



THE  
UNIVERSITY OF  
BRITISH  
COLUMBIA

# ingenuity

Faculty of Applied Science  
Engineering News

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## Driven by research

### Fast track to emissions reduction

Imagine reducing vehicle emissions by one-third—tomorrow. According to Mechanical Engineering Assistant Professor Martin Davy, we have the technology and capability to do so.

Because fuel-cell vehicles are still a distant reality, Davy is investigating an alternative solution. His research focusing on a new generation of clean-burning, gaseous-fuelled engines makes Canada's commitment to the Kyoto Protocol—specifying significant reductions in greenhouse-gas emissions by 2012—a realistic endeavor.

Davy's research has two primary goals: minimizing harmful emissions and increasing engine efficiency by using less fuel and burning it completely. Herein lies the crux of his research—the more completely a traditional hydrocarbon fuel burns, the more greenhouse-gas emissions are produced. According to Davy, the solution lies in using clean-burning gaseous fuels.

"Gaseous fuel technology is a logical, systematic route to the goal of producing a zero-emissions vehicle," says Davy. "It's an evolutionary approach."

This evolutionary approach entails progressively modifying internal combustion (IC) engines to use clean-burning, low-carbon fuels. Traditional fossil fuels—diesel and gasoline—contain a substantial quantity of carbon and produce significant amounts of carbon dioxide. Methane, commonly referred to as natural gas, contains only one carbon molecule for every four hydrogen molecules, approximately half the carbon content of the traditional fuels. Davy's research involves adding increasing amounts of hydrogen to the natural



Martin Davy uses equipment provided by CFI funding for his clean energy research. The laser is used to excite fluorescence in fuel that is then photographed.

gas mixture, further reducing the fuel's carbon content, until it is possible to use pure hydrogen—producing water vapour as its only by-product.

"By making incremental improvements to current technology, moving to gaseous fuels and optimizing the IC engine, we can make a significant contribution to greenhouse-gas reduction in a short time," says Davy.

To further study gaseous-mixture preparation and combustion, Davy has recently secured Canada Foundation for Innovation (CFI) funding for *Diagnostics for Energy Efficient Powertrain Imaging Mixture Preparation on Advanced Combustion Technologies* (DEEP-IMPACT). The grant provides equipment for laser-based measurement techniques in order to study in-cylinder mixture formation. DEEP-IMPACT will be housed in the Clean Energy Research Centre and will facilitate a number of collaborative research projects.

# Message

## from the Dean



Welcome to the fall 2005 issue of *Ingenuity*. As the Faculty celebrates its 90th year, I am pleased to report on a variety of exciting developments. From the expansion of our physical infrastructure to providing additional educational opportunities for students, we have many recent accomplishments of which I am extremely proud.

The Fred Kaiser Building located at 2332 Main Mall—immediately east of the E Cairn—formally opened in September. Pages 10 and 11 have details of the opening ceremony. The building will serve as the hub of engineering, centralizing Engineering Student Services, the Technical Communication Centre and the Faculty of Applied Science Dean's Office, as well as housing the expansion of the Departments of Electrical and Computer Engineering and Mechanical Engineering. The expansion will help accommodate the 600 additional undergraduates currently registered in electrical and computer engineering and mechatronics, as a result of the provincial government's 2001 Doubling the Opportunity initiative.

I am also pleased to announce the completion of the Chemical and Biological Engineering Building, which opened this fall. The building provides much-needed classrooms, faculty offices and laboratory space for the department and also houses the Clean Energy Research Centre. Its official opening ceremony will be held in March 2006 and details will be included in a future issue of *Ingenuity*.

Renovations have also occurred within engineering buildings to better serve our students. The L.B. Gatenby Study Room provides mining undergraduate students with a much-needed communal place to study, work and learn. The new Civil Engineering Design Studio houses a computer laboratory, several group work areas and includes a model-construction area for civil engineering students. Please see pages 6 and 7 for details of these two refurbished spaces.

With respect to our program activity, we are also pleased to witness the opening of UBC Okanagan (UBCO) in Kelowna and the establishment of UBC Engineering as a dual-campus Faculty. With 70 students beginning the Engineering One program this fall, we are dramatically expanding engineering education and career opportunities for those in B.C.'s Southern Interior. For an introduction to engineering at UBCO, please see page 4. In future issues of *Ingenuity*, we will share with you further news of engineering at UBCO.

We have come a long way since 1915 when the Faculty of Applied Science was first established, with its nine students, as one of UBC's three founding faculties. We currently number more than 3,000 undergraduate students at UBC's two campuses. Today, with our thousands of engineering alumni, students and faculty working to better our society, I am so proud of our many accomplishments and the enormous contribution to the development of British Columbia and Canada. I thank all who support the Faculty for your ongoing efforts.

As always, please contact me—by letter, telephone 604-822-6412, fax 604-822-7006, or e-mail dean@apsc.ubc.ca—if you are able to assist in the development of the Faculty, if you have any suggestions to provide or if you would like further information on the Faculty's activities.

**Michael Isaacson**

Dean

To view past issues of *Ingenuity* and learn more about the Faculty, visit our website at <http://www.apsc.ubc.ca/publications/engineering.html>.

# Champion of research

“The University of British Columbia, aspiring to be one of the world’s best universities, will...conduct outstanding research to serve the people of British Columbia, Canada and the world.” Trek 2010, Vision Statement

Associate Dean Savvas Hatzikiriakos is working to make UBC’s research vision a reality.

Appointed Associate Dean Research and External in 2003, Hatzikiriakos’ main responsibility is to provide support for the Faculty’s research enterprise by identifying new research opportunities and establishing and developing partnerships between faculty, industry and government.

