despite having had "a tough ride." He is philosophical about those bumps in the road and thankful for them. He explains: "They were part of my journey and they led to greater things. I think they have also made me more useful as a mentor." Despite the successful outcome of his bumpy ride, he maintains "it would have been beneficial if I had started to build an advisory board of trusted relationships earlier in my career."

In 1997, Gin founded Extreme CCTV, eventually growing the business to become a world leader in the design, development and manufacture of "extreme condition" surveillance equipment. His 11-year journey with the company included taking it public and then selling it to German technology giant Robert Bosch in 2008. In 2007, Gin received the Ernst & Young Entrepreneur of the Year Award in the Technology & Media category.

Gin credits UBC for the skills that have proved useful to him both as an engineer and an entrepreneur. He says there were so many courses and so much material to cover that "we became conditioned to working together as colleagues to solve problems quickly and to work in teams."

"We became conditioned to working together as colleagues to solve problems quickly and to work in teams."

These days, Gin still acts in an advisory capacity to Bosch but spends most of his time with other entrepreneurs on ventures that are technology oriented, clean, green and/or humanitarian. He has also established a Capital Pool Corporation (CPC) and is looking for a suitable private company that needs financing. In all these ventures, his role is that of mentor, advisor, director and/or investor.

At his 25-year class reunion in 2008, Gin initiated the first "FIVE for 25" alumni event: five-minute synopses of the 25-year careers of several members of his class. Gin has since turned it into an annual event for other 25-year Engineering grad classes to share their stories. Gin hopes that FIVE for 25 will "inspire and instill confidence in the next generation of engineers and let them see what trails others have blazed before them."

Gin has some mentoring advice for students: "Stay in school and finish well. The world rewards those who can finish." And, "The act of doing things gets results. Getting results will give you the confidence and the courage to succeed. When producing results becomes your orientation, you won't have to look for opportunities—they will find you."

PHOTO CREDIT: DINA GOLDSTEIN

Keith Martin

The Flying Five ride across Canada for Muscular Dystrophy

From left: McDonald, Cuthbert and Martin on a training ride.

What would it be like to ride a bike across Canada? Publish a book? Be named on a patent for fuel cell innovation? Be diagnosed with muscular dystrophy? All while excelling in the rigorous Engineering Physics program?

Most of us don't know and wonder, how is all this possible? On an icy, foggy day this winter, Keith Martin detailed what it's like.

In the fall of 2007, Keith's Sigma Chi brother and Mining Engineering student Michael McDonald suggested a trans-Canada bicycle ride. They were joined by Patrick Cuthbert (BASc '08) and two of Mike's lifelong friends from Ontario.

The quintet decided to make their 7,800-km ride a fundraising effort for Muscular Dystrophy Canada because Keith was diagnosed with the condition in 2005. The Moving Muscles Ride was born when the team dipped their bikes into the Pacific Ocean in Tofino, B.C. on May 13, 2008, and set off on an 85-day journey across the nation.

The group faced highs and lows. They encountered two weeks of headwinds on the prairies; one day was so bad that they rode only 60 kilometres—half their daily average. Keith recalls the high point of the journey—a homecoming arranged by his cousin and mother in Metis Beach, Quebec.

"When we turned the bend into town, fire engines met and escorted us. Church bells were ringing and about 300 people were cheering for us. It was awesome."

The Moving Muscles Ride reaches the finish line at the harbour in St. John's, Nfld.

Three years earlier, during Keith's second year at UBC, he learned that he had muscular dystrophy. "I was pretty much in denial for a year or so, but I carried on. I decided that I want to be the master of my own destiny," says Keith.

Keith has facioscapulohumeral muscular dystrophy (FSHD), a muscle-deteriorating condition that progressively weakens the facial, shoulder and upper-arm muscles and affects balance. FSHD should not shorten Keith's life, but he has felt some changes.

"I play hockey, so my skating—my balance—is not as good as it used to be."

As an avid golfer, Keith finds the sport especially challenging as he can no longer lift his arms above his shoulders.

But when asked what is hardest for him, Keith replies:

"Engineering Physics, the concepts are really tough. And the course load—seven or eight courses each term—is intense."

