



THE  
UNIVERSITY OF  
BRITISH  
COLUMBIA

# ingenuity

Faculty of Applied Science  
Engineering News

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## Making SUV's environmentally sound is a weighty problem

### Lighten the load and you lighten gas costs

Whether it's safety, comfort, looks, or just that feeling of being king of the road, SUV's have become increasingly popular, a development that has environmentalists slamming on the brakes.

"The public is becoming increasingly concerned about the downsides associated with these larger and heavier vehicles. They burn more gas, and greater fuel consumption increases the amount of greenhouse gases emitted into the environment," says Metals and Materials Engineering Prof. Warren Poole.

Engineers are currently examining many strategies to reduce the environmental impact of cars, SUV's and light trucks. The Canadian government maintains that reducing vehicle weight is the most cost-effective means to reduce fuel consumption and greenhouse gas emissions. Prof. Poole agrees, "a key to reducing vehicle weight is to introduce new lighter, higher strength materials into the vehicles. In this way, we can provide consumers with vehicles that are safe while reducing fuel consumption and greenhouse gas emissions."

Prof. Poole has been working for the past five years on the development of novel automotive materials with Alcan, Dofasco and Stelco, Canada's largest materials suppliers to the automotive industry. For example, UBC has formed a research partnership with Alcan, the leading supplier of aluminum for all of the major North American car companies, to develop aluminum body panels for vehicles.



Prof. Warren Poole in front of the Gleeble, used to simulate the manufacturing process used in steel or aluminum plants.

Michael Robertson

The automotive industry is increasingly leaning towards the tailored use of materials where each component is engineered for its particular requirement, much like high-performance race cars. High strength materials are required for bumpers and side impact beams, while highly formable materials are needed for fenders, door panels and trunk lids. This keeps the driver and passengers safe, and the vehicle as light as possible.

Continued on page 5

# Message

## from the Dean

Welcome to the Spring 2003 issue of *Ingenuity*. An External Review of the Faculty of Applied Science, conducted by a panel of five distinguished deans from other universities, was recently completed. I am pleased to report that the Panel's findings on the general state of the Faculty are positive and complimentary. The Panel's report includes statements such as: "the departments and programs are thriving," "there is excellent leadership from the... Associate Deans, Department Heads, and Directors," "this is a Faculty on the move," and so on. The report also contains many suggestions worthy of consideration, and these will be carefully reviewed during the months ahead.

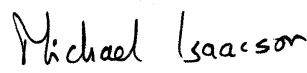
We have indeed seen some remarkable accomplishments in the Faculty during the last six years. I summarized these in my message in the Spring/Summer 2002 issue of *Ingenuity* (see link below). They include the development of exciting new programs; enhancements to the learning environment; the introduction of major research initiatives; the creation of more than 20 chairs and professorships; the appointment of more than 80 outstanding faculty members; significantly enhanced linkages with our partners and external communities; and increases to our resource base, in part through successful fundraising and through the establishment of several building projects. The Faculty's success is due to the contributions of members of the Faculty, its leadership, UBC colleagues, and our external stakeholders. Thank you.

I would like to highlight the great importance of collaborations in the development of the Faculty. One of the five goals in the Faculty's strategic plan is to strengthen the Faculty's relationships with its external communities and I believe we have been doing this very successfully. We have a strong and broad-ranging record of collaborations that has served us well. We have many external partners, including numerous companies that span a wide range of industries, alumni, donors and friends of the Faculty, other engineering schools, and other research and professional organizations. We collaborate through our advisory councils, co-op placements, field trips to industry sites, exchange and partnership programs, joint research projects, research grants and contracts, technology transfer activities, consulting, guest lectures, visitors to the Faculty, faculty-member leaves at companies and other institutions, fundraising activities, alumni events, continuing education, and so on.

Within the University, we have effective joint appointments with several other faculties, including the Faculties of Agricultural Sciences, Forestry, Graduate Studies, Medicine and Science. With respect to programs, we collaborate closely with the Faculty of Arts on the double BA/BASc degree; and with the Faculty of Science on the Geological Engineering and Engineering Physics programs, the Master of Software Systems, and majors/options in Software Engineering. The engineering departments are also interacting closely on the Integrated Engineering program, through five faculty members appointed to various departments but with responsibilities for the program. On the research front, we collaborate with virtually all other faculties in numerous ways. Of particular note are our collaborations through the Advanced Materials and Process Engineering Laboratory, the Biotechnology Laboratory, the Institute for Computing, Information and Cognitive Systems, and the Centre for Environmental Research in Minerals, Metals and Materials. I am most grateful to my fellow deans for engendering a strong sense of cooperation and for fostering a positive environment that supports such close collaborations.

Finally, I would like to highlight the special importance of our relationship with the University's senior leadership in moving the Faculty forward. I wish to pay particular tribute to President Piper and Vice President McBride for the critical and broad-ranging roles they have played. They have secured major resources for the University, assured a supportive and exciting education and research environment that has enabled the Faculty to pursue its various initiatives, and advanced the Faculty of Applied Science more directly in very many ways.

As I look back on the last six years, we have so much to be proud of. Our many achievements have only been possible through the strong support and efforts of all members of the Faculty, and through our strong and productive relationships with so many partners, both within the University and outside it. Thank you all for what you have been doing for Applied Science at UBC.



**Michael Isaacson**

Dean



To view the Spring/Summer 2002 issue of *Ingenuity*, see: <http://www.apsc.ubc.ca/publications/engineering.html>.

# Teaching pulp ... it's not fiction

## Pulp and Paper Centre Director Dick Kerekes leads the way

Many of us would never guess that pulp and paper is one of British Columbia's largest industries and that we have 26 mills that produce some of the world's finest pulp and paper products.

But UBC's Prof. Dick Kerekes is out to change that lack of awareness by ensuring UBC remains a leader in pulp and paper-related teaching, research and industry consultation.

He says the paper industry in B.C. is often misunderstood. "A common perception is that trees are cut down to make paper—not true in most cases. About 80 per cent of B.C.'s pulp is made from the residue from sawmills. This wood residue in the form of chips is collected and taken to pulp mills. What doesn't become lumber, becomes high-quality pulp

that is made into a range of paper products used in B.C. and around the world."