Research opportunities range from a single researcher with individual funding to a multidisciplinary group collaborating on a broad topic. A prime example of the latter is the Clean Energy Research Centre, dedicated to the study of renewable energy with collaborations across engineering disciplines.

Hatzikiriakos’ role within these partnerships is to facilitate the smooth operation of research by working with the director and individual researchers, as well as the funding agency. His portfolio includes a broad range of responsibilities, from ensuring optimal laboratory space to preparing and presenting proposals.

Not limited to working with professors within the UBC Faculty, Hatzikiriakos seeks research opportunities with international universities. Recently partnerships have emerged with KOÇ University

and Middle East Technical University in Turkey, the National University of Singapore and Cheju National University in Korea.

Developing strategy for Faculty research activities also falls within Hatzikiriakos’ portfolio. The Faculty is currently undergoing a paradigm shift to further promote the study of biomedical and life-sciences research; the new Biomedical Engineering Program, scheduled to begin in fall 2006, is one such initiative to emerge.

Hatzikiriakos was integral in the strategic decision to bring the Master of Engineering program (MENG) to the Faculty of Applied Science, recently transferred from the Faculty of Graduate Studies. The move aligns the MENG degree professionally.

Graduate students are integral to an outstanding research program, and it is Hatzikiriakos’ role to oversee and expand the master’s program. He, along with MENG Program Manager Deb Feduik, ensures the program runs smoothly in terms of the university’s academic policies.

One of the most challenging yet rewarding aspects of Hatzikiriakos’ role as Associate Dean is serving as the Faculty’s main advocate for researchers in their effort to secure external funding. He negotiates with

UBC’s University-Industry Liaison Office to support researchers’ intellectual property rights and facilitates contracts with the private sector.

With advanced degrees from the University of Toronto and McGill University, as well as 14 years’ experience as a chemical engineering professor at UBC, Hatzikiriakos has a keen understanding of the challenges researchers face in securing their intellectual property. He has successfully collaborated with private companies to fund his own research in polymer flow. In one such partnership with DuPont, he was able to develop his research on paste extrusion of Teflon®, an innovative technology used commonly to produce Teflon tape (extensively used by plumbers), as well as Teflon-coated cables for the aerospace industry.

“As Associate Dean, I have had the unique opportunity to learn about the structure of the university and its decisions regarding research,” says Hatzikiriakos.

Previously, as a researcher, I would occasionally become frustrated by the university’s stance on intellectual property rights and the procedures followed to sign contracts with the private sector. The insight I’ve gained since becoming Associate Dean



Associate Dean Research and External Savvas Hatzikiriakos

is invaluable in helping me to assist our faculty in understanding the university’s position and, ultimately, to advance their research.”

With such a broad range of responsibilities, Hatzikiriakos finds it imperative to empathize with others to better understand their position. Each party—researcher, industry, university or graduate student—brings a different strength and set of needs to the table.

Driven by the university’s vision to conduct outstanding research, Hatzikiriakos finds inspiration for his role as Associate Dean in the words of 19th-century French author Victor Hugo, “An invasion of armies can be resisted but not an idea whose time has come.”

Hatzikiriakos has been appointed to a second three-year term, ending June 30, 2008.

# UBC Okanagan opens!

## Dean welcomes faculty and students

September 2005 has been filled with excitement—the University of British Columbia opened its Okanagan campus in Kelowna, and the Faculty of Applied Science celebrated its new status as a dual-campus Faculty with the inauguration of its engineering program in Kelowna.

On September 8, the university hosted formal opening ceremonies at the new campus in Kelowna with President Martha Piper, Premier Gordon Campbell and many dignitaries, including four university presidents from Asian-Pacific universities, in attendance.

Engineering at UBC Okanagan will help meet the province's demand for engineers and dramatically expand the opportunity for students from the Southern Interior to study engineering. On September 6, seventy students began the program, which will lead to four-year baccalaureate degrees in engineering.

To celebrate, Dean Isaacson hosted a reception on September 22 to welcome new engineering faculty and students to the Okanagan campus. He also acknowledged and thanked all members of the UBC community and industry partners who helped fulfill the vision of establishing an engineering school at UBCO.



Dean Isaacson in academic regalia for UBCO's opening ceremony, September 8, 2005

"I am very pleased to celebrate with you the opening of UBC Okanagan and the establishment of engineering at UBCO," said Dean Isaacson. "Thank you all for your efforts, dedication and persistence."

UBCO Deputy Vice Chancellor Barry McBride thanked Dean Isaacson for his leadership and the Engineering Advisory Committee (EAC) of the Okanagan Partnership for its support, and he welcomed students to an exciting future in engineering at UBCO.

The EAC of the Okanagan Partnership is a group of industry professionals that among other things, has been very helpful in providing strategic advice, guidance and support for the engineering program. Several members addressed students during the opening ceremony and wished them well in their academic studies and their engineering careers.

The engineering faculty members, led by Applied Science Associate Dean and Acting Director Bruce Dunwoody, include Sander Calisal, Carolyn Hay, Richard Klukas, Andrew Labun, Gordon Lovegrove, Craig Merkl and Nicholas Swart. Please see page 15 for more information on them.

Congratulations to all sharing in the excitement of UBC Okanagan's inaugural year. Best wishes for success!

Left: Students listen to speakers at the Faculty-hosted reception.

Below: Engineering faculty, industry partners and UBCO colleagues are welcomed.



## Driven by research Continued from page 1

The first portion of Davy's DEEP-IMPACT projects involves the further development of a new method of ignition stabilization developed by fellow UBC Professor Robert Evans. Evans' partially stratified-charge (PSC) technique involves the injection of a small quantity of natural gas adjacent to the spark-plug just prior to ignition. This allows the use of highly dilute air-fuel mixtures considered too lean for use in conventional IC engines, thereby reducing engine emissions and increasing engine efficiency.