In addition to Engineering Physics, Keith is pursuing a Minor in Commerce and intends to graduate in 2010.

During 2007, Keith completed an eight-month Co-op work placement at Ballard Power Systems. He was recently listed on a patent for a special sealant used on fuel-cell stacks.

"I was surprised to hear that they'd taken my idea to patent stage," he said. "It says a lot about Ballard to recognize the work of a Co-op student."

Outside academia, Keith finds it hard to make time for everything he wants to do. In addition to school and sports—hockey, golf, tennis, squash and snowboarding—Keith is a teaching assistant for Physics and belongs to Sigma Chi, a leadership-focused fraternity.

From the blog he kept during his trans-Canada trip, Keith authored *The Flying Five*, a book to inspire children with muscular dystrophy and their families. Not only did Keith and his friends raise over $155,000 for muscular dystrophy through their bike ride and Keith's book, but they also generated immeasurable awareness for the cause.

How is all this possible?

Keith answers simply, "I focus on what I can do instead of what I cannot."

Aaron Coret

Giving back to the sport he loves and inventing the snowboard Landing Pad so others can excel in a safe environment

"That's essentially what the Landing Pad was designed to be, a renewable powder landing."

Fourth-year Engineering student Aaron Coret divides his time between courses in the Integrated Engineering (IGEN) program and nurturing his startup business, Katal Innovations.

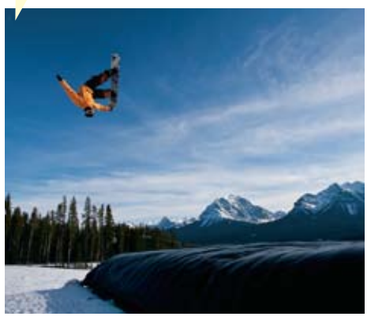
IGEN provides a broad-based, multi-disciplinary education through hands-on courses in which students design, build and test projects that span different engineering disciplines. Students gain real-life design and project-management experience.

Born from a fourth-year IGEN design course, Katal Innovations' main product is a unique inflatable structure designed to provide a safe training mechanism for freestyle snowboarders; its creators have dubbed it "The Landing Pad."

"Over the past 20 years, snowboarding has evolved from a small group of riders crowded around half-pipes to a mainstream industry with terrain parks at every resort and a large following of people who are absolutely obsessed with it," says Coret.

"The idea came from our obsession with pushing the sport ourselves. The most exciting thing about snowboarding is getting better and succeeding and doing well—about progressing to higher levels—but sometimes you get hurt."

The Landing Pad enables snowboarders to progress in a safe environment.



With an ever-increasing number of people packing into terrain parks, attempting bigger and more difficult tricks, the risk for injury increases. Jump landings in the terrain park are on hard-pack at best and, more often than not, near-solid ice.

By ensuring a safer landing, the Katal—named after the SI unit of catalytic activity or progress—Landing Pad allows boarders to try harder tricks, to push their abilities in a safe environment and to progress in their sport.

Unlike other inflatable devices that serve as a giant pillow, Katal's unique ramp-shape and patent-pending design enable a rider to continue movement downhill if landing successfully or to cushion the fall by deflating in case of an unsuccessful landing.

"Essentially the Landing Pad was designed to mimic a renewable powder landing," says Coret.

Coret admits that he had long seen the need for such a safety innovation, but it was not until his IGEN assignment coincided with a life-changing injury that he and his teammate Stephen Slen (BASc '07) took the Landing Pad from concept to design.

In 2005, during his third year of studies at UBC, Coret broke his neck in a snowboarding accident on the Whistler Blackcomb Glacier. Now a C5/C6 quadriplegic, Coret gets around in a motorized wheelchair.

"After my accident, I devoted time to this project—time that I would've previously spent snowboarding," says Coret. "This project is directly inspired by my desire to give something back to the sport I love so much."

Now in its third-phase design, the latest version of the Landing Pad recently debuted at Lake Louise and is available for special events.