"There was a time when there were very few university educational programs available in B.C., relative to the size of our industry, and this needed to change," says Prof. Kerekes. So, back in 1986 he spearheaded the opening of UBC's Pulp and Paper Centre, a 2,200 square metre complex of offices and laboratories designed to offer graduate education and research for the industry. The Centre is operated in collaboration with the Pulp and Paper Research Institute of Canada (Paprican), a non-profit research and education organization funded by member companies from the industry.

As Director of the Centre, Prof. Kerekes is also at the helm of UBC's

Advanced Papermaking Initiative (API), a program made possible by an endowment provided by Forest Renewal B.C. The API is housed in UBC's Pulp and Paper Centre and supports studies in all areas of papermaking.

"The endowment helped to significantly expand the Centre's teaching and research initiatives in fibre processing, papermaking, and papermaking chemistry. It also enabled us to hire two new faculty members—

Prof. Mark Martinez and Prof. James Olson—who teach, conduct research, and also provide world-class consulting expertise to industry in all aspects of papermaking," says Prof. Kerekes.

An advisory committee, comprised primarily of technical people from B.C.'s pulp and paper industry, provides guidance to a management committee chaired by Prof. Kerekes, to ensure the best use of the endowment funds.

*Continued on page 13*

**An example** of how UBC's Advanced Papermaking Initiative has been able to help the paper industry is a recent collaborative problem-solving effort with one of Canfor's paper mills in Prince George, B.C. Prof. Martinez was able to apply his recent research findings and make recommendations to help the mill improve the quality of the paper it produces.

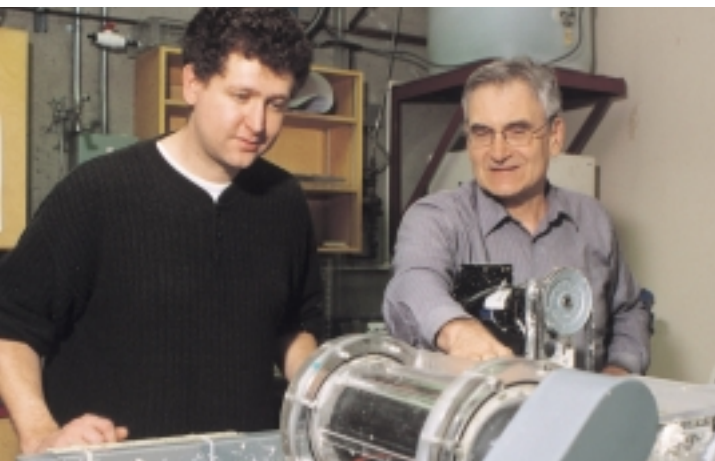
The mill had a challenge on its hands and welcomed the assistance of Prof. Martinez to help solve it. There was a need to improve the uniformity of fibre distribution in the paper.

In collaboration with Paprican, Prof. Martinez has been studying how paper fibres flocculate (bunch together), and ways to level out this "flocciness." This made him the ideal candidate to help Canfor tackle its problem.

Prof. Martinez says, "B.C. fibre produces some of the best paper in the world. In the B.C. interior, our cold weather makes for slow-growing trees and this creates long, fine fibres, which results in strong paper; however, their propensity to flocculate is greater."

The research of Prof. Martinez helped Canfor reduce the graininess of its paper. With his recommendations and other machine adjustments, the mill was able to significantly increase its productivity.

Prof. Martinez has recently presented his findings at the International Paper Physics Seminar—once again UBC's Faculty of Applied Science shared new knowledge with researchers from around the world.



Michael Robertson

Prof. Mark Martinez (left) and Prof. Dick Kerekes. This custom-built test apparatus enables papermaking experimentation at high fibre-to-water concentration ratios. Using more fibre, and less water, saves energy.

# Increasing high quality job-ready skills

UBC's Faculty of Applied Science is continually developing programs that add extra value to a UBC engineering degree, making it among the most progressive engineering schools in Canada. Not resting on its laurels, the Faculty maintains close ties with industry to ensure it is producing graduates who meet and exceed today's engineering requirements.

In the last issue of *Ingenuity*, we featured our Information Technology Minor that provides engineering graduates of non-IT disciplines with a solid understanding of computer systems technology so they can actively work with computer professionals to solve engineering problems. Here are two more study complements, designed to meet the needs of today's competitive engineering job market:

## Engineering Management Specialization of the Master of Engineering (M.Eng.) degree

The Master of Engineering degree at UBC includes an Engineering Management specialization available to graduate students from all engineering disciplines. The program was created to address industry's need for engineers with managerial skills. It is designed to offer engineering graduate students a more balanced education in technical and managerial subjects, giving graduates solid management/leadership skills that will help them to start their own businesses or to effectively manage engineering and technical enterprises for the companies that hire them.

"This specialization aims to prepare graduates to become managers and leaders, trains students to work and think in an entrepreneurial way, equips them to understand the basic fundamentals of accounting, finance, and business development, and provides them with skills in how to work as part of a multi-disciplinary team," says Dr. Sheryl Staub-French, Engineering Management Coordinator and Assistant Professor of Civil Engineering.

"We have seen significant and growing interest in the program from students who understand that they will soon be heading into a very competitive job market," she says. "Students also benefit from the Faculty's success in partnering with industry leaders who join us as sessionals and guest lecturers, and present to us engineering management issues of concern to industry."

Students who select this specialization must complete 12 credits in management-related subjects, to include two core courses, *Technology*



Marian Zadra

Prof. Sheryl Staub-French educates tomorrow's engineering managers.

*Entrepreneurship for Engineers and Business Decisions for Engineering Ventures*. Students are then able to customize their program by selecting from a variety of electives that cover topics in project management, intellectual property management, technology-based product marketing and development, operations research, and modeling and optimization.

"The content of courses offered reflects our belief that we must educate engineers so they can leverage technology to support managerial decisions," concludes Prof. Staub-French.