With the exception of the small quantity of fuel injected around the spark plug, the PSC engine may be termed an "external" mixture preparation device—the fuel is injected into the intake manifold, as is the conventional method for spark-ignition engines.

Unlike gasoline or other liquid fuels, gaseous fuels occupy a large physical volume and dis-

place air normally used for combustion. Therefore the power of gaseous-fuelled engines is substantially lower than that of gasoline engines. Davy's solution to the power problem is to apply an "internal" mixture formation strategy, introducing the fuel directly into the cylinder after the intake valves have closed.

He is currently investigating injector hardware that will meet both the high-flow requirements of full-load operation while simultaneously delivering a suitable low-flow injection for low-load operation.

To meet his research goals, Davy is also studying fully-variable valve systems, which could potentially be used to control a low-emissions combustion process known as Homogeneous-Charge Compression Ignition (HCCI). Recent research in the U.S. has demonstrated a 10% improvement in fuel efficiency with a simul-

taneous 90% reduction in nitrous oxide (NO<sub>x</sub>) emissions when a normally spark-ignited natural gas engine was operated in HCCI mode. Usually HCCI combustion is restricted to a narrow range of engine operating conditions, significantly limiting the value of the technology. However, Davy, along with industry partner Westport Innovations, is developing mixture preparation strategies that will provide large-scale improvements by increasing load range.

"It is remarkably fortuitous to have Westport in Vancouver," says Davy. "Their world-renowned expertise is a vital asset to DEEP-IMPACT, especially in studying hydrogen fuelling for IC engines."

Although hydrogen has a number of attractive properties as fuel—foremost, when produced renewably it has the potential to eliminate carbon-based emissions—its use presents a number of challenges.

The density of hydrogen gas is extremely low, resulting in less power. It has very low ignition energy and is prone to backfiring and can cause preignition. Hydrogen also has a high flame temperature, leading to NO<sub>x</sub> emissions if not properly controlled. The quality of the mixture preparation is especially important in reducing emissions.

Davy is using lasers to develop strategies to resolve

the mixture preparation challenges facing hydrogen-fuelled IC engines.

"We have this soup swirling around with different chemicals. Identifying harmful emissions within this soup is a significant challenge," says Davy. "We use lasers to tag molecules with a burst of energy, causing them to fluoresce."

Davy likens the chemical reaction to ten people facing away, and each one given a push. Nine will shrug off the interaction, but the tenth will react wildly.

"We excite the molecules by giving them a push with the laser. Most relax back to their normal state, but one goes berserk and emits light, revealing itself as a pollutant," says Davy.

The fluorescing molecule is photographed to identifying where it is in relation to the flame. This allows Davy to see how well the fuel and air have mixed and to optimize the mixing process so the combustion occurs as cleanly as possible.

"CFI's funding of DEEP-IMPACT is the catalyst that allows the dream of a zero-emissions vehicle to become a reality," says Davy. "Now it's off to the laboratory to make it happen by 2010."

2010 is the proposed completion date of the West Coast's hydrogen highway, linking Vancouver to San Diego in time for the Olympics.



A Westport fuel injector, like this one, is used by Professor Davy to study hydrogen fuelling.

# Advancing Education and Research

## Yes, I would like to support the Faculty of Applied Science

Name: \_\_\_\_\_

Address for tax receipt: \_\_\_\_\_  
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I would like to make a tax-deductible donation of \$ \_\_\_\_\_, which will be directed to the *Faculty of Applied Science Endowment Fund for Student Support*. (Please make cheque payable to "The University of British Columbia.")

I would like my gift to be directed to a specific department or program. (please specify)

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I would like my gift to remain anonymous.

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Faculty of Applied Science  
The University of British Columbia  
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September 2005 was a very exciting month for the Faculty of Applied Science. Three important infrastructure projects were completed, giving us the opportunity to advance student learning and research. I am very pleased to highlight for you what we have accomplished through the kindness of our donors.

The official opening of the Fred Kaiser Building, the new central hub of the engineering precinct on campus, was held on September 15. This building was made possible through the combined efforts of the Government of British Columbia and

the Kaiser Foundation for Higher Education.

Two new undergraduate study spaces were also opened: one in the Department of Civil Engineering and one in the Department of Mining Engineering. Generously supported by alumni and friends, these learning spaces will be extremely beneficial to enhancing student education.

The new Fred Kaiser Building is also the home of our recently updated donor wall, which recognizes the generosity of donors who have given \$25,000 or more to engineering at UBC. The next time you are on campus, please take the



opportunity to stop by and see its new placement.

Should you want to find out more about our development priority projects for this year, please contact me at 604-822-1329 or [hillary.gosselin@ubc.ca](mailto:hillary.gosselin@ubc.ca). We look forward to hearing from you!

Thank you.

**Hillary Gosselin**  
Director of Development

## Civil Design Studio opens for students

When the Earthquake Engineering Research Facility opened in its new location last year, the Department of Civil Engineering gained the space formerly occupied by the earthquake laboratory's shake-table in the Civil and Mechanical Engineering Building. On September 26, the department hosted the official opening of the refurbished space and unveiled the Civil Engineering Design Studio.

The renovation of the space was made possible by a number of donors, including Read Jones Christoffersen and Mrs. Susan Christoffersen,

whose combined contribution was used to name the computer laboratory after the late Mr. Per Christoffersen.

"We're very pleased to have this opportunity...to make a visible and lasting tribute to Per Christoffersen," said Norman Webster, President and Principal, Read Jones Christoffersen. "The studio speaks to the practical application of innovative thinking, which is consistent with Per's approach to engineering."