"If it wasn't for the design courses in IGEN, we never would have had the opportunity, the time or the support to realize this dream. The emphasis on hands-on design experience was the major reason I enrolled in the program," says Coret. "Thanks to this experience, we now have the opportunity to improve our sport and to help others."

The Landing Pad can be seen at *www.katalinnovations.com.*

PHOTO CREDITS: ANDREW STRAIN (AARON), RUSSELL BROWN (SNOWBOARDER) STORY REPRINTED WITH PERMISSION FROM UBC REPORTS | VOL. 55 | NO. 5 | MAY 7, 2009 BY BRIAN LIN
PHOTO CREDIT: MARTIN DEE

Marisol Valerio

Driven by passion in her pursuit of higher education and musical inspirations

"Geological engineering combines my love of math and physics with my passion for the outdoors."

Passion underscores everything Marisol Valerio does, be it collecting soil samples by helicopter in the Northwest Territories or playing the violin while dressed as her alter ego, medieval fantasy warrior Violet Sin.

The Costa Rican transplant was attracted to B.C. for its natural beauty and diverse culture, and she got everything she had hoped for – on top of an education she says would be "difficult to find elsewhere" in the faculties of Science and Applied Science.

"Geological engineering combines my love of math and physics with my passion for the outdoors," says Valerio, who graduated this spring with a Bachelor of Applied Science degree. "People in my field get into it because they enjoy the work. It's definitely not your average nine-to-five desk job."

Valerio says the mentors and colleagues she's met over the past five years are serving society by providing something it needs. "And we're coming up with knowledge and skills to bring the industry beyond complying with existing regulations but doing what's best for the environment—because for many of us, our love of nature is why we got into the field in the first place."

While her studies and Co-op placements have taken her from diamond mines in Canada's Northwest Territories to uranium explorations in Australia, her musical talents have taken her back in time in a variety of genres. Valerio has served as orchestra conductor and performed in four student-opera productions and also plays the violin in three bands spanning country, Latin and "folk metal" genres.

On stage, Valerio (a.k.a Violet Sin, her folk-metal persona) is joined by fellow UBC students and Scythia band members—Thorgen Hellhammer, Helmut Doomfist, Lady Thundertroll, Savage Tombfiller and the Souleater—as she unleashes the "angel's harp," or violin. Their original "battle songs" tell stories of wizards and goblins. To hear Scythia performances, visit the band's MySpace profile at *www.myspace.com/scythiavancouver.*

"I've been playing the violin since I was four but it wasn't until I came to UBC that I realized there were so many different ways of expressing myself musically," says Valerio. "In a way, it sums up my experience here in Vancouver, where you can hear five different languages just while sitting on the bus.

"The opportunity to immerse myself in a variety of opinions and traditions and learn from students and teachers from around the world has really broadened my horizon," she adds. "As an international student, it's reassuring to see people embracing diversity—I never felt like an outsider."

With a full-time job already lined up with a Vancouver-based consulting firm, Valerio is looking forward to taking a few days off to visit Hawaii. "Compared with my native Costa Rica, the pace is so much faster here and people are a lot more efficient,'" she says. "Managing time well and keeping a good work-life balance is another valuable skill I've learned during my time at UBC."

Alumni Updates

Laughs, smiles, jokes, tall tales and libations—enjoy the highlights of recent UBC Engineering alumni gatherings. Hundreds of alumni made it back to campus this spring, and we hope more of you will participate in UBC activities in the coming year.

A Message from the Director of Development and Alumni Relations

As the Acting Director of Development and Alumni Relations, I am pleased to welcome you all to this redesigned issue of *Ingenuity.*

For our team this is not the only thing that is new—we've recently moved to new offices in the Chemical and Biological Engineering Building (290–2360 East Mall, Vancouver BC V6T 1Z3), but our phone numbers and email addresses remain the same. Also, following the lead of the UBC-wide change, Applied Science recently merged Development and Alumni Relations into one office, and we are pleased to officially have Tracey Charette, Manager of Alumni Relations, as part of our team.

We've just enjoyed our most successful alumni reunion weekend to date, welcoming back several hundred of you to campus. I hope that more of you will follow this example and come back to your alma mater to get involved. Not only do we host regular reunions, but there are many other activities—mentorship, Co-op and Old Red New Red, to name a few—to get involved with in Engineering. Please help us give today's students the benefit of your experience!