Anyone interested in enrolling as a student or contributing as an industry participant, should contact Program Coordinator Sheryl Staub-French at (604) 827-5118 or by e-mail at [sherylsf@civil.ubc.ca](mailto:sherylsf@civil.ubc.ca)

## Technical Communication Centre

The Faculty's new Technical Communication Centre (TCC), opened by Vice President McBride on April 24, offers language study assistance to enable students to acquire necessary communication skills.

"We're committed to producing the finest engineering graduates," says Donna Schultz, Director of the Centre. "This includes ensuring they have effective communication skills."

While the study of engineering usually attracts those who excel in math and science, as professional engineers who prepare specs and client proposals, having good language skills is imperative.

The TCC has seven faculty members who teach APSC 201, a second-year mandatory technical communication course that forms part of all engineering programs at UBC. Students must successfully complete this course to enroll in fourth-year engineering courses. As well, TCC faculty work with professors in selected technical courses regarding the integration of writing, speaking and presentation skills with the technical content. They also speak to students in classrooms about assignment expectations and strategies; they provide feedback on assignments that need improvement in writing; and they provide workshops for students on writing tasks, such as drafting and revising documents.

Ms Schultz says that the TCC is versatile. Each communication problem is tackled on an individual basis. "It's about how we can serve our students best. This means that we work closely with professors so that they can call upon us if they



Marian Zadra

Centre Director Donna Schultz displays some of the tools of her trade.

feel they have a class that needs special assistance with their writing, speaking or presentation skills and we'll prepare a writing or presentation session specifically for that class."

Ms Schultz says that their doors are also open to students who would like to meet with someone from the TCC on their own.

## Making SUV's...

Continued from page 1

Poole quotes the late Keith Brimacombe of the Department of Metals and Materials Engineering who often said, "success requires three main ingredients: people, ideas and money!" This is where being at a great university like UBC makes all the difference. UBC attracts outstanding students from Canada and around the world and UBC has been instrumental in helping us raise the money we need. "As for ideas," says Poole, "we have many and are excited about the opportunity to pursue them. For example, we are developing

novel processes to improve material properties by microstructure engineering, i.e., the microstructure of the material is controlled by the processing conditions. We have recently received \$750,000 from the Canada Foundation for Innovation, the provincial government and UBC to develop a state-of-the-art laboratory where we can simulate what happens in a steel or aluminum manufacturing plant," continues Poole.

"The laboratory environment offers control beyond what is available in the actual plant. For instance,

we're able to stop the machine, called a Gleeble, at any time, and examine how the properties of the material are being affected by the individual processing steps."

The Gleeble provides a cost effective way to physically simulate high temperature processes and applications at a far lower cost than full-scale tests. The results are then applied to an actual practical process, such as producing high strength aluminum alloys. This allows individual components to be lighter, thereby reducing overall vehicle weight.

"The dream of a materials engineer is to be able to truly engineer the required properties of a material by careful control of processing. Our work focuses on developing fundamental understanding where it is lacking, and integrating knowledge in a systematic approach," says Poole.

Reduced vehicle weight improves performance, and safety is not compromised. A lighter vehicle handles better and is more fuel efficient. The end result provides a win-win situation for drivers and the environment.

# Another Year of Tremendous Support

Graduates of the Faculty work in virtually every major sector of our economy and serve society through technical research and development, infrastructure renewal, environmental protection and resource development. They are helping to raise the standard of living for people in British Columbia and around the world.

Given that engineers are serving society in many ways, it is not surprising that they are also generous contributors to their communities. Exemplifying this, alumni, corporations and friends have donated over \$5 million to the Faculty over the past fiscal year in support of engineering. Remarkably, a total of 1,683 alumni, 98 corporations and 515 friends provided gifts, signifying a high participation rate.

Engineering alumni have established a significant number of awards over the years. Their outstanding contributions in support of scholarships and bursaries have ensured that there are sufficient funds for students in need; and these funds ensure that students can stay in their programs.

We wish to recognize all levels of donations as they reflect a fundamental commitment to the work of the Faculty, and enrich our programs. Annually, we receive tremendous support for the Engineering Endowment Fund for Student Support, which is designated annually to areas of strategic importance for students, and is resulting in an enriched student experience. On behalf of the Faculty, we sincerely appreciate the support of donors and thank alumni and friends for helping to better our engineering programs for future generations.



**Mona Miller-Tait**

Manager of Development  
Tel: (604) 822-0603  
mona.miller-tait@ubc.ca

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

Name \_\_\_\_\_

Address for tax receipt \_\_\_\_\_

- 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 \_\_\_ undesignated/ \_\_\_ directed to the following program:
 

<input type="radio"/> Chemical & Biological Engineering	<input type="radio"/> Engineering Physics	<input type="radio"/> Metals & Materials Engineering	<input type="radio"/> Combined Arts / Engineering Program
<input type="radio"/> Civil Engineering	<input type="radio"/> Environmental Engineering	<input type="radio"/> Mining Engineering	<input type="radio"/> Minor in Commerce
<input type="radio"/> Computer Engineering	<input type="radio"/> Geological Engineering	<input type="radio"/> Co-operative Education Program	<input type="radio"/> Minor in Information Technology
<input type="radio"/> Electrical Engineering	<input type="radio"/> Integrated Engineering		
	<input type="radio"/> Mechanical Engineering		
- I would like my gift to remain anonymous.
- I would like the Faculty's Development Officer to contact me (phone and/or e-mail address: \_\_\_\_\_ ) to discuss:
 

<input type="radio"/> support for a named infrastructure project	<input type="radio"/> a planned gift	<input type="radio"/> the tax advantages of gifts of securities
	<input type="radio"/> a gift-in-kind	<input type="radio"/> support for a named Chair or Professorship

Please return to:  
**Business and Development Office**  
Faculty of Applied Science  
The University of British Columbia  
2006-2324 Main Mall  
Vancouver, BC V6T 1Z4

Tel: (604) 822-8335  
Fax: (604) 822-0688  
e-mail: development@apsc.ubc.ca  
web: www.apsc.ubc.ca/development

# MidNet Professorship in Digital Multimedia

## Making universal multimedia more accessible

The MidNet Professorship in Digital Multimedia has recently been established through a commitment of \$500,000 by MidNet, together with equivalent matching funds from The University of British Columbia. The Professorship holder is Dr. Panos Nasiopoulos. He is a pioneer in DVD technology, and is well-respected as a multimedia technology pundit, within both Hollywood and the consumer electronics industry.