Several other donors, including Buckland and Taylor, the Cement Association of Canada, Golder Associates, Stuart

Olsen Construction and Westmar Consultants each made a significant contribution to the studio and have displayed information about their work in the studio.

In addition to the computer laboratory and six group work areas, the design studio includes a model construction area with tools for students to create models from their designs. Intended for use as a classroom, the studio also includes a podium and audio-visual equipment. A partial mezzanine level provides extra working space for students with tables, chairs and whiteboards.

# Mining celebrates alumnus and a new facility

On September 23, the Department of Mining Engineering held an official opening ceremony for the L.B. Gatenby Study Room. This new facility provides mining undergraduates with a much-needed communal place to study, work and learn.

The room is named in honour of Lisle B. Gatenby, a leading mining engineer and a UBC Mining Engineering graduate whose career took him and his family from B.C. to the Yukon to Guyana, and included working for the United Nations.

Mr. Gatenby passed away in 2002, and his family—George Gatenby, Lisle Gatenby Jr., Mary-Anne Skeans and Rod Gatenby—collectively donated \$100,000 to the department to honour their father and his career. The department used the contribution to refurbish and furnish a space for students to study, and honoured Mr.

Gatenby's contribution to the mining community by placing within it the story of his life and his accomplishments, as well as a number of maps from his collection.

Members of the Gatenby family, friends of the family, students and faculty attended the official opening ceremony hosted by Malcolm Scoble, Head of the Department of Mining Engineering.

"This room came at the perfect time for us," said Scoble. "It was a period when we started to experience a really strong trend in growth. We are truly very, very grateful."

Third-year student Jill LeDrew also thanked the Gatenbys on behalf of all present and future mining engineering students.

"This room fulfills a wish my father had when he passed away in 2002," said George Gatenby, youngest son on behalf of his family. "He wanted to give a gift



Children of the late Lisle B. Gatenby—Rod Gatenby, Mary-Anne Skeans and George Gatenby—stand in front of the commemorative plaque in the L.B. Gatenby Study Room.

to mining education in B.C., and the study room is, we feel, a perfect fit."

Thanking those in attendance, Rod Gatenby, eldest son added, "My father would be truly honoured to see you all here today."

UBC alumnus Robin Porter (BASC '37) spoke to students about the many things he had learned over his 60 years in mining. "In a few years, you'll look back

and see that time has gone in a flash," he said "so you want to take every opportunity you have to learn. When you get your sheepskin, that will be the start of a great adventure."

The Faculty would like to thank the Gatenby Family for its contribution to the department and for the opportunity to showcase for future mining engineers the life of one of UBC's accomplished alumni.

## Continued from previous page

Civil Engineering Professor Helmut Prion, whose inspiration sparked the creation of the studio, referred to it as a place "where engineering creativity and industry meet."

"This is a great source of pride and unity for us, and will provide a home for students," said Jayson Walker, Civil Engineering Undergraduate Club President. "It is an essential tool for encouraging creativity. Thank you

on behalf of all civil engineering students."

"The Department of Civil Engineering and its students are benefiting tremendously from this new facility, and we are most grateful to all who made this possible," said Dean Isaacson, thanking the many donors, faculty, staff, students, alumni and friends who worked to make the studio a reality.



Dean Isaacson, Professor Helmut Prion and Dept. Head Eric Hall unveil the commemorative plaque for the studio which honours its donors.

# Alumni update

Welcome to the fall/winter issue of *Ingenuity*. In last fall's newsletter we provided you with details of some exciting developments between UBC and the Alumni Association. We are delighted that the university now has an Alumni Relations Unit (ARU) under the leadership of Marie Earl, Associate Vice President Alumni and Executive Director, Alumni Association. She and her staff have been working closely with various alumni, off-campus focus groups, faculties and members of the UBC community to improve alumni relations. As a Faculty we are happy to have the opportunity to work with the ARU to discuss, share and implement ways to increase both the level and quality of services for our graduates.

As many of you know UBC recently opened its Okanagan campus in Kelowna. This means we will be welcoming many more alumni in the coming years. With the additional graduates, it will become increasingly important that we stay in touch to best provide services and keep you connected with your alma mater. We would love to have your feedback to help better serve you.

One of the exciting areas of alumni relations is the opportunity to be a part of class reunions and regional receptions. I am happy to share some of these recent, happy occasions with you. If you would like to be involved in organizing a reunion for your class or have feedback, please feel free to contact me at 604-822-9454 or [mcordeiro@apsc.ubc.ca](mailto:mcordeiro@apsc.ubc.ca).



May Cordeiro  
Alumni Relations Officer

## 2005 Event Highlights

### Hong Kong CIVL'79 — 25th Reunion — March 22, 2005

Hong Kong-based Civil '79 classmates and guests enjoyed a memorable reunion dinner at the Hong Kong Country Club together with grads from other engineering disciplines.

From left: Helen Kwan (Fred Tam's wife), Fred Tam (party organizer), Jenny Lam ("No change in 25 years," says Fred Tam), Leo Kung and Dominique Mok



### CIVL '79 — 25th Reunion — April 16, 2005

The Civil Class of 1979 celebrated its 25th reunion with cocktails and dinner at the Royal Vancouver Yacht Club. A quarter-century later, they're still having fun.

*"There were some mysterious goings-on on Saturday night that we couldn't figure out. Somehow, we found our grad photo from CEME at the Yacht Club. As upstanding Civil Engineering graduates, we made sure it was returned to its rightful place in CEME."*



## Calgary Alumni and Friends Reception— June 23, 2005

Dean Michael Isaacson met with Calgary engineering alumni at a reception hosted at the Sheraton Suites Calgary Eau Claire. He informed guests about the various developments at the UBC Vancouver and Okanagan campuses. Rick Ballantyne (MECH'81), President of Terasen Pipelines, spoke about his UBC education and provided an update on Terasen Pipelines and the outlook of the oil and gas sector in Canada.