Our Development team continues to work hard to engage our communities in support of Engineering. We are pleased to showcase for you in this issue a generous new gift from the Kaiser Foundation for Higher Education, which in 2004 was also the lead donor to the Fred Kaiser Building. We are also extremely pleased to announce new gifts from The Ledcor Group, Finning (Canada) and Peter Kiewit Sons' Co. in honour of one of our students. Thank you to all of you who have made contributions in support of Applied Science.

As always, please do not hesitate to get in touch with me or my colleagues in the Applied Science Development and Alumni Relations Office to learn more about how you can get involved with UBC Engineering. I can be reached at 604-827-5625 or gio.festa@ubc.ca.

Best regards,

Giovanni (Gio) Festa
Acting Director
Development and Alumni Relations

2009 Event Highlights

UBC ENGINEERING REUNION RECEPTION AT ALUMNI WEEKEND

UBC Engineering welcomed more than 100 alumni from the classes of 1959, 1969, 1979, 1984, 1989 and 1999 to a reunion event on May 23 as part of UBC's Alumni Weekend. At her first Alumni Reunion as Dean, Dr. Tyseer Aboulnasr gave an engaging presentation to an enthusiastic audience who kept her on her toes. Afterwards, guests joined department heads and faculty members for tours of the engineering departments and "tech talks" highlighting the research of each.

ANNUAL MINING DINNER 1

The Norman B. Keevil Institute of Mining Engineering hosted its 13th Annual Mining Dinner on January 31. Robin Sheremata (MINE '85), keynote speaker for the evening, gave a presentation on safety, while another highlight of the evening was the announcement of the Ken Mathews Award in Mining Geomechanics. The surprise of the evening was the rock 'n' roll performance of Professor Marcello Veiga and his all-student band, performing "Why ARD?" to the tune of "YMCA."

OLD RED NEW RED 2

On February 5, the Faculty of Applied Science and the Engineering Under-graduate Society hosted Old Red New Red for Engineering students and alumni. This year marked our best turnout of alumni, many of whom were proudly wearing their Reds. Fraser Hodge (CIVL '69) was the guest speaker, and it was a veritable coup to hear the account (with no acknowledgment of personal involvement) of the capture of the Nine O'Clock Gun.

FIVE FOR 25—MECH ENGINEERING 3

The Mechanical Class of 1984 returned to campus to celebrate 25 years since graduation and gave back to UBC Engineering students! Five alumni reflected on their journeys since graduating from UBC Engineering and offered students inspiration upon graduation into the current economy, similar to that of 1984.

"In some ways, a vocation is not fully realized until we offer up our hard-earned knowledge in the service of teaching others. I have learned many great lessons from those who practiced before me, and was delighted to share my lessons learned in the spirit of a strong and prosperous profession," said Andrew Mc Fadyen (MECH '84). We invite the Classes of 1985 to campus to share their knowledge and career experiences with students at FIVE for 25 events in 2009/2010.

1 Members of the Mathews family, Drs. Scoble and Pakalnis with student award recipient, Paul Hughes
2 Fraser Hodge addressing students and alumni at Old Red New Red 2009
3 Presenting members of the MECH class of 1984 at Five for 25
4 EECE Class of 1979 at 30th reunion

MECH 1969 REUNION

Sixteen classmates and their wives descended upon Pacific Shores in Parksville April 17 to celebrate their 40-year reunion. That evening included a Chinese seafood buffet and (at least) 40 beers. The next day the class hiked the Little Qualicum Falls followed by picnicking at the falls and ice cream cones at Coombs. Dinner at the Shores with many stories was a fitting end to the day. Sunday, the class had brunch by the ocean before bidding each other adieu.
Submitted by Doug Lunam (MECH '69).