As there are many standards that do not allow for the inter-operability of multimedia products, one of the intentions of the

Professorship is to provide a forum for companies and researchers to work together and find consensus on the implementation of standards that will make multimedia communications more accessible. As well, the creation of universal standards may enable people to interface easily with new multimedia communications technology. Further research interests include the enhanced protection of digital products during the creation, storage, management and distribution processes.

MidNet is a company headquartered in the United States that provides services

for mission critical applications in support of many industries, including film, entertainment and telemedicine. MidNet aggregates bandwidth for these applications to enable universal multimedia accessibility.

“The Faculty appreciates not only MidNet’s involvement and support in this burgeoning research area, but also the demonstration of confidence in our research and leadership capabilities. We are poised to make tangible and significant contributions to support the development of the multimedia industry,” Dean Isaacson commented.



Dr. Panos Nasiopoulos is the Director of the Master of Software Systems Program, and an Associate Professor of Electrical & Computer Engineering.

## The Loss of Christina Huckvale, Metals & Materials Engineering Student



On August 25, 2002, Christina Huckvale, a third-year metals and materials engineering student who was working for Alcan in Kitimat on a co-op work placement, died in a hiking accident on Mount Elizabeth. The tragedy was mourned deeply by many.

Christina was active in a number of campus activities and a popular student in the Faculty. “The Department’s faculty members and students are deeply saddened by the loss of Christina. She was one of those students that not only performed well academically but also had a very positive impact on the Department by virtue of her personality and willingness to become involved in extra-curricular activities. Students like Christina are tremendously important as they help establish a sense of community within the Department,” said Steve Cockcroft, Head of the Department of Metals & Materials Engineering.

Christina was an avid hiker and snowboarder. She spoke French, and played the piano and the flute. She was a volunteer at Science World in Vancouver, was a member of a dragon boat team and played the French horn in a brass band. Christina is survived by her parents, Cuthbert (Cus) and Pacita, her brother William, aunts, uncles, cousins and many friends.

To honour Christina’s memory, The Christina Lim Huckvale Memorial Fund has been established, which will support an award at UBC in her name. A total of \$54,784 has been received to date from 132 donors.

Contributions may be sent to:  
CIBC WOOD GUNDY  
Attn: Diane Wong, Trustee  
7th Floor, 925 West Georgia Street  
Vancouver, BC V6C 3L2

UBC will issue charitable tax receipts.

# Alumni update

I would like to thank all our alumni who volunteered their time and expertise to help make our 2002 reunions very successful and memorable events. The positive feedback from those who attended the reunions reinforces our belief that our involvement in bringing you together through these and other similar events are welcome and appreciated. I would also like to thank the many people who helped to locate classmates whose current addresses we did not have. Through our combined efforts, I was able to update approximately one hundred members on our alumni database. I look forward to working with many more of you this year. Your feedback on any event is welcome. If you would like to be involved in organizing your class reunion or would like to participate in our other alumni activities, please contact me (see contact details on the bottom of page 9).



May Cordeiro

## Old Red New Red networking evening

The Faculty of Applied Science, the UBC Alumni Association, and the Engineering Undergraduate Society hosted an “Old Red New Red” networking evening on Wednesday, February 5, 2003, at Cecil Green Park. About 100 students, 65 alumni, and several faculty members attended the event. The evening went well and provided a wonderful networking opportunity for students who were able to meet alumni and hear about their career experiences. It also provided alumni with the opportunity to share their engineering student experiences and traditions with current undergraduate students, and to hear about their student life and current UBC developments in engineering.

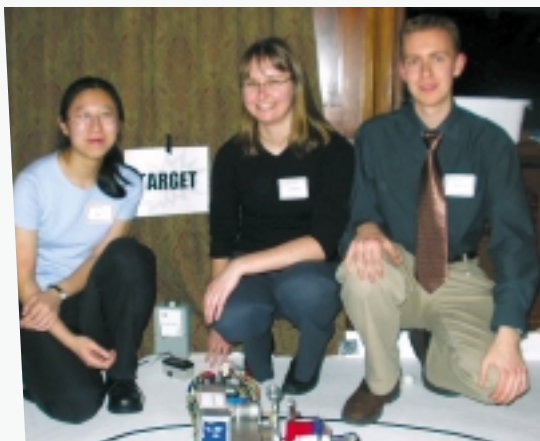
This year’s event also included an Engineering Ball Model competition. A panel of alumni did the judging and were impressed by our inventive and enthusiastic students. Thanks to all who took time out of their busy schedules to make the evening informative and enjoyable.



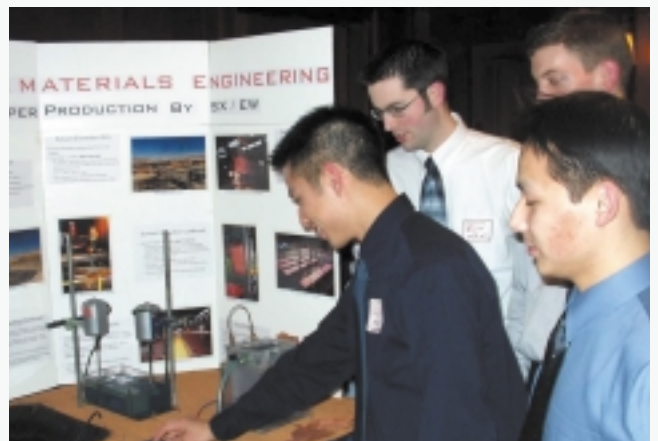
Students share a laugh.



Dr. Ralph Sultan (MECH'56) checks out the Civil Engineering Building Envelope Model.