Below: Dean Isaacson enjoys an evening with alumni and friends in Calgary.

Right: Dean Isaacson (left) with guest speaker Rick Ballantyne in Calgary.



## EECE '60-95—Annual BBQ— August 17, 2005

The EECE Classes of 1960–95 were treated to an annual barbecue at the University Golf Club. Beautiful weather, an excellent venue and scrumptious food made for a very enjoyable evening.

Electrical and Computer Engineering Head Vijay Bhargava and student Justin Williams provided department updates. Guest speaker and Professor Emeritus Charles Laszlo spoke to guests about the new Biomedical Engineering Program. He and his wife Doreen recently made a generous donation towards funding the program.



Justin Williams (left) with faculty—Peter Lawrence, Charles Laszlo and Rob Rohling—alumni and guests, including Doreen Laszlo (far right).



## METS '69—35th Reunion— September 18, 2004

The Metallurgy Class of 1969 celebrated its 35th reunion with a luncheon at classmate Don Aven's residence.

From left: Stu Morton, Tom Lidkea, Wayne Peace, Vern Seto, Alex Currie and Don Aven

# Fred Kaiser Building opens—

Many years of hard work and dedication on the part of the faculty and friends of Applied Science was celebrated on September 15 as the Fred Kaiser Building was officially opened. The new central hub of the engineering precinct on campus, the building was funded in part by the B.C. Government's Doubling the Opportunity initiative as well as by the Kaiser Foundation for Higher Education.

More than 175 people filled the five-storey atrium in the Fred Kaiser Building during the afternoon to hear the speeches and enjoy the official opening.

The event was attended by B.C. Minister for Advanced Education the Honourable Murray Coell, UBC President Martha Piper, and Mr. Fred Kaiser, Chairman and Chief Executive Officer of Alpha Technologies Group, each of whom joined Dean Michael Isaacson in speaking about the impact of the new facility.

"I am absolutely delighted to be here. The University of British Columbia is a great university that gets better every day because of the citizens of British Columbia," said Coell. "I just have one message today, from the Premier and from the province—thank you, Fred. Thank you for your generosity, your kindness—and we will remember you always."



Martin Dee/Telestudios



Martin Dee/Telestudios

Mr. Kaiser addresses the assembly during the ceremony.

President Piper noted that the importance of new technologies was never more evident than in the recent natural disaster in New Orleans.

"Humankind has proven, time and again, that it can tackle the most daunting challenges through technology. But it requires leadership. It requires innovation. It requires determination. And I think Fred Kaiser provides a wonderful example of that type of leadership, innovation and determination," said Piper.

"I am incredibly grateful to the leaders of government and industry who do so much to help the University of British Columbia realize its goal of being truly a world-renowned university," she continued.

Dean Isaacson acknowledged the many people who had worked on the Fred Kaiser Building, from the Government and the Kaiser Foundation, to the faculty and staff of Applied Science.

"This building is the result of the hard work, inspiration and vision of a large number of people," he said. "None of this would be possible without the various contributions of a great number of people. We owe a tremendous debt of gratitude to all those who helped us—thank you to all of you."

Dean Isaacson reflects on the development of the new building.

# faculty and friends celebrate

The new building will house space for over a dozen research groups within the Department of Electrical and Computer Engineering, including the new Alpha Technologies Power Laboratory, named by the Kaiser Foundation in honour of the company Fred Kaiser formed.

“It is a great honour and, at the same time, quite humbling to have this building bear my name,” said Kaiser.

“This building is here today due to an ever-increasing awareness of the necessity of the interaction between the private sector, the government and the institution.

One of the delightful trends here in British Columbia and around the world is the increase in social entrepreneurship. In order to win, we need to apply our collective talents and resources for the benefit of society as a whole,” said Kaiser.

“You can rest assured that we have many, many challenges ahead of us and in giving our young people the opportunity, the knowledge, the tools and the positive spirit to succeed, we will be turning those challenges into lasting successes. This approach will go a long way towards everyone’s desire to make the world a better place,” he said.

Head of the Department of Electrical and Computer Engineering Vijay Bhargava and Justin Williams, President of the department’s student club, also added their thanks to the B.C. Government and the Kaiser Foundation during their speeches.

In addition to housing the expansion of the Department of Electrical and Computer Engineering, the building will also be home to the Department of Mechanical Engineering’s Mechatronics Program; and it will form the centralized home for the Dean’s Office, Engineering Student Services and the Technical Communication Centre.

The Faculty of Applied Science would like to extend its thanks to all those whose contributions made the Fred Kaiser Building a reality. We hope that all our alumni will find the opportunity to come by and visit the new face of engineering on the Vancouver campus.



From left: Vijay Bhargava, President Piper, Justin Williams, Mr. Kaiser, Minister Coell and Dean Isaacson pose after unveiling the building’s commemorative plaque.



President Piper converses with Mr. Kaiser and Minister Coell during the reception.



EECE’s Luca Filipozzi (far left) leads a tour for Mr. Kaiser and guests.

# Celebrating a quarter of a century..

## Engineering Co-op turns 25!

Over the past 25 years, Engineering Co-op has grown exponentially and continues to offer valuable work experiences to students in the chemical and biological, civil, computer, electrical, environmental, geological, integrated, materials, mechanical and mining engineering programs.

During the 2005–06 academic year, Engineering Co-op expects to provide more than 1,000 work term placements—a record number. With the continuing expansion of the job market and strong economy, the outlook is positive for a growing number of placements.