CIVIL 1979 REUNION

The Civil Engineering Class of 1979 met on May 2 at the Royal Vancouver Yacht Club for a night of dining and reminiscing. The class welcomed Professors Don Anderson, Peter Byrne, Liam Finn, Don Mavinic, Sid Mindess and Frank Navin. Jeff Herold, the Class of '79 president and the evening's emcee, remarked, "It's hard to believe that it has been 30 years. A few of us were at the pub last night and decided that we hadn't aged at all and looked pretty much the same as we did in 1979. Unfortunately, based on our conversation with the waitress, we found out that our eyesight is failing as well!" Many old friendships were rekindled and a fun evening was had by all.
Submitted by Jamie Lott (CIVL '79).

CIVIL 1989 REUNION

The Civil Engineering Class of 1989 celebrated its 20-year reunion on May 23 in conjunction with Alumni Weekend 2009. An exceptional evening was spent at The Main in East Van reminiscing, honouring those who could not attend and catching up on the last 20 years. The central theme of the evening was "the more things change, the more they stay the same."
Submitted by Richard Wong (CIVL '89).

ELECTRICAL 1979 REUNION 4

Nearly half of the EECE class of 1979

attended the 30th reunion on May 23 at the Jericho Sailing Club. Special thanks to Frank Lee, who travelled from Hong Kong for the weekend, and Charles Franz, who came from Hawaii!
Submitted by Greg Aasen (EECE '79).

ELECTRICAL 1969 REUNION 5

Members of the EECE Class of 1969 reunited to celebrate their 40th anniversary with the theme "Reconnect with the City, the University and your Classmates." The group spent Friday evening reconnecting with each other in Vancouver's trendy Yaletown. Saturday was spent on campus at the Engineering Reunion Reception hosted by Dean Aboulnasr, followed by dinner with classmates and guests at a local restaurant in Vancouver's Chinatown!
Submitted by Jim Yan (EECE '69).

CIVIL 1972 REUNION 6

CIVL '72 celebrated their 37-year reunion with a three-day program that dovetailed with the UBC Engineering Reunion Reception during Alumni Weekend. The program started with a tour of the new Canada Line and a ride on the new Skytrain from YVR to Waterfront Station, a walking tour of the new YVR West Wing of the International Lounge and a visit to the luggage-handling facilities in the bowels of YVR. The day ended with dinner at Carvers Steakhouse, with several emeriti and professors in attendance. While on campus, alumni found their old grad photo on the walls of CEME and reminisced about the time they found the remains of the Engineering Chariot outside the Cheese.
Submitted by Jeff Yip (CIVL '72).

MECH 1984 REUNION

MECH Class of 1984 celebrated 25 years in true engineering style with a party at Cecil Green House! This close-knit group welcomed classmate and former MECH President Maurice Duteau from Shanghai. The class enjoyed the evening as they reminisced over old *Slipstick* photos, exaggerated achievements, heard a wonderful presentation from Christian Beaudrie of Engineers Without Borders (*www.ewb.ca*) and started planning their next reunion!
Submitted by Guy Borowski (MECH '84).

5 CIVL CLass of 1972 with the Engineering Chariot
6 EECE Class of 1969 at 40th reunion
7 Kenneth Julien, Dan Gelbart and Judy Graves

CLASS OF 1959 LUNCHEON

Nearly 70 alumni from UBC Engineering 1959, including Civil, Geological, Metallurgical, Electrical and Engineering Physics, gathered on campus to celebrate their 50th anniversary with a luncheon at Sage Bistro. After lunch, the class of 1959 was treated to tours of the Civil Engineering Department, the Earthquake Shake lab and the Ike Barber Learning Centre's advanced robotic retrieval system. Ray Meadowcroft
(METL '59), who was also a former Department Head, helped organize the tour with Materials Engineering Head Warren Poole.

HONORARY DEGREE RECEPTION 7

Dean Tyseer Aboulnasr hosted a reception in celebration of the Faculty of Applied Science's three Honorary Degree recipients on May 25. The honorees each gave an inspiring speech amongst faculty, colleagues, friends and family. Dean Aboulnasr recognized their diverse accomplishments, and commented on how each share the same mutual interest—serving society. Applied Science awarded honorary degrees to three distinguished individuals at the 2009 Spring Congregation: Daniel Gelbart, Adjunct Professor of UBC Mechanical Engineering and a highly respected inventor and entrepreneur; Judy Graves, long time advocate for the homeless and coordinator for Vancouver's Tenant Assistance Program; and Kenneth Julien, President of the National University of Trinidad and Tobago and former Dean of Engineering at the University of the West Indies.