Engineering Physics students' display.



Metals & Materials Engineering students' display.



### CIVL'52 Reunion—October 4 and 5, 2002

Our CIVL'52 graduates (above) got together for a two-day reunion. This included a Happy Hour at classmate Doug Lambert's residence on October 4, and a private dinner at Cecil Green Park on October 5.

### Seattle alumni & friends breakfast— October 31, 2002

Dean Isaacson hosted a breakfast for our Seattle engineering alumni on Thursday, October 31, 2002, at the Hotel Monaco. It was interesting to meet and hear from each of the attendees about their careers since graduating from UBC.

Discussions included a variety of academic topics related to student enrollment, curriculum and the physical infrastructure. Participants seemed unanimous in their opinion that it is important to provide our students with technical writing skills. Dean Isaacson was happy to advise the group that the Faculty has opened a Technical Communication Centre especially for this purpose. All present expressed their appreciation to the Dean for the opportunity to get together, and also to hear about developments in engineering at UBC.

### List of 2003 receptions and reunions

Class	Volunteer	Email	Date of Function	Details of Function
BASC'53	May Cordeiro	cordeiro@exchange.ubc.ca	Friday, September 19	Lunch at UBC's Cecil Green Park
			Saturday, September 20	Reception and tours of the engineering buildings
BASC'63	May Cordeiro	cordeiro@exchange.ubc.ca	Sunday, September 21	Evening Reception at UBC's Cecil Green
BASC'73	May Cordeiro	cordeiro@exchange.ubc.ca	Wednesday, September 24	Evening Reception at UBC's Cecil Green Park
Calgary Engineering Alumni	May Cordeiro	cordeiro@exchange.ubc.ca	Thursday, June 26	Evening Reception at The Calgary Petroleum Club
CHML'68	Don Berkeley	donberkeley@gulfislands.com	May 30 and 31	TBA
	Chris Goymour	chris@partnersemployment.com		
CIVL'49	Ray Cunliffe	rcunlito40@aol.com	TBA	TBA
CIVL'63	Wilbur Walrond	walrond@shaw.ca	Saturday, September 20	TBA
CIVL'83	Jack Gin	jgin@extremecctv.com	TBA	TBA
ELEC'83	Bill Richardson	Bill_Richardson@pmc-sierra.com	TBA	TBA
ECE60-90	May Cordeiro	cordeiro@exchange.ubc.ca	TBA	TBA
MECH'68	Brian Callow	bcallow@shaw.ca	TBA	TBA

\* TBA—to be announced

Detailed information on all events will be mailed in the coming months. For information on how you can get involved in any of our alumni activities, please contact Alumni Relations Officer May Cordeiro at cordeiro@exchange.ubc.ca.

# Nominated for Stockholm Water Prize

UBC engineers gain world recognition



Martin Dee

Prof. Don Mavinic (left) and Plant Manager Fred Koch with phosphorus fertilizer extracted from UBC's wastewater.

In their business, it's the equivalent of the Oscars and the Nobel Prize, and it is, indeed, an honour just to be nominated.

This year, Professors Ken Hall, Don Mavinic and Professor Emeritus Bill Oldham from the Department of Civil Engineering were nominated for the prestigious Stockholm Water Prize. This international environmental award honours outstanding achievements in the protection of the world's water resources. While the main prize eluded them, they were among very distinguished and world-class company with their few fellow nominees.

It is even more remarkable when you understand the humble beginnings of the project that has gained worldwide attention.

Few people on campus are aware that there is an innocuous pair of trailers parked in the woods off West 16th Avenue and Southwest Marine Drive. This site has been quietly helping to clean UBC sewage for almost 20 years. But others around the world have become aware of the profound advances in wastewater treatment that have been made at the University's Biological Nutrient Removal (BNR) Pilot Plant.

The Department's environmental engineering group built the small-scale pilot plant in 1985. One of only two facilities of its kind in Canada, it treats about five per cent of the sewage generated on campus.

So what makes it a contender for the world's most famous water prize?

It's the bugs.

The BNR plant uses naturally occurring microbes, aka bugs, to remove valuable nitrogen and phosphorus from UBC's wastewater. Once removed, these elements become by-products that can be re-used as fertilizer. It has the double benefit of being environmentally friendly and also generating revenue from the sale of the fertilizer.

It has become the model for an increasing number of municipalities around the world.

"We look at the waste as a resource," says Prof. Don Mavinic, one of the plant's founders. "If you look at it constructively, it's a product, not a problem, and we call it integrated environmental technology."

"It is also cheaper than treating waste by the more conventional chemical method. Unlike chemicals, there are no purchase costs, or costs to dispose of chemical-laced sludge that can't be put in landfills or incinerated."

"We basically set up the temperature and pH conditions for the bugs to do their thing, and they merrily go around doing the work of removing the nitrogen and phosphorus from the discharge stream," Mavinic says.

UBC's Department of Microbiology and Immunology provides advice and research on the best "bugs" for the cleaning job. So far, 17 PhD students and 25 MASc students have conducted research at the facility.

The idea of using bugs to do the dirty work is an old one, but until now it was only for use in one temperature condition, making it ineffective in harsher climates. Bill Oldham, another founder of the BNR plant,

pioneered a way to adapt biological nutrient removal technology so that bugs could do their work in all kinds of temperatures.

Today, more than 20 per cent of eligible municipal facilities around the world have purchased the advanced nutrient removal treatment technology. Canada's prairie provinces have switched over completely to this system.

"We developed a research and knowledge base that no one else in the world has at this scale," Mavinic says.

"Municipalities from the European Union to Australia are purchasing and adapting the technology to treat their wastewater."

The byproducts can also be used in mining reclamation and in forestry.

So while the project may not have won the first prize in Stockholm this year, these UBC engineers and students remain winners to a growing number of municipalities at home and around the globe that are benefiting from their research.

# Kudos to our students

## Engineering student awarded top scholarship of \$40,000 over four years

Thanks to the BMO Financial Group National Scholarship, one of the country's top students is now completing his first year in engineering at UBC.