Since its inception, Engineering Co-op has consistently garnered interest from local as well as international employers from countries such as the U.S., Japan, Germany, Chile and China. Although the majority of co-op students work within the province, there is

significant interest in working outside British Columbia. For many this may be their first time away from home and provides the opportunity to live on their own and travel—life lessons not easily learned in a lecture room.

“I had this great opportunity to work in a foreign country, gaining significant technical work experience and was able to travel to many different European countries,” says Amir Bahrami, electrical engineering co-op student who worked in Germany. “When I accepted the job, I never thought that I would be spending New Year’s Eve in Paris, walking down the Champs d’Elysee, enjoying the festivities and meeting people from all over the world—this was truly a once in a lifetime experience.”

“We want our Engineering Co-op students to gain the very most from their work experiences,” says Engineering Co-op Director Jenny Kagetsu.

“In order to increase opportunities for our students, one strategic objective of the program is to increase international placements from nine to 15 per cent by 2008.”

Of the 921 co-op placements made last year, 71 per cent were in B.C., 20 per cent were in other Canadian provinces and nine per cent were international.

“Prior to enrolling in Co-op, I believed the program would increase my chances of finding a job after graduation,” says Wendy Hoy (CPEN ’05), Engineering Co-op Student of the Year, awarded to the top graduate based on work accomplishments, academics and campus involvement.

“Co-op helped me build a foundation to continually hone my job-search skills and provided a base of technical knowledge that can only be acquired through experience. Ultimately, I acquired a full-time position with Microsoft—which I am truly proud to have,” says Hoy.

Over the past 25 years, Engineering Co-op has helped define the career paths of thousands of students. Co-op graduates are now co-op employers, in turn supporting the program that gave them their first professional opportunity. A key benefit they derive from the program is access to a large pool of well-

educated and talented engineering students who can help address short-term technical staffing needs. With the increasing costs of recruitment, and the consequences of hiring the wrong person, many employers use co-op as a way to assess potential career employees.

Co-op has also fostered strong relationships between industry and the university. Each co-op student is assigned a faculty supervisor, providing professors an opportunity to go on-site and discuss work performance and explore industry collaborations. Electrical and Computer Engineering Professors Joseph Yan and Cyril Leung have recently connected with Cisco Systems Canada and plan to integrate their project into UBC’s engineering curriculum.

Engineering Co-op thrives on this harmonious trio—student, industry and faculty—of successful relationships. It is these relationships that will promote the program’s growth for the next 25 years.

To find out more information about Engineering Co-op, please visit [www.coop.apsc.ubc.ca](http://www.coop.apsc.ubc.ca) or call 604-822-3022.



2005 Engineering Co-op Student of the Year Wendy Hoy

# Diamond in the rough

## Unique research shines in the Northwest Territories

The Northwest Territories have long tempted southern prospectors with dreams of gold and diamonds. Canada's two active diamond mines, located on land claimed by aboriginal communities, currently serve as the field of study for Ginger Gibson, mining engineering Ph.D. candidate. After a year of study in the diamond mines of the Northwest Territories, Gibson doesn't claim to be a 'northern expert,' but she does lay claim to observing community resilience in the face of massive cultural change.

"Fifty years ago many of the northern aboriginal communities were dependent on traditional economies—living off the land and hunting caribou," says Gibson. "We are witnessing rapid change as they become wage-based economies."

As the topic of her dissertation, *Vulnerability and Resilience in Aboriginal Communities: The Effects of Mining as a Change in the Northwest*, Gibson studies the experience of aboriginal workers in mines. Her research seeks to understand what factors influence individual, family and community resilience—the ability to cope and adapt—in the face of political and economic change.

"The results have been extremely interesting and unexpected," says Gibson.

"One of the groups I work with, the Tlicho, are incredibly communal, working together to ensure as many as possible get jobs. They buoy up the miner and support his immediate family while he's away."

Miners and those working for local companies supporting the industry infuse their communities with capital that is managed collectively and used to build infrastructure.

"Less emphasis is placed on the nuclear family and more on the community, differing from the southern miner's experience," says Gibson.

Studying miners may seem a peculiar topic for a mining dissertation, but not for Gibson, an applied-anthropologist-turned-mining-engineering-student. After working for more than a decade in communities affected by resource extraction and seeing "too many fires fueled by lack of community consultation," Gibson became frustrated. Her frustration led to further studies, gaining the technical knowledge to enable her to influence change for the advancement of social justice.

Thus far Gibson has found the mining community quite receptive.

"Engineers work as a team to seek solutions and are open to new perspectives in order to problem-solve," says Gibson.



Ginger Gibson at Northwest Territories diamond mine



Gibson helps solve personnel issues specific to the aboriginal community. For example, contrary to company policy granting paid time off to attend the funeral of an immediate family member only, a worker may request leave for an elder's funeral. Although not considered "immediate family" by company definition, the miner feels he must attend.

"Mine managers need cross-cultural training to understand the miner's perspective," says Gibson. "When developing mines in aboriginal communities, getting advice at the impact assessment stage is too late, often proving ineffective and costly. Establishing expertise, knowledge and personnel at the onset is imperative."

Northern mines have an obligation to meaningfully employ aboriginal people. Apart from this, there is a crisis emerging in the availability of skilled miners. Recruitment, retention, skills and training are serious issues.

As an applied anthropologist, it is Gibson's ethical responsibility to study and to serve. Recently she helped secure funds for the development of the Tlicho

Trades and Technology Program. Located within the Tlicho communities, 45 students will attend the program this fall to learn about careers in mining. The innovative curriculum, developed by a team including Gibson and supervisor Professor Malcolm Scoble, educates students on a range of issues from the technical to the social.