MISSING *SLIPSTICKS*

The Engineering Alumni Office is hoping to put together a complete collection of *Slipsticks*. We are missing years 1999, 1995, 1994, 1993, 1989, 1967 and anything prior to 1951. If you or someone you know can donate one, let us know!

WINNER OF THE CONTEST

We are pleased to announce that Gord Milne (CIVL '72) was the lucky winner of the draw prize (one night's accommodation at West Coast Suites) for completing the survey in the last issue of *Ingenuity*.

Upcoming Events

Reunions are but one way to reconnect with classmates and your alma mater. Discover upcoming events that you are invited to attend. Consider cheering on the Thunderbirds this fall, attending UBC's Alumni Achievement Awards or learning about leading-edge research.

UPCOMING EVENTS

HOMECOMING

Not just for engineers, fun for everyone! Homecoming 2009 is happening on September 26. The UBC Thunderbirds will be butting heads with the Regina Rams. Join the fun and show support for your old school. Get into the blue-and-gold spirit by joining the tailgate party before the game. Details coming soon: *www.alumni.ubc.ca/events.*

OLD RED NEW RED 2010

The annual alumni-student event, Old Red New Red, will be in February 2010 during Engineering Week—we hope to see you there!

APPLIED SCIENCE ALUMNI MEET UP

UBC Applied Science will be in Calgary in Fall 2009. If you live in Calgary or the area, make sure we have your contact information so we can send you an invitation!

UBC ALUMNI ACHIEVEMENT AWARDS

UBC will proudly celebrate the talent and success of graduates at the annual Alumni Achievement Awards in November 2009. We have much to celebrate with three awards from Applied Science this year—be sure to watch *Trek magazine* and *Grad Gazette.* For more details, visit:
www.engineering.ubc.ca/alumni.

EVENTS OPEN TO ALUMNI

BIOMEDICAL ENGINEERING GRAND ROUNDS SEMINAR SERIES

Beginning again this September, The Grand Rounds Seminar Series invites distinguished biomedical leaders from industry and academia across Canada to present and discuss current topics in biomedical engineering research and development. For more information, visit:
www.bme.ubc.ca/news-events.

ICICS–DISTINGUISHED LECTURE SERIES

Join ICICS—the Institute for Computing, Information, and Cognitive Systems—for the Distinguished Lecture Series, featuring academic and industrial leaders in the forefront of their fields:
SEPTEMBER 24/09:
Robert J. Hocken, UNC-Charlotte
OCTOBER 22/09:
Seth Copen Goldstein, Carnegie Mellon University
NOVEMBER 26/09:
Jonathan Schaeffer, U.Alberta
JANUARY 21/10:
Rahul Sarpeshkar, MIT
For more info, visit: *www.icics.ubc.ca*

ENGINEERING OPEN HOUSE

Save the date! Saturday, November 7, 2009 at the Fred Kaiser Building. Bring your friends and family to see what UBC Engineering has to offer today! Details will be posted at:
www.engineering.ubc.ca/openhouse.

STAY CONNECTED

Be an active member of the UBC Applied Science community regardless where you live. Would you like to join us for events in Vancouver and across Canada? Do you have a talent for connecting people? Do you know of success stories from UBC Engineering alumni? Are you willing to share your experience with UBC students or alumni new to your region? Are you proud of your alma mater?

Please ensure we have your contact information and most importantly your email address so we can include you in our electronic communications! Update your contact info at *www.apsc.ubc.ca/alumni/contact* or email alumni@apsc.ubc.ca

Enter UBC's travel contest to win a Canary Islands Cruise!!! Visit *www.alumni.ubc.ca* for full contest instructions and regulations. Contest closes September 17, 2009.

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. **HIRE A CO-OP STUDENT TODAY!**

Contact us by phone at 604-822-3022 or email at eng.coop@ubc.ca.

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