David Wei Si was one of the four scholarship winners who had lunch on March 26 with UBC President Martha Piper and BMO Senior Vice President, B.C. and Yukon Division, Gail Cocker.

These undergraduate scholarships are among the most sought-after university awards in Canada, valued at \$40,000 over four years. They are awarded to students entering UBC who balance academic excellence with significant contributions

to the community through volunteerism, athletics, or artistic excellence. David Si understands the importance of a balanced life.

"A lot of skills in life you don't learn through academics. It's how you talk to people; how you resolve issues. I learned that through the student council. When we had arguments, we had to learn to settle it. With athletics, I learned to handle setbacks. It helps me to be a better human being. And if you really want to have fun, you have to get involved."

And he is involved! His contributions to the UBC community are consider-

able. To name a few, David is active in the intramural basketball league, editor of the Engineering Faculty Yearbook, coordinator of the Jumpstart Youth Leadership Program, an Engineering Squad Leader, and an actor in campus theatre productions. His latest goals are an overseas posting with Engineers Without Borders and climbing Mount Kilimanjaro next year.

"Winning the scholarship has motivated me to do better and achieve more," says Si. "I probably wouldn't be here without it, and I love the environment here—it's a beautiful campus. And people here

are concerned about academics, but they also want to have fun. I really like that. Especially the engineers: they're crazy!"



Martin Dee

From left: UBC President Martha Piper, David Wei Si and Ms Gail Cocker, BMO Senior Vice President, B.C. and Yukon division.

## Opening a can of energy savings... a prize winning effort

The next time you open a can of pop, think of the efforts of a team of UBC Metals and Materials Engineering students to make the production of that can more energy efficient.

Rick Adam, Evan Lu, Todd Mannering, Rowda Mohamud, Tara Selinger and Allen Tang were named Energy Ambassadors for their work on a computer model to save energy in the making of aluminum. The \$1,000 prize was split amongst all members of the design group.

The students developed a computer model to predict the formation of hot tear defects in the aluminum alloy AA5182—better known as the aluminum used in

pop cans. Their report stated that computer models are produced relatively cheaply, with an excellent benefit to industry. They can replace the costly and inefficient method of trial and error commonly used in the casting industry.

Richard Adam represented the group and traveled to Ottawa to attend the ceremony that included an open house during which Energy Ambassadors made poster presentations on their projects and fielded questions from interested visitors. It was also an opportunity to meet with prospective employers from the Office of Energy Efficiency (OEE) and other branches of National Resources Canada (NRCan).

More than 80 applications were received for the 2003 Energy Ambassadors Program competition, ranging from education, environmental studies and business administration to mechanical engineering, industrial design and architecture. One of the goals of the Energy Ambassadors Program is to raise students' awareness of energy efficiency and how it relates to many aspects of their lives and studies.

"In addition to the high level of specialized knowledge shown in the submissions, it was the vitality and energy of the 20 winning proposals that made them stand out," says Colleen Paton, Director of the program that



Richard Adam (left) with Rick Cameron, Assistant Deputy Minister of the Energy Sector at NRCan, who congratulated the Energy Ambassadors as he visited each exhibit.

administers the Energy Ambassadors competition with the OEE.

"We need bright and energetic young people like you to work with bright and energetic older people like me," quipped Rick Cameron, Assistant Deputy Minister of the Energy Sector at NRCan. "I can see that these are the types of ideas and attitudes Canada needs to achieve its Kyoto Protocol commitments."

# Planning for our physical needs

The mission of a capital projects manager

We profile many professors and students in *Ingenuity*, but there is also a great team of support staff within the Faculty that are busy behind the scenes making a vital contribution to the Faculty's smooth operation and its many advances. Here is one such valuable person.

His name is Ron Loewen and, as Business Analyst and Capital Projects Manager, he is an integral member of the Dean's Office team. His job is to work closely with the Dean to assess the Faculty's infrastructure needs and to ensure that provincial, federal, UBC and donor dollars allocated to infrastructure enhancements are put to the

best economic and functional use possible.

The Faculty currently has several major building projects in progress, including the new Chemical and Biological Engineering Building (which will also house the Clean Energy Research Centre), the Electrical and Computer Engineering Building expansion project and a second building for the

Institute for Computing Information and Cognitive Systems. Dean Isaacson wrote about these in our last issue of *Ingenuity*. The Faculty is fortunate to be in the midst of these important capital projects, which are enabling the upgrade of older, unsuitable facilities and the continued expansion of the Faculty's educational and research activities. But it brings with it much hard work.

A significant part of Ron's job is to coordinate the assessment of the functional needs for each building project in terms of space requirements for instructional, research and administrative functions. This information is used to develop cost estimates and is presented to funding agencies and potential donors to demonstrate the needs and plans for a particular building project.

Once funding is in place and a building project is approved, Ron works with those at UBC Properties Trust, who act as UBC's construction project managers. Through his membership on the Building Project Steering Committee, Ron also monitors the pro-

ject on behalf of the Faculty to ensure that the project meets Faculty needs within the available resources.

He says, "one of my primary objectives is to ensure that facilities conform to the functional requirements of the students, faculty and staff who will occupy and work in the new building." He is a strong believer in the dictum that "form follows function," meaning that functional suitability is the primary concern and the building form will follow from meeting the functional requirements. It is this emphasis on functional capacity that Ron believes will enable the Faculty to continue its leadership role in education and research far into the future.

According to Dean Isaacson, "Ron is a tremendous part of the team, with an incredible ability to analyse our requirements and constraints, and articulate these to our various stakeholders. We are lucky to have him working with us and I very much appreciate being able to rely on him on a daily basis." Thank you, Ron!



Ron Loewen is hard at work ensuring the Faculty's infrastructure needs are met.

# Eleventh Applied Science faculty member receives Canada Research Chair

Good news for cell phone users



Michael Robertson

Prof. Robert Schober is a strong proponent of “out with the old and in with the new.”

Robert Schober, Assistant Professor of Electrical and Computer Engineering, joined UBC in September 2002. He says it was UBC’s reputation and location that convinced him that this was the university where he wanted to do research.