"This is an exciting opportunity for Applied Science to meet the needs of a northern population—providing an overview of mining, an introduction to underground mining and a connection to southern resources," says Gibson. "It'd be marvelous to see a graduate of Tlicho Trades at UBC in a couple of years."

Gibson's research is funded by a scholarship from the Trudeau Foundation, established to promote human rights and global citizenship.

# Retirements

The Faculty would like to acknowledge with sincere appreciation the following faculty members who retired on June 30, 2005 for their many years of service:

## Sander M. Calisal, Mechanical Engineering



Ayesha Calisal

Sander Calisal received his B.Sc. in Mechanical Engineering from Robert College, Turkey, in 1964. That same year, he began work as a research assistant studying naval architecture and earned his doctorate from the University of California, Berkeley, in 1970. After receiving his Ph.D., he lived in several countries and worked in a variety of academic roles—at the U.S. Naval Academy, the University of Washington, Bogazici University (Istanbul) and the Middle East Technical University.

For the past 25 years, Calisal has been a professor in the Department of Mechanical Engineering researching ship hydrodynamics and application of computer technology to ship design and experimental naval architecture. He also initiated the Naval Architecture option within the Mechanical Engineering Degree Program, with specialty courses in ship design and performance. The option became a model for other specialty programs in the department.

With well over 100 refereed publications, conference proceedings, reports and grants, Calisal has been a great contributor to the field of ship design. Most recently, he developed a novel procedure to reduce the energy requirements of ships by increasing their beam. This procedure, called waterline parabolization, proved to be effective for coastal tankers, yachts and fishing vessels promising more than ten per cent reduction in fuel consumption. In acknowledgement of his many achievements, he was named a Fellow of the Society of Naval Architects and Marine Engineers.

Calisal has recently accepted an appointment with UBC Okanagan to assist with the establishment of the new engineering program. In addition, he plans to continue his research in marine hydrodynamics with an emphasis on developing techniques for harnessing ocean wave and tidal energy.

## Don McAdam, Mechanical Engineering



Ayesha Calisal

Don McAdam received his B.Sc. in Mechanical Engineering from the University of Alberta in 1961. He worked for Atomic Energy of Canada, Ltd. for several years and then shifted to a career in academia. He moved to Africa and taught at Accra Polytechnic in Accra, Ghana, and Ahmadu Bello University in Zaria, Nigeria. He returned to Canada and furthered his studies in heat transfer, receiving his Ph.D. from UBC in 1975.

Using his skills and knowledge to address engineering problems has been a theme throughout McAdam's career since he was first hired by the Department of Mechanical Engineering in 1981. Recently he spearheaded the creation of a power wheelchair suitable for indoor and outdoor use,

which can operate over rough sidewalks and small obstacles with reasonable comfort and safety. For students who have difficulty visualizing in three dimensions, he is developing a computer program to aid in developing visualization skills.

He has had very broad teaching interests that covered courses at the first- to fourth-year levels and has made excellent service contributions to the department, Faculty and UBC during the past 30 years.

In retirement, McAdam plans to continue practicing engineering. He is currently teaching APSC 151 and developing a heat exchanger for residential ventilation with a local firm. He also plans to pursue his hobby of working on his antique Jaguar and to spend more time in his "sanctuary"—also known as a workshop.

### Editor's Note:

We are sad to report that, at press time, we received word that Mechanical Engineering Professor Emeritus Geoff Parkinson passed away on Thursday, September 22. We will report on the life and career of this special man in the next issue of *Ingenuity*. In the meantime, our sympathies go out to his family and friends.

# Appointments

## Civil Engineering

**Violeta Martin** was appointed Lecturer and Hydrotechnical Laboratory Manager on July 1. Her expertise is in the area of water resources engineering, including river engineering, fluid mechanics, hydraulics and hydrology.

## Electrical and Computer Engineering

**Leo Stocco** was appointed Instructor on July 1. His position is associated with

the Integrated Engineering program. His research interests include robotics, bio-medical applications, haptic interfaces and electro-mechanical optimization.

**Konrad Walus** was appointed Assistant Professor on September 1. His research expertise includes the simulation and design of nanoelectronic devices and circuits, with a current focus on the realization of Quantum-Dot Cellular Automata (QCA).

## Mechanical Engineering

**Dana Grecov** was appointed Assistant Professor on July 1. Her expertise is in the areas of fluid mechanics and rheology, with applications to industrial processing flows, biofluid mechanics and advanced materials.

**Xiaodong Lu** was appointed Assistant Professor on August 12. His research focuses on novel electromechanical systems through the integration

of electromechanics, precision machine design, structural dynamics, circuits, real-time computer design and advanced control algorithms.

**Boris Stoeber** was appointed Assistant Professor on July 1. This is a joint appointment with the Department of Electrical and Computer Engineering (33%). He is an expert in the areas of microelectromechanical systems, microfluidics, sensor technology and integrated microsystems.

## ...and introducing the UBC Okanagan Engineering faculty

**Sander Calisal** has been appointed Professor effective September 1. He is a UBC Mechanical Engineering Professor Emeritus who comes with a lifetime's worth of expertise in hydrodynamics research and university administration, as well having educated multiple generations of today's engineers.

Applied Science Associate Dean Engineering Programs **Bruce Dunwoody** has been appointed Acting Director of UBC Okanagan Engineering, assuming the administration of the program.

**Carolyn Hay** has been appointed Sessional Lecturer effective September 1. She has 15 years experience teaching post-secondary English courses, including writing, professional communications and public speaking. She will be teaching APSC 176—Technical Communication.