Prof. Schober’s research in the development of new algorithms for wireless communication systems will allow more information to transmit over a given bandwidth with a given complexity. His focus is on the design and analysis of high data rate wireless communications systems that make the most efficient use of available resources such as bandwidth and power.

Important aspects of Prof. Schober’s research include the design of

multi-antenna and multi-user signaling schemes, suppression of interference from unwanted sources, equalization of wireless channels, and robust low-complexity signal detection techniques.

This is good news for about one billion users of wireless communication devices around the world since his research applies to the improved use of cell phones, mobile radios,

and satellite-based security systems on devices such as truck trailers, boxcars and storage containers.

Prof. Schober’s research could lead to more reliable cell phones that have a longer battery life and that are more robust against interference from other mobile users. For transport companies it means easier and more efficient tracking of containers.

**The Canada Research Chair Program is designed to build our country’s research capacity through federally funded research positions that help to retain and recruit top researchers. It’s a \$900 million program that supports the establishment of 2,000 Canada Research Chair positions at universities across Canada. Of these, 156 UBC Chairs will be named by 2005.**

## Teaching pulp...

Continued from page 3

“That’s what our research is all about,” says Prof. Kerekes. “We find ways to help industry make the best use of our fibre resources and to obtain the maximum value from fibre for paper-making purposes.”

“We need to continue to find new ways of meeting the changing needs of the industry,” says Prof. Kerekes. In addition to regular courses

taught by faculty members at UBC, Prof. Kerekes and Prof. Chad Bennington conduct a 33-hour course on pulp and paper technology by interactive tele-video to engineering students at the University of Victoria.

In a new initiative, the lectures are now being taped and offered to engineers in industry as a flexible-delivery distance education course.

**In recognition of his long-term contributions to the science and technology of the industry, Prof. Dick Kerekes was awarded the 1999 John S. Bates Memorial Gold Medal — one of the highest awards presented to a member of the Pulp and Paper Technical Association of Canada. He is the youngest recipient of this life-time achievement award. In 2001, Prof. Kerekes was appointed the first Paprican Professor of Pulp and Paper Engineering, a new endowed professorship established in the Faculty by UBC and Paprican.**

# Bridging the distance between Canada and Pakistan

## Faculty expert shares knowledge with Aga Kahn University

Jim Sibley, Educational Technology Coordinator with the Faculty's Centre for Instructional Support (CIS), undertook an exciting consulting opportunity during the first week of November 2002 to advise the Aga Kahn University (AKU) in Karachi, Pakistan, on its plans for revamping its undergraduate medical sciences program. The AKU Faculty of Health Sciences' Medical College is in the process of converting its curriculum to a problem-based learning (PBL) program. As part of the new curriculum, help was needed in creating a tightly integrated assessment strategy that would bring together classroom

teaching, clinical teaching and PBL outcomes, and provide students with high quality on-line formative and summative assessment opportunities. In order to design this integrated model, a thorough examination and redesign of the student/teaching assistant (TA)/faculty interaction process was necessary.

Jim explains, "I had been invited to the University by the Department of Basic and Biological Sciences (whose Vice-chair turns out to be UBC Professor Emerita of Pathology Anne P. Autor). They were hoping that I could bring the UBC experience and CIS's expertise to aid their efforts. The week was a blur of faculty focus sessions and meetings,

TA training sessions and meetings with IT staff. By the end of the week, we had developed an integrated assessment model for the first year of the program, developed a communication plan for the assessment development process, created trainers and facilitators handbooks, and trained a group of TA's and question writers on the finer points of writing quality multiple choice questions."

Jim goes on to report, "The trip was highly successful and provided me not only with an opportunity to assist a fellow university, but also with the opportunity to learn a lot about assessment, Aga Kahn University

and Pakistan. Most of all, I had the opportunity to make some excellent new friends."

Dr. Philippe M. Frossard, Professor and Chair of the AKU Department of Biological and Biomedical Sciences, could not agree more, "Jim setting up a model for TA-faculty interactions on the subject of PBL will greatly benefit the smooth running and success of the new curriculum delivery, and has actually come at the perfect time. In fact, Jim's overall contribution to AKU has been immense. This work will form the basis for all further policies, procedures and developments related to PBL, both in our Department and at AKU at large."



Dr. Andleeb Arshad (left), Senior Instructor in the AKU Department for Educational Development, shows Jim Sibley AKU's beautiful campus.

## The Faculty's Centre for Instructional Support

began operations in May 2001 with a mandate to promote and facilitate the innovative and effective use of educational technologies and sound pedagogical principles to improve student learning and teaching effectiveness. One of the goals within this mandate is to create an atmosphere of consultation, communication and collaboration. Therefore, when the Faculty of Applied Science was approached by AKU to tap into the Centre's experience with PBL and on-line assessment using the course program WebCT, there was no hesitation in the decision to send Jim Sibley over. He is a trainer for WebCT software and has given numerous workshops, including Creating Effective Assessment Using WebCT.

If you would like to learn more about the Centre and the many services it provides, please contact Jim Sibley at (604) 822-9241 or [jim.sibley@ubc.ca](mailto:jim.sibley@ubc.ca), or visit the Centre's website at [www.learning.apsc.ubc.ca](http://www.learning.apsc.ubc.ca).

# Faculty mourns the passing of acclaimed aerospace engineer



The Faculty of Applied Science sadly reports that world-renowned mechanical and aerospace engineer Dr. Vinod J. Modi, Professor Emeritus in the Department of Mechanical Engineering, passed away on February 12, 2003, in Vancouver at the age of 73.

Born in Bhavangar, India, Dr. Modi began his studies in aeronautical

engineering at the Indian Institute of Science in Bangalore, where he obtained undergraduate degrees in electrical and mechanical engineering. He obtained his masters degree at the University of Washington and his doctoral degree at Purdue University.

Dr. Modi joined the Department of Mechanical Engineering at UBC as an assistant professor in 1961. During his 32-year career until his "retirement" in 1993, he published more than 500 technical papers and played a major role in establishing the doctoral program in the Department, supervising its first doctoral student, as well as mentoring more than 90 other graduate students and post-doctoral fellows. He was a world-class researcher in the fields of spacecraft dynamics, control, fluid

mechanics, and biomechanics, establishing UBC as a leading spacecraft dynamics and controls research centre and winning innumerable honours and awards, including the Jacob Biely Prize in 1981, the Science Council of British Columbia's Gold Medal in 1986, and the Killam Research Prize in 1987.

Active in institutes and professional societies across North America and abroad, Dr. Modi was a Fellow of the Royal Society of Canada, the Canadian Aeronautics and Space Institute, the American Institute of Aeronautics and Astronautics, the American Astronautical Society, the American Society of Mechanical Engineers, and the British Interplanetary Society. He was also the first Canadian to be named a member of the International Academy of Astronautics

and the only Canadian to be named an honorary member of the Japanese Rocket Society.

Dr. Modi has been a valued member of the Faculty, leaving a legacy that will long be remembered. He is greatly missed by friends, colleagues and students at UBC.

A fund has been established in memory of Dr. Modi, to support student scholarships, education, and research activities. Tax receipts will be issued. Donations may be sent to:

V.J. MODI MEMORIAL FUND  
c/o Dept. of Mechanical Engineering, UBC  
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Vancouver, BC V6T 1Z4

Tel: (604) 822-6367  
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## Appointments

### Applied Science

- **Dr. George Sawatzky**, Professor of Physics and Astronomy in the Faculty of Science, was appointed Director of the interdisciplinary Advanced Materials and Process Engineering Laboratory on October 1, 2002, assuming the administration of the research centre and replacing former Acting Director Dr. Matthias Militzer.

### Civil Engineering

- **Dr. Kenneth Elwood** was appointed Assistant Professor on January 1. His research focus is earthquake engineering, including performance-based seismic design, seismic behaviour of reinforced concrete structures, seismic retrofit, characterization of seismic demands, nonlinear structural analysis and shake table testing.
- **Dr. Dawn Shuttle** was appointed Associate Professor on October 1, 2002. Her research expertise is in numerical modelling applied to problems in the fields of geotechnical engineering and hydrogeology.

### Electrical & Computer Engineering

- **Ms. Carol Jaeger** was appointed Instructor on January 1. Her expertise is in electronics, electric circuit theory, electromagnetic theory, signal processing, microprocessors, and digital design. She has been a sessional lecturer in the Department since 1998.
- **Dr. Guy Lemieux** was appointed Assistant Professor on January 1. His field of research is in the design and optimization of programmable logic structures, especially as applied to computing systems.

- **Dr. David Michelson** was appointed Assistant Professor on January 1. His specialty is wireless communications with emphasis on characterization of radiowave propagation in both indoor and urban environments. He has been an adjunct professor with the Department since 2000.

# Achievements

- Civil Engineering Professor **Nemy Banthia** has earned two distinctive honours: he was elected Fellow of the American Concrete Institute International; and he has been named a UBC Distinguished University Scholar in recognition of his exceptional scholarship in the fields of advanced materials and structural engineering.
- Civil Engineering Professor **Frank Navin** will be presented with an honorary degree from McMaster University in June. The degree will recognize his many career achievements and contributions to the fields of transportation engineering and road safety engineering.
- Civil Engineering Professor **Don Mavinic** has been elected a Fellow of the Canadian Academy of Engineering.
- Civil Engineering Professor **Carlos Ventura** has earned two awards: he received the D.J. Michele Award from the Society of Experimental Mechanics in recognition of exemplary service and support in promoting the science and educational aspects of modal analysis technology and the Jai Krishna Gold Medal Award from the Indian Society of Earthquake Technology (ISET) for best paper published in ISET publications during the period 1997-2000.
- Electrical and Computer Engineering Professor **Victor C.M. Leung** has been elevated to Fellow of the Institute of Electrical and Electronics Engineers (IEEE) in recognition of his contributions to the design of protocols and management strategies for wireless and mobile communication networks.
- Electrical and Computer Engineering Assistant Professor **David Michelson**, as Chair of the Vancouver Chapter of the IEEE Communications Society, accepted the 2002 Chapter of the Year Award at IEEE Globecom in Taipei for achieving excellence in Chapter operations and for furthering the objectives of the Society. The Vancouver Chapter placed first out of 135 chapters worldwide.
- Electrical and Computer Engineering Professor **David Pulfrey** has been elected a Fellow of the Canadian Academy of Engineering.
- Electrical and Computer Engineering Professor **Tim Salcudean** has been elected a Fellow of the Canadian Academy of Engineering.
- Electrical and Computer Engineering Assistant Professor **Robert Schober** has been awarded a Tier II Canada Research Chair in wireless communications.
- Electrical and Computer Engineering Associate Professor **Steven Wilton** was awarded a 2003 UBC Killam Teaching Prize in recognition of outstanding teaching performance.
- Mechanical Engineering Associate Professor **Antony Hodgson** was awarded a 2003 UBC Killam Teaching Prize in recognition of outstanding teaching performance.
- Mining Engineering Professor **G. Ward Wilson** has received the Geoenvironmental Division Award from the Canadian Geotechnical Society in recognition of outstanding technical contributions to the practice of multidisciplinary geoenvironmental engineering in Canada and/or internationally.



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#### The Faculty's engineering activities include the following:

##### Departments and Programs

- Chemical and Biological Engineering
- Civil Engineering
- Electrical and Computer Engineering
- Engineering Physics
- Environmental Engineering
- Geological Engineering
- Integrated Engineering
- Mechanical Engineering
- Metals and Materials Engineering
- Mining Engineering

##### Office of the Dean

- Business & Development Office
- Engineering Student Services
- Engineering Co-op Office

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

- Institute for Computing, Information and Cognitive Systems (ICICS)
- The Advanced Materials and Process Engineering Laboratory (AMPEL)
- The Clean Energy Research Centre (CERC)
- The Biotechnology Laboratory
- The Pulp and Paper Centre