**Richard Klukas** was appointed Assistant Professor on July 1. His current research interests include wireless location, radio frequency propagation channel modeling and ultra-wideband communications and positioning.

**Andrew Labun** was appointed Associate Professor on May 1. His research focuses on microelectronics; interconnect reliability and process variation analysis of complex ultra-large-scale integration structures; electrical and chemical engineering simulations and analysis of semiconductor materials and process technologies; integration of complex computer-aided design reliability flows; and high-power gas lasers.

**Gordon Lovegrove** has been appointed Assistant Professor effective July 1, 2005 to June 30, 2006. He is on secondment from his position as Director of Transportation Management of the UBC Trek Program and is an expert in sustainability, community planning and safety.

**Craig Merkl** was appointed Instructor I on July 1. His expertise is in the areas of dynamics, aerodynamics, fluid dynamics, mechanisms, robotics and automation, thermodynamics and heat transfer.

**Nicholas Swart** has been appointed Adjunct Professor effective September 1. His research focuses primarily on the development of numerical simulation algorithms for coupled field problems encountered in the study of thermal-based silicon microsensors.



UBC Okanagan Engineering faculty (clockwise from top left): Sander Calisal, Richard Klukas, Carolyn Hay, Craig Merkl, Gordon Lovegrove, Andrew Labun and Nicholas Swart

# Achievements

Chemical and Biological Engineering Professor Emeritus **Norman Epstein** has been elected a Fellow of the Canadian Academy of Engineering.

Chemical and Biological Engineering Professor **John Grace** has been awarded a UBC Killam Teaching Prize.

Chemical and Biological Engineering Professor **Kevin Smith** has received the 2005 Award for Teaching Excellence from the Association of Professional Engineers and Geoscientists of B.C.

Civil Engineering Professor **Nemkumar Banthia** has been elected a Fellow of the Indian Concrete Institute.

Civil Engineering Professor Emeritus **Peter Byrne** has received two distinctive honours. He has received the 2005 Mayerhof Award from the Canadian Geotechnical Society for significant and outstanding contributions to the art and science of foundation engineering; and he has received (along with co-authors E. Naesgaard, K. Adalier and T. Abdoun) the Casimir Gzowski Medal from the Canadian Society for Civil Engineering for the best paper published in 2004 in both the *Canadian Geotechnical Journal* and the *Canadian Journal of Civil Engineering*.

Civil Engineering Professor **Sietan Chieng** has received the Jim Beamish Award from the Canadian Society of Agricultural Engineering for outstanding work in the area of soil and water.

Civil Engineering Associate Professor **Rob Millar** has received (with co-authors B. Eaton and M. Church) the 2005 Wiley Award from the British Geomorphological Research Group for best paper published in the journal *Earth Surface Processes and Landforms*.

Civil Engineering Professor **Alan Russell** has received the 2005 E. Whitman Wright Award from the Canadian Society for Civil Engineering for developing innovative computer applications in civil engineering.

Electrical and Computer Engineering Associate Professor **Sidney Fels** has won (along with F. Bowie and R. Belmore) a City of Vancouver competition to construct a \$180,000 piece of electronic public art at the soon-to-be-built community-centre complex at 1 Kingsway.

Electrical and Computer Engineering Professor **Andre Ivanov** and Assistant Professor **Shahriar Mirabbasi** have received (along with S. Sheikhaei) the Outstanding Student Paper award at the 2005 IEEE Canadian Conference on Electrical and Computer Engineering.

Electrical and Computer Engineering Assistant Professor **Z. Jane Wang** has received two distinctive honours. She has been named a 2005 Early Career Scholar by the Peter Wall Institute for Advanced Studies; and she has received (along with co-authors M. Wu, W. Trappe and K.J. Ray Liu) the 2004 Best

Paper Award from the *Journal on Applied Signal Processing*.

Electrical and Computer Engineering Professor **Rabab Ward** has received (along with co-authors A. Bashahshi and G. Birch) the Excellence in Neural Engineering Award at the IEEE-EMBS Neural Engineering Conference for their paper "A New Design of the Asynchronous Brain Computer Interface Using the Knowledge of the Path of Features."

Mechanical Engineering Associate Professor **Elizabeth Croft** has received the 2005 Professional Service Award from the Association of Professional Engineers and Geoscientists of B.C.

Mechanical Engineering Professor **Nimal Rajapakse** has received the 2005 Meritorious Achievement Award from the Association of Professional Engineers and Geoscientists of B.C.

Mining Engineering Department Head **Malcolm Scoble** has been appointed a member of the Federal-Provincial Environmental Assessment Review Panel for the Kemess North Copper-Gold Mine Project.

Mining Engineering Professor **G. Ward Wilson** has received two distinctive honours. He was elected a Fellow of the Canadian Academy of Engineering; and he has received the 2005 R.A. McLachlan Memorial Award from the Association of Professional Engineers and Geoscientists of B.C.



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

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##### Departments and Programs

- Chemical and Biological Engineering
- Civil Engineering
- Electrical and Computer Engineering
- Engineering One (UBC Okanagan)
- Engineering Physics
- Environmental Engineering
- Geological Engineering
- Integrated Engineering
- Materials Engineering
- Mechanical Engineering
- Mining Engineering

##### Office of the Dean

- Business & Development Office
- Centre for Instructional Support
- Engineering Co-op Office
- Engineering Student Services
- Technical Communication Centre

##### The Faculty participates in several research centres and laboratories, including:

- Advanced Materials and Process Engineering Laboratory (AMPEL)
- Clean Energy Research Centre (CERC)
- Institute for Computing, Information and Cognitive Systems (ICICS)
- Michael Smith Laboratories
- NUS-UBC Applied Science Research Centre
- Pulp and Paper Centre

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